Cambria County 2022 Hazard Mitigation Plan

Prepared for:

Cambria County Department of Emergency Services

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Certification of Annual Review Meetings

YEAR	DATE OF MEETING	PUBLIC OUTREACH ADDRESSED? *	SIGNATURE
2022			
2023			
2024			
2025			
2026			

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

Record of Changes

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

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Acronyms

AACT: American Academy of Clinical Toxicology

ACHA: American College Health Association

ACMT: American College of Medical Toxicology

AHJ: Authority Having Jurisdiction

AMD: Acid Mine Drainage

ANSI: American National Standards Institute

ASAM: American Society of Addiction Medicine

ASHRAE: American Society of Heating, Refrigerating, and Air-Conditioning Engineers

ASIRT: Association for Safe International Road Travel

BFE: Base Flood Elevation

CBRNE: Chemical, Biological, Radiological, Nuclear, or Explosive

CDC: Centers for Disease Control and Prevention

CERT: Community Emergency Response Team

CFR: Code of Federal Regulations

CFS: Commodity Flow Study

CHSN: College Health Surveillance Network

CCIDRAP: Center for Infectious Disease Research and Policy

CRS: Community Rating System

DCNR: Department of Conservation and Natural Resources

DDAP: Department of Drug and Alcohol Programs

DEA: Drug Enforcement Administration

DFIRM: Digital Flood Insurance Rate Map

DMA: Disaster Mitigation Act

DPS: Department of Public Safety

EF: Enhanced Fujita

EIA: Energy Information Administration

EMA: Emergency Management Agency

EMPG: Emergency Management Performance Grant

EMS:	Emergency Medical Services
EOP:	Emergency Operations Plan
EPA:	Environmental Protection Agency
EPCRA:	Emergency Planning and Community Right-To-Know Act
EPZ:	Emergency Planning Zone
FBI:	Federal Bureau of Investigations
FEMA:	Federal Emergency Management Agency
FMA:	Flood Mitigation Assistance Grant Program
FRA:	Federal Railroad Association
GIS:	Geographic Information Systems
HAZUS:	Hazards U.S. Software
HMA:	Hazard Mitigation Assistance
HMEP:	Hazardous Material Emergency Planning Grant
HMGP:	Hazard Mitigation Grant Planning
HMP:	Hazard Mitigation Plan
HMRF:	Hazardous Material Response Fund
HSCA:	Hazardous Sites Cleanup Act
HSGP:	Homeland Security Grant Program
HVE:	Homegrown Violent Extremist
ICC:	International Code Council
IES:	Illuminating Engineering Society
LEPC:	Local Emergency Planning Committee
LGTBQ:	Lesbian, Gay, Bisexual, Trans & Queer
LPT:	Local Planning Team
MAT:	Medication-Assisted Treatment
MPC:	Municipalities Planning Code
NARM:	Notification and Resource Manual
NAS:	Neonatal Abstinence Syndrome
NCDC:	National Climatic Data Center
NCEI:	National Centers for Environmental Information

NFIP: National Flood Insurance Program

NFPA: National Fire Protection Association

NIH: National Institute of Health

NLD: National Levee Database

NOAA: National Oceanic and Atmospheric Administration

NTP: Narcotic Treatment Program

NWS: National Weather Service

OIH: Opioid-Induced Hyperalgesia

OUD: Opioid Use Disorder

PA DCED: Pennsylvania Department of Community and Economic Development

PA DEP: Pennsylvania Department of Environmental Protection

PA DOA: Pennsylvania Department of Agriculture

PA GWIS: Pennsylvania Groundwater Information System

PA HART: Pennsylvania Helicopter Aquatic Rescue Team

PAWNVCP: Pennsylvania West Nile Virus Control Program

PDMP: Prescription Drug Monitoring Program

PDSI: Palmer Drought Severity Index

PEMA: Pennsylvania Emergency Management Agency

PennDOT: Pennsylvania Department of Transportation

PHMSA: Pipeline and Hazardous Materials Safety Administration

PISC: Pennsylvania Invasive Species Council

POD: Points of Dispensing

PWSA: Public Water Service Area

RF: Risk Factor

SARA: Superfund Amendments and Reauthorization Act

SFHA: Special Flood Hazard Area

TRI: Toxic Release Inventory

UCC: Uniform Construction Code

US HHS: United States Department of Health and Human Services

USACE:	Untied States Army Corp of Engineers
USDA:	United States Department of Agriculture
USDA FS:	United States Department of Agriculture Forest Service
USGS:	United States Geological Survey
WL:	Working Level
WMD:	Weapon of Mass Destruction
WUI:	Wildland Urban Interface

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 2021, the Cambria County Department of Emergency Services contracted the services of a consulting agency to revise and update the Cambria County Hazard Mitigation Plan. The plan was successfully updated in accordance with the requirements set forth by PEMA and FEMA. The updated Cambria County Hazard Mitigation Plan was adopted by the Cambria County Commissioners in 2022. All sixty-three municipalities adopted the 2016 Cambria County Hazard Mitigation Plan as the municipal hazard mitigation plan, and it is anticipated that all participating municipalities will adopt the 2022 Cambria County Hazard Mitigation Plan Update.

The Cambria County Commissioners secured a grant to complete the 2022 update to the Cambria 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 on September 29, 2021.

The planning process for the 2022 Cambria 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:

Natural hazards:

- Drought
- Extreme Temperature
- Flooding (100-Year Flood), Flash Flooding, Ice Jam Flooding
- Hailstorm
- Hurricane and Tropical Storm
- Invasive Species
- Landslide
- Lightning Strike
- Pandemic and Infectious Disease
- Radon Exposure
- Subsidence/Sinkhole
- Tornado/Windstorm
- Wildfire

Human-caused hazards:

- Building/Structural Collapse/ Blighted Properties
- Civil Disturbance
- Building/Structure Collapse
- Blighted Properties
- Dam Failure
- Disorientation
- Drowning
- *Emergency Services
- Environmental Hazards / Hazardous Materials
- Levee Failure
- Opioid Epidemic
- Terrorism/Cyberterrorism Incidents
- Transportation Accidents
- Urban Fire and Explosion

- Utility Interruption

A total of thirty-one hazards have been identified in the 2022 Cambria County Hazard Mitigation Plan. A total of seventeen identified hazards were listed in the previous 2016 plan update. The new hazards include Blighted Properties, Civil Disturbance, Hurricane/Tropical Storm, Invasive Species, Emergency Services, Opioid Epidemic, and Winter Storm.

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

- Reduce potential injury/death and damage to existing community assets due to floods, flash floods, and ice jams.
- Reduce potential injury/death and damage to community assets due to all hazards.
- Promote disaster-resistant future development.
- Promote hazard mitigation as a public value in recognition of its importance to the health, safety, and welfare of the population.
- Improve response and recovery capabilities.
- Protect critical infrastructure.

Mitigation actions are specific projects and activities that help achieve goals. A total of thirty-three actions were developed for this plan update as they pertain to hazards identified by the local planning team. The 2016 Cambria County Hazard Mitigation Plan consisted of ten 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 the project opportunity forms that were submitted during the 2016 HMP update could not be determined during this planning period. A total of six project opportunities were submitted for this plan update.

The 2022 Cambria County Hazard Mitigation Plan is the cornerstone to reducing Cambria 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 2022 Cambria 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.

1. Introduction

1.1. Background

The Cambria 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 Cambria County and all of its sixty-three municipalities. The Cambria County Department of Emergency Services and the Cambria County Planning Commission were charges by the County Board of Commissioners to prepare the 2022 plan. The 2016 HMP has been utilized and maintained during the five-year life cycle.

The Cambria 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 Cambria County as a sub-grantee. The Cambria County Commissioners assigned the Cambria County Department of Emergency Services 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 Cambria County. This updated HMP will provide another solid foundation for the Cambria 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 cycles 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 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 Cambria County Multi-Jurisdictional Hazard Mitigation Plan serves as a framework for saving lives, protecting assets, and preserving the economic viability of the sixty-three municipalities in Cambria County. The HMP outlines actions designed to address and reduce the impact of a full range of natural hazards facing Cambria County, including drought, earthquakes, flooding, tornadoes, hurricanes/tropical storms, invasive species, and severe winter weather. Human-caused hazards such as transportation accidents, emergency services shortage, hazardous materials spills, and fires are also addressed.

A multi-jurisdictional planning approach was utilized for the Cambria County HMP update, thereby eliminating the need for each municipality to develop its own approach to hazard 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 References

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 Stormwater 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.

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

2. Community Profile

2.1. Geography and the Environment

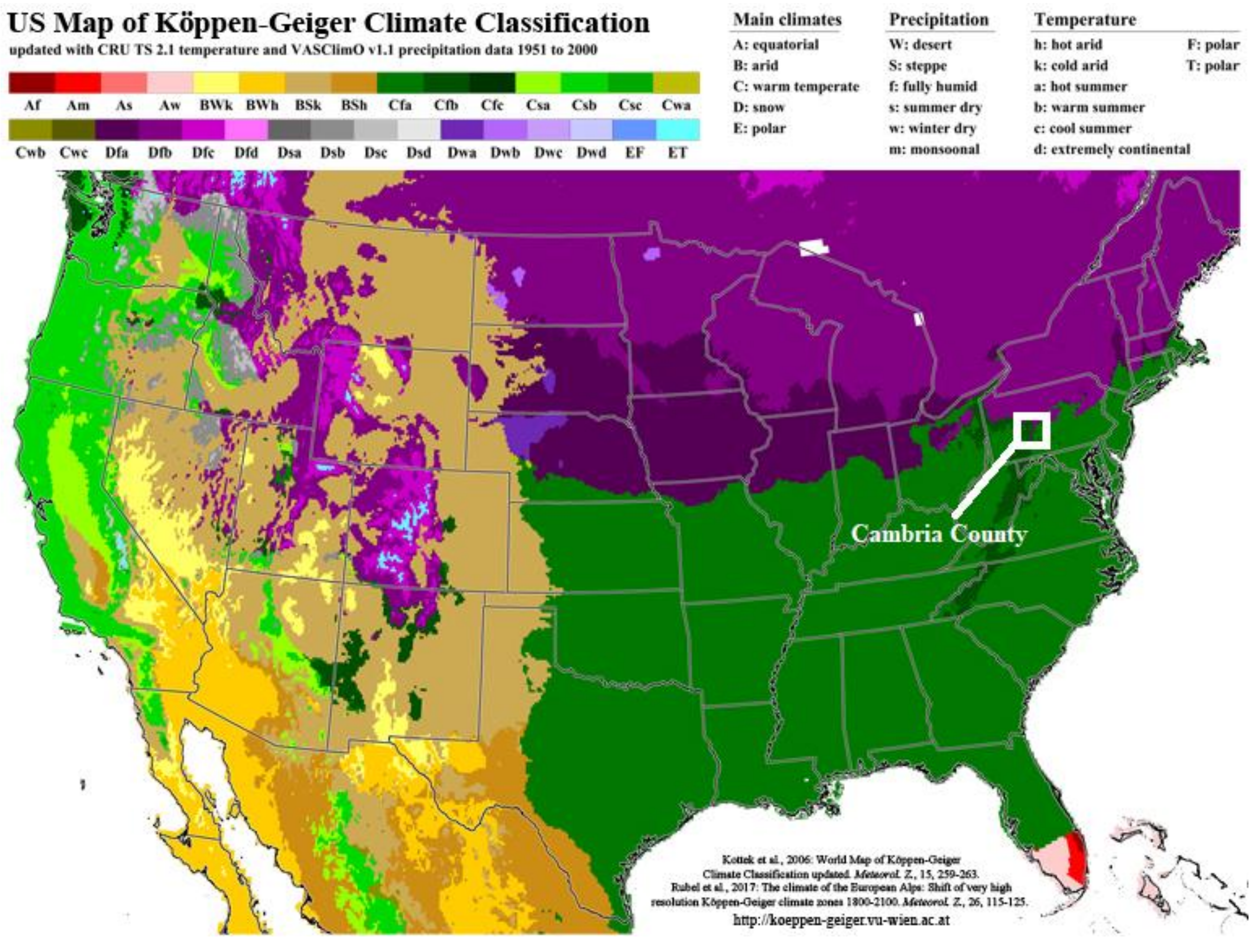
Cambria County south-western quadrant of Pennsylvania, on the western edge of the main ridge of the Allegheny Mountains. Cambria County is largely a rural county with steep rolling hills and ridge and valley topography. The elevation of the county ranges from a low of 1,814 feet above sea level to a high of 3,136 feet. Cambria County is bordered by Clearfield County to the north, Blair County and Bedford County to the east, Somerset County to the south, and Indiana County and Westmoreland County to the west. The 688.2 square mile county ranks thirty-one of sixty-seven in total land area for Pennsylvania counties.

The county is divided by numerous streams and creeks, including the West Branch of the Susquehanna River. The county also has many municipalities and a large area of state-owned property, including state game lands. *Figure 3 – Cambria County Basemap* shows Cambria County and the major roadways and railroads that are located in the county and the municipalities. *Figure 4 – Cambria County Watersheds* illustrates the major watersheds that are located either totally or partially in Cambria County. The county is bisected by the West Branch Susquehanna Watershed and the Ohio River Watershed.

C4ambria County averages 40.66 inches of precipitation per year, with a high of 4.05 inches in September and a low of 2.46 inches in February. This is above the United States average of 37.0 inches of rain each year.

The Köppen-Geiger Climate Areas map classifies Cambria County and the rest of Pennsylvania as Humid Continental, which can be seen in *Figure 1 – Köppen-Geiger Climate Map*. While the counties of Pennsylvania share many weather similarities, there are also a few unique characteristics to the area.

Figure 1 - Köppen-Geiger Climate Map



2.2. Community Facts

Cambria County was created in 1804 from parts of Somerset, Bedford, and Huntingdon Counties. Through an act of Assembly, passed the 29th of March 1805, Ebensburg was declared as the county seat. However, it was not until 6th of January 1807, that an act was passed which changed the county from a provisional county, associated with Somerset County, and granted the jurisdiction its full legal status. Then, the first general election in the county was held in October 1807, after which time it began to operate independently. Two historical industries in the county were coal and iron mining, with coal remaining a prominent resource today. Cambria County has direct access to major markets in the east and west United States through US Route 22 and US Route 220, which runs east to west through of the county.

2.3. Population and Demographics

According to the 2016 Hazard Mitigation Plan, the 2010 population in Cambria County was 143,679, and the most populous municipality was Johnstown City with 20,978 residents. The 2020 population demographics from the United States Census Bureau illustrate continuing trends for Cambria County. The total population for Cambria County is 133,472 based on 2020 United States Census Bureau. The total change in population for Cambria County from 2010 to 2020 was a decrease of 10,207 and a change of -7.65%. The most populous municipality is still Johnstown City. The municipalities in the county that had the largest percentage of decrease from 2010 to 2020 were Cresson Township (-52.73%), Lorraine Borough (-28.86%), and Tunnelhill Borough (-18.36%). The municipalities that had the highest percentage of increase for the period from 2010 to 2020 were Chest Township (23.63%), Carrolltown Borough (18.84%), and White Township (10.20%). *Table 1 – Population Change in Cambria County* illustrates the trends and data from United States Census Bureau. These figures are based off data from the United States Census Bureau in 2020. *Figure 5 – Cambria County Population Density* illustrates the average population density values per census track in the various municipalities of Cambria County.

Table 1 - Population Change in Cambria County

Population Change in Cambria County from 2010-2020				
Municipality	**2010 Census**	**2015 Estimates**	**2020 Census**	**Percent of Change 2010-2020**
Adams Township	5,972	5,840	5,752	-3.82%
Allegheny Township	2,851	2,812	2,815	-1.28%
Ashville Borough	227	199	213	-6.57%
Barr Township	2,056	1,977	2,049	-0.34%
Blacklick Township	2,013	2,033	1,876	-7.30%
Brownstown Borough	744	766	696	-6.90%
Cambria Township	6,099	6,002	5,814	-4.90%
Carrolltown Borough	853	859	1051	18.84%
Cassandra Borough	147	155	162	9.26%
Chest Township	349	317	457	23.63%
Chest Springs Borough	149	196	140	-6.43%
Clearfield Township	1,604	1,523	1,604	0.00%
Conemaugh Township	2,012	2,063	1,941	-3.66%
Cresson Borough	1,711	1,675	1,525	-12.20%
Cresson Township	4,336	3,381	2,839	-52.73%

Population Change in Cambria County from 2010-2020				
Municipality	**2010 Census**	**2015 Estimates**	**2020 Census**	**Percent of Change 2010-2020**
Croyle Township	2,339	2,219	2,307	-1.39%
Daisytown Borough	326	352	298	-9.40%
Dale Borough	1,234	1,138	1,008	-22.42%
Dean Township	391	402	328	-19.21%
East Carroll Township	1,654	1,530	1,425	-16.07%
East Conemaugh Borough	1,220	1,141	1082	-12.75%
East Taylor Township	2,726	2,647	2,422	-12.55%
Ebensburg Borough	3,351	3,265	3,404	1.56%
Ehrenfeld Borough	228	211	203	-12.32%
Elder Township	1,038	1,009	1028	-0.97%
Ferndale Borough	1,636	1,578	1,547	-5.75%
Franklin Borough	323	299	278	-16.19%
Gallitzin Borough	1,668	1495	1536	-8.59%
Gallitzin Township	1,324	1,371	1,273	-4.01%
Geistown Borough	2,467	2,368	2,363	-4.40%
Hastings Borough	1,278	1,253	1,213	-5.36%
Jackson Township	4,392	4,271	4,236	-3.68%
Johnstown City	20,978	20,369	18,411	-13.94%
Lilly Borough	968	802	879	-10.13%
Lorain Borough	759	801	589	-28.86%
Loretto Borough	1,302	1,238	1,196	-8.86%
Lower Yoder Township	2,699	2,629	2,388	-13.02%
Middle Taylor Township	727	771	660	-10.15%
Munster Township	690	616	653	-5.67%
Nanty Glo Borough	2,734	2,657	2,511	-8.88%
Northern Cambria Borough	3,835	3,716	3,560	-7.72%
Patton Borough	1,769	1,920	1,728	-2.37%
Portage Borough	2,638	2,561	2,459	-7.28%
Portage Township	3,640	3,556	3,432	-6.06%
Reade Township	1,619	1,599	1,441	-12.35%
Richland Township	12,814	12,447	12,233	-4.75%
Sankertown Borough	675	659	630	-7.14%
Scalp Level Borough	778	801	744	-4.57%
South Fork Borough	928	960	954	2.73%
Southmont Borough	2,284	2,204	2,045	-11.69%
Stonycreek Township	2,844	2,758	2,771	-2.63%

Population Change in Cambria County from 2010-2020				
Municipality	**2010 Census**	**2015 Estimates**	**2020 Census**	**Percent of Change 2010-2020**
Summerhill Borough	490	451	479	-2.30%
Summerhill Township	2,467	2,414	2,303	-7.12%
Susquehanna Township	2,007	1,985	1,889	-6.25%
Tunnelhill Borough	245	243	207	-18.36%
Upper Yoder Township	5,449	5,328	5,147	-5.87%
Vintondale Borough	414	395	412	-0.49%
Washington Township	875	1,041	832	-5.17%
West Carroll Township	1,296	1,242	1,186	-9.27%
Westmont Borough	5,181	5,039	4,982	-3.99%
West Taylor Township	795	712	729	-9.05%
White Township	836	868	931	10.20%
Wilmore Borough	225	252	206	-9.22%
TOTAL	**143,679**	**139,381**	**133,472**	**-7.65%**
Source: United States Census Bureau (2021), 2020 Census Data				

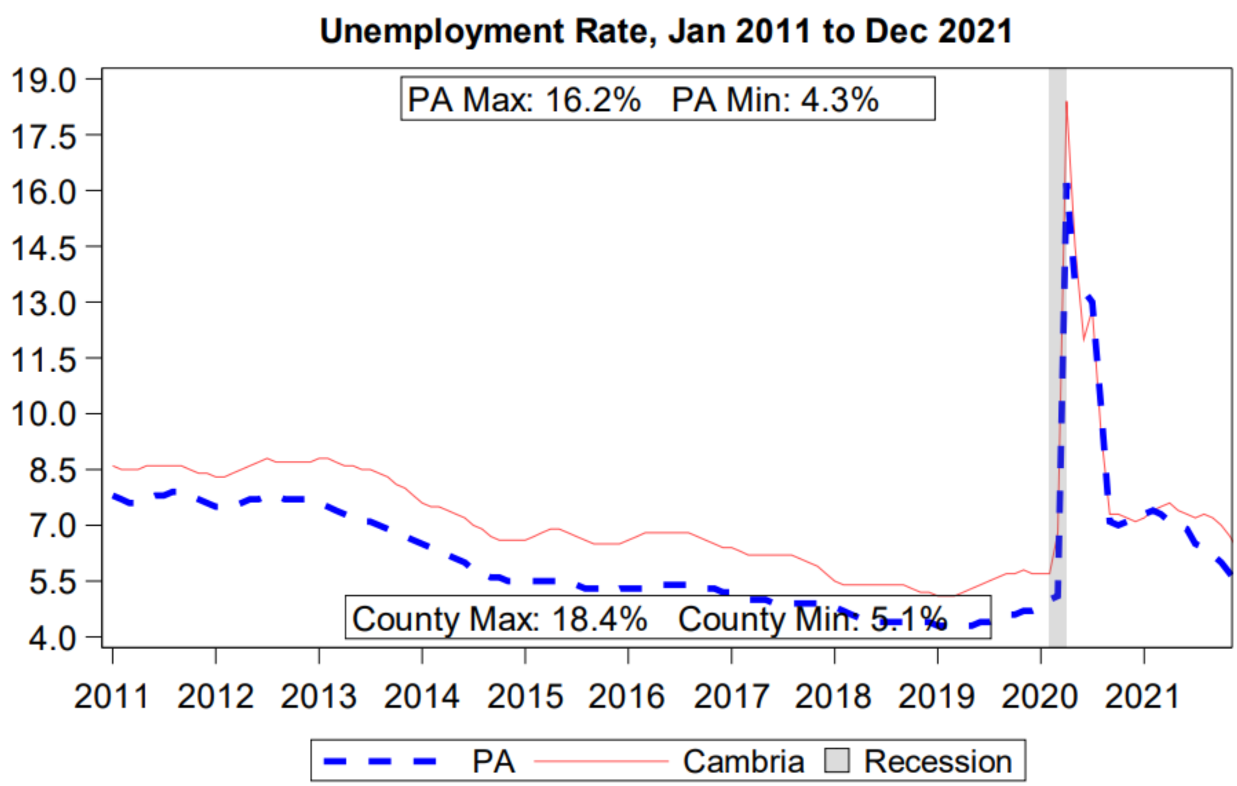
There are approximately 64,395 housing units in Cambria County, Pennsylvania. Of these housing units, there are an estimated 56,490 households within the county, with an average size of 2.19 persons. The owner-occupied housing rate of Cambria County is 74.9% of the structures. The median value of the owner-occupied housing units in Cambria County from 2015 to 2019 is $96,800.00. The median monthly owner's costs for a structure with a mortgage was $1,058.00 and the median monthly owner's costs for a structure without a mortgage was $439.00. The median gross rent for rental properties in Cambria County is $620.00.

The racial makeup of the county is 93% White, 3.0% Black or African American, >0.1% American Indian and Alaska Native, 0.4% Asian, 1.6% Hispanic or Latino, and 2% two or more races. The median age of Cambria County is 46.3 years of age, which is higher than the median age of Pennsylvania at 40.8 and the national median of 38.1 years of age. The percentage of Cambria County residents under the age of 5 years old is 4.8%, between the ages of 18 and 64 years old is 58%, and aged 65 years old and older is 23%.

The median household income for households in Cambria County is $49,076.00 and the poverty rate of Cambria County is 15.3% of the total population. The poverty rate for the Commonwealth of Pennsylvania as a whole is 12%. There are approximately 9,320 veterans in Cambria County. The median veteran income in Cambria County as of 2019 was $30,672.00. The veteran unemployment rate in Cambria County was approximately 6.5%.

The Covid-19 Pandemic caused a large portion of the population of the United States, Pennsylvania, and Cambria County to become unemployed or experience interruptions in employment. Based on Pennsylvania Department of Labor and Industry data, there was a large spike in unemployment both across the Commonwealth and Cambria County. At the height of the Covid-19 Pandemic in the spring of 2020, the unemployment rate for Cambria County hit 18.4% of the working population of the county. That is higher than the peak unemployment percentage for Pennsylvania, which peaked at 16.2% of the working population of the entire state. *Figure 2 – Unemployment Rate Jan. 2011 to Apr. 2021* illustrates the trend and large spike in unemployment. The current unemployment rate for Cambria County is 7.0% and roughly accounts for 3,700 working age adults (ages 16 to 65). The total estimated workforce for Cambria County is 53,300 working age adults (ages 16 to 65).

Figure 2 - Unemployment Rate Jan. 2011 to Apr. 2021



Source: Pennsylvania Department of Labor & Industry

The top ten employers in Cambria County are a mix of private and public employers and a list of the employers can be found in *Table 2 – Top 10 Employers by Employment in second quarter of 2021*. A list of the quarterly census of employment wages and the industries that make up that employment can be found in *Table 3 – Quarterly Census of Employment and Wages, 2020 Annual Averages.*

Table 2 - Top 10 Employers by Employment in second quarter of 2021

Top 10 Employers in Cambria County (Q2 2021) (PA DLI)	
Employer Rank:	**Employer Name:**
1	DLP Partner Conemaugh LLC
2	State Government
3	Federal Government
4	Wal-Mart Associates Inc
5	Cambria County
6	Saint Francis University
7	DLP Conemaugh Physician Practices
8	Sheetz Inc
9	Lockheed Martin Aeroparts Inc
10	McAneny Brothers Inc

The top employers' data was obtained through the Pennsylvania Department of Labor and Industry's Center for Workforce Information and Analysis. This data only provided a list of employers, their ranking, and North American Industry Classification System (NAICS) descriptions. *Table 3 – Quarterly Census of Employment and Wages, 2020 Annual Averages in Cambria County* only calls out how many locations per NAICS description and total number of employees.

Table 3 - Quarterly Census of Employment and Wages, 2020 Annual Averages in Cambria County

Quarterly Census of Employment and Wages, 2021 Annual Averages in Cambria County (PA DLI)					
NAICS	**Description**	**Number of Locations**	**Number of Employees**	**Employment Percentage**	**Average Wages**
11	Agriculture, Forestry, Fishing, and Hunting	24	104	0.2%	$27,220.00
21	Mining, Quarrying, and Oil & Gas	13	106	0.2%	$61,503.00
22	Utilities	34	409	0.9%	$86,656.00
23	Construction	219	1,551	3.3%	$48,880.00
31-33	Manufacturing	124	3,905	8.4%	$53,936.00

Quarterly Census of Employment and Wages, 2021 Annual Averages in Cambria County (PA DLI)					
NAICS	**Description**	**Number of Locations**	**Number of Employees**	**Employment Percentage**	**Average Wages**
42	Wholesale Trade	120	1,374	3.0%	$53,936.00
44-45	Retail Trade	454	6,072	13.1%	$27,926.00
48-49	Transportation and Warehousing	149	2,065	4.4%	$42,379.00
51	Information	42	634	1.4%	$47,601.00
52	Finance and Insurance	190	1,811	3.9%	$59,729.00
53	Real Estate, Rental, and Leasing	72	354	0.8%	$36,639.00
54	Professional and Technical Services	187	1,661	3.6%	$64,212.00
55	Management of Companies and Enterprises	21	331	0.7%	$78,718.00
56	Administrative and Waste Services	121	2,050	4.4%	$28,580.00
61	Educational Services	101	4,420	9.5%	$46,182.00
62	Healthcare and Social Assistance	648	11,672	25.1%	$49,789.00
71	Arts, Entertainment, and Recreation	44	349	0.8%	$18,837.00
72	Accommodation and Food Services	295	3,347	7.2%	$14,481.00
81	Other Services (Except Public Administration)	362	1,815	3.9%	$26,818.00
92	Public Administration	142	2,467	5.3%	$46,645.00
-	**Total, All Industries**	**3,361**	**46,496**	**100.0%**	**$43,184.00**
NAICS (North American Industry Classification System)					

There are a few major transportation routes within the county that would be capable of handling a large amount of heavy truck traffic. There are three major interstate highways, US 22, US 219, and US 422. State route 22 runs from Cincinnati, Ohio to Newark, New Jersey and runs from east to west through Cambria County. US 219 bisects the state and runs north to south through the Cambria County. US 422 is split into two sections, one in the west and one in the east. The western end runs from Cleveland, Ohio and ends in Ebensburg, Pennsylvania, directly in Cambria County.

There are four hospitals in Cambria County, and these are: Conemaugh Memorial Hospital – Johnstown, Conemaugh Miners Medical Center - Hastings, Crichton Rehabilitation Center – Johnstown, and Memorial Medical Center Select Specialty Hospital - Johnstown. There are also sixty-six paid and volunteer fire departments in Cambria County which service the large number of municipalities. Along with the fire departments, there are forty-four police departments, and this number includes both local police departments and state police barracks in Cambria County.

2.4. Land Use and Development

Cambria County has approximately 437,436 acres of total land area, and 6,390 acres of water area, with a population per square mile of 191 persons based on 2019 data estimates. Cambria County is largely rural in character with approximately 58% of the county landscape undeveloped. The amount of undeveloped land in the county has decreased over the past fifty years due to a decrease in active agriculture and mining, which are both considered as development from a land use classification perspective. Agriculture makes up approximately 12% of the total land area in Cambria County, while commercial and industrial uses account for under 1.5% collectively. Only 5.5% of land in Cambria County is designated as residential, as visualized in *Figure 6 – Cambria County Land Cover*.

An analysis of land use and development potential was conducted as a part of the 2011 update to the Cambria County Comprehensive Plan. This analysis included consideration of factors such as zoning consideration, conservation subdivision, sewer and water services, and public input on the state of county-wide land use. Consideration was given to the location of existing infrastructure, as well as possible future infrastructure expansions. The following municipalities were listed as the most prominent locations of future development within the county, as identified in the 2011 Cambria County Land Use Study:

- Richland Township
- Westmont Borough
- Johnstown City
- Geistown Borough
- Adams Township
- Ebensburg Borough
- Jackson Township
- Cambria Township

2.5. Data Sources

The following data sources were used during the update process:

- United States Census Bureau.
- National Climatic Data Center (NCDC).
- National Oceanic and Atmospheric Administration (NOAA).
- Pennsylvania Department of Conservation and Natural Resources (PA DCNR).
- Pennsylvania Department of Labor and Industry (PA DLI)
- Pennsylvania Groundwater Information System (PaGWIS).
- Pennsylvania Emergency Incident Reporting System.
- Pennsylvania Emergency Management Agency (PEMA).

The countywide Digital Flood Insurance Rate Maps (DFIRM) were used for all flood risk analysis and estimation of loss. The Cambria DFIRMs were approved and effective in 2013. The DFIRM database provides flood frequency and elevation information used in the flood hazard risk assessment. Other Cambria County GIS datasets including road centerlines, structures, and municipalities were utilized in conjunction with the DFIRM data.

In order to assess the vulnerability of different jurisdictions to the hazards, data on past occurrences of damaging weather events was compiled. A large number of natural-hazard events were gathered from the National Climatic Data Center (NCDC) database. The NCDC is a division of the United States Department of Commerce's National Oceanic and Atmospheric Administration (NOAA). Information on hazard events is compiled by the NCDC from data gathered by the National Weather Service (NWS), another division of NOAA. The data is then presented by the NCDC as tabular data that can be queried in the United States Storm Events database, which "documents the occurrences of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce" (NOAA, 2006). The classification of storm events in the database is based on data collected from around the United States and the Commonwealth of Pennsylvania, so the data may not be filed under the correct storm category due to user input error. The reason for this data issue results from some storm events falling under multiple categories, including but not limited to winter storm, ice storm, tornado, hurricane / tropical storm, flooding, and flash flooding. Many of the events listed in the United States Storm Events database can fall under multiple categories. In an effort to include a comprehensive list of prior storm events for Cambria County, search queries with multiple storm classifications were conducted for each hazard.

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

This hazard mitigation plan evaluates the vulnerability of the county's critical infrastructure facilities. For the purposes of this plan, critical infrastructure facilities are those entities that are essential to the health, welfare, and safety of the community. This includes but is not limited to airports, emergency medical service (EMS) stations, communication facilities and towers, day care centers and preschools, fire departments, hospitals and medical facilities, police departments, schools, and senior living facilities. The locations of these facilities were provided by the Cambria County GIS Department.

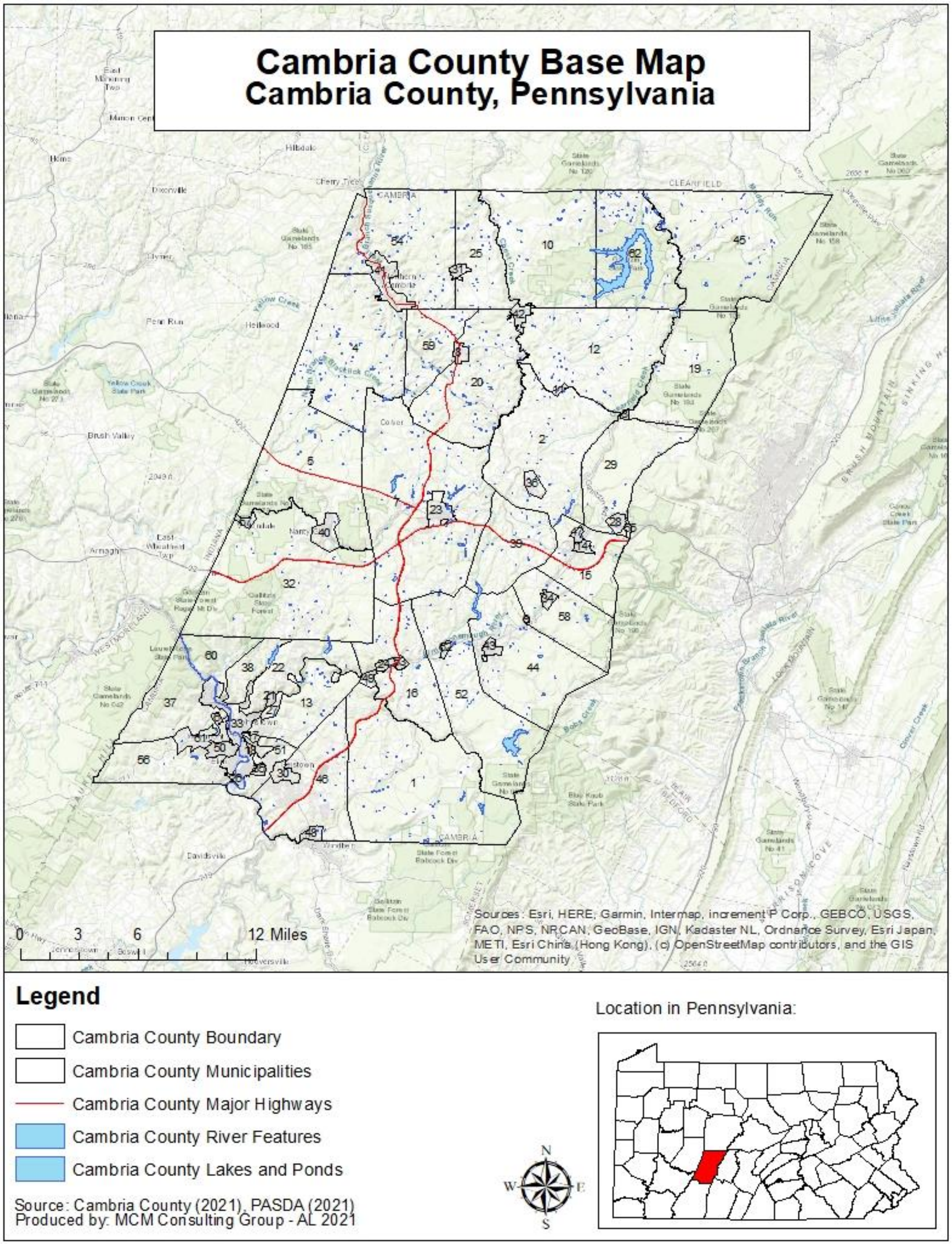
Geographic Information Systems (GIS) Data

GIS data was utilized in risk assessment, estimation of loss, and the development of map products for the hazard mitigation plan update. A foundation of data was available from the Cambria County GIS Department. Some of the utilized data was downloaded from the Pennsylvania Spatial Data Access (PASDA). A large portion of the plan utilizes census data from the United States Census Bureau, but the 2020 census data collection and dissemination was disrupted due to the Covid-19 Pandemic in 2020 and 2021. The 2020 census was delayed, and the information received during the census was spread out due to social distancing and the limiting of census takers going door to door to gather information. A large effort was made in 2020 to increase awareness of completing the census online, but the information for the 2020 Census at large has not been published at the time of this writing.

The Cambria County GIS Department provided the following layers for use in the development of hazard profiles and hazard profile mapping for the 2022 Hazard Mitigation Plan Update:

- County Address Points
- Road Centerlines
- Communication Towers
- Cambria County Boundary
- EMS Locations
- Fire Department Locations
- Hospitals
- Cambria County Municipalities
- Police Departments
- Preschools
- School Buildings and Education Facilities
- Senior Living Facilities

Figure 3 - Cambria County Basemap



Cambria County Base Map
Cambria County, Pennsylvania

Municipalities:
1. Adams Township
2. Allegheny Township
3. Ashville Borough
4. Barr Township
5. Blacklick Township
6. Brownstown Borough
7. Cambria Township
8. Carrolltown Borough
9. Cassandra Borough
10. Chest Township
11. Chest Springs Borough
12. Clearfield Township
13. Conemaugh Township
14. Cresson Borough
15. Cresson Township
16. Croyle Township
17. Daisytown Borough
18. Dale Borough
19. Dean Township
20. East Carroll Townshp
21. East Conemaugh Borough
22. East Taylor Township
23. Ebensburg Borough
24. Ehrenfeld Borough
25. Elder Township

Municipalities continued:
26. Ferndale Borough
27. Franklin Borough
28. Gallitzin Borough
29. Gallitzin Township
30. Geistown Borough
31. Hastings Borough
32. Jackson Township
33. City of Johnstown
34. Lilly Borough
35. Lorain Borough
36. Loretto Borough
37. Lower Yoder Township
38. Middle Taylor Township
39. Munster Township
40. Nanty Glo Borough
41. Northern Cambria Borough
42. Patton Borough
43. Portage Borough
44. Portage Township
45. Reade Township
46. Richland Township
47. Sankertown Borough
48. Scalp Level Borough
49. South Forl Borough
50. Southmont Borough

Municipalities continued:
51. Stonycreek Township
52. Summerhill Township
53. Summerhill Borough
54. Susquehanna Township
55. Tunnelhill Borough
56. Upper Yoder Township
57. Vintondale Borough
58. Washington Township
59. West Carroll Township
60. West Taylor Township
61. Westmont Borough
62. Wilmore Borough
63. White Township

Cambria County Boundary
Cambria County Municipalities
Cambria County Major Highways
Cambria County River Features
Cambria County Lakes and Ponds

Source: Cambria County (2021), PASDA (2021)
Produced by: MCM Consulting Group - AL 2021

Figure 4 - Cambria County Watersheds

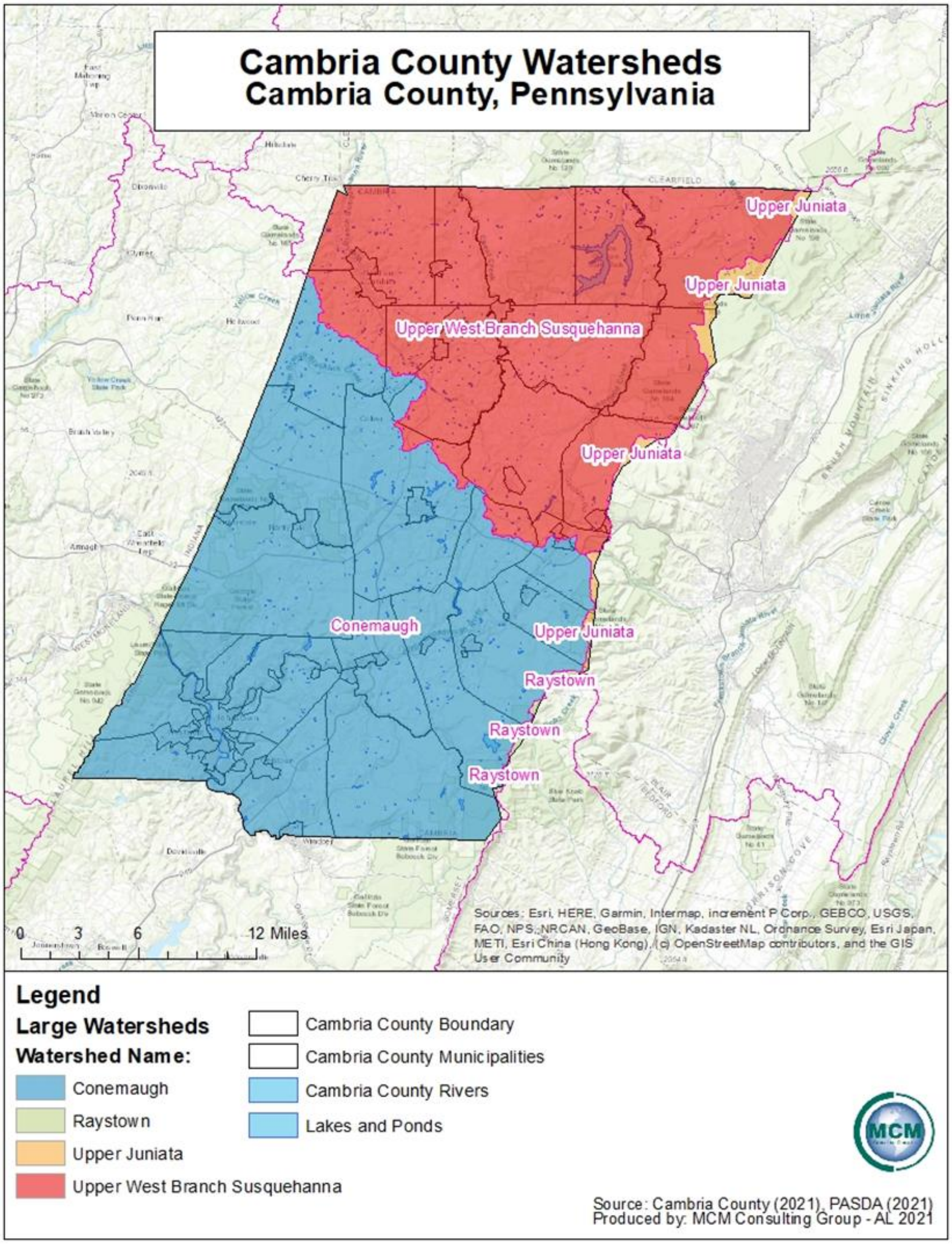


Figure 5 - Cambria County Population Density

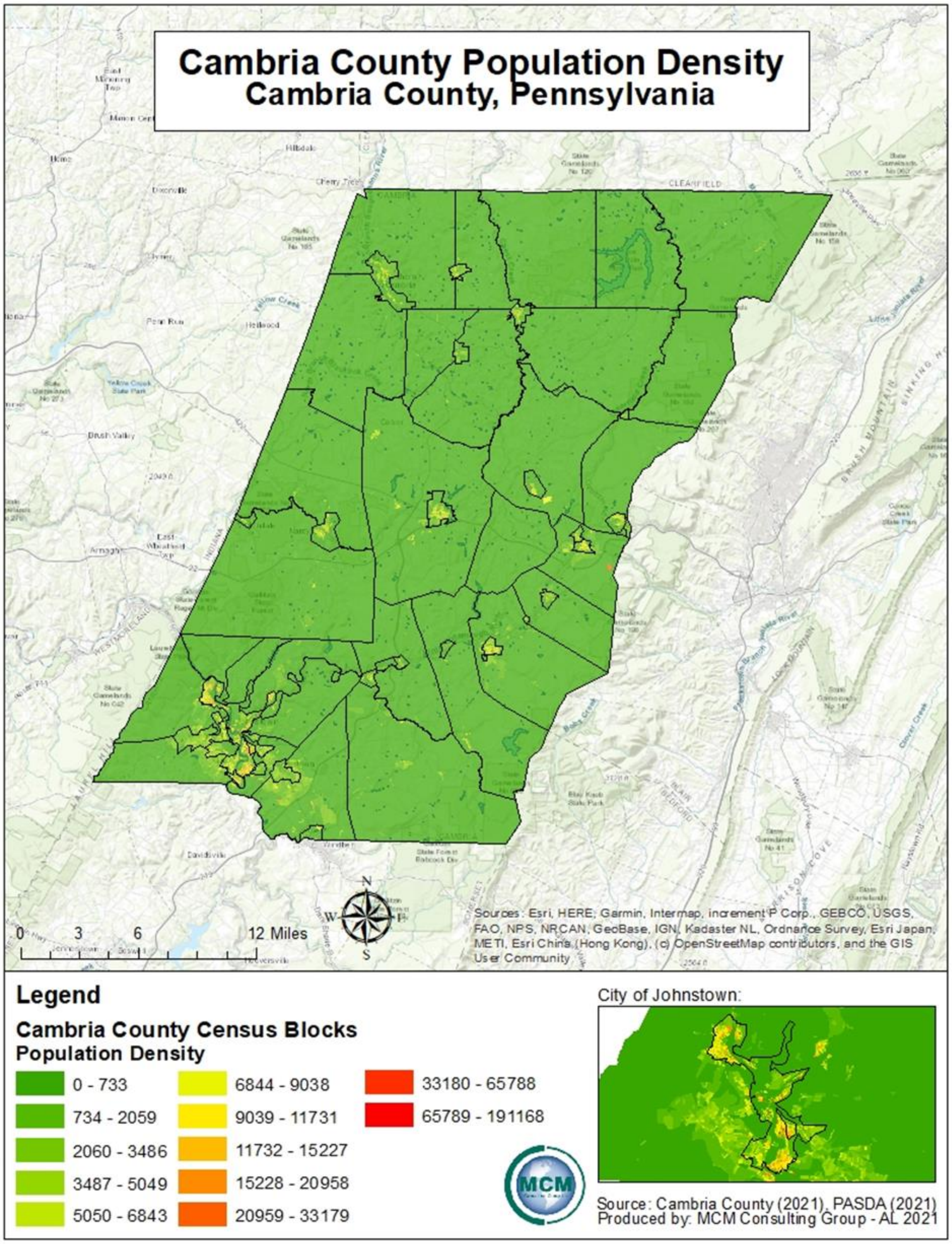
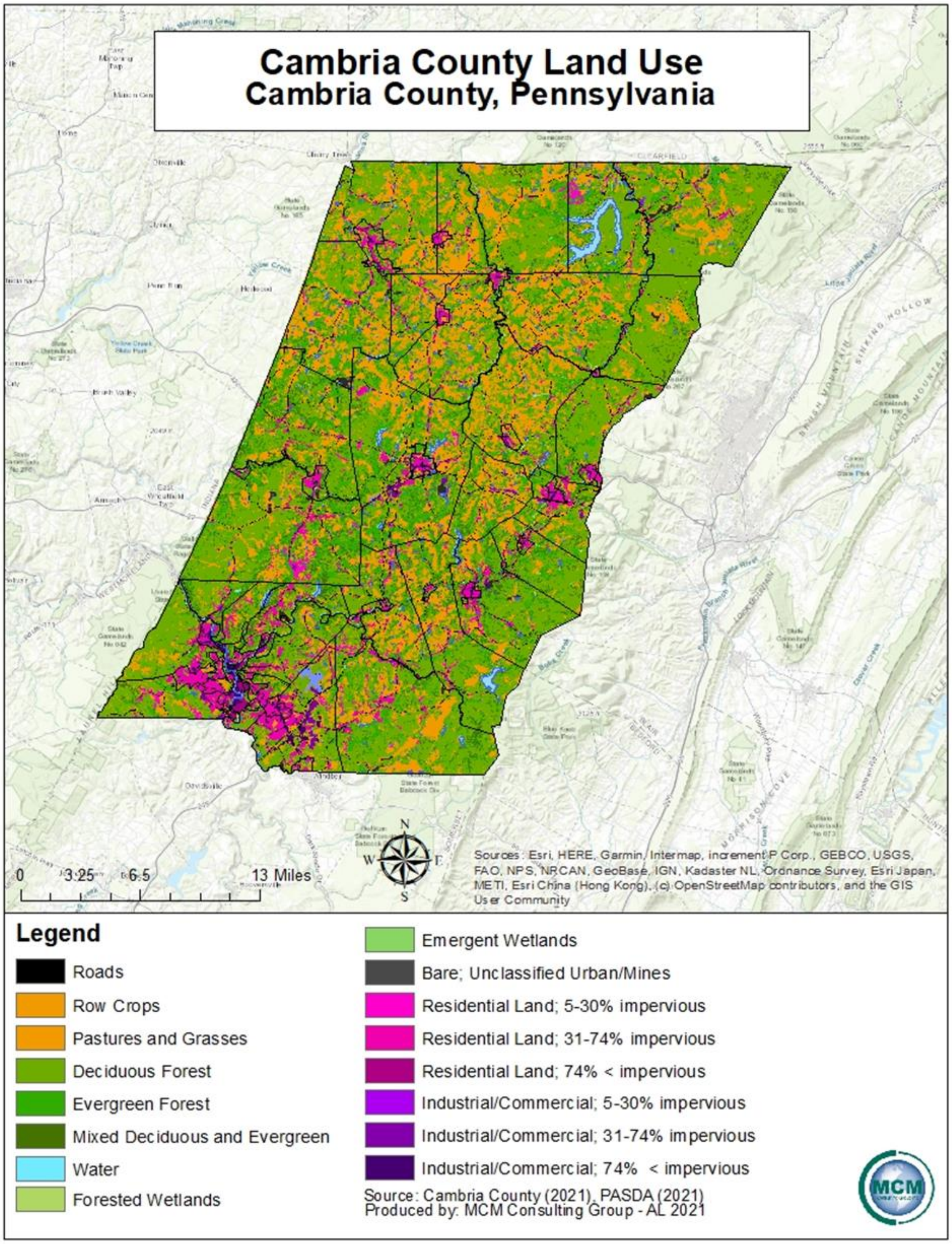


Figure 6 - Cambria County Land Cover



3. Planning Process

3.1. Update Process and Participation Summary

The Cambria County Hazard Mitigation Plan update began September 29th, 2021. The Cambria County Commissioners were able to secure a hazard mitigation grant to start the process. The Cambria County Department of Emergency Services was identified as the lead agency for the Cambria County Hazard Mitigation Plan update. The planning process involved a variety of key decision makers and stakeholders within Cambria County. Cambria 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 Cambria County Department of Emergency Services 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 Cambria County Department of Emergency Services in coordinating and leading public involvement meetings, local planning team meetings, analysis, and the writing of the updated HMP. The Cambria 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, meetings were held with the option to attend 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 Cambria County Local Planning Team and staff. 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. Cambria 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.
- Developing an implementation plan.
- Announcing completion via press releases and postings on the county website.
- Plan adoption at a public meeting of the Cambria County Board of Commissioners.
- Plan submission to FEMA and PEMA.

The 2022 Cambria County HMP was completed March 5, 2022. The 2022 plan follows an outline developed by PEMA which provides a standardized format for all local HMPs in the Commonwealth of Pennsylvania. The 2022 HMP format is consistent with the PEMA recommended format. The 2022 Cambria County HMP combined dam failure and levee failure profiles; and has added additional hazard profiles to the HMP, and these additional profiles increased the subsections in section 4.3 of the HMP.

3.2. The Planning Team

The 2022 Cambria County Hazard Mitigation Plan update was led by the Cambria County Steering Committee. The Cambria 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 4 – Steering Committee* outlines the individuals that comprised this team.

Table 4 - Steering Committee

Cambria County Hazard Mitigation Plan Update Steering Committee	
Name	**Organization**
Greg Schilling	Cambria County EMA
June Kania	Cambria County EMA
Steve Kocsis	Cambria County GIS
Katie Kinka	Cambria County Planning Commission
Art Martynuska	Cambria County EMA

In order to represent the county, the Cambria County Steering Committee developed a diversified list of potential local planning team (LPT) members. Members that participated in the 2016 hazard mitigation plan were highly encouraged to join the 2022 team. The steering committee then provided invitations to the prospective members and provided a description of duties to serve on the LPT. The invitations for members of the LPT were disseminated by the Cambria County Department of Emergency Services 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 5 – Local Planning Team* served on the 2022 Cambria County Hazard Mitigation Local Planning Team, actively participated in the planning process by attending meetings, completing assessments, surveys, and worksheets and/or submitting comments.

Table 5 - Local Planning Team

Cambria County Hazard Mitigation Plan Local Planning Team		
Name	**Organization**	**Position**
Art Martynuska	Cambria County EMA	Director
Greg Schilling	Cambria County EMA	Public Safety Specialist
June Kania	Cambria County EMA	
Steve Kocsis	Cambria County GIS	GIS Director
Katie Kinka	Cambria County Planning Commission	Senior Planner
John Dryzal	Cambria County Conservation District	
Bill Claar	Lilly Borough	Elected or Appointed Official
William Kanich	Blacklick	Elected or Appointed Official
Paul Schrift	Wilmore Borough	Elected or Appointed Official
Charles Ross	NWS State College	Elected or Appointed Official
Steve Kass	SHARP HazMat Team	Elected or Appointed Official
John Wagner, Sr.	Dean Township	Elected or Appointed Official
Renee Daly	Cambria County Redevelopment Authority	Elected or Appointed Official
Michael Dadey		Elected or Appointed Official

3.3. Meetings and Documentation

Meetings with local elected officials and the local planning team were held as needed. 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 6 – 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, and other documentation is in Appendix C.

The draft plan was made available for public review on February 3, 2022. The draft was advertised on Cambria County's social media page and was made available digitally on the Cambria County website at:

https://sites.google.com/view/cambriacountyema/home/planning-resource-documents

The public comment period remained open until March 5, 2022. All public comments were submitted via an online survey or in writing to Greg Schilling at the Cambria Department of Emergency Services. Public commenting was available during the public comment period via a Survey Monkey link that was advertised on the county website and social media pages. No public comments were received for this planning period, so no comments are included in Appendix C of this hazard mitigation plan update.

Table 6 - HMP Process Timeline

Cambria County HMP Process Timeline		
Date	**Meeting**	**Description**
10/06/2021	Cambria 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 and capability assessment worksheets.
10/06/2021	Municipal kick-off meeting	Defined hazard mitigation planning and identified roles and responsibilities. Discussed the 2016 hazard mitigation plan and defined a timeline to complete the 2022 update.
10/28/2021	Local Planning Team meeting	Select hazards for the 2022 hazard mitigation plan.

Cambria County HMP Process Timeline		
Date	**Meeting**	**Description**
11/10/2021	Local Planning Team meeting – Selection of Hazards	Cambria County LPT met to discuss hazards profiled in the previous plan and identify any new hazards to be included in the plan update.
12/09/2021	Local Planning Team Meeting – Risk Factor Assessment and Mitigation Strategy	Cambria County LPT met in person to determine a risk factor score for each of the selected hazards in the 2022 update.
12/08/2021	Meetings with municipal officials	In person meetings to educate county and local elected officials on the hazard mitigation planning process. Presented findings of the hazard vulnerability analysis and risk assessment. Distributed hazard mitigation project opportunity forms to municipalities.
12/09/2021	Meetings with municipal officials	In person meetings to educate county and local elected officials on the hazard mitigation planning process. Presented findings of the hazard vulnerability analysis and risk assessment. Distributed hazard mitigation project opportunity forms to municipalities.
12/15/2021	Local Planning Team meeting – Mitigation Strategy	Cambria County LPT met via Zoom to discuss 2022 goals, objectives, and actions for mitigation strategy development.
02/03/2022	Local Planning Team meeting – Draft Plan review	The draft HMP was made available to all members of the LPT. All were invited to submit any changes to the document.
02/03/2022	Cambria County Hazard Mitigation Plan – Draft Plan public review	The draft HMP presentation was held-in person. All members of the public were invited to submit any comments via an online survey or provide comments to the Cambria County Emergency Management Agency.

3.4. Public and Stakeholder Participation

Cambria 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 Cambria County website. Copies of those advertisements are 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 for completion and return to the Cambria County Department of Emergency Services 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 Cambria County Department of Emergency Services.

1. **Risk Assessment Hazard Identification and Risk Evaluation Worksheet**: Capitalizes on local knowledge to evaluate the change in the frequency of occurrence, magnitude or 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 2017 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 2022 municipal project opportunity forms are included as well, located in Appendix G.

In an effort to capture public input, the Cambria County LPT held in person meetings and offered on-line surveys. Members of the public were also encouraged to contact Cambria County Department of Emergency Services 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.

Cambria County invited all contiguous counties to review the 2022 draft hazard mitigation plan. A letter was sent to the emergency management coordinator in Bedford, Blair, Clearfield, Indiana, Somerset, and Westmoreland counties in Pennsylvania, on. Copies of these letters are included in Appendix C Multi-Jurisdictional Planning.

3.5. Multi-Jurisdictional Planning

Cambria 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 risk 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 plan. *Table 7 – Municipality Worksheets, Surveys, and Forms Participation* reflects the municipalities participation by completing worksheets, surveys, and forms.

Table 7 - Municipality Worksheets, Surveys, and Forms Participation

Cambria County HMP Worksheets, Surveys, and Forms Participation				
Municipality	**Capability Assessment Survey**	**Risk Assessment Hazard Identification and Risk Evaluation Worksheet**	**NFIP**	**Hazard Mitigation Opportunity Form Review and Updates**
Adams Township	X	X	X	
Allegheny Township	X	X	X	
Ashville Borough	X	X	X	
Barr Township	X	X	X	X
Blacklick Township	X	X	X	X
Brownstown Borough	X	X		
Cambria Township	X	X	X	
Carrolltown Borough				X
Cassandra Borough	X	X	X	
Chest Township	X	X	X	X
Chest Springs Borough				X
Clearfield Township	X	X	X	
Conemaugh Township	X	X	X	
Cresson Borough	X	X		
Cresson Township	X	X		X
Croyle Township	X	X	X	X
Daisytown Borough	X	X	X	
Dale Borough	X	X	X	X
Dean Township	X	X	X	X
East Carroll Township	X	X	X	
East Conemaugh Borough	X		X	
East Taylor Township		X	X	X

Cambria County HMP Worksheets, Surveys, and Forms Participation				
Municipality	**Capability Assessment Survey**	**Risk Assessment Hazard Identification and Risk Evaluation Worksheet**	**NFIP**	**Hazard Mitigation Opportunity Form Review and Updates**
Ebensburg Borough	X	X	X	
Ehrenfeld Borough	X	X	X	X
Elder Township	X	X	X	X
Ferndale Borough	X	X	X	X
Franklin Borough	X	X	X	
Gallitzin Borough		X	X	
Gallitzin Township	X	X	X	
Geistown Borough	X	X	X	X
Hastings Borough	X	X	X	
Jackson Township		X		
Johnstown City	X	X	X	
Lilly Borough	X	X	X	X
Lorain Borough	X	X	X	X
Loretto Borough	X	X	X	
Lower Yoder Township	X	X	X	
Middle Taylor Township	X	X	X	X
Munster Township	X		X	X
Nanty Glo Borough	X	X	X	
Northern Cambria Borough	X	X	X	
Paton Borough			X	
Portage Borough				
Portage Township	X	X	X	X
Reade Township	X	X	X	
Richland Township	X	X	X	
Sankertown Borough	X	X	X	
Scalp Level Borough	X	X	X	X
South Fork Borough	X	X		X
Southmont Borough	X	X	X	
Stonycreek Township	X	X	X	
Summerhill Borough				X
Summerhill Township	X	X	X	X
Susquehanna Township	X	X	X	X
Tunnelhill Borough				
Upper Yoder Township		X	X	

Cambria County HMP Worksheets, Surveys, and Forms Participation				
Municipality	**Capability Assessment Survey**	**Risk Assessment Hazard Identification and Risk Evaluation Worksheet**	**NFIP**	**Hazard Mitigation Opportunity Form Review and Updates**
Vintondale Borough	X	X	X	
Washington Township	X	X	X	
West Carroll Township	X	X	X	X
Westmont Borough	X	X	X	
West Taylor Township	X	X	X	
White Township		X	X	
Wilmore Borough	X	X	X	

The majority of the sixty-three municipalities within Cambria County adopted the 2016 Cambria County Hazard Mitigation Plan as the municipal hazard mitigation plan. The goal of the Cambria County Local Planning Team is to have 100% participation by municipalities in adopting the 2022 Cambria County Hazard Mitigation.

The table above was completed with the most accurate information available at the time of the writing of this Hazard Mitigation Plan Update. Since the writing of this plan, some of the municipalities listed above have provided information to Cambria County which updates their participation status. Portage Borough submitted forms through the Cambria Department of Emergency Services, and they attended one meeting virtually to satisfy the requirement for attendance. Patton Borough had their police chief, who is also the new emergency official for the borough, speak to a representative from the Cambria County Department of Emergency Services by phone to discuss hazard mitigation. Additionally, Tunnelhill Borough, which is listed above as not having participated, completed a capability assessment, a hazard identification worksheet, and a risk assessment evaluation. Tunnelhill Borough also met with the Cambria Department of Emergency Services in their office to satisfy the attendance requirement. Also, Carrolltown Borough covered submission of documents for East and West Carroll Townships. Jackson Township spoke directly with the Cambria County Department of Emergency Services over the telephone and the local representative from Summerhill Borough was in contact with the plan owner for the last portion of the planning process.

4. Risk Assessment

4.1. Update Process Summary

A key component to reducing future loss 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 a 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 Cambria County risk assessment provides in-depth knowledge of the hazards and vulnerabilities that affect Cambria 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 Cambria County Emergency Operations Plan (EOP), local EOPs and other public and private emergency management plans.

The Cambria 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 Cambria County Local Planning Team reviewed and assessed the change in risk for all natural and human-caused hazards identified in the 2016 hazard mitigation plan. The mitigation planning team then identified hazards that were outlined within the Pennsylvania Hazard Mitigation Plan but not included in the 2016 Cambria County Hazard Mitigation Plan that could impact Cambria County. The team utilized the hazard identification and risk evaluation worksheet that was provided by the Pennsylvania Emergency Management Agency.

The Cambria County Steering Committee met with municipalities and provided guidance on how to complete the municipal hazard identification and risk evaluation worksheet. Fifty-eight municipalities in Cambria 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 Cambria County assessment data to estimate loss to particular hazards. Risk factor was then assessed to each of the seventeen hazards utilizing the hazard prioritization matrix. This assessment allows the county and its municipalities to focus 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 8 – Presidential & Gubernatorial Disaster Declaration contains a list of all Presidential and Gubernatorial disaster declarations that have affected Cambria County and its municipalities from 1955 through 2021, according to the Pennsylvania Emergency Management Agency.

Table 8 - Presidential & Gubernatorial Disaster Declarations

Presidential Disaster Declarations and Gubernatorial Declarations and Proclamations		
Date	**Hazard Event**	**Action**
September, 1963	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

Presidential Disaster Declarations and Gubernatorial Declarations and Proclamations		
Date	**Hazard Event**	**Action**
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
October, 2010	Hurricane Sandy	Presidential Emergency Declaration
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	Gubernatorial Proclamation of Emergency

Presidential Disaster Declarations and Gubernatorial Declarations and Proclamations		
Date	**Hazard Event**	**Action**
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
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
Source: Pennsylvania Emergency Management Agency and Federal Emergency Management Agency		

4.2.2. Summary of Hazards

The Cambria 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 2016 HMP and the standard list of hazards, the local planning team decided that the 2021 plan should identify, profile, and analyze thirty-three hazards. These thirty-three hazards include all of the hazards profiled in the 2016 plan. The list below contains the hazards that have the potential to impact Cambria County as identified through previous risk assessments, the Cambria County Hazard Vulnerability Analysis and input from those who 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 farming and other water-dependent industries, water dependent recreation uses, and residents who depend on wells for drinking water.

Extreme Temperature

Extreme heat often results in the highest number of annual deaths of all weather-related hazards. In most of the United States, extreme heat is defined as a long period (2 to 3 days) of high heat and humidity with temperatures above 90 degrees. Extremely cold air comes every winter in at least part of the country and affects millions of people across the United States. The arctic air, together with brisk winds, can lead to dangerously cold wind chill values. People exposed to extreme cold are susceptible to frostbite and hypothermia in a matter of minutes.

Flooding, Flash Flooding, and Ice Jam 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.

Hailstorm

Hailstorms occur when ice crystals form within a low-pressure front due to the rapid rise of warm air into the upper atmosphere and the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until, having developed sufficient weight, they fall as precipitation in the form of balls or irregularly shaped masses of ice greater than 0.75 inches in diameter. Hailstorms can cause significant damage to homes, vehicles, livestock, and people.

Hurricane/Tropical Storm

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.

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.

Lightning Strike

Lightning is a giant spark of electricity resulting from the build-up of positive and negative charges within a thunderstorm. The flash or "bolt" of light can occur within the thunderstorm cloud or between the cloud and the ground. Lightning is a leading cause of injury and death from weather-related hazards. Although most lightning victims survive, people struck by lightning often report a variety of long-term, debilitating symptoms.

Pandemic and Infectious Disease

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 disproportionate 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/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.

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

Building/Structural Collapse/Blighted Properties

Buildings and other engineered structures, including bridges, may collapse if their structural integrity is compromised, especially due to effects from other natural or human-made hazards. Older buildings or structures, structures that are not built to standard codes, or structures that have been weakened are more susceptible to be affected by these hazards.

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

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.

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.

Drowning

Drowning is death from suffocation, typically associated with swimming, fishing, boating or bridge accidents, or suicide. It can be a significant hazard in communities with numerous residential pools or water bodies (e.g., ponds, lakes, rivers, etc...) and extensive outdoor recreational activity. Drowning rates are particularly high for children ages 1-14. The Centers for Disease Control and Prevention estimates that drowning is the second leading cause of injury death (after motor vehicle crashes) among children ages 1-14.

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 hazard profiles in this report. Both EMS and fire services face challenges from lack of funding and lower rates of volunteerism.

Environmental Hazards/Hazardous Materials

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).

Hazardous material releases can contaminate air, water, and soils and have the potential to cause injury or death. Dispersion can take place rapidly when transported by water and wind. While often accidental, releases can occur as a result of human carelessness, intentional acts, or natural hazards. When caused by natural hazards, these incidents are known as secondary events.

Levee Failure

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.

Opioid Epidemic

An opioid epidemic is the rapid increase in the use of prescription and non-prescription opioid drugs in the United States beginning in the late 1990s and continuing throughout the first two decades of the 2000s. Opioids are a diverse class of moderately strong painkillers, including oxycodone, hydrocodone, and a very strong painkiller, fentanyl, which is synthesized to resemble other opiates such as opium-derived morphine and heroin. The potency and availability of these substances, de-spite their high risk of addiction and overdose, have made them popular both as for-mal medical treatments and as recreation-al drugs. Due to their sedative effects on the part of the brain which regulates breathing, opioids in high doses present the potential for respiratory depression and may cause respiratory failure and death.

The Commonwealth of Pennsylvania, along with other states in the nation has enact-ed legislation to curb the prescription and distribution of these drugs to try to prevent addiction rising from abuse as a painkiller. This includes but is not limited to restrictions to prescribing to minors, quantity limits, a prescription database with entry requirements and other limits to its availability.

Terrorism/Cyberterrorism Incidents

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. Cyberterrorism 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".

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.

Urban Fire and Explosions

Urban fires and explosions include those fires and explosions that occur within urban, or developed, regions, and often pose an increased threat due to their tendency to easily spread to neighboring structures. The effects may be minor or severe and include injury, loss of life, property damage, and residential or economic disruption/displacement.

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 (Unit-ed 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 are 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 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. 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 Cambria 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 4.3.3). 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. Climate change is also expected to result in more intense hurricanes and tropical storms. With the rise of atmospheric temperatures, ocean surface temperatures are rising, resulting in warmer and more moist 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 experience drought conditions intermittently throughout the calendar year. A drought is broadly defined as a time period of prolonged dryness that contributed to the depletion of ground and surface water. Droughts are regional climatic events, so when such an event occurs in Cambria 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 droughts:

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 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 can have adverse effects on farms and other water-dependent industries. This can result in a local economic loss. Areas of extensive agriculture uses are particularly vulnerable to drought; 79,341 acres of Cambria County, or roughly 17.9% of the 444,160 total land acreage, are held in farms (United States Department of Agriculture [USDA], 2017 Census). Acreage for farming has decreased since the 2012 USDA Census when there was a reported total of 76,889 farming and drought vulnerable acres.

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

The average annual precipitation of 49.14 inches is during the spring and summer months and that value is derived from averaging ten years of precipitation averages for Cambria County. Rural farming areas of Cambria County are most at risk when a drought occurs. A drought can create a significant financial burden (especially to families as 97% of Cambria County farms are family-owned and operated). Approximately 60% of the county farmland use is devoted to crop cultivation and 40% to livestock and poultry. Wildfires are often the most severe secondary effect associated with drought. Wildfires can devastate wooded and agricultural 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 9 – 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.

Table 9 - Drought Preparation Phases

Drought Preparation Phases				
Phase	**General Activity**	**Actions**	**Request**	**Goal**
Drought Watch	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%.

Drought Preparation Phases				
Phase	**General Activity**	**Actions**	**Request**	**Goal**
Drought Warning	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%.
Drought Emergency	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.	Reduced water use by 15%.
Source: Pennsylvania Department of Environmental Protection, 2017				

<u>Local Water Rationing:</u> 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. Cambria 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 records)
- Soil moisture via the Palmer Drought Index as seen in *Table 10 – Palmer Drought Severity Index*, which is a soil moisture algorithm calibrated for relatively homogenous regions which measures dryness based on recent precipitation and temperature.

Table 10 - Palmer Drought Severity Index

Palmer Drought Severity Index (PDSI)	
Severity Category	**PDSI Value**
Extremely Wet	4.0 or more
Very Wet	3.0 to 3.99
Moderately Wet	2.0 to 2.99
Slightly Wet	1.0 to 1.99
Incipient Dry Spell	0.5 to 0.99
Near Normal	0.49 to -0.49
Incipient Dry Spell	-0.5 to -0.99
Mild Drought	-1.0 to -1.99
Moderate Drought	-2.0 to -2.99
Severe Drought	-3.0 to -3.99
Extreme Drought	-4.0 or less

Hydrologic drought events result in a reduction of stream flow, a reduction of lake/reservoir storage, and a lowering of groundwater levels. These events have adverse impacts on public water supplies for human consumption, rural water supplies for livestock consumption and agricultural operations, water quality, natural soil water or irrigation water for agriculture, soil moisture, conditions conductive to wildfire events, and water for navigation and recreation.

The effects of a drought can be far-reaching in both the economic and environmental realms. Economic impacts include the reduced productivity of aquatic resources, mandatory water use restrictions, well failures, cutbacks in industrial production, agricultural losses, and limited recreational opportunities. Environmental impacts of drought include the following:

- Hydrologic effects – Lower water levels in reservoirs, lakes, and ponds; reduced stream flow; loss of wetlands; estuarine impacts; groundwater depletion and land subsidence; and effects on water quality, such as increases in salt concentration and water temperature.

- Damage to animal species – Lack of feed and drinking water; disease; loss of biodiversity; mitigation, or concentration; and reduction and degradation of fish and wildlife habitat.
- Damage to plant communities – Loss of biodiversity and loss of trees from urban landscapes and wooded conservation areas.
- Increased number and severity of fires.
- Reduced soil quality.
- Air quality effects – Dusts and pollutants.
- Loss of quality in landscape.

4.3.1.3 Past Occurrence

The Pennsylvania 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 1980 to 2021 is shown in *Table 11 – Past Drought Events in Cambria County*.

The National Oceanic and Atmospheric Administration (NOAA) has archived records showing extreme droughts for the commonwealth in 1931 and a prolonged event in the 1960's as seen in *Figure 7 – Pennsylvania Palmer Drought Index 1900 – 1999*.

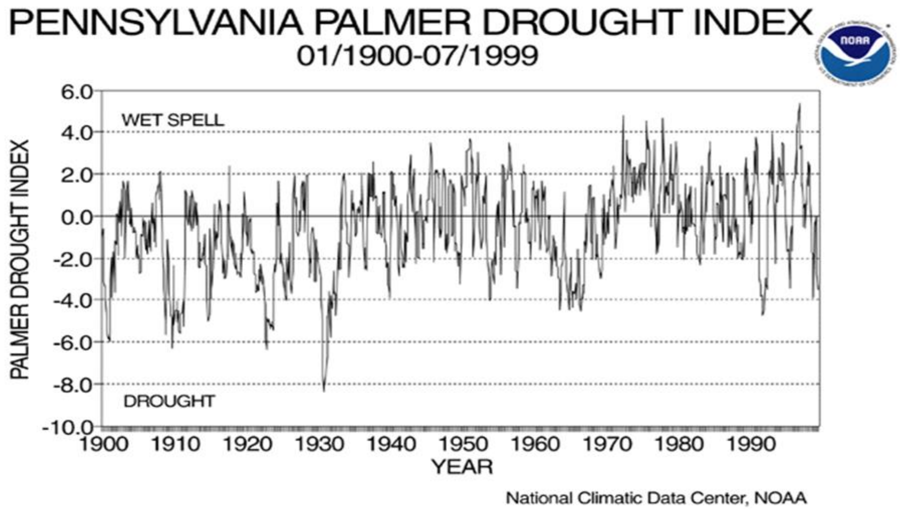
Based on the county's more recent disaster history and other drought occurrence data, the worst drought event in Cambria County occurred in the summer of 1999. Extended dry weather spurred Governor Ridge to declare a drought emergency in fifty-five counties. During this event, precipitation deficits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

Table 11 - Past Drought Events in Cambria County

Past Drought Events in Cambria County			
Start Date	**End Date**	**Drought Status**	**Event Duration**
Sept. 1955		Emergency**	
1962	1966		
11/18/1980	04/20/1982	Emergency	2 years, 5 months, 3 days
04/26/1985	10/22/1985	Watch	5 months, 26 days
10/22/1985	12/19/1985	Emergency	1 month, 28 days
07/07/1988	08/24/1988	Emergency	1 month, 24 days

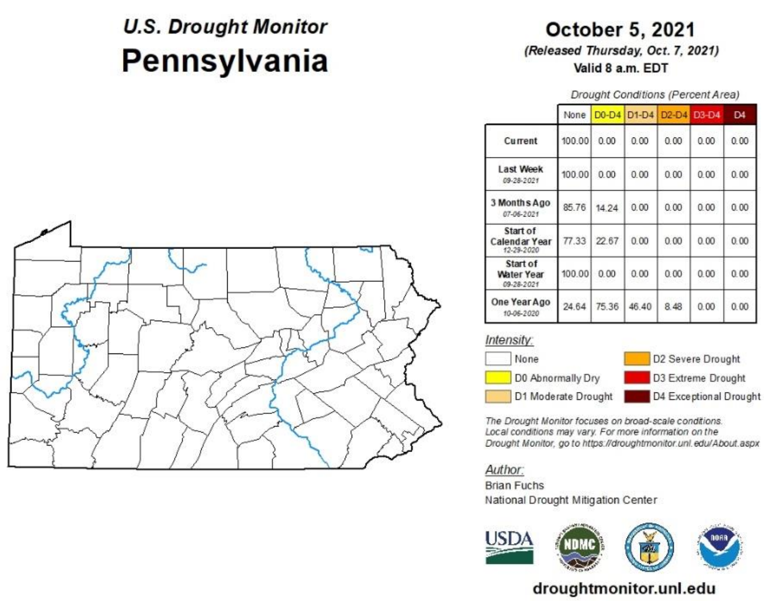
Past Drought Events in Cambria County			
Start Date	**End Date**	**Drought Status**	**Event Duration**
08/24/1988	12/12/1988	Warning	3 months, 18 days
03/03/1989	05/15/1989	Watch	2 months, 12 days
06/28/1991	07/24/1991	Warning	26 days
07/24/1991	04/20/1992	Emergency	8 months, 27 days
04/20/1992	09/11/1992	Warning	4 months, 22 days
09/01/1995	09/20/1995	Warning	19 days
09/20/1995	11/08/1995	Emergency**	2 months, 27 days
11/08/1995	12/18/1995	Warning	1 month, 10 days
07/17/1997	11/13/1997	Watch	3 months, 28 days
12/03/1998	12/16/1998	Warning	13 days
12/16/1998	03/15/1999	Emergency	2 months, 27 days
06/10/1999	07/20/1999	Warning	1 month, 10 days
07/20/1999	09/30/1999	Emergency**	2 months, 10 days
09/30/1999	02/25/2000	Warning	4 months, 26 days
02/25/2000	05/05/2000	Watch	2 months, 10 days
08/24/2001	05/13/2002	Watch	8 months, 20 days
04/11/2006	06/30/2006	Watch	2 months, 20 days
08/06/2007	02/15/2008	Watch	6 months, 9 days
11/07/2008	01/26/2009	Watch	2 months, 20 days
09/16/2010	11/10/2010	Watch	1 month, 26 days
08/05/2011	09/02/2011	Watch	28 days
08/02/2016	11/03/2016	Watch	3 months, 1 day
08/21/2020	02/04/2021	Watch	5 months, 14 days
Source: Pennsylvania Department of Environmental Protection, 2021 **Gubernatorial Disaster Declaration			

Figure 7 - Pennsylvania Palmer Drought Index 1900 - 1999



Pennsylvania had its warmest July on record in 2020, and sixteen counties entered Drought Watch status on August 21, 2020. As of the writing of this plan, however, drought watches had been lifted for all commonwealth counties. In June 2021, dry conditions were again creeping east across the commonwealth. *Figure 8 – U.S. Drought Monitor, Pennsylvania* illustrated the conditions of drought in Pennsylvania at the time of the report.

Figure 8 -U.S. Drought Monitor, Pennsylvania



4.3.1.4 Future Occurrence

It is difficult to forecast the exact severity and frequency of future drought events. Future 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 Cambria County has experienced severe drought between 5% to 10% of the time between 1895 and 1995 as seen in *Figure 9 – Palmer Drought Severity Index*. This report can be used to make a rough estimate of the future probability of drought in Cambria 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.

Figure 9 - Palmer Drought Severity Index

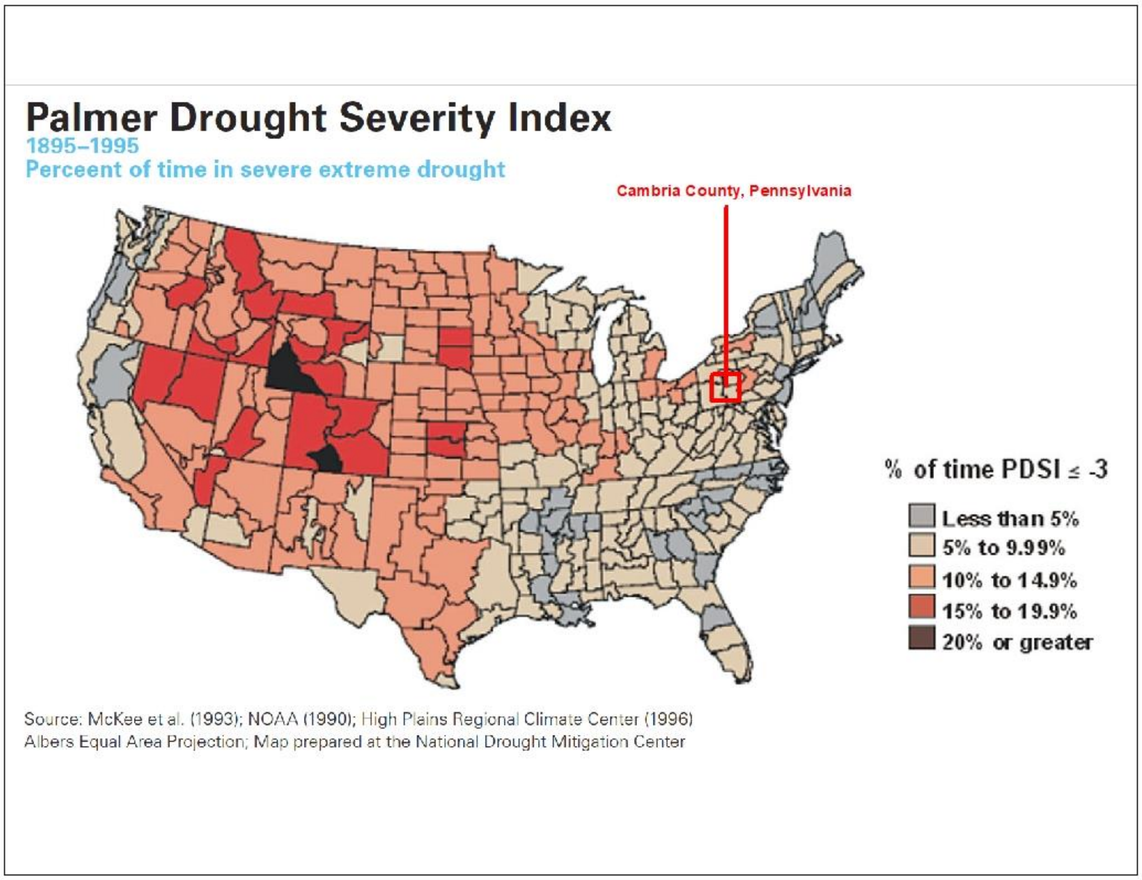
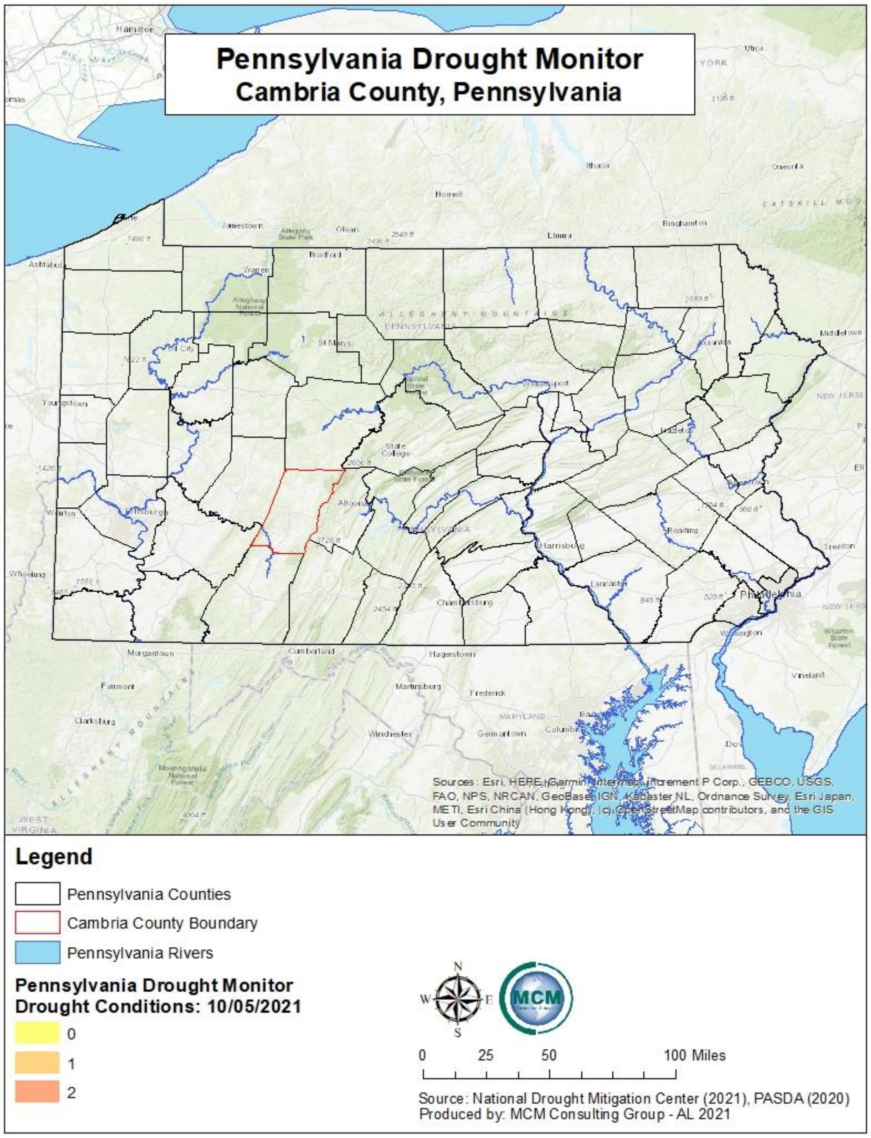


Figure 10 – Current Drought Index for Pennsylvania below shows that Cambria County is currently in normal conditions. The last of the 2020 Drought Watches was lifted in February 2021.

Figure 10 - Current Drought Index for Pennsylvania



The potential for a drought to occur in Cambria County is high. Given the frequency of drought watches issued for Cambria 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 Cambria County, the impact depends on the duration of the event, severity of conditions, and area affected. The map above shows that Cambria County and most of Pennsylvania is currently (and most often) in normal (non-drought) conditions.

4.3.1.5 Vulnerability Assessment

Drought vulnerability depends on the duration and area of impact. However, other factors contribute to the severity of a drought. Unseasonably high temperatures, prolonged winds, and low humidity can heighten the impact of a drought.

Extended periods of drought can lead to lowered stream levels, altering the delicate balance of riverine ecosystems. Certain tree species are susceptible to fungal infections during prolonged periods of soil moisture deficit. Fall droughts pose a particular threat because groundwater levels are typically at their lowest following height of the summer growing season.

Wildfire is the most severe secondary effect associated with drought. Wildfires can devastate wooded and agricultural areas, threatening natural resources and farm production facilities.

Prolonged drought conditions can cause major ecological changes, such as increases in scrub growth, flash flooding, and soil erosion.

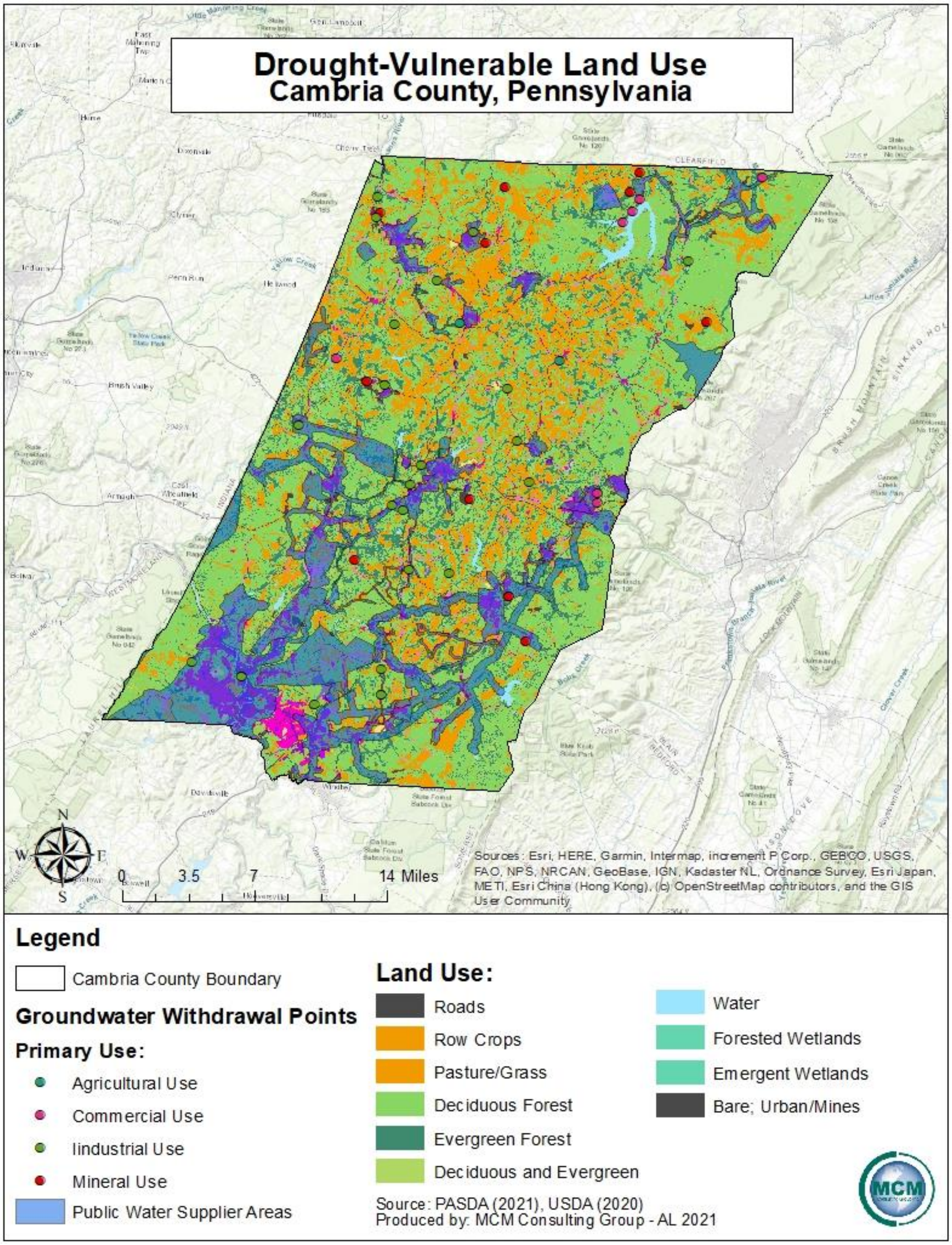
Droughts can have adverse effects on farms and other water-dependent industries. This can result in a local economic loss. The 2017 U.S. Census of Agriculture lists nearly 79,341 acres of prime agricultural land in Cambria County and there are multiple recreational sites across the county dependent on consistent water sources and replenishment. From a societal perspective, public safety is an issue in terms of consumable water being unavailable, as well as water for fire protection and emergency being in short supply.

The most significant losses resulting from drought events are typically found in the agriculture and aquaculture sectors. 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 20% 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 that there were 557 farms in Cambria County, at an average size of 142 acres. Cambria County ranks 44th of sixty-seven counties in the commonwealth for agricultural production, totaling over $30 million annually. Agricultural production from crops, including nursery and greenhouse crops, accounts for more than $18 million in commerce annually. Production from livestock, poultry, and their products accounts for $12 million annually.

A map of properties with tillable agricultural land use, forestry, and other land in the county vulnerable to drought is shown below in *Figure 11 – Drought-Vulnerable Land Cover and Public Water Supply*.

Figure 11 - Drought Vulnerable Land Cover and Public Water Supply



4.3.2. Extreme Temperature

4.3.2.1 Location and Extent

Pennsylvania, and more specifically, Cambria County can experience many different temperature extremes. High temperatures occur about ten days per year at any location in Pennsylvania, however, southern parts of the state, experience more than twice this number. Freezing temperatures occur on an average of 100 or more days per year with longest freeze-free period at near sea level locations such as northwest Pennsylvania (adjacent to Lake Erie). Extreme temperatures can be devastating – extreme heat can cause sunburn, heat cramps, heat exhaustion, heat stroke, and dehydration, while extreme cold can cause hypothermia and frostbite. Both can potentially cause long-lasting disabilities. January is typically the coldest month for Cambria County, with an average temperature of 26.3°F. *Figure 15 - Average Minimum Temperature Trends for Pennsylvania* shows the average minimum temperatures in Pennsylvania with Cambria County identified. July has typically been the warmest month for Cambria County, with an average temperature of 69.9°F. *Figure 16 - Average Maximum Temperature Trends for Pennsylvania* shows the average maximum temperatures in Pennsylvania with Cambria County identified. Temperatures can vary across Cambria County due to elevation changes in topography.

4.3.2.2 Range of Magnitude

When extreme temperature events occur, they typically impact the entirety of Cambria County, including the surrounding region. Extreme heat is described as temperatures that hover at least 10ºF above the average high temperature for a region during the summer months. Extreme heat is responsible for more deaths in Pennsylvania than all other natural disasters combined. Temperature advisories, watches, and warnings are issued by the National Weather Service relating impacts to the range of temperatures typically experienced in Pennsylvania. Heat advisories are issued when the heat index temperature is expected to be equal to 100°F, but less than 105°F. Excessive heat warnings are issued when heat indices will attain or exceed 105°F and are issued within twelve hours of the onset. Excessive heat watches are issued when there is a possibility that excessive heat warning criteria may be experienced within twenty-four to seventy-two hours, but their occurrence and timing are still uncertain. A potential worst-case extreme temperature scenario would be widespread areas of the Commonwealth experiencing 90°F or higher temperatures for an extended number of days. The heat could overwhelm the power grid and cause widespread blackouts, cutting off vital HVAC services for residents. It could create crisis management issues for senior citizens on fixed incomes, the homeless, and other vulnerable populations. The heat index is a measurement that takes into account both the temperature and relative humidity, and it is calculated as shown in *Figure 12 - National Weather Service's Heat Index Matrix*.

Figure 12 - National Weather Service's Heat Index Matrix

Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution   Extreme Caution   Danger   Extreme Danger

Extreme cold temperatures drop well below typical temperatures and are often associated with winter storm events. Wind can make the apparent temperature drop further, and exposure to such extreme cold temperatures can cause hypothermia, frost bite and death. Wind chill warnings are issued when wind chills drop to -25°F or lower. While this threshold applies to the entire state, the threshold for advisories varies based on regions. Wind chill advisories are issued in the south and western sections of Pennsylvania, when wind chill values drop to -10°F to -24°F. Wind chill advisories are issued in the southern-central to northern sections of the Commonwealth when wind chills drop to -15°F to -24°F. The National Weather Service created a wind chill chart which shows the time frostbite takes to set in depending on temperature and wind speed as shown in *Figure 13 - National Weather Service's Wind Chill Matrix*.

Figure 13 National Weather Service's Wind Chill Matrix

Wind Chill Chart

Wind (mph) \ Temperature (°F): Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

Wind Chill (°F) = $35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

Source: (NOAA NWS, 2001)

4.3.2.3 Past Occurrence

Cambria County has had more past occurrences of extreme cold incidents than extreme heat due to the geographic location of the county. *Table 12 - Past Extreme Temperature Occurrences for Cambria County* shows the past occurrence events associated with extreme temperature (hot and cold) that have occurred in Cambria County. The data in the table was reported from early 2000s to the year 2015. Due to the source used, no further events have been documented since 2015, however, events most likely have occurred without being documented. With a total of seventeen different extreme temperature events that have occurred, twelve of the events were extreme cold related while the remaining five were extreme heat related. There were no reports of death or injury related to the occurrences. However, numerous sources have provided information regarding past occurrences and losses associated with extreme temperature in Cambria County and the Commonwealth as a whole. Due to the number of sources available with information~~,~~ the number of events and losses could vary slightly in number.

Data from the National Climatic Data Center reports that there have been eighty-five extreme temperature episodes in Pennsylvania from 2000 to present, resulting in a total of ninety-four deaths and 103 injuries. Out of the eighty-five events, fifty of them were extreme cold related with four deaths. The other thirty-five events were extreme heat related with ninety deaths and 103 injuries across the state. The biggest event was on June 21, 2011, which had a significant effect on Cambria County itself. In the 2011 event, there was a total of twenty-five deaths and sixty injuries within one day. Record-breaking heat temperatures were experienced in nineteen different counties.

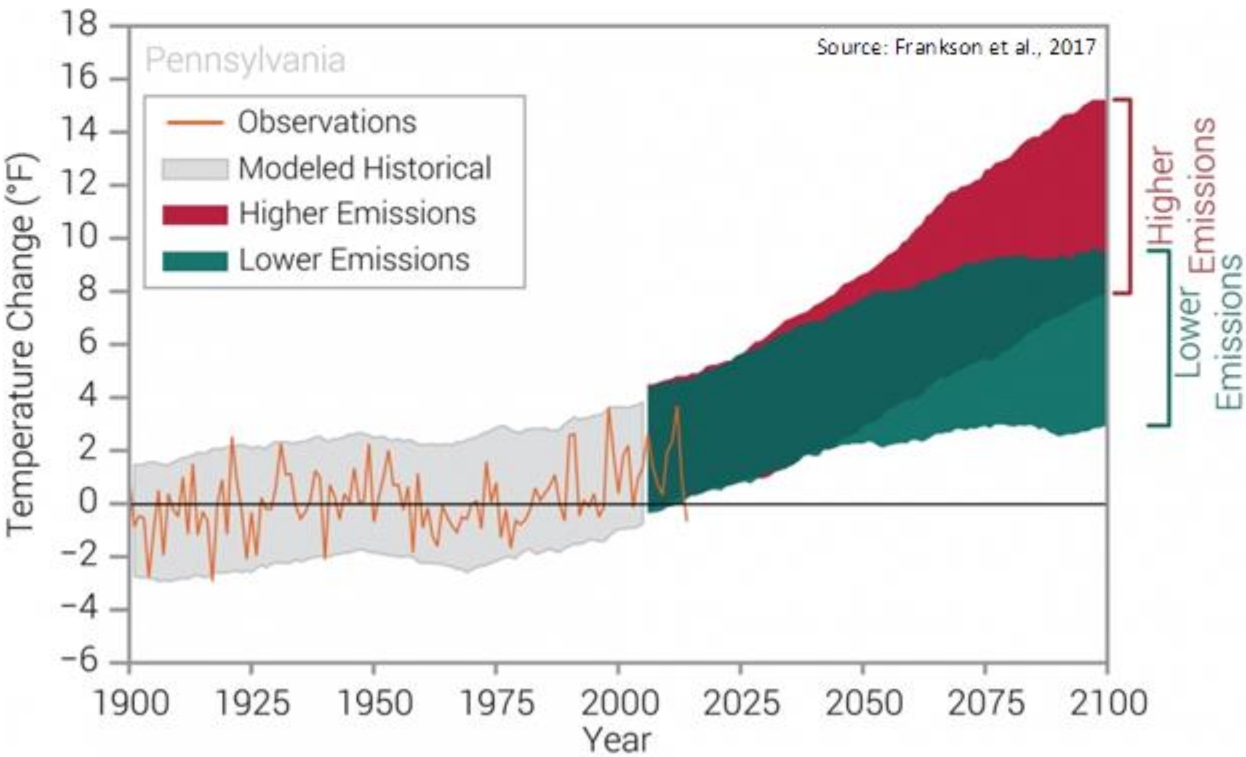
Table 12 - Past Extreme Temperature Occurrences for Cambria County

Past Extreme Temperature Occurrences for Cambria County (NOAA, 2020)		
Location	**Date**	**Type**
Cambria County	1/26/2007	Extreme Heat
Cambria County	2/03/2007	Extreme Cold
Cambria County	2/07/2021	Extreme Cold
Cambria County	2/16/2007	Extreme Cold
Cambria County	3/6/2007	Extreme Heat
Cambria County	1/19/2008	Extreme Heat
Cambria County	2/10/2008	Extreme Heat
Cambria County	12/21/2008	Extreme Heat
Cambria County	1/15/2009	Extreme Cold
Cambria County	2/4/2009	Extreme Cold
Cambria County	3/2/2009	Extreme Cold
Cambria County	1/6/2014	Extreme Cold
Cambria County	1/28/2014	Extreme Cold
Cambria County	2/14/2015	Extreme Cold
Cambria County	2/19/2015	Extreme Cold
Cambria County	1/20/2019	Extreme Cold
Cambria County	1/30/2019	Extreme Cold

4.3.2.4 Future Occurrence

Extreme temperatures will continue to impact Cambria County in the future. Anthropogenic climate change is causing extreme climatic events to occur more frequently, suggesting that extreme temperatures are becoming a more threatening hazard as the impacts of climate change intensify. The annual average temperature has increased by 1.2˚F across the continental United States during the years 1986 to present compared to the time period 1901 to 1960 and temperatures are expected to continue rising. *Figure 14 - Observed and Projected Temperature Change for Pennsylvania* shows these projected changes in temperature for Pennsylvania based on climate models considering the possibilities of increased and decreased levels of greenhouse gas emissions. In recent years, record high temperatures have outnumbered record low temperatures 2:1 so it is expected that the risk of extreme heat will be amplified whereas the risk of extreme cold will be attenuated. The Northeastern United States is expected to experience twenty to thirty more days with temperatures above 90˚F, and twenty to thirty fewer days below freezing by approximately 2050. While there may be fewer extreme cold events, those that do occur are expected to reach record-setting low temperatures more often. Historically, Cambria County has had more extreme cold events than extreme heat events due to the geographic location of the county; however, this balance is expected to shift somewhat in the coming years to include a greater proportion of extreme heat events.

Figure 14 - Observed and Projected Temperature Change for Pennsylvania



Source: (Frankson et al., 2017)

4.3.2.5 Vulnerability Assessment

Extreme temperatures are usually a regional hazard when they occur. The very old (sixty-five years or older, accounting for 23.2% of Cambria County population) and the very young (five years or younger, accounting for 4.9% of Cambria County population) are most vulnerable to extreme temperatures due to risk factors, mobility challenges, and disabilities. Extreme temperatures can increase the demand for utility services, often resulting in an increased cost which some consumers may be unable to afford. The increased demand for services may cause a decrease in availability of these services or failure of the system. A decrease or failure of the utility system during extreme temperature events would put a large population at great risk. Extreme temperature events can also drastically increase the volume of emergency calls, potentially overwhelming the public safety communications center. Extreme heat events can also contribute to drought conditions, which in turn increase the risk of wildfire, as discussed in *Section 4.3.1*.

For a breakdown at a municipal level for ages vulnerable to extreme heat events, see the table below for more information.

Municipal Specific Proportion of Highly Vulnerable Population (United States Census, 2020)			
Municipality	**Age Demographic**	**Total**	**Population Percentage (%)**
Adams Township	Under 5 Years	282	4.9
	65 Years and Over	1,219	21.2
Allegheny Township	Under 5 Years	107	3.8
	65 Years and Over	369	13.1
Ashville Borough	Under 5 Years	0	0.0
	65 Years and Over	60	28.2
Barr Township	Under 5 Years	125	6.1
	65 Years and Over	402	19.6
Blacklick Township	Under 5 Years	39	2.1
	65 Years and Over	418	22.3
Brownstown Borough	Under 5 Years	15	2.2
	65 Years and Over	216	31.0
Cambria Township	Under 5 Years	215	3.7
	65 Years and Over	1,436	24.7
Carrolltown Borough	Under 5 Years	30	2.9
	65 Years and Over	154	14.7
Cassandra Borough	Under 5 Years	6	3.6
	65 Years and Over	20	12.6
Chest Township	Under 5 Years	13	2.8
	65 Years and Over	135	29.5
Chest Springs Borough	Under 5 Years	15	10.7
	65 Years and Over	23	16.7
Clearfield Township	Under 5 Years	159	9.9
	65 Years and Over	318	19.8
Conemaugh Township	Under 5 Years	54	2.8
	65 Years and Over	448	23.1
Cresson Borough	Under 5 Years	73	4.8
	65 Years and Over	290	19.0
Cresson Township	Under 5 Years	105	3.7
	65 Years and Over	619	21.8
Croyle Township	Under 5 Years	141	6.1
	65 Years and Over	526	22.8
Daisytown Borough	Under 5 Years	13	4.4
	65 Years and Over	70	23.4

Municipal Specific Proportion of Highly Vulnerable Population (United States Census, 2020)			
Municipality	**Age Demographic**	**Total**	**Population Percentage (%)**
Dale Borough	Under 5 Years	46	4.6
	65 Years and Over	178	17.7
Dean Township	Under 5 Years	16	4.8
	65 Years and Over	51	15.6
East Carroll Township	Under 5 Years	76	5.3
	65 Years and Over	296	20.8
East Conemaugh Borough	Under 5 Years	27	2.5
	65 Years and Over	250	23.1
East Taylor Township	Under 5 Years	63	2.6
	65 Years and Over	480	19.8
Ebensburg Borough	Under 5 Years	231	6.8
	65 Years and Over	745	21.9
Ehrenfeld Borough	Under 5 Years	12	6.0
	65 Years and Over	42	20.5
Elder Township	Under 5 Years	52	5.1
	65 Years and Over	353	34.3
Ferndale Borough	Under 5 Years	107	6.7
	65 Years and Over	277	17.9
Franklin Borough	Under 5 Years	17	6.2
	65 Years and Over	78	28.3
Gallitzin Borough	Under 5 Years	108	7.0
	65 Years and Over	238	15.5
Gallitzin Township	Under 5 Years	44	3.5
	65 Years and Over	236	18.5
Geistown Borough	Under 5 Years	61	2.6
	65 Years and Over	756	32.0
Hastings Borough	Under 5 Years	84	6.9
	65 Years and Over	256	21.1
Jackson Township	Under 5 Years	225	5.3
	65 Years and Over	949	22.4
Johnstown City	Under 5 Years	1,049	5.7
	65 Years and Over	3,866	21.0
Lilly Borough	Under 5 Years	63	7.2
	65 Years and Over	211	24.0
Lorain Borough	Under 5 Years	15	2.5
	65 Years and Over	96	16.3
Loretto Borough	Under 5 Years	8	0.7

Municipal Specific Proportion of Highly Vulnerable Population (United States Census, 2020)			
Municipality	**Age Demographic**	**Total**	**Population Percentage (%)**
	65 Years and Over	610	5.1
Lower Yoder Township	Under 5 Years	72	3.0
	65 Years and Over	776	32.5
Middle Taylor Township	Under 5 Years	15	2.3
	65 Years and Over	170	25.7
Munster Township	Under 5 Years	45	6.9
	65 Years and Over	122	18.7
Nanty Glo Borough	Under 5 Years	138	5.5
	65 Years and Over	610	24.3
Northern Cambria Borough	Under 5 Years	224	6.3
	65 Years and Over	527	14.8
Patton Borough	Under 5 Years	100	5.8
	65 Years and Over	286	16.6
Portage Borough	Under 5 Years	152	6.2
	65 Years and Over	561	22.8
Portage Township	Under 5 Years	202	5.9
	65 Years and Over	1,115	32.5
Reade Township	Under 5 Years	40	2.8
	65 Years and Over	280	19.4
Richland Township	Under 5 Years	575	4.7
	65 Years and Over	3,083	25.2
Sankertown Borough	Under 5 Years	30	4.8
	65 Years and Over	172	27.3
Scalp Level Borough	Under 5 Years	32	4.2
	65 Years and Over	249	33.5
South Fork Borough	Under 5 Years	53	5.6
	65 Years and Over	177	18.6
Southmont Borough	Under 5 Years	73	3.6
	65 Years and Over	627	30.7
Stonycreek Township	Under 5 Years	116	4.2
	65 Years and Over	781	28.2
Summerhill Borough	Under 5 Years	50	10.4
	65 Years and Over	102	21.4
Summerhill Township	Under 5 Years	106	4.6
	65 Years and Over	544	23.6
Susquehanna Township	Under 5 Years	77	4.1
	65 Years and Over	512	27.1

Municipal Specific Proportion of Highly Vulnerable Population (United States Census, 2020)			
Municipality	**Age Demographic**	**Total**	**Population Percentage (%)**
Tunnelhill Borough	Under 5 Years	7	3.6
	65 Years and Over	30	14.4
Upper Yoder Township	Under 5 Years	288	5.6
	65 Years and Over	1,338	26.0
Vintondale Borough	Under 5 Years	25	6.1
	65 Years and Over	69	16.9
Washington Township	Under 5 Years	28	3.4
	65 Years and Over	176	21.1
West Carroll Township	Under 5 Years	95	8.0
	65 Years and Over	255	21.5
Westmont Borough	Under 5 Years	204	4.1
	65 Years and Over	976	19.6
West Taylor Township	Under 5 Years	4	0.5
	65 Years and Over	195	26.8
White Township	Under 5 Years	83	8.9
	65 Years and Over	242	26.1
Wilmore Borough	Under 5 Years	15	7.3
	65 Years and Over	27	13.0
Cambria County	**Under 5 Years**	**6,545**	**4.9**
	65 Years and Over	**30,693**	**22.9**

Figure 15 - Average Minimum Temperature Trends for Pennsylvania

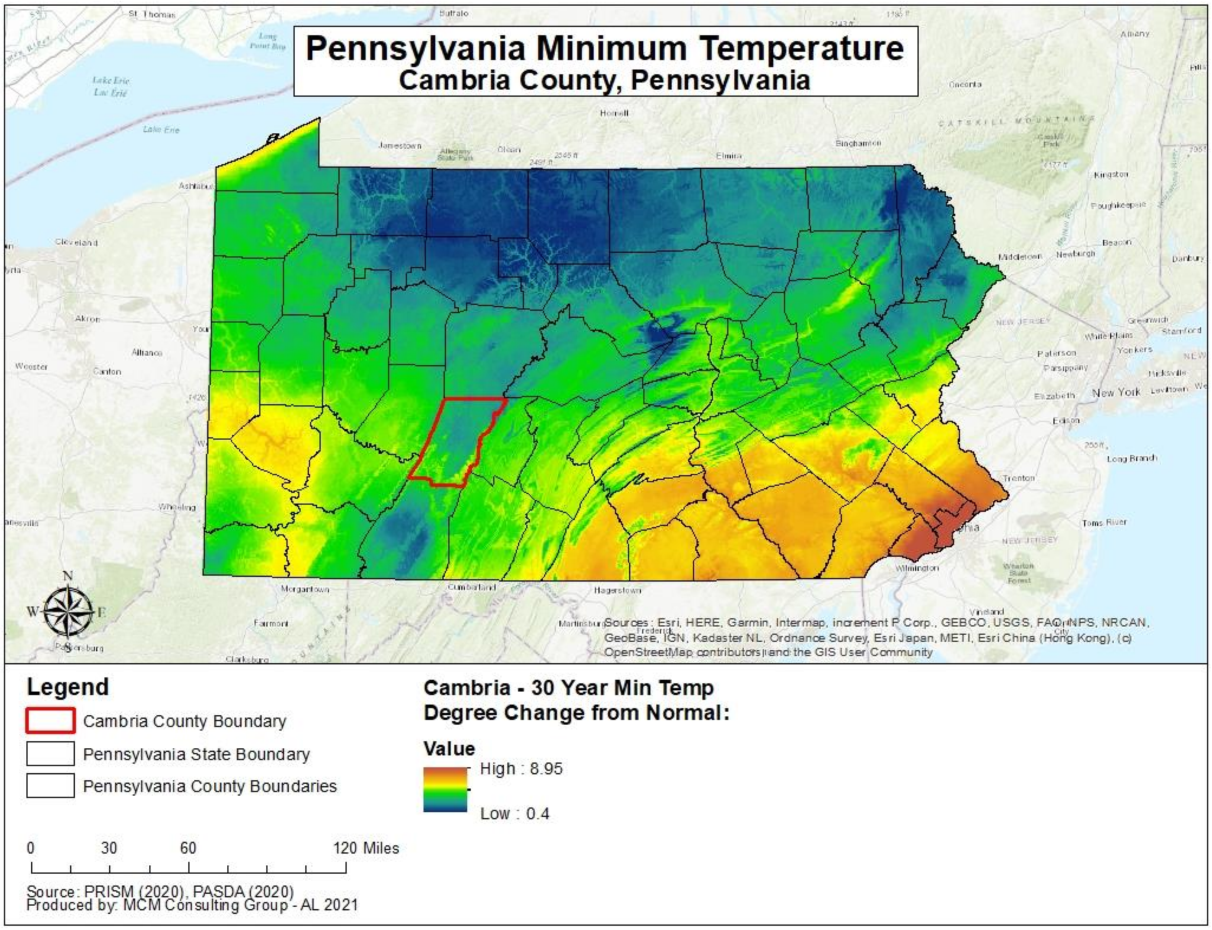
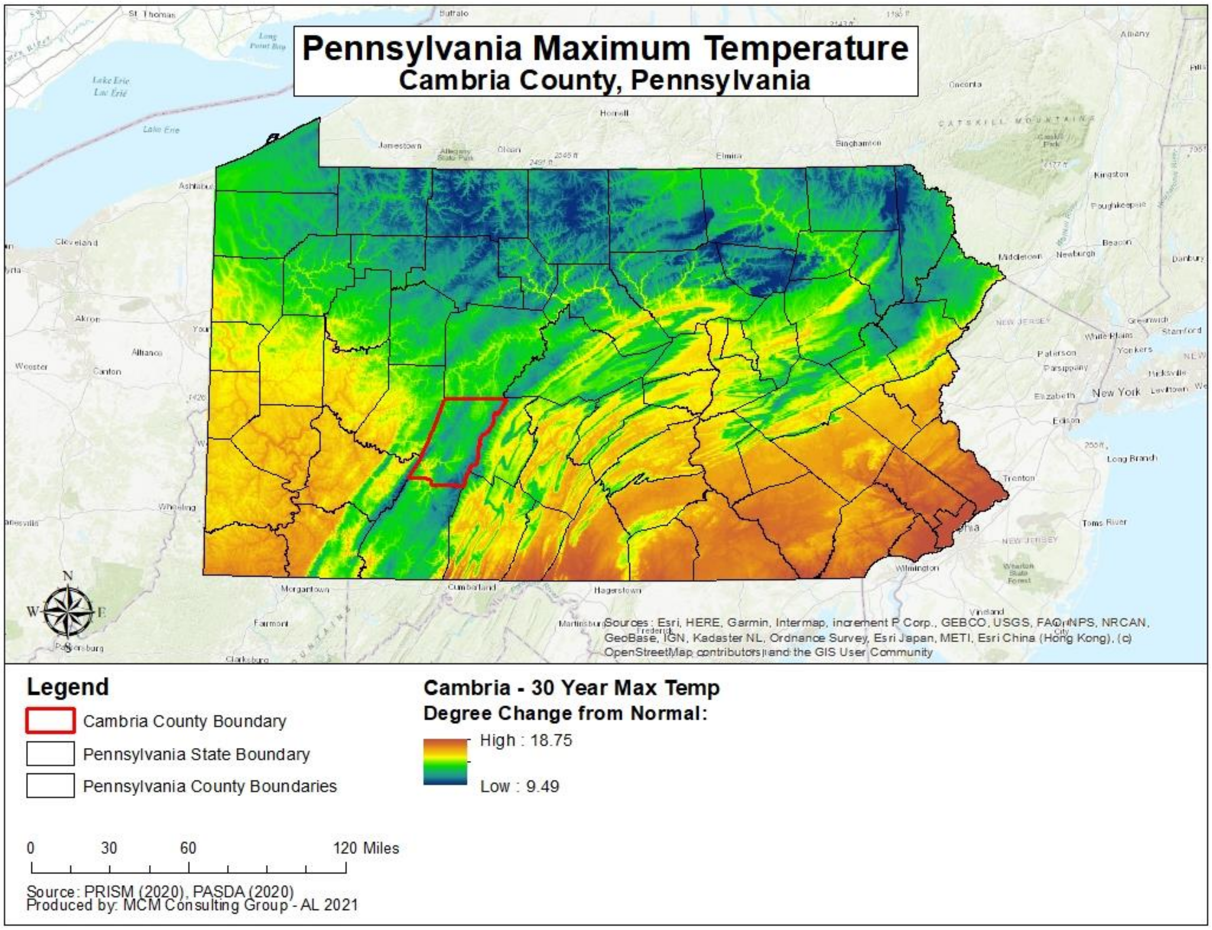


Figure 16 - Average Maximum Temperature Trends for Pennsylvania



4.3.3. Flooding, Flash Flooding, and Ice Jam Flooding

4.3.3.1 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 events are generally the result of excessive precipitation. General flooding is typically experienced when precipitation occurs over a given river basin for an extended period. Flash flooding is usually the result of heavy, localized precipitation falling in a short period of time over a given location, often in mountain streams and mountainous regions, and in urban areas where much of the ground is covered in impervious surfaces. Flash floods are relatively common in Cambria County and the severity of those flood events is dependent upon a combination of creek, stream, and river basin topography and physiography, hydrology, precipitation, and weather patterns. Present soil conditions, the degree of vegetative clearing, and the presence of impervious cover must also be considered when determining the severity of a flood or flood event.

Winter flooding can include ice jams, which occur when warm temperatures and heavy rain cause snow to melt rapidly. Snow melt combined with heavy rains can cause frozen rivers to swell, which breaks the ice layer on top of a river. The ice layer often breaks into large chunks, which float downstream, piling up in narrow passages and near other obstructions such as bridges and dams. All forms of flooding can damage infrastructure.

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 event. Flood recurrence intervals are explained in more detail in section 4.3.3.4. However, in assessing the potential spatial extent of flooding, it is important to know that a floodplain associated with a flood that has a 10% chance of occurring in a given year is smaller than a floodplain associated with a flood that has a 0.2% chance of occurring.

The National Flood Insurance Program (NFIP) publishes digital flood insurance rate maps (DFIRMs). These maps identify the 1% annual chance of flood area. The special flood hazard area (SFHA) and base flood elevations (BFE) are developed from the 1% annual chance flood event as seen in *Figure 17 – Flooding and Floodplain Diagram*. Structure located within the SFHA have a 26% chance of flooding in a thirty-year period. The SFHA serves as the primary regulatory boundary used by FEMA, the Commonwealth of Pennsylvania, and the Cambria County local government. Federal floodplain management regulations and mandatory flood insurance purchase requirements apply to the following high-risk special flood hazard areas in *Table 13 – Flood Hazard High Risk Zones*. Appendix D of this hazard mitigation plan includes a flooding vulnerability map for each municipality in Cambria County with vulnerable structures and critical infrastructure facilities identified using the most current DFIRM data for Cambria County.

Past flooding events have been primarily caused by heavy rains, which cause small creeks and streams to overflow their banks, often leading to road closures. Flooding poses a threat to functional needs facilities, agricultural areas, and those who reside or conduct business in the floodplain. The most significant hazard exists for facilities in the floodplain that process, use, or store hazardous materials. A flood could potentially release and transport hazardous materials throughout the area. Most flood damage to a property and structure located in the floodplain is caused by water exposure to the interior, high velocity water, and debris flow.

Figure 17 - Flooding and Floodplain Diagram

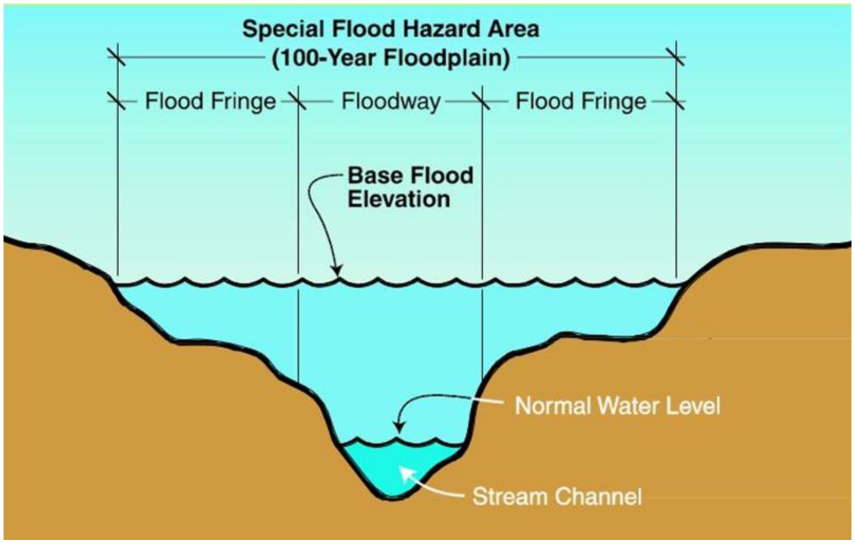


Table 13 - Flood Hazard High Risk Zones

Flood Hazard High Risk Zones	
Zone	**Description**
A	Areas subject to inundation by the 1% annual chance flood event. Because detailed hydraulic analysis has not been performed, no base flood elevations or flood depths are shown.
AE	Areas subject to inundation by the 1% annual chance flood event determined by detailed methods. BFEs are shown within these zones.
AH	Areas subject to inundation by the 1% annual chance shallow flooding (usually areas of ponding) where average depths are 1 – 3 feet. BFEs derived from detailed hydraulic analysis are shown in this zone.
AO	Areas subject to inundation by the 1% annual chance shallow flooding (usually sheet flow on sloping terrain) where average depths are 1 – 3 feet. Average flood depths derived from detailed hydraulic analysis are shown within this zone.

Flood Hazard High Risk Zones	
Zone	**Description**
AR	Areas that result from the decertification of a previously accredited flood protection system that is determined to be in the process of being restored to provide base flood protection.
Source: FEMA, 2017	

4.3.3.2 Range of Magnitude

The Conemaugh River Bain has caused significant flooding in Cambria County, specifically on the following streams, creeks, and their tributaries:

- Conemaugh River
  - Little Conemaugh River

Several factors determine the severity of floods, including rainfall intensity and duration, topography, ground cover, and the rate of snowmelt. Water runoff is greater in areas with steep slopes and little to no vegetative ground cover. The mountainous terrain of Cambria County can cause more severe floods as runoff reaches receiving water bodies more rapidly over steep terrain. The is of particular concern for areas along steep slopes and on the edges of valleys throughout Cambria County.

Urbanization typically results in the replacement of vegetative ground cover with impermeable surfaces like asphalt and concrete, increasing the volume of surface runoff and stormwater, particularly in areas with poorly planned stormwater drainage systems. A large amount of rainfall over a short time span can cause flash flood events. Additionally, small amounts of rain can cause floods in locations where the soil is still frozen, saturated from a previous wet period or if the areas is largely covered in impermeable surfaces such as parking lots, paved roadways, and other developed areas. The county occasionally experiences intense rainfall from tropical storms in later summer and early fall, which can potentially cause flooding as well.

Severe flooding can cause injuries and deaths and can have long-term impacts on the health and safety of citizens. Severe flooding can also result in significant property damage, potentially disrupting the regular function of functional needs facilities and can have widespread negative effects on local economies. Industrial, commercial, and public infrastructure facilities can become inundated with flood waters, threatening the continuity of government and business. The functional needs population must be identified and located in flooding situations, as they are often home bound. Mobile homes and manufactured structures are especially vulnerable to high water levels. Flooding can have significant environmental impacts when the flood water release and/or transport hazardous materials.

The most severe flooding in Central Pennsylvania and South-Central Pennsylvania has been associated with the Susquehanna River Basin. The greatest magnitude of county wide flooding impacts was reported as a result of Hurricane Agnes in 1972. Hurricane Agnes deposited a large amount of rain on Ohio, western Pennsylvania, northern West Virginia, and southwestern New York, with an average of 8 ½ inches of rain reported over most areas. This large amount of rain contributed to widespread and record setting flooding across the Commonwealth of Pennsylvania. Pennsylvania experienced an estimated $2.1 billion in damage and forty-eight deaths.

Flash floods can occur very quickly and with little warning. Flash flood can also be deadly because of the rapid rise in water levels and devastating flow velocities. The more developed areas in the county can be easily susceptible to flash floods because of the significant presence of impervious surfaces, such as streets, sidewalks, parking lots, and driveways.

Severe flooding also comes with secondary effects that could have long lasting impacts on the population, economy, and infrastructure within Cambria County. Power failures are the most common secondary effect associated with flooding. Coupled with a shortage of critical services and supplies, power failures could cause a public health emergency. Critical infrastructure, such as sewage and water treatment facilities, can fail, causing sewage overflows and the contamination of groundwater and drinking water. Flooding also has the potential to trigger other hazards, such as landslides, hazardous material spills, and dam failures.

The maximum threat of flooding for Cambria County is estimated by looking at the potential loss data and repetitive loss data, both analyzed in the risk assessment section of the hazard mitigation plan. In these cases, the severity and frequency of damage can result in permanent population displacement, and business may close if they are unable to recover from the disaster.

Estimation of potential loss is completed through FEMA's HAZUS software, A level two HAZUS scenario was performed for the entirety of Cambria County. A level two scenario is the standard scenario process for hazard mitigation, as it utilizes FEMA depth grid information. A level two scenario can also include first floor elevation and basic building statistics in the study region. The FEMA reports generated by the software at the end of the scenario were utilized to estimate the amount of damage and loss from a flood. The total building loss for a 100-year flood based on a HAZUS level two scenario is displayed in *Table 14 – HAZUS Building Economic Loss Figures*. The total business interruption values occurring from a proposed 100-year flood based on FEMA HAZUS data is illustrated in *Table 15 – HAZUS Business Interruption Economic Loss Figures*. *Figure 18 – Loss by Occupancy Type* illustrates the breakdown of economic losses by either residential, commercial, industrial, or other use type.

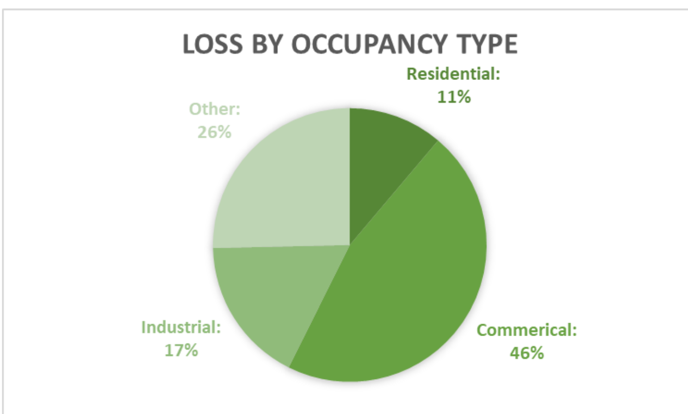
Table 14 - HAZUS Building Loss Figures

HAZUS Building Economic Loss Figures					
	Residential	**Commercial**	**Industrial**	**Other**	**Total**
Building:	$74,690,000.00	$75,470,000.00	$65,870,000.00	$13,570,000.00	$229,600,000.00
Content:	$41,820,000.00	$204,470,000.00	$156,100,000.00	$74,670,000.00	$477,070,000.00
Inventory:	$0*	$2,680,000.00	$19,450,000.00	$210,000.00	$22,340,000.00
Subtotal:	**$116,510,000.00**	**$282,610,000.00**	**$241,420,000.00**	**$88.450,000.00**	**$729,000,000.00**
Source: HAZUS, 2021					

Table 15 - HAZUS Business Interruption Economic Loss Figures

HAZUS business Interruption Economic Loss Figures					
	Residential	**Commercial**	**Industrial**	**Other**	**Total**
Income:	$4,180,000.00	$188,010,000.00	$16,810,000.00	$24,420,000.00	$233,430,000.00
Relocation:	$30,320,000.00	$59,800,000.00	$9,170,000.00	$16,980,000.00	$116,270,000.00
Rental Income:	$19,880,000.00	$35,560,000.00	$2,370,000.00	$2,870,000.00	$60,680,000.00
Wage:	$9,850,000.00	$183,000,000.00	$10,590,000.00	$278,060,000.00	$482,500,000.00
Subtotal:	**$64,220,000.00**	**$466,380,000.00**	**$38,940,000.00**	**$322,330,000.00**	**$891,870,000.00**
Source: HAZUS, 2021					

Figure 18 - Loss by Occupancy Type



Although floods can cause deaths, injuries, and damage to property, they are naturally occurring events that benefit riparian systems which have not been disrupted by human actions. Such benefits include groundwater recharge and the introduction of nutrient rich sediments which improves soil fertility. However, human development often disrupts natural riparian buffers by changing land use and land cover, and the introduction of chemical or biological contaminants that often accompany human presence and can contaminate habitats after flood events.

4.3.3.3 Past Occurrence

Cambria County has experienced numerous flooding, flash flooding, and ice jam events in the past. The flooding and flash flooding were caused by a variety of heavy storms, inclement weather, tropical storms, and other issues. A summary of recent flood event history for Cambria County from January 1996 to October 2021 is found in *Table 16 – Past Flood and Flash Flood Events*. Details of each event can be found in NOAA's National Center for Environmental Information (NCEI) database. Additional data was also acquired by examining Cambria County's Corvena™ Knowledge Center information from 1996 to 2021.

Table 16 - Past Flood and Flash Flood Events

Past Flood and Flash Flood Events			
Event Location	**Event Date**	**Event Type**	**Property Damage Estimate**
Cambria County (entire county)	07/19/1996	Flash Flood	$0*
City of Johnstown	08/21/1996	Flash Flood	$0*
Cambria County (entire county)	09/06/1996	Flash Flood	$0*
City of Johnstown	05/25/1997	Flash Flood	$0*
Cambria County (entire county)	11/07/1997	Flash Flood	$0*
Cambria County (entire county)	04/26/1998	Flash Flood	$0*
Cambria County (southern portion)	05/05/1998	Flash Flood	$0*
City of Johnstown	06/19/1998	Flash Flood	$0*
Cambria County (entire county)	01/23/1999	Flash Flood	$5,000.00*
City of Johnstown	04/22/1999	Flash Flood	$20,000.00*
City of Johnstown	06/03/2003	Flash Flood	$0*
City of Johnstown	11/19/2003	Flash Flood	$0*
Cambria County (entire county)	11/19/2003	Flood	$0*
Cambria County (entire county)	01/04/2004	Flood	$0*
Cambria County (entire county)	04/13/2004	Flood	$0*
City of Johnstown	06/16/2004	Flash Flood	$50,000.00*
Cambria County (entire county)	07/27/2004	Flood	$0*
Cambria County (entire county)	09/08/2004	Flood	$0*
Carrolltown Borough	09/17/2004	Flash Flood	$0*
Cambria County (entire county)	09/17/2004	Flood	$0*
Lilly Borough	05/31/2006	Flash Flood	$0*

Past Flood and Flash Flood Events			
Event Location	**Event Date**	**Event Type**	**Property Damage Estimate**
Ferndale Borough	08/09/2007	Flash Flood	$0*
Ebensburg Borough (county seat)	08/20/2007	Flash Flood	$0*
Nanty Glo Borough	08/23/2007	Flash Flood	$0*
Cresson Township	08/23/2007	Flash Flood	$0*
Northern Cambria Borough	06/20/2009	Flash Flood	$0*
Cresson Township	09/07/2011	Flood	$0*
Lower Yoder Township	05/27/2012	Flash Flood	$0*
Lorain Borough	08/08/2013	Flash Flood	$0*
Northern Cambria Borough	09/02/2013	Flash Flood	$200,000.00*
Portage Township	03/04/2015	Flood	$70,000.00*
City of Johnstown (airport)	06/15/2017	Flash Flood	$0*
City of Johnstown	06/16/2017	Flash Flood	$0*
Lower Yoder Township	06/16/2017	Flash Flood	$0*
City of Johnstown	07/07/2019	Flash Flood	$0*
City of Johnstown	07/07/2019	Flash Flood	$0*
		Total:	**$345,000.00***
Source: NCEI NOAA, 2021 *Property Damage Values are estimated and are not exact figures. Data from NCEI and Knowledge Center			

One of the country's worst flooding disasters occurred in Cambria County on May 31st, 1889. The Johnstown Flood was the direct result of the dam failure located near what is currently South Fork in Cambria County. The Johnstown Flood remains one of the deadliest flooding events ever to occur in the United States, especially one that is not tied to a hurricane or tropical storm. The Johnstown Flood resulted in approximately 2,209 deaths and approximately $490 million in property damage. More discussion regarding the Johnstown Flood and the dam failure that caused the event can be found in section 4.3.16. Dam Failure.

The National Flood Insurance Program (NFIP) identifies properties that frequently experience flooding. Repetitive loss properties are structures insured under the NFIP which have had at least two paid flood losses of more than $1,000 over any ten-year period since 1978. 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 repair, on average, equaled or exceeded 25% 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. *Table 17 – Repetitive Loss Properties* illustrates the communities that have repetitive loss properties, the total building payments, the contents payments, and the number of losses and properties. There are nineteen repetitive loss properties in Cambria County. *Table 18 – Summary of Type of Repetitive Loss Properties by Municipality* illustrates the breakdown of type of repetitive loss properties in Cambria County.

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. *Table 19 – Severe Repetitive Loss Properties* illustrates the communities within Cambria County that have severe repetitive loss properties, the total building payments, the contents payments, and the number of losses and properties. The data used in the table is based on data provided by PEMA.

Most municipalities in Cambria County participate in the NFIP. Information of each participating municipality can be found in *Table 20 – Municipal NFIP Policies & Vulnerability*.

At the time of this writing, the Municipal NFIP information was requested from PEMA but was not yet received. This information will be added to the following tables when it is available.

Table 17 - Repetitive Loss Properties

Repetitive Loss Properties						
Community Name	**Community Number**	**Cumulative Building Payment**	**Cumulative Contents Payment**	**Sum of Total Paid**	**Losses**	**Properties**
Dean Township	421440	$52,528.65	$5,110.54	$57,639.19	4	1
Ferndale Borough	421429	$38,004.36	$2,982.09	$40,986.45	5	2
City of Johnstown	420231	$74,035.81	$41,908.91	$115,944.72	13	6
Lower Yoder Township	420233	$2,871.12	$1,229.86	$4,100.98	2	1
Nanty Glo Borough	422610	$12,830.48	$7,555.05	$20,385.53	4	2
Patton Borough	420235	$34,795.87	$7,614.66	$42,410.53	8	3
Portage Township	421444	$1,207.18	$8,200.00	$9,407.18	2	1

Repetitive Loss Properties						
Community Name	**Community Number**	**Cumulative Building Payment**	**Cumulative Contents Payment**	**Sum of Total Paid**	**Losses**	**Properties**
Richland Township	422264	$1,112.90	$10,129.10	$11,242.00	3	1
Southmont Borough	420239	$3,133.32	$0.00	$3,133.32	2	1
Wilmore Borough	420244	$64,156.71	$1,527.17	$65,683.88	2	1
	Total:	**$284,676.40**	**$86,257.38**	**$370,933.78**	**45**	**19**
Source: PEMA, 2022						

Table 18 - Summary of Type of Repetitive Loss Properties by Municipality

Summary of Type of Repetitive Loss Properties by Municipality					
Municipality	**Type**				
	Non-Residential	**2-4 Family**	**Single Family**	**Condo**	**Other Residential**
Dean Township	0	0	1	0	0
Ferndale Borough	2	0	0	0	0
City of Johnstown	2	0	4	0	0
Lower Yoder Township	0	0	1	0	0
Nanty Glo Borough	1	0	0	0	0
Patton Borough	0	1	2	0	0
Portage Township	1	0	0	0	0
Richland Township	1	0	0	0	0
Southmont Borough	0	0	1	0	0
Wilmore Borough	0	0	1	0	0
Source: PEMA, 2022					

Table 19 - Severe Repetitive Loss Properties

Severe Repetitive Loss Properties (PEMA, 2022)						
Community Name	**Community Number**	**Cumulative Building Payments**	**Cumulative Contents Payments**	**Sum of Total Paid**	**Losses**	**Properties**
No Severe Repetitive Loss Properties in Cambria County.						
	Total:	**$**	**$**	**$**		

Table 20 - Municipal NFIP Policies & Vulnerability

Municipal NFIP Policies					
Community Name	**Community Number**	**Contract Count**	**Policy Count**	**Total Coverage**	**Premium and Policy Fee**
Dean Township	421440	4	4	$664,000.00	$9,669.00
Ferndale Borough	421429	20	20	$1,569,100.00	$20,811.00
City of Johnstown	420231	325	325	$74,407,000.00	$869,653.00
Lower Yoder Township	420233	5	5	$865,200.00	$2,205.00
Nanty Glo Borough	422610	10	10	$1,237,900.00	$8,392.00
Patton Borough	420235	14	14	$1,011,300.00	$9,345.00
Portage Township	421444	10	10	$1,648,100.00	$6,415.00
Richland Township	422264	10	10	$3,233,000.00	$6,492.00
Southmont Borough	420239	7	7	$1,430,000.00	$3,075.00
Wilmore Borough	420244	11	11	$1,149,900.00	$6,149.00
	Total:	**416**	**416**	**$86,617,900.00**	**$942,206.00**
Source: PEMA, 2022					

4.3.3.4 Future Occurrence

Flooding is a frequent problem throughout the Commonwealth of Pennsylvania. Cambria County will certainly be impacted by flooding events in the future, as Cambria County experiences some degree of flooding annually. The threat of flooding is compounded in the late winter and early spring months, as melting snow can overflow streams, creeks, and tributaries, increasing the amount of groundwater, clogging stormwater culverts and bridge openings. The NFIP recognizes the 1% annual chance flood, also known as the base flood of a one-hundred-year flood, as the standard for identifying properties subject to federal flood insurance purchase requirements. A 1% annual chance flood is a flood which has a 1% chance of occurring in a given year or is likely once every one-hundred years. The digital insurance maps (DFIRMs) are used to identify areas subject to the 1% annual chance of flooding.

A property's vulnerability to a flood is dependent upon its location in the floodplain. Properties along the banks of a waterway are the most vulnerable. The property within the floodplain is broken into sections depending on its distance from the waterway. The ten-year flood zone has a 10% chance of being flooded every year. However, this label does not mean that this area cannot flood more than once every ten years. This label simply designates the probability of flood which has a magnitude equal to that which occurs, on average, at ten-year intervals. In actuality, natural floods rarely occur at precise intervals in time. Further away from this area is the fifty-year floodplain. This area includes all of the ten-year floodplain plus additional property. The probability of a flood of this magnitude occurring during a one-year period is 2%. A summary of flood probability is shown in *Table 21 – Flood Probability Summary*.

Table 21 - Flood Probability Summary

Flood Probability Summary	
Flood Recurrence Intervals	**Annual Chance of Occurrence**
10-year	10.00%
50-year	2.00%
100-year	1.00%
500-year	0.20%
Source: FEMA, 2009	

4.3.3.5 Vulnerability Assessment

Riverine and Stream Flooding

Cambria County is vulnerable to stream and river flooding on an annual basis. Flooding puts the entire population at some level of risk, whether through flooding of homes, businesses, places of employment, roadways, sewers, and water infrastructure. Flooding can cause significant power outages and poor road conditions that can lead to heightened transportation accident risk.

Functional needs facilities and critical infrastructure are the most vulnerable buildings and services when riverine and stream flooding is considered. Functional needs facilities are facilities that, if damaged, would present an immediate threat to life, public health, and safety. Facilities that use and store hazardous materials pose a potential threat to the environment during flooding events if flooding causes a leak, inundation, or equipment failure. Appendix D of this hazard mitigation plan includes a flooding vulnerability map for each municipality in Cambria County, with vulnerable structures and functional needs facilities that are located within the special flood hazard area.

Table 22 – Expected Damage to Essential Facilities (HAZUS) illustrates the estimated damage levels to certain essential facilities based on classifications in the HAZUS General Building Stock. There are twelve facilities that are estimated to be at least moderately damaged by a 100-year flooding event in the HAZUS Level Two scenario that was completed for Clearfield County. Of those twelve facilities that are estimated to be moderately damaged by the scenario, ten of those facilities will undergo a loss of use. Four fire stations will experience a loss of use, as well as three police stations within the county. One hospital will experience a loss of use, and plans must be made to assist in the treatment of patients at alternate facilities if a flooding event of the magnitude in the scenario occurs. Also, two schools will experience enough damage to result in loss of use and the education of the students would need to be moved to another location until such a time that repairs can be completed. Plans for such an event, and the damage that would result to essential facilities, must be in place to successfully mitigate the potential disruption to critical facilities and functional needs facilities.

Table 22 - Expected Damage to Essential Facilities (HAZUS)

Expected Damage to Essential Facilities				
Classification	**Number of Facilities**			
	Total:	**At Least Moderate:**	**At Least Substantial:**	**Loss of Use:**
Emergency Operations Center	1	0	0	0
Fire Stations	55	5	0	4
Hospitals	5	1	0	1
Police Stations	37	3	0	3
Schools	64	3	0	2

Table 23 - County Structures Within Special Flood Hazard Area shows the number of site structure address points within the Special Flood Hazard Area as well as the critical infrastructure facilities and functional needs facilities. This information was compiled using the Special Flood Hazard Area and GIS data provided by the Cambria County GIS Department.

Table 23 - County Structures Within Special Flood Hazard Area

County Structures Within Special Flood Hazard Area			
Municipality	**Site Structure Address Points Within Flood Area**	**Critical Infrastructure Within Flood Area**	**Functional Needs within Flood Area**
Adams Township	180	1	0
Allegheny Township	4	0	0

County Structures Within Special Flood Hazard Area			
Municipality	**Site Structure Address Points Within Flood Area**	**Critical Infrastructure Within Flood Area**	**Functional Needs within Flood Area**
Ashville Borough	0	0	0
Barr Township	10	0	0
Blacklick Township	7	0	0
Brownstown Borough	0	0	0
Cambria Township	0	0	0
Carrolltown Borough	0	0	0
Cassandra Borough	6	0	0
Chest Township	0	0	0
Chest Springs Borough	0	0	0
Clearfield Township	6	0	0
Conemaugh Township	0	0	0
Cresson Borough	0	0	0
Cresson Township	0	0	0
Croyle Township	55	0	0
Daisytown Borough	0	0	0
Dale Borough	0	0	0
Dean Township	13	0	0
East Carroll Township	9	0	0
East Conemaugh Borough	1	0	0
East Taylor Township	26	0	1
Ebensburg Borough	1	0	0
Ehrenfeld Borough	1	0	0
Elder Township	1	0	0
Ferndale Borough	122	0	0
Franklin Borough	0	0	0
Gallitzin Borough	0	0	0
Gallitzin Township	5	0	0
Geistown Borough	18	0	0
Hastings Borough	5	0	0
Jackson Township	4	0	0
City of Johnstown	2,816	2	2
Lilly Borough	7	0	0
Lorain Borough	11	0	0
Loretto Borough	0	0	0
Lower Yoder Township	16	0	0
Middle Taylor Township	3	0	0

County Structures Within Special Flood Hazard Area			
Municipality	**Site Structure Address Points Within Flood Area**	**Critical Infrastructure Within Flood Area**	**Functional Needs within Flood Area**
Munster Township	0	0	0
Nanty Glo Borough	38	0	0
Northern Cambria Borough	122	0	0
Patton Borough	90	0	0
Portage Borough	49	0	0
Portage Township	32	0	0
Reade Township	23	0	0
Richland Township	0	0	0
Sankertown Borough	0	0	0
Scalp Level Borough	15	0	0
South Fork Borough	1	0	0
Southmont Borough	1	0	0
Stonycreek Township	202	1	0
Summerhill Borough	1	0	0
Summerhill Township	5	0	0
Susquehanna Township	14	0	0
Tunnelhill Borough	0	0	0
Upper Yoder Township	57	0	1
Vintondale Borough	22	0	0
Washington Township	2	0	0
West Carroll Township	11	0	0
Westmont Borough	0	0	0
West Taylor Township	23	0	0
White Township	27	0	0
Wilmore Borough	31	0	0
Totals:	**4,093**	**4**	**4**

Table 24 – Critical Infrastructure and Functional Needs Additional Information illustrates the additional information including name, the municipality, and the type of facility for each critical infrastructure and functional needs facilities that falls within the Special Flood Hazard Area for Cambria County. This information was compiled using Cambria County's GIS Information with the assistance of the Cambria County GIS Department.

Table 24 - Critical Infrastructure and Functional Needs Additional Information

Critical Infrastructure and Functional Needs Additional Information in Special Flood Hazard Area		
Type of Facility:	**Facility Name:**	**Municipality:**
Critical Infrastructure		
EMS Stations	Forest Hills EMS	Adams Township
Fire Departments	Johnstown Fire Dept. Station 36-2	City of Johnstown
	Johnstown Fire Dept. Station 36 HQ	City of Johnstown
	Riverside Fire Company Station 20	Stonycreek Township
Functional Needs Facilities		
Post Office	Johnstown Post Office	City of Johnstown
	Mineral Point Post Office	East Taylor Township
Schools	Greater Johnstown High School	City of Johnstown
	Saint Andrews School	Upper Yoder Township

Flash Flooding

Flash flooding is a common occurrence in Cambria County and can occur anywhere in the county. A large portion of flash flooding occurs in populated areas that have increased impervious ground cover. During the risk assessment process, numerous resources were utilized to determine flash flooding locations in Cambria County. Municipalities were asked to identify locations within the municipality that were prone to frequent flash flooding. The National Climatic Data Center was also queried to determine flash flood vulnerable areas. This data reflected in *Table 16 – Past Flood and Flash Flood Events* above.

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

- Carrolltown Borough
- City of Johnstown
- Ebensburg Borough
- Ferndale Borough
- Northern Cambria Borough

Although the above locations were identified as vulnerable areas in Cambria County, they are not the only locations that are vulnerable to flash flooding. The Cambria County Hazard Mitigation Team will continue to work with municipalities to identify vulnerable flash flooding locations and identify vulnerable functional needs populations and critical facilities.

4.3.4. Hailstorm

4.3.4.1 Location and Extent

Hail is possible within most thunderstorms. It is produced by cumulonimbus (storm clouds) and within two nautical miles of the parent storm. In the form of solid precipitation, hail is produced when an ice crystal collects additional water in the lower part of the storm but is pushed upward by the storm's updraft. The liquid water freezes in the upper regions of the storm, making the ice crystal larger, this is also known as a hailstone. The hail will continue to grow in this manner until its weight exceeds the force of the updraft. Hailstones can take the shape of balls or irregular lumps of ice.

Hailstorms are not limited to any particular geographic area of the county. Prediction of the duration of the storm nor the extent of area affected by such an occurrence can't be predicted.

4.3.4.2 Range of Magnitude

Hailstones can measure between 0.2 inches to six inches in diameter. The METAR (a format for reporting weather information, predominately used by pilots) reporting code for hail 0.20 inches or greater is GR, while smaller hailstones are coded GS. Hail that is larger than 0.80 inches are usually considered large enough to cause damage. The US National Weather Service will issue severe thunderstorm warnings when hail that is 1 inch or greater in diameter is expected.

National Oceanic and Atmospheric Administration Skywarn program requests trained Skywarn Spotters measure hail with a ruler, but if one is not available, related terms can be used. See *Table 25 - Size of Hail in Related Terms.* Hail should only be measured when it is safe to do so.

Table 25 - Size of Hail in Related Terms

Size of Hail in Related Terms	
Related Item	**Size of Hail**
BB	Less than 1/4”
Pea	1/4”
Dime	7/10”
Penny	3/4"
Nickel	7/8”
Quarter	1”
Half Dollar	1 1/4"
Walnut or ping-pong ball	1 1/2"
Golf ball	1 3/4"
Lime	2”
Tennis ball	2 1/2"
Baseball	2 3/4"
Large apple	3”

Size of Hail in Related Terms	
Related Item	**Size of Hail**
Softball	4"
Grapefruit	4 1/2"

Environmental and other impacts from hailstorms ranges from

- Crop production damage
- Flooding caused by accumulation of hail that blocks drains
- Loss of electric power
- Trees brought down
- Flash flooding; and
- Mudslides

4.3.4.3 Past Occurrence

In the 1960's the National Weather Service (NWS) developed the Skywarn® program. Skywarn® has trained weather spotters who provide reports of severe weather to NWS. These reports assist meteorologists to make life-saving warning decisions. Concerned citizens, amateur radio operators, truck drivers, emergency management personnel and others volunteer their time and energy to report hazardous weather impacting their communities.

Even with data from Doppler radar, satellite, and surface weather stations, NWS technology can't detect every instance of weather such as hail. So, reports from Skywarn® volunteers is a vital service for making warnings to those in the storm's path.

NOAA's National Weather Service storm prediction center reports on hail events for Cambria County are detailed in *Table 26 – National Weather Service Hail Reports*.

Table 26 - National Weather Service Hail Reports

National Weather Service Hail Reports			
Date	**Time**	**Location**	**Size (inches)**
05/17/1960	1500	Cambria County	2.5
06/06/1969	1230	Cambria County	0.75
06/26/1970	1520	Cambria County	1
07/11/1980	1825	Cambria County	1

National Weather Service Hail Reports			
Date	Time	Location	Size (inches)
05/11/1981	1345	Cambria County	1
10/01/1981	1530	Cambria County	0.75
07/08/1985	1440	Cambria County	1
07/08/1985	1455	Cambria County	0.75
07/09/1985	1500	Cambria County	1
07/07/1989	1815	Cambria County	1.75
04/01/1993	1330	Southmont	1
05/12/1993	1416	Johnstown	1.5
07/20/1994	1620	Geistown	0.75
06/03/1995	1739	Ebensburg	0.75
07/15/1995	2030	Belsano	0.75
06/14/1996	1543	Johnstown	Not Reported
07/03/1996	225	Ebensburg	0.75
05/03/1997	1458	Lilly	0.75
05/05/1998	1740	Johnstown	0.75
05/06/2003	1823	Belsano	1.5
05/10/2003	328	Johnstown	1
08/27/2003	850	Hastings	1
05/07/2004	1010	Ashville	1
06/01/2004	1232	Ebensburg	0.88

National Weather Service Hail Reports			
Date	**Time**	**Location**	**Size (inches)**
06/13/2007	1605	Johnstown	0.88
08/23/2007	1417	Plattsville	0.88
06/22/2008	2245	Nanty Glo	1
07/24/2008	1317	Glasgow	0.88
04/25/2010	1520	Ebensburg	1
04/25/2010	1542	Vinco	0.88
05/14/2010	1445	Belmont	1.75
05/31/2010	1523	Buckhorn	1
10/11/2010	1905	Glasgow	1
06/09/2011	1438	Mundys Corner	1
05/27/2012	1653	Ebensburg	0.75
09/02/2013	1800	Barnesboro	0.88
05/13/2014	1820	Brookdale	1
07/13/2014	1612	Johnstown	0.88
07/13/2014	1703	Mundys Corner	1
04/20/2015	1652	Nicktown	0.88
05/06/2015	1549	Portage	1
07/25/2016	1454	Barnesboro	1
05/15/2018	1305	Portage	1
05/15/2018	1320	Bens Creek	1.25

National Weather Service Hail Reports			
Date	**Time**	**Location**	**Size (inches)**
05/23/2019	2017	Johnstown	1
05/28/2019	1442	Beaver Valley	2
05/28/2019	1510	Clover	1.5

It should be noted that all occurrences of hail in Cambria County may not have been recorded in the table above. This is due to lack of reports to the NWS, either because the hail happened at: locations uninhabited, during overnight hours, or residents that observed the hail were not Skywarn® spotters.

4.3.4.4 Future Occurrence

Hailstorms are associated with thunderstorms and should be considered highly likely for Cambria County. While death and severe injury are rarely attributed to hailstorms, they still pose a threat to unsheltered peoples, vehicles, livestock, crops, and even structures, so vulnerability to the hazard should continue to be monitored. Cambria County should expect to see moderate hailstorm weather events, and the hazards which they entail, perpetuate.

4.3.4.5 Vulnerability Assessment

Hailstorms are associated with thunderstorms and should be considered highly likely for Cambria County. While death and severe injury are rarely attributed to hailstorms, they still pose a threat to unsheltered peoples, vehicles, livestock, crops, and even structures, so vulnerability to the hazard should continue to be monitored. Cambria County should expect to see moderate hailstorm weather events, and the hazards which they entail, perpetuate.

Hailstorms can have a large impact on cars, passenger vehicles, and trucks within Cambria County. The vulnerability of transportation vehicles is directly related to the number of those vehicles and the storage of those vehicles when not in use. There is approximately 135,617 total registered vehicles in Cambria County based on information released by the Pennsylvania Department of Motor Vehicles for their last reporting year in 2021. Of those vehicles, 81,515 were passenger vehicles not related to trucking or transportation of goods. Not all of those vehicles would be vulnerable to a hailstorm at any one time, because of parking location and storage of vehicles in garages or covered areas. Also, not all vehicles registered in the county are driven every day. That being said, the total vulnerability of vehicles to hail in Cambria County is quite high and should be examined in greater detail in the next planning period. A greater examination of the economic impact of a hailstorm on cars and motor vehicles would provide a greater view of how this could affect the residents and travelers in Cambria County.

4.3.5. Hurricane and Tropical Storm

4.3.5.1 Location and Extent

Cambria 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 39 miles per hour (mph). The system becomes a tropical storm when the maximum sustained winds reach between 39 and 74 miles per hour. When wind speeds exceed 74 mph, the system is considered a hurricane. Tropical storms impacting Cambria County develop in tropical or sub-tropical waters found in the Atlantic Ocean, Caribbean Sea, or Gulf of Mexico. Another type of tropical storms is a nor'easter, which is a large cyclone that rotates clockwise and is 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 Cambria County is located about 200 miles inland of the East Coast of the United States, tropical storms can track inland and cause heavy rainfall and strong winds. Cambria County is located inland of the East Coast region, designated by FEMA, as being Hurricane-Susceptible (see *Figure 19 – Pennsylvania Wind Zones*). Cambria County falls within the wind zone three. Zone three suggests that shelters and critical facilities should be able to withstand winds up to 110 miles per hour. Tropical storms and hurricanes are regional and seasonal events that can impact very large areas that are hundreds to thousands of miles across over the life of the storm. Hurricane and tropical storm seasons are typically from June to November. All communities within Cambria County are equally subject to the impacts of hurricanes and tropical storms that track near the county. Areas in Cambria County which are subject to flooding, wind, and winter storm damage are particularly vulnerable.

4.3.5.2 Range of Magnitude

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 Cambria County. Expected damage from hurricane force winds is measured using the Saffir-Simpson Scale (*Table 27 - 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 results in dangerous winds with some damage, while a category two storm results in extremely dangerous winds with extensive damage. 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. In Cambria County, wind impacts from tropical events include downed trees and utility poles which cause utility interruptions. Wind impacts are an additional issue associated with mobile homes due to structures not being well-anchored. Additionally, these storms can produce high volumes of rainfall in Cambria County 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 four.

Table 27 - Saffir-Simpson Scale

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

4.3.5.3 Past Occurrence

Error! Reference source not found. *Impacting Cambria County* lists all coastal storms that have i mpacted Cambria County from 1954 to 2021.

Hurricane Irene and Tropical Storm Lee were two events that impacted and caused damage to the Commonwealth as a whole. Although they are separate events, Hurricane Irene and Tropical Storm Lee together caused significant rainfall to occur due to how close the events took place. First, Tropical Storm Lee caused significant flooding in the central and eastern counties in Pennsylvania, with wind damage that caused utility outages for 1-2 days. Then, Hurricane Irene caused additional flooding with utility interruptions for 5-8 days. Many flooding events took place in Pennsylvania over the duration of the storms.

Table 28 - History of Coastal Storms Impacting Cambria County

History of Coastal Storms Impacting Cambria County (NOAA 2021)			
Year	Name	Category at Time of Cambria County Impact	Wind Speed at Time of Cambria County Impact
1954	Hurricane Hazel	Extratropical Storm	70 Knots
1955	Hurricane Connie	Tropical Storm	45 Knots
1959	Hurricane Gracie	Extratropical Storm	25 Knots
1963	Unnamed Tropical Storm	Tropical Depression	25 Knots
1979	Hurricane David	Tropical Storm	40 Knots
1979	Hurricane Frederic	Tropical Storm	35 Knots
1996	Hurricane Fran	Tropical Depression	30 Knots
1999	Hurricane Dennis	Tropical Depression	20 Knots
2002	Hurricane Isidore	Extra Tropical Storm	20 Knots
2003	Hurricane Isabel	Tropical Storm	50 Knots
2004	Hurricane Frances	Extra Tropical Storm	30 Knots
2012	Hurricane Sandy	Extra Tropical Storm	50 Knots
2018	Hurricane Florence	Extra Tropical Storm	25 Knots

4.3.5.4 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 29 – Annual Probability of Wind Speeds* shows the annual probability of winds that reach the strength of tropical storms and hurricanes in Cambria 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 Cambria County will experience winds from coastal storms that could cause minimal to moderate damages. The future probability of a tropical storm or hurricane will be approximately once every five years, or 20% chance annually. The probability of winds exceeding 118 mph is less than 0.1% annually.

Table 29 - Annual Probability of Wind Speeds

Annual Probability of Wind Speeds (FEMA, 2000)		
Wind Speed (mph)	Saffir-Simpson Scale	Annual Probability of Occurrence (%)
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

Annual Probability of Wind Speeds (FEMA, 2000)		
Wind Speed (mph)	Saffir-Simpson Scale	Annual Probability of Occurrence (%)
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, all which impact the future of Cambria County.

4.3.5.5 Vulnerability Assessment

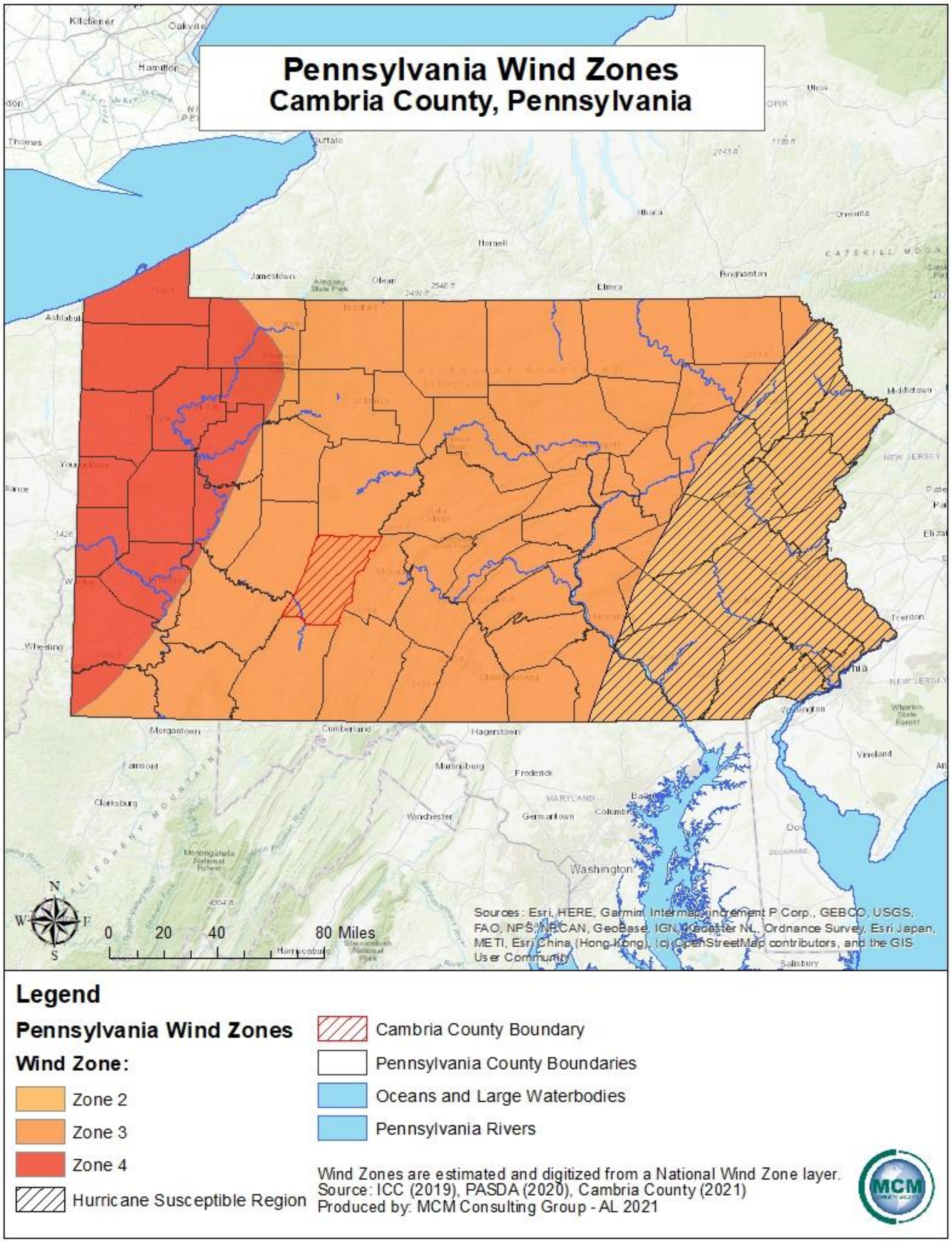
The impacts of climatic change are no longer hypothetical concepts set in the future, but rather tangible and hazardous realities. Tropical storms tracking nearby Cambria County can not only cause high winds but can also cause heavy rains to occur. A vulnerability assessment for hurricanes and tropical storms focusses on the impacts of flooding and severe winds. Flooding associated from hurricanes/tropical storms can occur in areas throughout Cambria County which can cause great loss and damage to buildings and other structures. The assessment for flood-related vulnerability is addressed in Section 4.3.3, and discussion of wind related vulnerability is addressed in Section 4.3.12.

Based on the information included in Section 4.3.3 related to flooding and HAZUS scenarios, the number of critical infrastructure that could be impacted by a 100-year flood event is twelve separate facilities for Cambria County. Five fires stations would be moderately impacted by a flood with that recurrence interval, one hospital would be moderately impacted, and three fire stations and schools would be impacted by that event. This table can be seen in greater detail in Section 4.3.3.5. A total of four critical infrastructure locations are located in the FEMA regulatory flood area for Cambria County and a total of four functional need facilities are also within that flood area. This table can also be seen in Section 4.3.3.5 of this hazard mitigation plan. A listing of these locations and more details can be found in Section 4.3.3.5 (*Table 24 – Critical Infrastructure and Functional Needs Additional Information*).

Mobile homes are at a greater vulnerability during a hurricane or tropical storm because those locations could be less well anchored to the ground than typical homes constructed with footings and foundations. High wind events make these locations particularly vulnerable because of sustained gale-force winds that can be associated with hurricanes and tropical storms. Mobile homes and improperly anchored homes can be found in locations throughout the county, and these are common around the entire Commonwealth of Pennsylvania.

Due to the impact of the devastating hurricanes and tropical storms, the vulnerability for Cambria County is high. Two kinds of vulnerable economic losses were determined: direct building loss and business interruption loss. Direct building loss consists of direct damage to any structure. Business interruption loss consists of relocation, employee wage loss, expenses, income loss, etc. With Cambria County, the county is highly vulnerable when it comes to the loss of buildings and other related items. The total business interruption for Cambria County equates to 891.9 million USD in total loss due to hurricane and tropical storm related hazards. Therefore, the vulnerability for building and business interruption is high for Cambria County.

Figure 19 - Pennsylvania Wind Zones



4.3.6. Invasive Species

4.3.6.1 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 can cause environmental and economic harm and pose a threat to human health. Often, an invasive species spreads and reproduces quickly. Invasive species are not limited to organisms that come from a foreign country. Invasive species can come from a different region in the United States. The main instigator of invasive species is human activity. 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 but are not limited to:

- 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
- Hobby trading or specimen trading

The Governor's Invasive Species Council of Pennsylvania (PISC), the lead organization for invasive species threats, recognizes two types of invasive species: Aquatic and Terrestrial.

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.

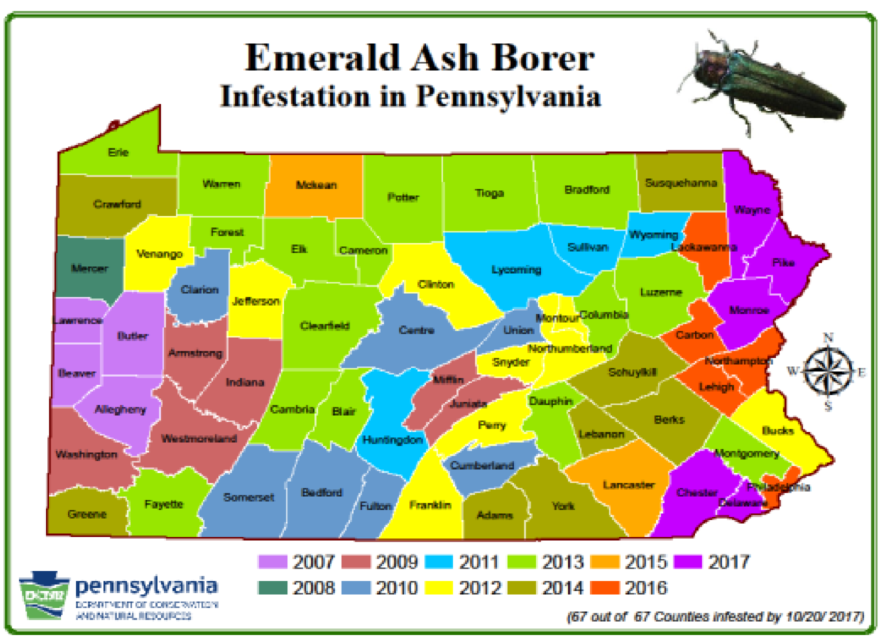
Terrestrial Invasive Species (TIS) are nonnative plants, vertebrates, arthropods, or pathogens that complete their lifecycle on land instead of in an aquatic environment and whose introduction does or is likely to cause economic/environmental damage or harm to human health.

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. For example, kudzu vine is an aggressive vascular plant. With wide ecological parameters and ease of spread, the vine is a more widespread invasive species threat. Other species' spread, such as the spotted lantern fly, has been limited by state agency activity. First discovered in Berks County in 2014, the spotted lantern fly was placed under a quarantine by the Pennsylvania Department of Agriculture in thirteen counties. *Table 30 - Prevalent Invasive Species* lists invasive species that have been found in Cambria County.

4.3.6.2 Range of Magnitude

The magnitude of invasive species threats ranges from nuisance to widespread killer. Some invasive species are not considered agricultural pests, and do not harm humans or cause significant ecological problems. For example, Brown Marmorated Stink Bugs are not considered to be an agricultural pest and do not harm humans. Other invasive species can have many negative impacts and cause significant changes in the composition of ecosystems. For example, the Emerald Ash Borer creates a 99% mortality rate in any ash tree it infects. 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 in Pennsylvania is the Emerald Ash Borer in Cambria County and the surrounding region (see *Figure 20 - Emerald Ash Borer Infestation in Pennsylvania*).

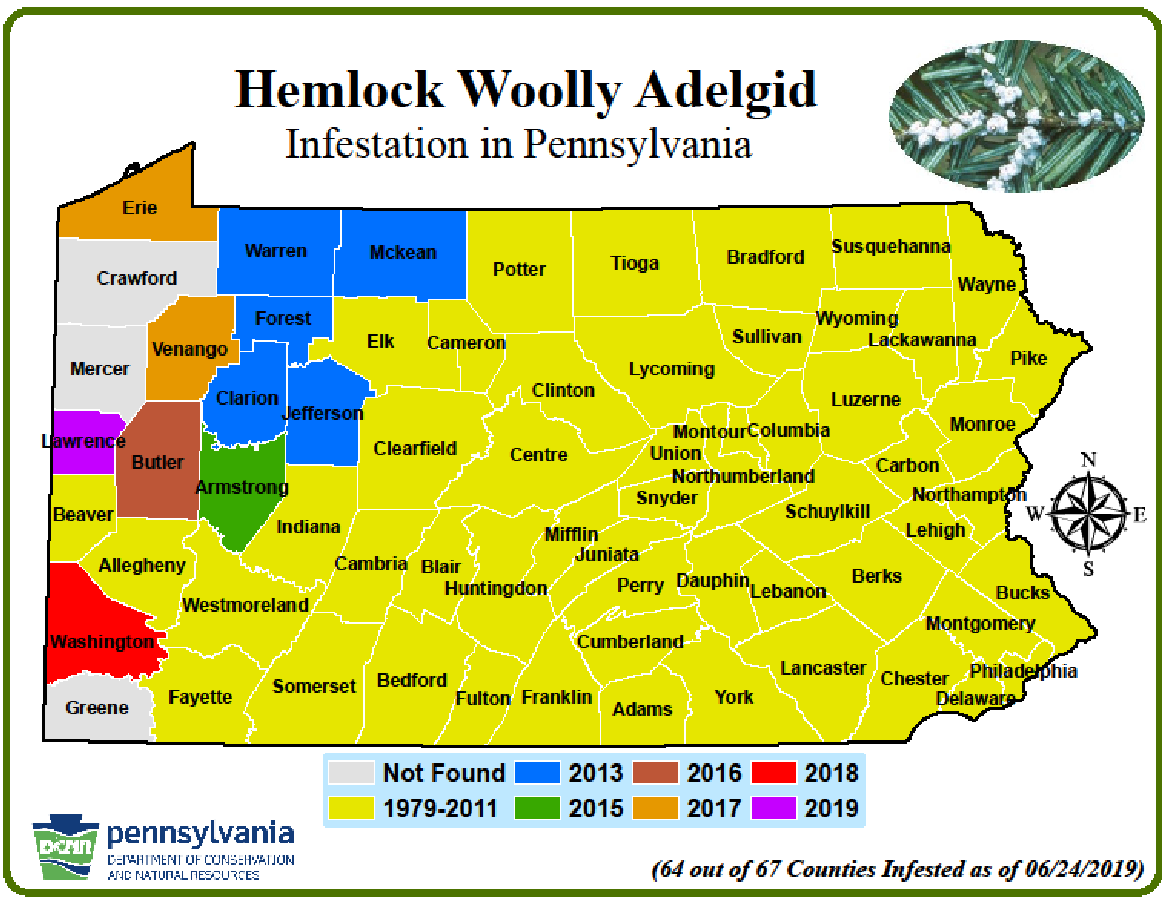
Figure 20 - Emerald Ash Borer Infestation in Pennsylvania



Another example of an invasive pest is the hemlock woolly adelgid. Hemlock woolly adelgid is a fluid-feeding insect that feeds on hemlock trees throughout eastern North America, including

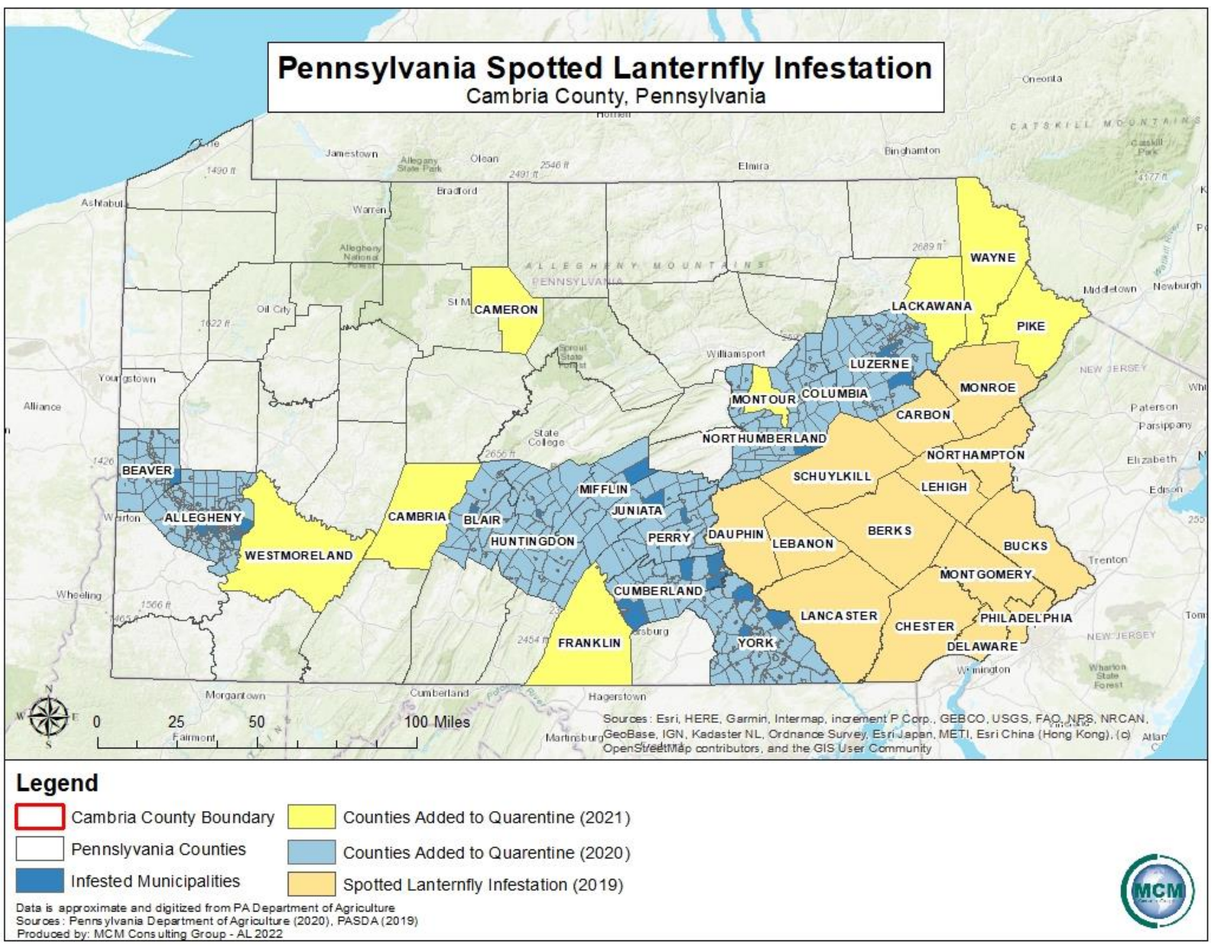
Pennsylvania. The egg sacs of these insects look like the tips of cotton swabs clinging to the undersides of hemlock branches. Hemlock woolly adelgid was introduced from Asia into the Pacific Northwest in 1924. It is likely to have been introduced into the northeastern United States in the 1950s, and it was first discovered in Pennsylvania in 1967. To date, sixty-four counties in Pennsylvania, including Cambria County, have been infested with this insect. See *Figure 21 - 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).

Figure 21 - Hemlock Woolly Adelgid Infestation in Pennsylvania



A final example of an invasive species is the Spotted Lanternfly. The Spotted Lanternfly is a harmful invasive species which feeds on plants, damaging or destroying them. This can negatively impact the areas of Pennsylvania known for outdoor scenery and activities. According to the Penn State Extension, the Spotted Lanternfly is a significant threat to Pennsylvania agriculture, landscapes, and natural ecosystems, including grape, tree-fruit, hardwood, and nursery industries, which collectively are worth nearly $18 billion to the state's economy, outdoor recreation, and biodiversity. The State Department of Agriculture gives the total number of infected counties as 34, as of March 2021. *Figure 22 – Pennsylvania Spotted Lanternfly Infestation* illustrates the counties in Pennsylvania that are considered to be in the quarantine zone for this pest.

Figure 22 - Pennsylvania Spotted Lanternfly Infestation in Pennsylvania



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

4.3.6.3 Past Occurrence

Invasive species have been entering Pennsylvania since the arrival of European settlers, but not all occurrences required government action. Cambria County is known for its great number of geographic features. There are various state game lands within the area which include state game lands 26, 42, 60, 79, 108, 120, 158, 184, 198, and 279. Prince Gallitzin state park and part of Laurel Ridge state park are in the county. A portion of Gallitzin state forest and other well-known areas in the county have significant amounts of forest land and lakes which species may invade. Due to the vast area of forests, there are many invasive terrestrial species that have been widespread in Cambria County that are common problems throughout the Commonwealth. Some of the most popular problematic species in Cambria County include but are not limited to:

- Emerald Ash Borer
- Brown Marmorated Stink Bug
- Japanese Beetle
- Hemlock Wooly Adelgid
- Spotted Lanternfly
- Garlic Mustard

Many of the extreme problematic species have been around for many years. However, the most recent problematic species are the Emerald Ash Borer, Hemlock Wooly Adelgid, and the Spotted Lanternfly. In 2007, both the Emerald Ash Borer and Hemlock Wooly Adelgid were both newly spotted species that caused extreme damage. Even more recently than 2007, the Spotted Lanternfly appeared in Cambria County. In 2014, this invasive species welcomed itself to Pennsylvania, however, it was not until 2021 that Cambria County had entered the quarantine zone for the Spotted Lanternfly infestation.

Table 30 - Prevalent Invasive Species lists problematic non-native species that are established in Cambria County. While all species listed here are not native to Cambria County, those species highlighted in red are considered to pose a more severe ecological threat than some of the others (Rank 1), species highlighted in yellow are considered to pose a significant ecological threat but not considered to spread as easily and aggressively (Rank 2), and species highlighted in green are considered to pose a lesser ecological threat (Rank 3).

Table 30 - Prevalent Invasive Species

Prevalent Invasive Species (EDDMaps, 2021; iMapInvasives, 2021; PA DCNR, 2019)		
Scientific Name	**Common Name**	**Type**
Achillea Millefolium	Common Yarrow	Plant
Agrostis capillaris	Colonial Bentgrass	Plant
Agrostis gigantea	Giant Bentgrass	Plant
Ailanthus altissima	Tree-of-Heaven	Plant
Alliaria petiolata	Garlic Mustard	Plant
Alnus glutinosa	European Alder	Plant
Anthoxanthum odoratum	Sweet Vernal Grass	Plant
Arctium minus	Lesser Burdock	Plant
Berberis thunbergii	Japanese Barberry	Plant
Brassica nigra	Black Mustard	Plant
Bromus inermis	Smooth Brome	Plant
Cardamine hirsuta	Hairy Bittercress	Plant
Celastrus orbiculatus	Oriental Bittersweet	Plant
Centaurea biebersteinii	Spotted Starthistle	Plant
Cipangopaludina chinensis	Chinese Mysterysnail	Invertebrate
Cipangopaludina japonica	Japanese Mysterysnail	Invertebrate
Cirsium arvense	Canada Thistle	Plant
Cirsium vulgare	Bull Thistle	Plant
Clinopodium vulgare	Wild Basil	Plant
Conium maculatum	Poison-hemlock	Plant
Corbicula fluminea	Asiatic Clam	Invertebrate
Coronilla varia	Common Crown-vetch	Plant
Cyprinus carpio	Common Carp	Animal
Daucus carota	Wild Carrot	Plant
Dipsacus fullonum	Wild Teasel	Plant
Elaeagnus umbellata	Autumn Olive	Plant
Epipactis helleborine	Eastern Helleborine	Plant
Fallopia japonica var. japonica	Japanese Knotweed	Plant
Festuca rubra	Red Fescue	Plant
Galium mollugo	Great Hedge Bedstraw	Plant
Glechoma hederacea	Ground-Ivy	Plant
Hemerocallis fulva	Orange Daylily	Plant
Hesperis matronalis	Dame's Rocket	Plant
Hieracium aurantiacum	Orange Hawkweed	Plant
Hieracium caespitosum	Meadow Hawkweed	Plant
Holcus lanatus	Common Velvetgrass	Plant

Prevalent Invasive Species (EDDMaps, 2021; iMapInvasives, 2021; PA DCNR, 2019)		
Scientific Name	**Common Name**	**Type**
Humulus japonicus	Japanese Hop	Plant
Hypericum perforatum	Common St. John's-wort	Plant
Hypochaeris radicata	Spotted Cat's-ear	Plant
Iris pseudacorus	Yellow Iris	Plant
Leucanthemum vulgare	Oxeye Daisy	Plant
Linaria vulgaris	Butter-and-Eggs	Plant
Lolium pratense	Meadow Fescue	Plant
Lonicera morrowii	Morrow's Honeysuckle	Plant
Lonicera spp	Invasive Honeysuckle	Plant
Lotus corniculatus	Garden Bird's-Foot-Trefoil	Plant
Medicago lupulina	Black Medic	Plant
Melilotus officinalis	Sweet Clover	Plant
Microstegium vimineum	Japanese Stiltgrass	Plant
Myosotis scorpioides	True Forget-Me-Not	Plant
Persicaria perfoliata	Mile-a-Minute-Weed	Plant
Phalaris arundinacea	Reed Canary Grass	Plant
Phleum pratense	Meadow Timothy	Plant
Plantago lanceolata	English Plantain	Plant
Poa compressa	Canada Bluegrass	Plant
Poa pratensis	Kentucky Bluegrass	Plant
Polygonum caespitosum	Oriental Lady's-Thumb	Plant
Ranunculus acris var. acris	Tall Buttercup	Plant
Ranunculus repens	Creeping Buttercup	Plant
Rorippa sylvestris	Creeping Yellowcress	Plant
Rosa multiflora	Multiflora Rose	Plant
Rumex acetosella	Sheep Sorrel	Plant
Rumex crispus	Curly Dock	Plant
Rumex obtusifolius	Bitter Dock	Plant
Saponaria officinalis	Bouncing-bet	Plant
Solanum dulcamara	Climbing Nightshade	Plant
Spiraea japonica	Japanese Spiraea	Plant
Trachemys scripta elegans	Red-eared Slider	Amphibian
Tragopogon dubius	Meadow Goat's-beard	Plant
Trifolium repens	White Clover	Plant
Tussilago farfara	Colt's-foot	Plant
Verbascum thapsus	Common Mullein	Plant

Prevalent Invasive Species (EDDMaps, 2021; iMapInvasives, 2021; PA DCNR, 2019)		
Scientific Name	**Common Name**	**Type**
Veronica officinalis	Common Speedwell	Plant
Vinca minor	Lesser Periwinkle	Plant
Viviparus georgianus	Banded Mysterysnail	Invertebrate

4.3.6.4 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. In 2017, Pennsylvania alone imported over $83 billion in goods from abroad, including agricultural, forestry, and fishery goods that commonly carry unknow pests. Climate change is contributing to the introduction of new invasive species. As maximum and minimum seasonal temperatures change, pests can 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. In order to combat the increase in future occurrences, the PISC 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.

There are several invasive species that are found near Cambria County but have not yet been formally detected inside the county (see *Table 31 – Future 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 in the future. Once a species is established, it is more difficult to eradicate it from an ecosystem, so prevention is very important. The development of appropriate plans will assist the county in reducing the possibility of a future encounter with any of these species. Working toward keeping these species from entering the area would be beneficial to the forests of Cambria County.

Table 31 - Future Vulnerable Species

Future Vulnerable Species (EDDMaps, 2021; PA DCNR, 2019; iMapInvasives, 2021)		
Scientific Name	**Common Name**	**Type**
Abutilon theophrasti	Velvetleaf	Plant
Acer platanoides	Norway Maple	Plant
Acorus calamus	Sweetflag, Calamus	Plant
Aegopodium podagraria	Hemlock Woolly Adelgid	Plant
Agrostis capillaris	Colonial Bentgrass	Plant
Allium vineale	Field Garlic	Plant
Alosa pseudoharengus	Alewife	Animal
Artemisia vulgaris	Mugwort	Plant
Bromus tectorum	Cheatgrass	Plant
Carassius auratus	Goldfish	Animal
Cardamine impatiens	Touch-me-not Bittercress	Plant
Carduus nutans	Musk Thistle	Plant
Catalpa speciosa	Northern Catalpa	Plant
Centaurea jacea	Brown Starthistle	Plant
Chelidonium majus	Greater Celandine	Plant
Cichorium intybus	Chicory	Plant
Commelina communis	Asiatic Dayflower	Plant
Convallaria majalis	European Lily-of-the-valley	Plant
Craspedacusta sowerbyi	Freshwater Jellyfish	Animal
Dactylis glomerata	Orchard Grass	Plant
Didymosphenia geminata	Didymo	Plant
Dipsacus spp. (species unknown)	Teasel (species unknown)	Plant
Elaeagnus angustifolia	Russian Olive	Plant
Etheostoma blennioides	Greenside Darter	Animal
Euonymus alatus	Burning Bush	Plant
Euphorbia cyparissias	Cypress Spurge	Plant
Fallopia sachalinensis	Giant Knotweed	Plant
Hibiscus syriacus	Rose-of-Sharon	Plant
Holcus lanatus	Common Velvetgrass	Plant
Hydrilla verticillata	Hydrilla	Plant
Lamium purpureum	Purple Deadnettle	Plant
Lathyrus latifolius	Perennial Pea	Plant
Lespedeza cuneata	Chinese Bushclover	Plant
Leucanthemum vulgare	Oxeye Daisy	Plant
Ligustrum obtusifolium	Border Privet	Plant

Future Vulnerable Species (EDDMaps, 2021; PA DCNR, 2019; iMapInvasives, 2021)		
Scientific Name	**Common Name**	**Type**
Ligustrum spp. (species unknown)	Privet (species unknown)	Plant
Ligustrum vulgare	European Privet	Plant
Lonicera japonica	Japanese Honeysuckle	Plant
Lonicera maackii	Amur Honeysuckle	Plant
Lysimachia nummularia	Creeping Jenny	Plant
Lythrum salicaria	Purple Loosestrife	Plant
Mentha x rotundifolia	Apple Mint	Plant
Morus alba	White Mulberry	Plant
Myosoton aquaticum	Giant-chickweed	Plant
Myriophyllum spicatum	Eurasian Water-milfoil	Plant
Najas minor	Brittle Naiad	Plant
Ornithogalum umbellatum	Common Star-of-Bethlehem	Plant
Osmerus mordax	Rainbow Smelt	Animal
Pachysandra terminalis	Japanese-spurge	Plant
Pastinaca sativa	Wild Parsnip	Plant
Persicaria hydropiper	Marshpepper Knotweed; Smartweed	Plant
Persicaria maculosa	Lady's Thumb	Plant
Phragmites australis ssp. australis	Common Reed	Plant
Pinus sylvestris	Scotch Pine	Plant
Poa trivialis	Scribner's Bluegrass	Plant
Polygonum caespitosum var. longisetum	Creeping Smartweed	Plant
Potamogeton crispus	Curly-leaf Pondweed	Plant
Potamopyrgus antipodarum	New Zealand Mudsnail	Plant
Prunus avium	Sweet Cherry	Plant
Pyrus calleryana	Callery Pear	Plant
Ranunculus ficaria	Lesser Celandine	Plant
Rorippa nasturtium-aquaticum	Watercress	Plant
Rosa canina	Dog Rose	Plant
Rubus phoenicolasius	Wineberry	Plant
Sorghum halepense	Johnson Grass	Plant
Stellaria media	Common Chickweed	Plant
Trachemys scripta scripta	Yellow-bellied Slider	Amphibian
Trifolium hybridum	Alsike Clover	Plant

Future Vulnerable Species (EDDMaps, 2021; PA DCNR, 2019; iMapInvasives, 2021)		
Scientific Name	**Common Name**	**Type**
Typha angustifolia	Narrowleaf Cattail	Plant
Verbascum blattaria	White Moth Mullein	Plant
Wisteria floribunda	Japanese Wisteria	Plant

4.3.6.5 Vulnerability Assessment

Cambria 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 wetlands, waterways, state parks, and game lands in Cambria 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.

Since there are large swatches of public land in Cambria County, there is a risk of future damage from invasive species that are present in the area. With about 444,160 acres of total land in Cambria County, there is vulnerability to various land sites and waterways. If an invasive species were to invade the popular terrestrial areas or waterways in Cambria County, a negative impact could occur. The invasion from an invasive species could cause damage to the scenic and natural resources needed in the county. Additionally, tourism for the county is vulnerable to the invasive species as well and would be affected if the parks were destroyed. Therefore, a great amount of land and native wildlife within Cambria County are at risk with the presence of invasive species.

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 Cambria 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) 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, Hemlock Woolly Adelgid, the Spotted Lanternfly, and plants like the Tree-of-Heaven which have all been identified in red in *Table 30 - Prevalent Invasive Species.*

Due to the past experiences with invasive plants in the county, there are five primary components which help with managing invasive plants to lower vulnerability:

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.

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.

It is best to act before a species can become established in the county, so forest management such as park rangers should be aware of invasive species found nearby Cambria County, but not yet present in the county (priority species in *Table 31 – Future Vulnerable Species*). Public outreach and education are important to increase knowledge of these species to improve identification and prevention of invasion. Without action, due to the instances and extent of the current infestations, it is reasonable to project that the county's vulnerability will increase.

4.3.7. Landslides

4.3.7.1 Location and Extent

Rock falls and other slope failures can occur in areas of Cambria County with moderate to steep slopes. Many slope failures are associated with precipitation events – periods of sustained above-average precipitation, specific rainstorms, or snowmelt events. Rockfalls, rockslides, rock topples, block glides, debris flows, mud flows, and mud slides are all forms of landslides. Areas experiencing erosion, decline in vegetation cover and earthquakes are also susceptible to landslides. Human activities that contribute to slope failure include altering the natural slope gradient, increasing soil and water content, and removing vegetation cover. Areas where this type of human activity is common are areas that were excavated along highways and other roadways.

The Pennsylvania Department of Conservation and Natural Resources (PA DCNR) describes landslide susceptibility in Cambria County as generally moderate to high but does include local areas of vulnerability along stream banks. *Figure 23 – Landslide Hazard Areas* shows areas of landslide susceptibility in Cambria County. A majority of Cambria County is located in the Appalachian Plateau Province which is known for steep slopes and high vulnerability. There are no areas of low susceptibility in Cambria County. Steep slopes are evenly spread throughout the county and there are locations that can be prone to landslides in almost every municipality.

4.3.7.2 Range of Magnitude

Landslides cause damage to transportation routes, utilities, and buildings. They can also create travel delays and other side effects for transportation of people and material. Fortunately, death and injuries due to landslides are relatively rare in Pennsylvania. Almost all of the known deaths due to landslides have occurred when rocks fall and slide along highways, causing vehicular accidents, injuries, and fatalities. Storm-induced debris flows are the only other type of landslide likely to cause injuries. 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 objects and buildings, rather than people.

The Pennsylvania Department of Transportation (PennDOT) and large municipalities incur substantial costs due to landslide damage and to additional construction costs for new roads in known landslide-prone areas. A 1991 estimate showed an average of $10 million per year is spent on landslide repair contracts across the Commonwealth of Pennsylvania and a similar amount is spent on mitigation costs for grading projects (DCNR, 2009). A number of highway sites in Pennsylvania need temporary or permanent repair at an estimated cost of between $300,000.00 and $2 million each. Similar landslide events that effect traffic and roadways throughout the commonwealth occur intermittently throughout the year. A 7,500-pound rockslide closed down parts of Pennsylvania State Route 11 in Montour County, Pennsylvania in November of 2020 for a number of weeks. Events of similar magnitude can and have occurred in and around Cambria County.

The 2018 Pennsylvania Hazard Mitigation Plan lists Cambria County as having a low incidence of landslides but high susceptibility. Cambria County landowners and real estate developers must know the magnitude of susceptibility within the county prior to the start of development.

4.3.7.3 Past Occurrence

No comprehensive list of landslide incidents in Cambria County is available, as there is no formal reporting system in place. PennDOT and municipal departments are responsible for slides that inhibit the flow of traffic or damage roads and bridges, but they generally only repair the road and the adjacent right-of-way areas.

4.3.7.4 Future Occurrence

Based on historical events, significant landslide events are likely in the county, occurring on average once every three years. Mismanaged intense development in steeply sloped areas could increase their frequency of occurrence. Road cuts are the most common development that puts an area at an increased probability of a slide. The Pennsylvania Department of Environmental Protection (PA DEP) has an Erosion and Sediment (E & S) program that sets requirements intended to mitigate erosion associated with development projects of a certain scale, which are similar to landslides prevention practices.

4.3.7.5 Vulnerability Assessment

Landslides are often precipitated by other natural hazards such as earthquakes or floods, and a serious landslide can cause millions of dollars 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 and landslide events.

A comprehensive database of land highly prone to erosion and landslides is difficult to come by. Those managing construction projects in Cambria County should be wary of erosion and the potential for landslides. There are several general factors that can be indicators of landslide prone areas. These include but are not limited to:

- Locations 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 line, tilted trees, cracks in the ground and irregularly, surfaced ground.

All the municipalities in Cambria County are vulnerable to landslides. *Table 32 – Structure Vulnerability Data* illustrates the number of site structure address points per municipality and the number of structures in high slope areas. Landslide events are most likely to occur in steeply sloped areas and in places where landforms have been altered for purposes of highway construction or other development. This is especially true if development is located at the base or crest of cliffs or near large highway cut-outs. These areas should be considered vulnerable to landslides, particularly if mitigation measures have not been implemented.

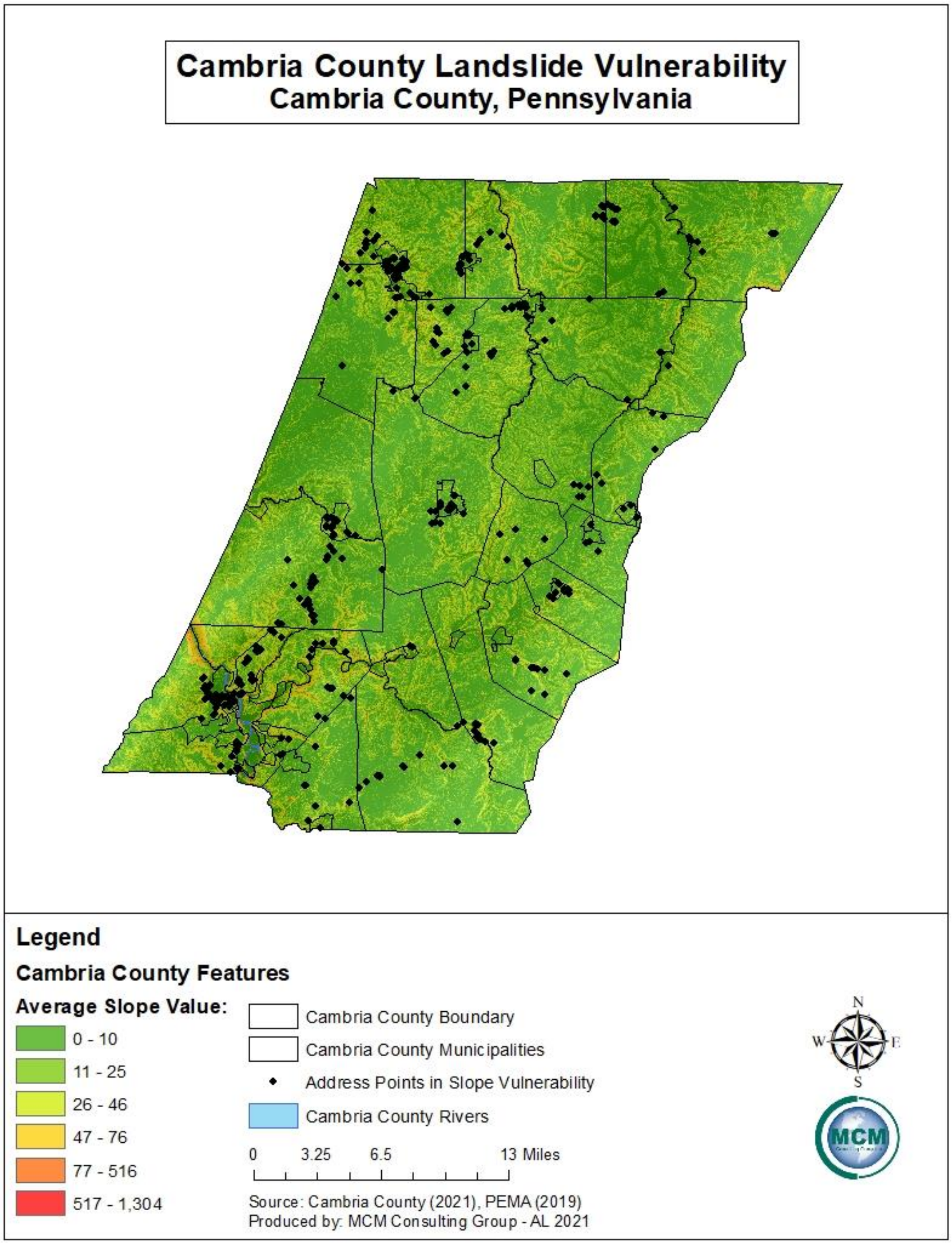
Table 32 - Structure Vulnerability Data

Structure Vulnerability Data		
Municipality	**Number of Addressable Structures Per Municipality**	**Number of Structures in Slope Area**
Adams Township	2,985	13
Allegheny Township	835	5
Ashville Borough	138	0
Barr Township	1,072	15
Blacklick Township	1,076	1
Brownstown Borough	358	7
Cambria Township	2,734	12
Carrolltown Borough	514	8
Cassandra Borough	75	0
Chest Township	516	8
Chest Springs Borough	70	0
City of Johnstown	11,409	35
Clearfield Township	826	8
Conemaugh Township	1.042	6
Cresson Borough	747	0
Cresson Township	1,299	4
Croyle Township	1,141	1
Daisytown Borough	145	0
Dale Borough	542	0

Structure Vulnerability Data		
Municipality	**Number of Addressable Structures Per Municipality**	**Number of Structures in Slope Area**
Dean Township	237	1
East Carroll Township	874	13
East Conemaugh Borough	685	0
East Taylor Township	1319	7
Ebensburg Borough (County Seat)	1,588	25
Ehrenfeld Borough	108	0
Elder Township	525	6
Ferndale Borough	785	0
Franklin Borough	216	0
Gallitzin Borough	805	3
Gallitzin Township	673	5
Geistown Borough	1,207	0
Hastings Borough	659	14
Jackson Township	2,342	30
Lilly Borough	452	5
Lorain Borough	384	0
Loretto Borough	248	0
Lower Yoder Township	1,706	91
Middle Taylor Township	362	24
Munster Township	335	6
Nanty Glo Borough	1,321	28
Northern Cambria Borough	1,857	37
Patton Borough	838	12
Portage Borough	1,274	0
Portage Township	1,814	13
Reade Township	1,024	8
Richland Township	5,489	9
Sankertown Borough	286	0
Scalp Level Borough	403	2
South Fork Borough	477	0
Southmont Borough	959	3
Stonycreek Township	1,702	3
Summerhill Borough	262	0
Summerhill Township	1,246	16
Susquehanna Township	1,104	17
Tunnelhill Borough	119	1

Structure Vulnerability Data		
Municipality	**Number of Addressable Structures Per Municipality**	**Number of Structures in Slope Area**
Upper Yoder Township	2,206	4
Vintondale Borough	261	0
Washington Township	497	6
West Carroll Township	685	13
West Taylor Township	454	1
Westmont Borough	2,193	0
White Township	1,780	14
Wilmore Borough	117	0
Totals:	**71,401**	**540**

Figure 23 - Landslide Hazard Areas



4.3.8. Lightning Strike

4.3.8.1 Location and Extent

Lightning is a massive electrostatic discharge between electrically charged regions within clouds, or between a cloud and the Earth's surface. The charged regions within the atmosphere temporarily equalize themselves through a lightning flash, commonly referred to as a strike if it hits an object on the ground. There are three primary types: from a cloud to itself (intra-cloud or IC); from one cloud to another cloud (CC); and, finally, between a cloud and the ground (CG). Lightning is always accompanied by the sound of thunder, although distant lightning may be seen but be too far away for the thunder to be heard. Thunder is caused by lightning. The bright light of the lightning flash caused by the expansion of electrons (called the "return stroke") represents a great deal of energy. This energy heats the air in the channel to above 50,000 degrees F in only a few millionths of a second. The air that is now heated to such a high temperature had no time to expand, so it is now at a very high pressure. The high-pressure air then expands outward into the surrounding air compressing it and causing a disturbance that propagates in all directions away from the stroke. The disturbance is a shock wave for the first 10 yards, after which it becomes an ordinary sound wave, or thunder.

Cambria County is subject to lightning strikes and thunderstorm activity throughout the year. Overall, the most active time for lightning strikes is from early spring to early fall seasons. While the impact of flash events is highly localized, strong storms can result in numerous widespread events over a broad area. In addition, the impacts of an event can be serious or widespread if lightning strikes a particularly significant location such as a power station, a campground or large public venue.

4.3.8.2 Range of Magnitude

Severe thunderstorms have lightning risks and can cause significant damage and be life threatening, though only a small percentage of thunderstorms become severe. Western Pennsylvania sits clearly in a region of the country susceptible to lightning strikes but not in the high danger zones of the southeastern or central parts of the country (see *Figure 1, National Lightning Detection Network 2018*). The 2019 Commonwealth of Pennsylvania All Hazards Mitigation Plan states that Pennsylvania ranks 9th among the fifty states in the country's number of lightning deaths and western Pennsylvania has a higher flash density than the rest of the Commonwealth – the risk is very real. Cambria County gets twenty-five to thirty-two days per year of thunderstorms with lightning that produces three to six flashes per square mile per year. Lightning can cause severe injury and is fatal in some cases, though most fatal strikes are not direct strikes to persons, but the result of ground current and most people survive them (see

Figure 3, Lightning Strikes in the U.S.). Deaths and injuries to livestock and other animals from ground current, thousands of forest and brush fires, and millions of dollars in damage to buildings, communications systems, power lines and electrical systems across the country are also the result of lightning.

4.3.8.3 Past Occurrence

Thunderstorms and lightning occur many times each year in Pennsylvania. Lightning was responsible for eleven deaths and 312 injuries in Pennsylvania between the years of 2003-2012. In 2016, one fatality from lightning occurred on a golf course and in 2019, two people were killed under a tree by lightning. In July of 2020, two men were killed by lightning in north central Pennsylvania, also while under a large tree.

During 2018, the National Lightning Detection Network (NLDN) recorded 197,654 cloud-to-ground flashes in the Commonwealth. During that year, Pennsylvania dropped in rank from 26th to 27th in the United States of cloud-to-ground flash densities. Most of the recorded flashes occurred between the annual dates of July 23-29 and most of those during the mid-afternoon to mid-evening hours, data that may prove useful for planning or public announcement purposes. *Figure 24 – National Lightning Detection Network, 2018*, illustrates the flash densities for the entire United States.

Figure 24 - National Lightning Detection Network, 2018

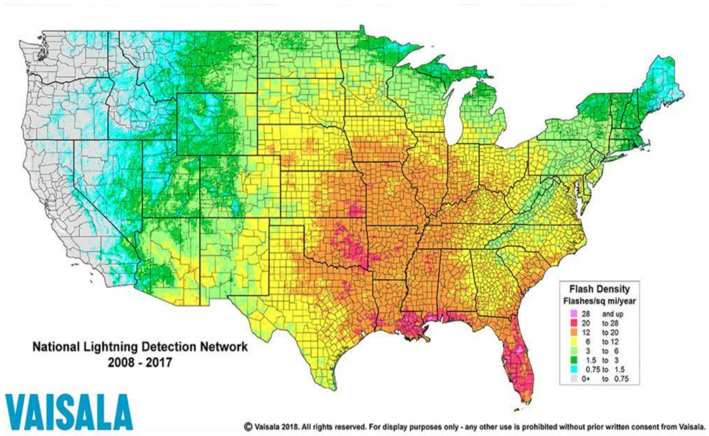


Figure 25 - U.S. Lightning Fatalities 2010-2021

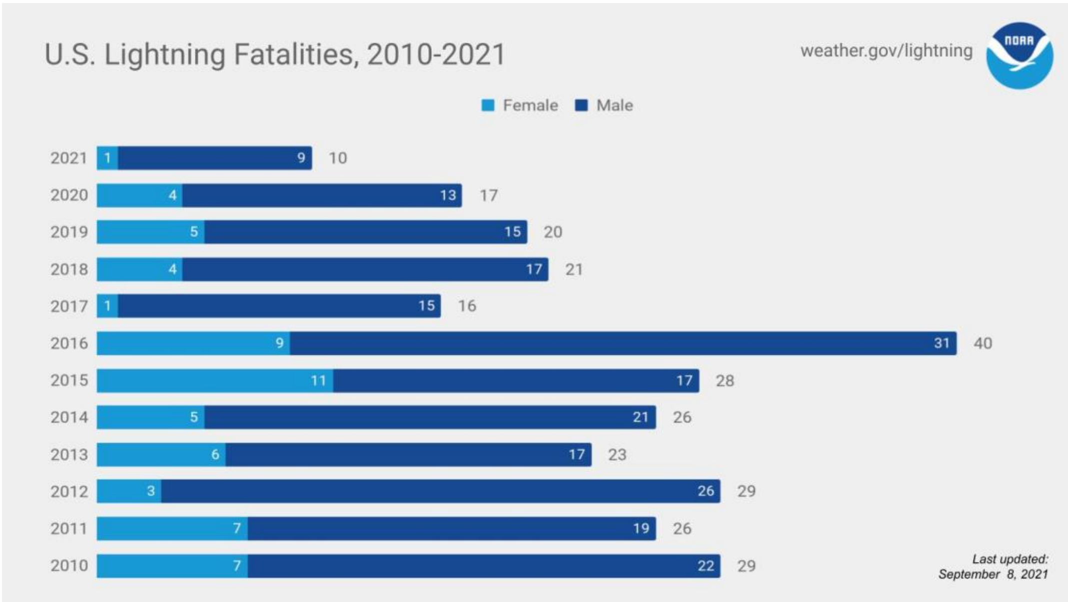


Table 33 - Injuries, Deaths, and Property Damage Due to Lightning Strikes in Cambria County shows injuries, deaths, and property damage cost estimate losses reported by the NCDC.

Table 33 - Injuries, Deaths, and Property Damage Due to Lightning Strikes in Cambria County

INJURIES, DEATHS AND, PROPERTY DAMAGE DUE TO LIGHTNING STRIKES IN CAMBRIA COUNTY AS REPORTED BY THE NCDC				
DATE	**LOCATION**	**TYPE**	**NO. OF INJURIES**	**NO. OF DEATHS**
7/6/1999	Colver	Lightning	1	0
8/13/1999	Patton	Lightning	1	0
8/7/2005	Patton	Lightning	4	1
Total			**6**	**1**

SOURCE: NCDC, 2022

4.3.8.4 Future Occurrence

Lightning strikes and thunderstorms are expected during and around the spring and summer months. These events have occurred in Cambria County in the past and will continue to occur in the future, although multiple casualties or deaths are highly unlikely given the hazard's recorded history of casualties in the county. The table above has some data prediction quality for future occurrence, though it cautions its imagery is experimental and in its evaluation stage. The chart will be revisited with the next annual plan update.

4.3.8.5 Vulnerability Assessment

The odds of being struck by lightning in a person's lifetime are 1 in 15,300, according to the National Oceanic and Atmospheric Administration's National Severe Storms Laboratory. News channels carried the story of that 1 in 15,300 in August of 1993 – a seven-year-old girl was either struck by lightning or felled by ground current from a barbed wire fence in Sugar Grove; she was in cardiac arrest when the property owner administered CPR (which she said she learned by watching the popular TV show Rescue 911) and saved her life.

Nine out of every ten people in the United States who are struck survive, according to a 2016 study presented at the International Lightning Detection Conference and International Lightning Meteorology Conference. However, lightning strikes can leave a person with many long-term health problems, including muscle soreness, headaches, cognitive problems, and nausea.

The potential for lightning strikes and thunderstorms exists in all municipalities in Cambria County. Events being held outdoors during the summer months are particularly vulnerable to lightning strikes. Due to the recreational land and waterways use in Cambria County, the potential for death or injury will remain present, although the risk may on a downward trend based on the reduced number of cloud-to-ground flashes reported in the Commonwealth in the five-year span since the last assessment.

Cambria County has taken a proactive approach to storm readiness and has received StormReady designation from the NWS. The StormReady program includes six criterion that are used to determine a community's storm preparedness. The six guidelines are defined below:

- Communication – A 24-hour warning point (WP) must be fully staffed at all times, and a County Emergency Operations Center (EOC) must be established.
- NWS Information Reception – At least four redundant systems must be in place at the WP to receive weather warnings.
- Hydro-meteorological Monitoring – At least four methods of monitoring hydro-meteorological data must be available.
- Local Warning Dissemination – There must be at least four redundant systems to notify the county of severe weather warnings, and there must be National Weather Radio-Specific Area Messaging Encoding receivers in public facilities.
- Community Preparedness – The county must present at least four annual weather safety talks, spotters and dispatchers must be trained biennially, and the county must host or co-

host NWS spotter training annually.

- Administration – The county must also meet a number of administrative criteria that include formal hazardous weather operations planning, biennial visits of the county Emergency Management Coordinator (EMC) to the NWS office, and annual visits by an NWS official to the County.

4.3.9. Pandemic and Infectious Disease

4.3.9.1 Location and Extent

Pandemic & Epidemic

An epidemic occurs when an infectious disease spreads more quickly than expected by experts. It is characterized by very widespread growth or extent that spreads quickly and incurs a greater rate of novel or endemic cases than baseline estimates would initially project. When an epidemic occurs, it typically impacts a larger area than would an outbreak. The rise and decline in epidemic prevalence of an infectious disease is dependent on the transfer of an effective dose of the infectious agent from an infected individual to one who is susceptible. After an epidemic has subsided, the affected host population retains a small proportion of susceptible individuals for which reintroduction of the infection will not result in a new epidemic. Therefore, barring pathogenic mutation, the host population may develop an immunity to the epidemic disease, which is termed herd immunity.

A pandemic is a disease outbreak that spreads across countries or continents, which affects the population of an extensive area. Extensive regions that could potentially be affected are several countries or even continents at a time. When a pandemic is present, the event usually affects more people and takes more lives than would an epidemic. Pandemics are further described as an extensive epidemic. Generally, pandemic diseases cause sudden illness in all age groups on a global scale. Pandemics are continuous events in third-world countries but do not affect the United States as frequently. A pandemic is measured and defined by the spreading of a disease rather than the fatalities associated with it. There are various characteristics of a pandemic outbreak, such as large, rapid scale spread, overload of healthcare systems, inadequate medical supplies, disruption of economy/society, and medical supply shortages. While a pandemic may be characterized as a type of epidemic, an epidemic is not a type of pandemic. Additionally, 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. In the event of a pandemic taking place in the eastern United States, the entirety of Cambria County would likely be impacted. Strains of influenza, or the flu, are highly contagious as 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.

On March 11, 2020, the World Health Organization (WHO) characterized the outbreak of a coronavirus disease as a pandemic. Before the official pandemic announcement, on February 11, 2020, WHO announced an official name for the disease of “coronavirus disease 2019”, abbreviated COVID-19. The ‘CO’ stands for ‘corona’, ‘VI’ for virus, and ‘D’ for ‘disease’. The word ‘corona’ means crown which refers to the appearance that coronaviruses get from the spike proteins sticking out of them. The virus mostly attacks the respiratory tract in humans, but it can cause further medical issues for those considered high risk or immunocompromised. COVID-19 most often causes respiratory symptoms that can feel much like a cold, a flu, or pneumonia, but COVID-19 can also harm other parts of the body. Both the upper respiratory tract, such as sinuses, nose, and throat, and lower respiratory tract, such as windpipe and lungs, are initially infected as a result of the disease. Lungs are typically the first targeted organ in the body for COVID-19. Other organs that could be infected by COVID-19 are the heart, brain, liver, and gastrointestinal tract. Coronaviruses are common in humans and many different species of animals including camels, cattle, cats, and bats. The disease is believed to have started in Wuhan Province, China in late 2019 and spread around the globe. The original source of viral transmission to human remains unclear, as does whether the virus became pathogenic before or after the spillover event. The intermediate animal that passed the virus from bats to people has not been identified. Researchers remain divided whether it came from wild species sold as food in the wet markets within Wuhan at the Huanan Seafood Market, or as the result of purposeful biological experimentation. The overall origin of the virus remains uncertain during the writing of this plan. Still, the WHO seeks to uncover the origin of the COVID-19 pandemic through forensic epidemiological research and scientific technology. Public health officials say it is critical to determine the identification of the origin of the pandemic to take steps to avert future outbreaks and pandemics. Future prevention may take many years for completion.

As of October 2021, there have been multiple documented variants of COVID-19 identified in the United States. Information about the characteristics of these variants is rapidly emerging. Scientists are working to learn more about how easily variants spread, whether they could cause more severe illness, and whether authorized vaccines currently offered will protect people against them. Viruses constantly change through mutation, and new variants of a virus are expected to occur. Researchers are still monitoring multiple variants but there are currently five notable variants in the United States. The five variants include: B.1.1.7 variant detected in the US in December 2020, B.1.617.2 (delta) also discovered in December 2020, B.1.351 variant detected in the US end of January 2021, P.1 variant also detected in January 2021, and the B.1.427 and B.1.429 variants which were detected in February 2021. The delta variant is currently the most common variant across the country. These novel mutations seem to spread more easily and quickly than other variants, which may lead to more cases of COVID-19.

Infectious Disease

Infectious diseases are illnesses caused by pathogenic organisms such bacteria, viruses, fungi, or parasites. There are various types of bacterial organisms that live on and within the human system but are considered harmless due to the normal flora present. Organisms become harmful and cause disease when under certain conditions. The causes of infectious diseases vary. The sources of infectious disease occur from contaminated food or waterways, infected animals/livestock, infection from biological vectors such as mosquitoes, etc. Infectious diseases include influenza, rabies, Middle East Respiratory Syndrome (MERS), West Nile virus, Lyme Disease, Zika virus, and Ebola virus.

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 a creature, usually an insect or a tick, transmits parasitic microorganisms to people and animals, and therefore spreads the diseases they cause. The disease causes headaches, high fever, neck stiffness, disorientation, tremors, convulsions, muscle weakness, paralysis, and death in its most serious form.

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 no symptoms at all. Zika is problematic 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.

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

Pandemic and infectious disease events cover a wide geographical area and can affect large populations, potentially including the entire population of the Commonwealth. The exact size and extent of an infected population is dependent upon how easily the illness is spread, the mode of transmission, and the amount of contact between infected and uninfected individuals. The transmission rates of pandemic illnesses are often higher in denser areas where there are large concentrations of people. The transmission rate of infectious disease will depend on the mode of transmission of a given illness. Pandemic events can also occur after other natural disasters, particularly floods, when there is the potential for bacteria to grow and contaminate.

4.3.9.2 Range of Magnitude

Pandemic & Epidemic

Public health emergencies typically occur on a regional basis. The magnitude of pandemic or infectious disease threat in the Commonwealth will range significantly depending on the aggressiveness of the virus in question, factors within the community that are impacted (medical care access, population density, etc.), and the ease of transmission. For example, the West Nile virus has less than 80% of cases that are clinically asymptomatic. Therefore, approximately 20% of the cases result in mild infection, as known as West Nile fever. However, there is a small percentage of cases that will result in severe neurological disease and even death.

Pandemic influenza has a higher transmission rate from person-to-person compared to the West Nile virus disease. However, advances in medical technologies have greatly reduced the number of deaths caused by the influenza over time. In the early 1900s, flu pandemics could cause tens of millions of deaths, while the 2009 Novel H1N1, known as 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 70% of those who were hospitalized during the 2009 H1N1 flu virus in the United States belonged to a high-risk group. However, with the COVID-19 pandemic, the transmission rates are much higher than any previous outbreaks related to other members of the coronavirus family such as SARS-CoV and MERS-CoV. In the past 100 years, the globe did not face a microbial pandemic similar in scale to the COVID-19 pandemic. The worldwide transmission rate of COVID-19 from human to human has rapidly advanced. As of October 2021, the current worldwide data indicates 245 million COVID-19 cases. The United States has the most reported new cases, and The United Kingdom is next with rapid increases in case numbers. It is difficult to make a projection of the final outcome with the COVID-19 pandemic. Of the six global outbreaks of viral infections, three were caused by coronaviruses (SARS, MERS, and COVID-19), of which COVID-19 is characterized by the most efficient and aggressive transmission.

High risk populations for disease/illness include children, the elderly, pregnant women, and immunocompromised persons. Such high-risk populations are discussed in more detail in Section 4.3.9.5. Advancements in medical technology help in the treatment and understanding of current and future pandemics. The wireless thermometer gun has become increasingly popular and beneficial to the COVID-19 pandemic by giving opportunity to measure individual’s body temperatures without being in close contact. Additionally, the wireless thermometer gun assists with pinpointing individuals that may be COVID infected if the individual has a fever, which helps reduce spread of the disease. This important medical equipment is being used as checkpoints during the pandemic at various public destinations such as hospitals, nursing home facilities, airports, etc. Other advances in medical technology instruments for COVID-19 include vaccination advancements (such as new mRNA vaccines which have been seen from Pfizer and Moderna), virus DNA sequencing, and molecular testing techniques for COVID-19 diagnosis.

Therefore, with advancements made during pandemics, such as the COVID-19 pandemic, the global effects of various outbreaks have drastically declined over the past century. While there are limited secondary hazards related to public health emergencies, an outbreak can cause a variety of general secondary effects. Civil disorder is the most likely secondary hazard to result from a public health emergency. Additional potential secondary effects could include: a shortage of medical supplies and personnel, hoarding of household paper and cleaning supplies, school and business disruption, government closings, government restrictions on travel, low attendance at places of employment, slowed productivity, and widespread economic instability.

The seasonal flu is still present throughout the country during a pandemic. A pandemic illness is not identical to a seasonal flu, as explained in *Table 34 – Pandemic and Seasonal Flu Differences*. The seasonal flu is classified as less critical than a pandemic event. Predictability and regularity are factors into the reasoning behind a lower level of concern when dealing with seasonal flu. However, a pandemic is considered to be more severe than seasonal flu.

Table 34 - Pandemic and Seasonal Flu Differences

Pandemic and Seasonal Flu Differences		
	Seasonal Flu	**Pandemic**
What is it?	Influenza (flu) is a contagious respiratory illness caused by flu A and B viruses that infect the human respiratory tract.	A flu pandemic is a global outbreak of a new flu A virus in people that is very different from current and recently circulating seasonal flu A viruses.
Occurrence?	Epidemics of seasonal flu happen every year. Fall and winter are the most common time for flu in the United States.	Flu pandemics happen rarely. Five have happened within the last 100 years.
Transmission?	Flu viruses are thought to spread mainly from person to person through droplets made when someone with flu coughs, sneezes, or talks near a person (within 6 feet).	Pandemic flu viruses spread in the same way as seasonal flu, but a pandemic virus is likely to infect more people because fewer people have immunity to the pandemic flu virus.

Pandemic and Seasonal Flu Differences		
	Seasonal Flu	**Pandemic**
Vaccination?	Seasonal flu vaccines are made each year to vaccinate people against the seasonal flu. Typically, only one dose is needed.	Although the U.S. government maintains a limited stockpile of pre-pandemic flu vaccines, this inventory may not be widely available in the early stages of a pandemic. Two doses of pandemic flu vaccine are likely to will be needed.
High Risk Group?	Young children, people sixty-five years and older, pregnant women, and the immunocompromised are more likely to have serious flu complications.	In some past pandemics, healthy and young adults, along with the immunocompromised and elderly were at high risk for developing severe flu complications.
Source: (CDC, 2009)		

The World Health Organization (WHO) developed an alert system to help inform the world about the seriousness of a pandemic. The alert system has six phases, with Phase 1 being the lowest risk and Phase 6 being the greatest risk of pandemic. The phases were developed in 1999, but then revised in 2005 and 2009 to provide a global framework and aid countries in pandemic preparedness and response planning. These phases of alert systems were used during the COVID-19 pandemic. The time after the first pandemic wave has been elaborated into post peak and post pandemic periods. These phases are listed below in *Table 35 - Pandemic Influenza Phases*.

Table 35 - Pandemic Influenza Phases

Pandemic Influenza Phases	
Phase	**Characteristics**
Phase 1	No animal influenza virus circulating among animals has been reported to cause infection in humans.

Pandemic Influenza Phases	
Phase	**Characteristics**
Phase 2	An animal influenza virus circulating in domesticated or wild animals is known to have caused infection in humans and is therefore considered a specific 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	Human-to-human transmission (H2H) of an animal or human-animal influenza virus able to sustain community-level outbreaks has been verified.
Phase 5	The same identified virus has caused sustained community level outbreaks in two or more 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.
Post-Peak Period	Levels of pandemic influenza in most countries with adequate surveillance have dropped below peak levels.
Possible New Wave	Level of pandemic influenza activity in most countries with adequate surveillance rising again.
Post-Pandemic Period	Levels of influence activity have returned to the levels seen for seasonal influenza in most countries with adequate surveillance.
Source: (WHO, 2009)	

4.3.9.3 Past Occurrence

Pandemic & Epidemic

Several pandemic influenza outbreaks have occurred over the past 100 years that not only affected Cambria County but the United States as a whole. *Table 36 - Past Pandemic Events in the United States* illustrates the various past pandemic events that have occurred since the late

1800's. The worst recorded pandemic was the Spanish Flu, due to the amount of infection spread that was present in the world. The two most recent pandemics that have occurred in Cambria County and the United States are the swine flu/Novel H1N1 and COVID-19 pandemics, with COVID-19 being the most current and having the highest transmission rates yet.

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 1/3 of the world's population was infected and had clinically apparent illnesses during the 1918 - 1919 influenza pandemic. Pennsylvania was one of the most affected states in the country because influenza tends to strike cities very hard. The Spanish Flu claimed 500,000 lives in the United States, which included Cambria County. There is a lack of data which provides exact numbers of deaths experienced in Cambria County from the Spanish Flu, however, a total of 60,000 deaths occurred in Pennsylvania. There were approximately 47,000 reported cases and 12,000 deaths in Philadelphia in just over four weeks. In the first six months, there were about 16,000 deaths and half a million cases of the Spanish Flu in Philadelphia. The 60,000 deaths in the Commonwealth also included Cambria County's deaths, but the exact number is uncertain. The factors of high populations, crowded places, and unhygienic conditions is attributed to higher deaths and cases across Pennsylvania. Therefore, Cambria County was drastically affected by the Spanish Flu Pandemic.

Swine Flu/H1N1

Cambria County was impacted by the H1N1 virus during 2009. The Pennsylvania Department of Health set up clinics throughout the county to administer vaccines. There is a lack of data for determining the exact cases and deaths from swine flu in Cambria County. However, Pennsylvania, as a total, had 10,940 cases and 78 deaths from this pandemic. Within the total cases and deaths of Pennsylvania, Cambria County's numbers were included although exact numbers are uncertain.

COVID-19

At the time of writing this plan, COVID-19 is an on-going pandemic at the time of the writing of this plan. Credible websites were used to provide the most up-to-date statistics. As of January 2021, Pennsylvania had an estimated 2.67 million total cases and 41,028 deaths related to the COVID-19 pandemic occurred in the United States. The first cases in Pennsylvania were reported on March 6, 2020, in Delaware and Wayne counties. The first confirmed case of COVID-19 in Cambria County was on March 23rd, 2020. As of January 2022, Cambria County had a daily new case rate of 157 per 100,000. Municipalities in Cambria County indicated an increase in the pandemic section of the risk factor assessment municipal comparison. The cases

and deaths in Cambria County are still increasing. Therefore, exact numbers of deaths and cases are constantly changing. As of February 2022, Pennsylvania was in vaccination Phase 2, which included any individual in Pennsylvania age twelve or older. Phase 1A included long-term care facility residents, health care personnel, individuals of ages 65 or older, and high-risk individuals. Phase 1B included educational workers, U.S. Postal Service workers, manufacturing workers, and public transit workers. Phase 1C included food service workers, construction workers, legal services, any government worker, public safety personnel, and more. As of January 2022, there were 7.12 million fully vaccinated people in Pennsylvania alone. With Cambria County specifically, a total of 77,736 (58.2%) individuals have been fully or partially vaccinated, with partial vaccinations accounting for 9,031 (6.8%) of those. Partial vaccinates indicates that a patient has received at least one COVID-19 vaccine but has not yet received the necessary number of vaccines at the recommended time intervals to be fully covered. At present, all COVID vaccines under EUA require two dosages. Therefore, the individual partially covered has only received one dose in the two-dose series. Meanwhile 68,705 (51.5%) individuals in Cambria County have been fully vaccinated which indicates that the patient has received the necessary number of COVID vaccines at the recommended time in intervals. To see more updated information, follow here:
https://www.health.pa.gov/topics/disease/coronavirus/Pages/Cases.aspx.

Table 36 - Past Pandemic Events in the United States

Past Pandemic Events in the United States	
Year(s)	**Common Name**
1889	Russian Flu
1918	Spanish Flu/H1N1
1957	Asian Flu/H2N2
1968	Hong Kong Flu/H3N2
2009	Swine flu/Novel H1NI
2020	COVID-19
Sources: (WHO & CDC, 2020)	

Infectious Disease

Not only has Cambria County experienced past pandemic events, but the county has also experienced past infectious disease events. The two major infectious disease events experienced across Cambria County and Pennsylvania as a whole are the West Nile Virus and Lyme Disease. Due to large rural and wooded areas within the county, these infectious diseases thrive in Cambria County. Both diseases are transmitted by the biological vector of an insect which is found throughout the county.

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. By 2003, all counties in the Commonwealth had confirmed cases. 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. Although West Nile Virus positive cases are few in Cambria County, 2018 had the most positive cases in Cambria County since 2015. Over the past five years, no human has tested positive for West Nile Virus in Cambria County. *Table 37 - West Nile Virus Control Program in Cambria County since 2015* outlines the West Nile Virus within Cambria County from 2015 to 2020.

Table 37 - West Nile Virus Control Program in Cambria County since 2015

West Nile Virus Control Program in Cambria County Since 2015				
Year	**Total Positives**	**Human Positives**	**Mosquito Positives**	**Bird Positives**
2020	0	0	0	0
2019	0	0	0	0
2018	39	2	2	35
2017	16	0	16	0
2016	6	0	6	0
2015	21	0	21	0
Source: (PA Department of Environmental Protection, 2020)				

Lyme Disease

Lyme Disease has been present in the United States and Cambria County for many years. More wooded areas have higher cases due to ticks being the main biological vector. Lyme disease is found in all sixty-seven counties within Pennsylvania. Cambria County has an overall approximated 1100 confirmed cases of Lyme disease from 2000 until 2019, although actual totals may be significantly higher due to under reporting. Cambria County as a whole has a moderately high positive total for Lyme Disease in the county, especially over the past several years. It is possible that numbers have risen dramatically due to lack of testing in previous years.

Cambria County experienced the highest number of positive cases in 2016 at 221 cases. Lyme disease case counts are alarming and consistently rising over the past several years. It should be noted that information represented for each county may vary due to reporting practices. Hence these figures represent a rough estimate of the Lyme disease burden in Cambria County. *Table 38 - Lyme Disease Data for Cambria County* outlines the Lyme Disease within Cambria County since 2013 to 2019. Data after 2019 was not available for this report.

Table 38 - Lyme Disease Data for Cambria County

Lyme Disease Data for Cambria County	
Year	**Total Positives**
2019	175
2018	137
2017	173
2016	221
2015	149
2014	91
2013	66
Source: (PA Department of Environmental Protection, 2019)	

4.3.9.4 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. Exact timing of pandemic influenza outbreaks is unpredictable, and complete avoidance of the events is nearly impossible. Therefore, future occurrences of pandemics and infectious disease are unclear. Future pandemics may also emerge from other diseases, especially invasive pathogens for which Cambria County and Pennsylvania as a whole lack natural immunity which adds to the uncertainty of future occurrences. With the current COVID-19 pandemic, the future of the disease is still unclear due to the novelty of the virus. Recently, the FDA approved COVID-19 vaccines have been offered to millions of Americans across the country, including Cambria County. The vaccination rollout will aid in the transition of COVID-19 from a pandemic to an endemic phase in the near future. However, researchers believe that COVID-19 will be similar to the influenza virus that re-emerges every year in a slightly different form due to mutation events.

Infectious Disease

Pandemic future occurrences have several unknown circumstances; however, future infectious disease occurrences are likely to occur. Infectious diseases such as West Nile Virus, Influenza, and Lyme Disease have been present in Cambria County for many years and are expected to perpetuate.

West Nile Virus

The best defense against West Nile virus in the future is to remove mosquito breeding locations – stagnant water sources. Another defensive measure to prevent insect bites is 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 used whenever people are outside.

Influenza

It is estimated that 5% - 25% of Pennsylvanians get the flu each year, and 120 - 2,000 die from complications of influenza. The CDC recommends that everyone six months and older get a flu vaccine every season to prevent future cases from rising. 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 to decrease the number of future cases from occurring. 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.

4.3.9.5 Vulnerability Assessment

Cambria County is considered to be a higher vulnerability county in regard to the COVID-19 disease. However, it is extremely difficult to predict a pandemic or an epidemic. 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, 18 - 42 million outpatient visits, and another 20 - 47 million sick people in the United States. Between 15% - 35% of the U.S. population could be affected by a pandemic, and the economic impact could range between $71.3 - $166.5 billion. This data for the current COVID-19 pandemic has fluctuated widely, however, at the time of the writing of this plan, was on pace for greater than a "medium level" pandemic. The COVID-19 pandemic has severely affected populations over the age of sixty-five, especially those in nursing homes – disproportionately. It has also severely affected different races disproportionately, e.g., non-Hispanic American Indian and Black peoples. 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.

Elderly individuals, children and immune deficient individuals are most vulnerable to disease. 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. The spread of disease has increased due to the vulnerability and density of these populations. Congregate living facilities, including correctional institutions and dormitories would also be at an increased risk due to the difficulties in adhering to the social distancing required to help stop the spread of a pandemic. During 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.

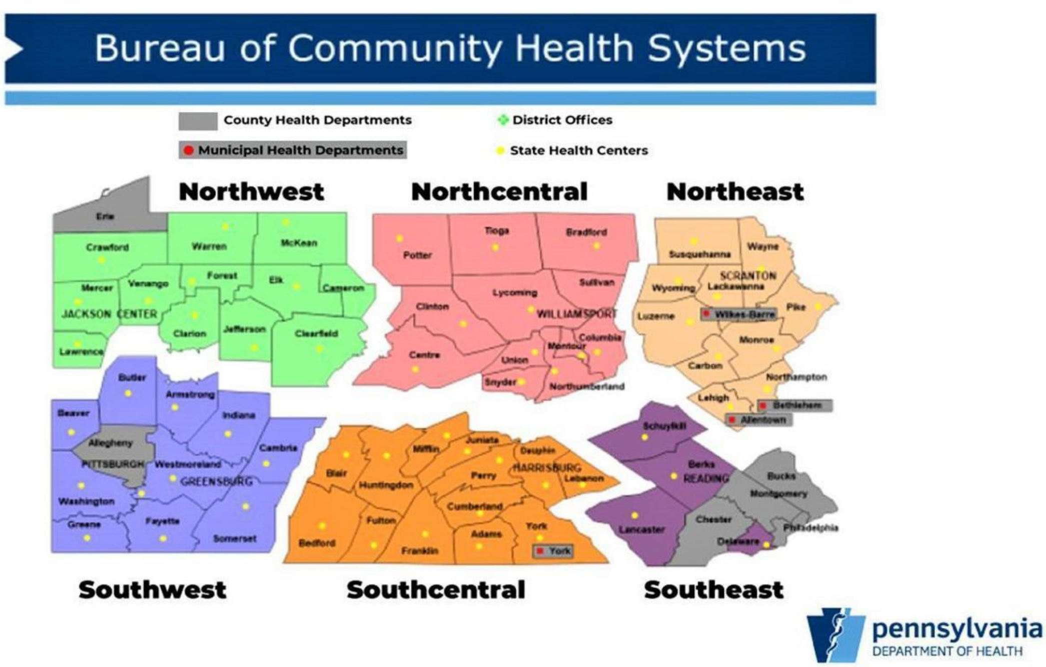
Health-care workers and those working in direct-care situations (such as correctional institutions or those who cannot social distance due to their jobs) are more likely to be exposed to a pandemic disease. Those that work outdoors for extended periods of time in warm months may be more vulnerable to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

The number of hospitals and beds present in a county can affect the vulnerability impact on the county as well. The number of hospitals within the county and number of beds within the hospital determines the amount of care vulnerable and sick patients will receive in times of need. The vulnerable individuals will need access to hospitals and medical procedures as well. If sick and vulnerable patients are higher in number than beds available, the vulnerability rates within the county will rise. 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 the six regional healthcare districts (see *Figure 26 - Pennsylvania Department of Health Districts*). Cambria County is in the southwest district. At the time of the writing of this plan, PODs have been involved with mass vaccinations against COVID-19.

Figure 26 - Pennsylvania Department of Health Districts



Source: (PA DOH, 2019)

4.3.10. Radon Exposure

4.3.10.1 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 can lead to the development of 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 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. 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:

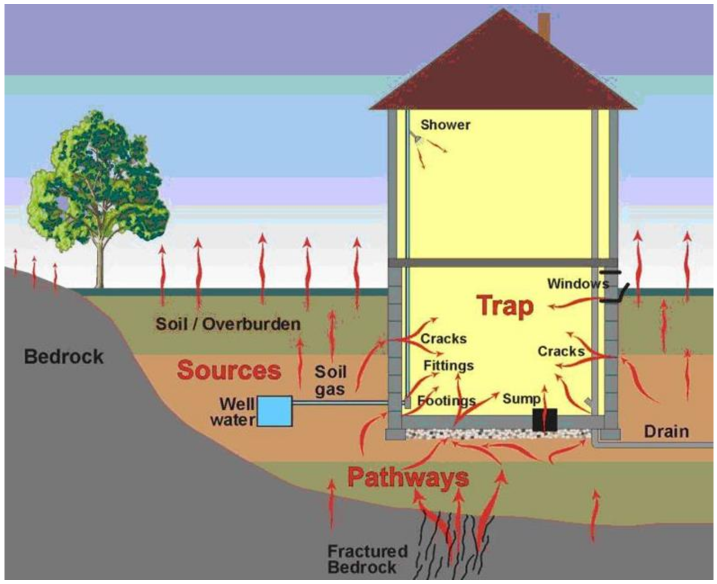
- Proximity to elevated uranium rich deposits (>50ppm). Areas within a few hundred feet of such deposits are most at risk. Such deposits are rare in Pennsylvania.
- Some more common rocks have higher than average uranium content (5 to 50 ppm), and proximity to such rocks also increases the risk of radon 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 X - 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

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.

Figure 27 - Sketch of Radon Entry Points into 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.

The second factor listed above is most likely the cause of high radon levels in Cambria County. The data show that most reported zip codes in the county have high basement radon level test results. The areas and test results are shown in more detail in the past occurrence section.

4.3.10.2 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 nonsmokers. 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 the 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 39 - 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 *Table 39 - Radon Risk for Smokers and Nonsmokers* below, a smoker exposed to radon has a much higher risk of lung cancer.

Table 39 - Radon Risk for Smokers and Nonsmokers

RADON LEVEL (pCi/L)	IF 1,000 PEOPLE WERE EXPOSED TO THIS LEVEL OVER A LIFETIME…*	RISK OF CANCER FROM RADON EXPOSURE COMPARES TO...***	ACTION THRESHOLD
SMOKERS			
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)	
NON-SMOKERS			
20	About 36 people could get lung cancer	35 times the risk of drowning	Fix Structure
10	About 18 people could get lung cancer	20 times the risk of dying in a home fire	

RADON LEVEL (pCi/L)	IF 1,000 PEOPLE WERE EXPOSED TO THIS LEVEL OVER A LIFETIME…*	RISK OF CANCER FROM RADON EXPOSURE COMPARES TO...***	ACTION THRESHOLD
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)	
*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.*			

4.3.10.3 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 40 - Radon Test Results in Cambria County *in Cambria County* shows a total of twenty-seven zip codes in Cambria County where tests were reported to the PA DEP to report their findings; those with no available data were not included in the table. The highest average radon level was reported from the 15722-zip code, which is in the north-western corner of the county, with an average reading of 16.0 pCi/L within location of the basement. Most reporting zip codes in Cambria 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 8.4 pCi/L, and the average first floor reading is 3.6 pCi/L.

Table 40 - Radon Test Results in Cambria County

Radon Level Test Results (PA DEP, 2020)					
Zip Code	**Postal Community**	**Location**	**Number of Tests**	**Max Result pCi/L**	**Average Result pCi/L**
15714	Northern Cambria, PA	Basement	213	348.3	6.3
		First Floor	N/A	N/A	N/A
15722	Carrolltown, PA	Basement	98	182.8	16.0
		First Floor	N/A	N/A	N/A
15762	Nicktown, PA	Basement	70	41.0	9.5
		First Floor	N/A	N/A	N/A
15901	Johnstown, PA	Basement	89	48.3	4.3
		First Floor	N/A	N/A	N/A
15902	Johnstown, PA	Basement	457	79.1	4.6
		First Floor	N/A	N/A	N/A
15904	Johnstown, PA	Basement	1913	108.7	5.7
		First Floor	85	36.7	4.9
15905	Johnstown, PA	Basement	2794	440.6	6.3
		First Floor	182	37.4	4.0
15906	Johnstown, PA	Basement	352	58.8	4.9
		First Floor	N/A	N/A	N/A
15907	Johnstown, PA	Basement	35	45.9	6.9
		First Floor	N/A	N/A	N/A
15909	Johnstown, PA	Basement	223	78.8	7.2
		First Floor	N/A	N/A	N/A
15931	Ebensburg, PA	Basement	522	163.5	8.0
		First Floor	N/A	N/A	N/A

Radon Level Test Results (PA DEP, 2020)					
Zip Code	Postal Community	Location	Number of Tests	Max Result pCi/L	Average Result pCi/L
15938	Lilly, PA	Basement	110	123.2	7.5
		First Floor	N/A	N/A	N/A
15940	Loretto, PA	Basement	235	94.4	6.5
		First Floor	N/A	N/A	N/A
15942	Mineral Point, PA	Basement	91	85.7	7.8
		First Floor	N/A	N/A	N/A
15943	Nanty Glo, PA	Basement	107	57.4	5.7
		First Floor	N/A	N/A	N/A
15946	Portage, PA	Basement	183	111.0	7.0
		First Floor	46	10.2	1.8
15952	Salix, PA	Basement	48	53.8	8.6
		First Floor	N/A	N/A	N/A
15955	Sidman, PA	Basement	57	66.5	7.3
		First Floor	N/A	N/A	N/A
15956	South Fork, PA	Basement	69	88.8	10.8
		First Floor	N/A	N/A	N/A
15958	Summerhill, PA	Basement	67	75.6	7.9
		First Floor	N/A	N/A	N/A
16613	Ashville, PA	Basement	63	44.8	10.2
		First Floor	N/A	N/A	N/A
16630	Cresson, PA	Basement	233	154.7	7.9
		First Floor	N/A	N/A	N/A
16636	Dysart, PA	Basement	33	137.6	14.9
		First Floor	N/A	N/A	N/A
16640	Flinton, PA	Basement	51	127.6	15.8
		First Floor	N/A	N/A	N/A
16641	Gallitzin, PA	Basement	76	102.0	8.3
		First Floor	N/A	N/A	N/A
16646	Hastings, PA	Basement	73	125.7	12.2
		First Floor	N/A	N/A	N/A
16668	Patton, PA	Basement	176	74.2	8.3
		First Floor	N/A	N/A	N/A

4.3.10.4 Future Occurrence

Radon exposure is likely given the geologic and geomorphic conditions in Cambria 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 28 – Pennsylvania Radon Levels*. Each zone reflects the average short-term measurement of radon that can be expected in a building without radon controls. Cambria County is located within Zone 2 with counties of moderate potential for radon which indicate an intermediate likelihood of occurrence in the future.

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

Due to the moderate 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 41 - Suggested Actions and Time Frame for Exposure to Radon Daughters* provides suggested actions and time frames for varying levels of exposure to radon daughters.

Table 41 - Suggested Actions and Time Frame for Exposure to Radon Daughters

Suggested Actions and Timeframe for Exposure to Radon Daughters		
Exposure Level*	Suggested Action**	Timeframe For Plan
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

Suggested Actions and Timeframe for Exposure to Radon Daughters		
Exposure Level*	Suggested Action**	Timeframe For Plan
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	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	4 to 15 months

4.3.10.5 Vulnerability Assessment

Proper testing for radon levels should be conducted across Cambria 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.

Cambria County is in the EPA Radon Hazard Zone 2, meaning there is a moderate 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. 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 piC/L. *Figure 29 – Radon Levels by Zip Code* 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 60,493 vulnerable buildings in Cambria 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 12,099 buildings) would be $14,518,320.

Figure 28 - Pennsylvania Radon Levels

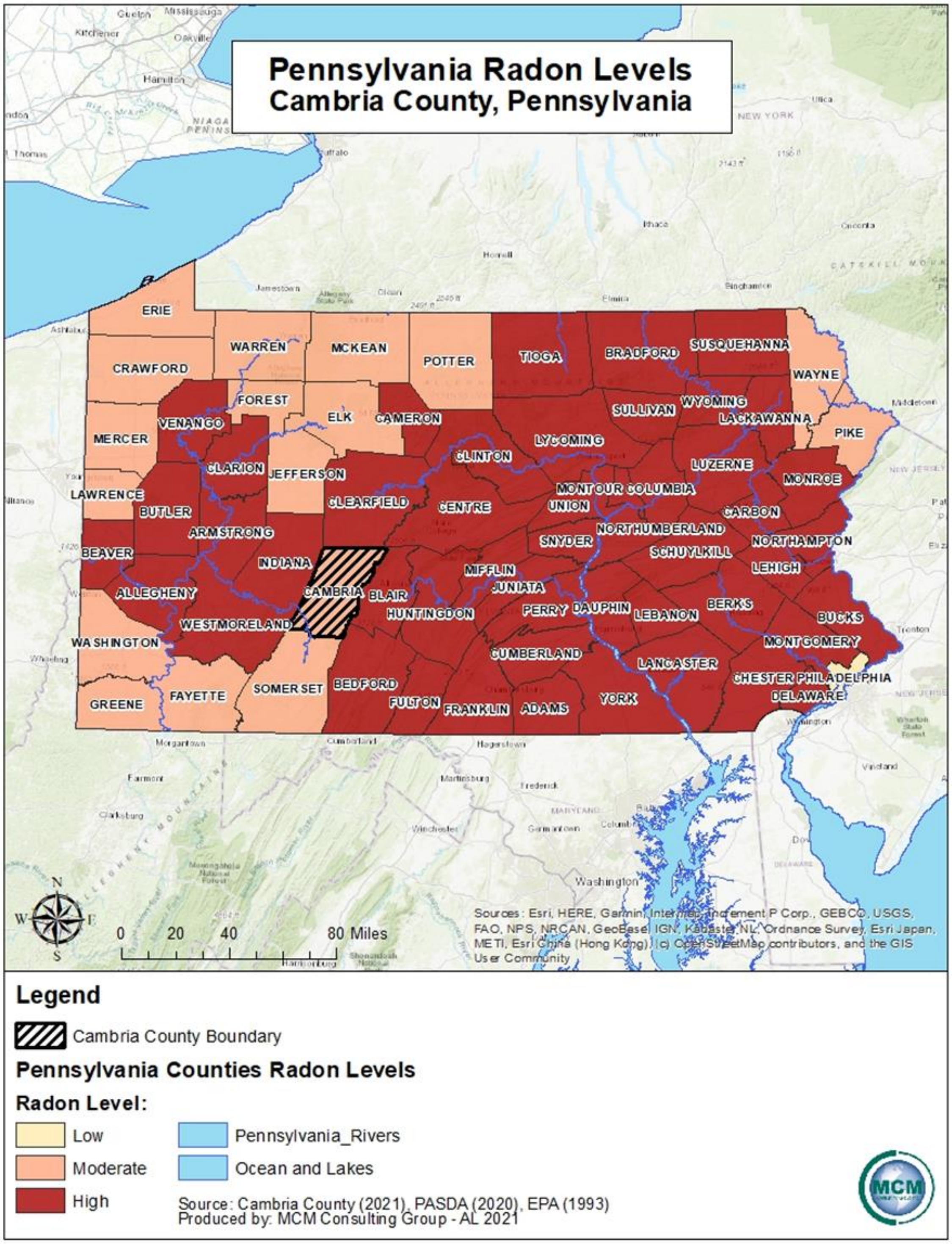
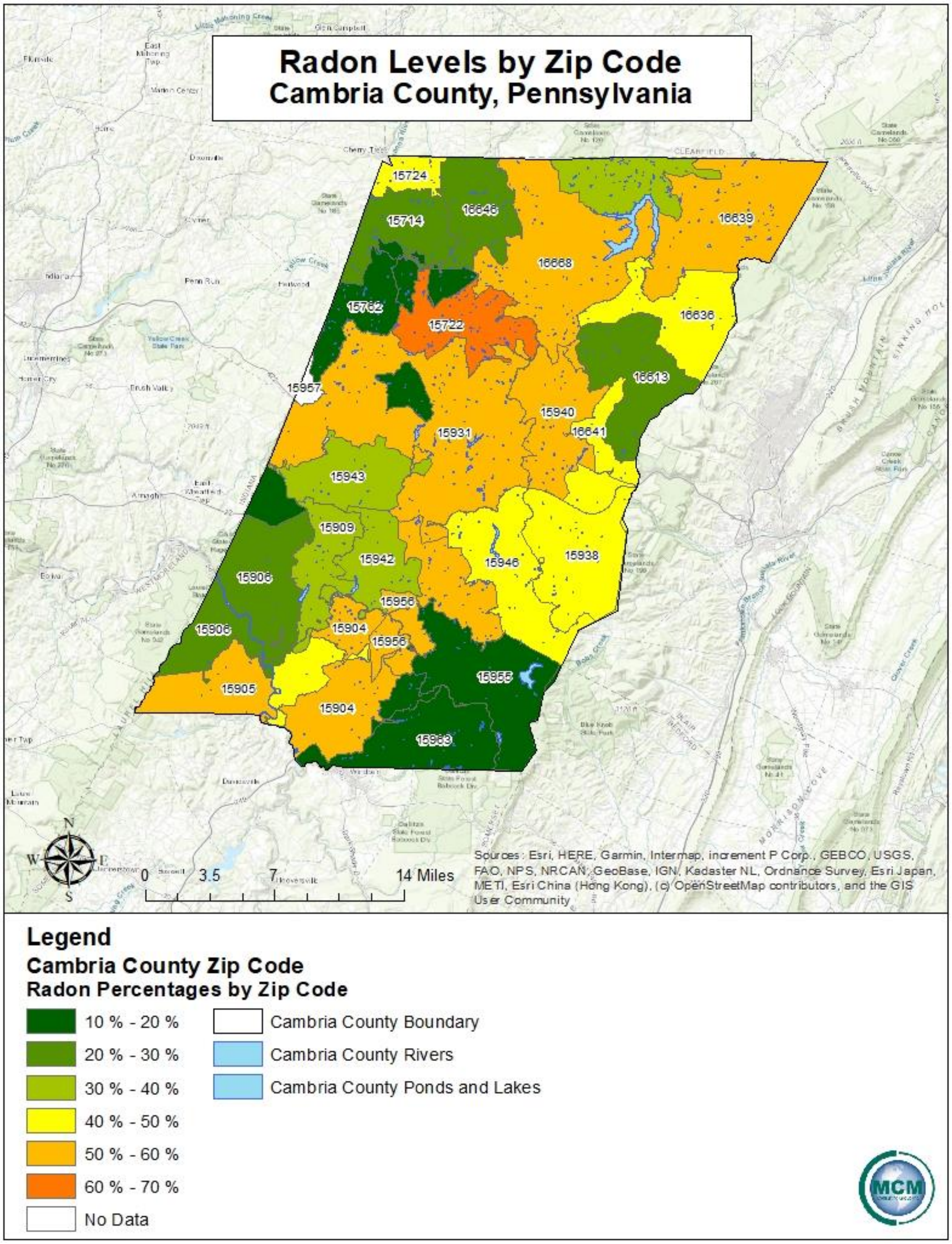


Figure 29 - Radon Levels by Zip Code



4.3.11. Subsidence/Sinkhole

4.3.11.1 Location and Extent

Subsidence is the sinking movement of the earth's surface; the result of this movement is commonly referred to as a sinkhole. There are two common causes of subsidence in Pennsylvania: 1) dissolution of carbonate rock such as limestone or dolomite and 2) mining activity. In the first case, water passing through naturally occurring fractures and bedding planes dissolves bedrock leaving voids below the surface. Eventually, overburden on top of those voids collapses, leaving surface depressions resulting in what is known as karst topography. Characteristic structures associated with karst topography include sinkholes, linear depressions, and cases. Often, sub-surface solution of limestone will not result in the immediate formation of karst features. Collapse sometimes occur only after a large amount of activity, or when a heavy burden is placed on overlying material. The bedrock geology is found mostly in the south-central and eastern portions of the Commonwealth of Pennsylvania, and Cambria County is located in a karst vulnerable area. Subsidence in Cambria County is primarily due to karst topography and also as a result of mining activity. This plan will focus on both carbonate rock/karst topography and mining activity. Cambria County has a history of subsidence due to carbonate rock and mining activity.

Mining activity is concentrated in the southwestern region of the state. The majority of sub-surface (i.e., underground) extraction of materials such as oil, gas, coal, metal ores (i.e., copper, iron, and zinc), clay, shale, limestone, or water can result in slow-moving or abrupt shifts in the ground surface and these areas have a higher potential to be impacted by sinkholes and subsidence. Sinkholes often develop where the cover above a mine is thin. Sinkhole development normally occurs where the interval to the ground surface is less than three to five times the thickness of the extracted seam and the maximum interval is up to ten times the thickness of the extracted seam. In western Pennsylvania, most sinkholes develop where the soil and rock above a mine are less than fifty feet thick.

Human activity can also result in subsidence or sinkhole events. Leaking water pipes or structures that convey storm-water runoff may result in areas of subsidence as the water dissolves substantial amounts of rock over time. Poorly managed stormwater can be an exacerbating factor is subsidence events. In some cases, construction, land grading, or earthmoving activities that cause changes in stormwater flow can trigger sinkhole events.

4.3.11.2 Range of Magnitude

No two subsidence areas or sinkholes are exactly alike. Variations in size and shape, time period under which they occur (i.e., gradually, or abruptly), and the proximity to development ultimately determine the magnitude of damage incurred. Events could result in minor elevation changes or deep, gaping holes in the surface. Subsidence and sinkhole events can be addressed before significant damage occurs.

Primarily, problems related to subsidence include the disruption of utility services and damages to private and public property including buildings, roads, and underground infrastructure. Isolated incidents of subsidence throughout the coal regions over the past years have affected houses, garages, and trees that have been swallowed up by subsidence holes. Lengths of local streets and highways, and countless building foundations have been damaged.

If long-term subsident or sinkhole formation is not recognized and mitigation measures are not implemented, fractures or complete collapse of building foundations and roadways may result. The worst-case scenario of a mine subsidence event for Cambria County would be similar to an event in Alleghany County in 2013, when sixty-nine homes in Hyde Park sustained mine subsidence damage. The Pennsylvania Department of Environmental Protection responded to the subsidence by filling the mine voids at a cost of $3.7 million. If mitigation measures are not taken, the cost to fill in and stabilize sinkholes can be significant although sinkholes are limited in range of magnitude.

Voids in the earth’s subsurface are created where coal was previously mined and removed. The condition removes a significant portion of the support of the overlying rock strata that usually causes the rock strata to fall or subside into the voids that may damage dwellings or other surface structures above the affected areas. Mining locations across the county should be carefully noted and avoided as sites for new construction unless the proper measures are taken to ensure the mine’s soundness.

The Cambria County local planning team assigned a risk factor assessment score of 2.4 to subsidence and sinkhole formation. This places the hazard at a moderate risk factor. *Figure 30 – Sinkhole Susceptibility in Pennsylvania* illustrates the portions of the Commonwealth of Pennsylvania where sinkholes and subsidence are common. The hazard for subsidence and sinkholes in these regions is very high. Cambria County has a large portion of mining areas and is therefore one of these regions.

4.3.11.3 Past Occurrence

There is no comprehensive list of mine subsidence in Cambria County. The Pennsylvania Department of Conservation and Natural Resources (PA DCNR) provides an online sinkhole inventory database, which lists a total of 3,619 identified sinkholes in Pennsylvania as of 2021. Of these sinkholes none fall within Cambria County. The fact that no sinkholes were identified does not necessarily mean there are no sinkholes in Cambria County. Additionally, the Pennsylvania Department of Environmental Protection indicates that some small incidences of sinkholes occur several times per week and cause limited damage and that many of these are related to failing infrastructure like water main breaks or collapsed pipes.

4.3.11.4 Future Occurrence

There is currently no reliable information regarding the probability of future occurrence of subsidence or sinkholes om Pennsylvania. One way of estimating the probability of future occurrences would be to project the historical trends into the future, but there is no comprehensive documentation of previous events in Cambria County. The PA DEP has noted that mine subsidence events are constant though they vary in intensity and damage. Based on geological conditions and mining activities in Cambria County, the annual occurrence of subsidence and sinkholes near karst topography and where mining occurs is considered likely. Although precise locations of future occurrences are difficult to predict due to site-specific conditions that contribute to sinkhole development, there are several signs that can signal potential development.

The signs include:

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

Based on geological conditions and mining activity, subsidence events are likely to occur in Cambria County. If land development and mining were to occur in an area that is unstable or unsafe, a subsidence event or sinkhole is likely to form. *Figure 32 – Areas Unsuitable for Mining in Pennsylvania* illustrates the areas of Pennsylvania where mining could potentially cause a subsidence event or a sinkhole. A significant number of these areas that are unsuitable for mining are located in and around Cambria County. *Figure 33 – Cambria County Unsuitable Areas for Mining* shows the areas in more detail in Cambria County where the land is unsuitable for future development.

4.3.11.5 Vulnerability Assessment

Areas of the county where commercial mining operations take place are the most vulnerable to subsidence and sinkhole hazards. Natural subsidence and sinkholes have never been reported in Cambria County. A mined area may be differentially prone to subsidence based on its geology and depth of mineral seam, but reliable information about the different locations of varying depths of seams are not available. Geologists agree that all areas that are mined are prone to subsidence; therefore, coal mined areas are shown as vulnerable to mine subsidence. Most of the mining that has occurred in Cambria County was superficial mining of natural resources. The mine sites were abandoned after extraction can potentially become areas susceptible to subsidence events. These areas can be seen in *Figure 31 – Abandoned Mined Sites in Cambria County*. Subsidence cannot be ruled out as a potential hazard for Cambria County. There are not state or county critical infrastructure facilities at risk in the county due to sinkholes.

Table 42 – Infrastructure within 500 Yards of Abandoned Mine Polygons illustrates the different infrastructure items that are within a vulnerability zone of 500-yards of the abandoned mine inventory locations within Cambria County. The abandoned mine inventory locations can be broken down into seven categories. These categories are AMD Ground Saturation, Coal Surface Mine, Entry Point / Opening, Refuse Pile, Settling Basin, Spoil Area, and Subsidence Area. These categories can also be found symbolized by color in *Figure X – Abandoned Mine Areas in Cambria County*. Based on information in the table below, there were nineteen critical infrastructure or functional needs facilities located within the 500-yard buffer zone around abandoned mine locations. These structures include but are not limited to EMS stations, fire departments, hospitals, and police departments for critical infrastructure and preschools and schools for functional needs.

Table 42 - Infrastructure within 500 Yards of Abandoned Mine Polygons

Infrastructure within 500-Yards of Abandoned Mine Areas		
Infrastructure Type:	**Name:**	**Subsurface Type:**
Critical Infrastructure		
Ambulance Service	Forest Hills Area Ambulance	Refuse Pile
	Patton Area Ambulance Association	Subsidence Area
	Veterans Memorial Ambulance	Subsidence Area
Fire Departments	Citizens Fire Company of Vintondale Station 45	Subsidence Area
	Dunlo Volunteer Fire Company Station 82	Refuse Pile
	Ferndale Borough Fire Department	Subsidence Area
	Johnstown Fire Department Station 36-3	Coal Surface Mine
	Revloc Volunteer Fire Company Station 44	Refuse Pile
	St. Michael Fire Department	Refuse Pile
	Summerhill Township Volunteer Fire Department	Refuse Pile
Hospital / Medical Clinic	Ebandjeff Medical Clinic	Subsidence Area
Law Enforcement	Ferndale Borough Police Department	Subsidence Area
	Northern Cambria Police Department	Subsidence Area
	South Fork Municipal Building	Subsidence Area
	Vintondale Borough Police Department	Subsidence Area

Infrastructure within 500-Yards of Abandoned Mine Areas		
Infrastructure Type:	**Name:**	**Subsurface Type:**
Wastewater Treatment Plant	Forest Hills Wastewater Treatment Plant	Coal Surface Mine
Water Treatment Plant	Barnesboro Water Plant	Subsidence Area
	Benscreek Water Treatment Plant	Coal Surface Mine
Functional Needs		
Schools	Bishop McCort High School	Subsidence Area
	Blacklick Valley High School	Subsidence Area
	Ferndale Area Jr. and Sr. High School	Subsidence Area
	Greater Johnstown High School	Subsidence Area
	Glendale Valley Elementary School	Coal Surface Mine
	Glendale Valley Jr. and Sr. High School	Coal Surface Mine

Figure 30 - Sinkhole Susceptibility in Pennsylvania

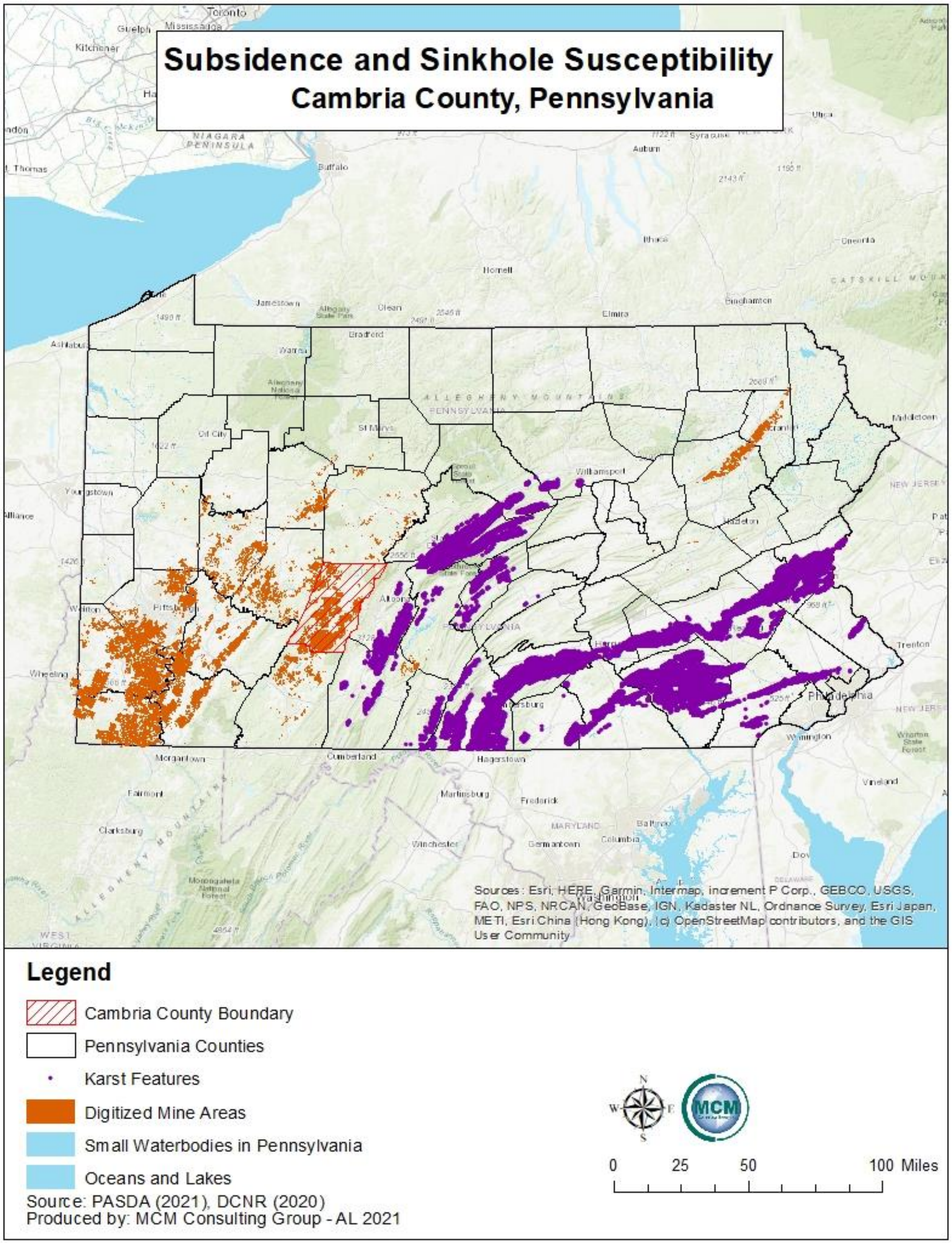


Figure 31 - Abandoned Mined Sites in Cambria County

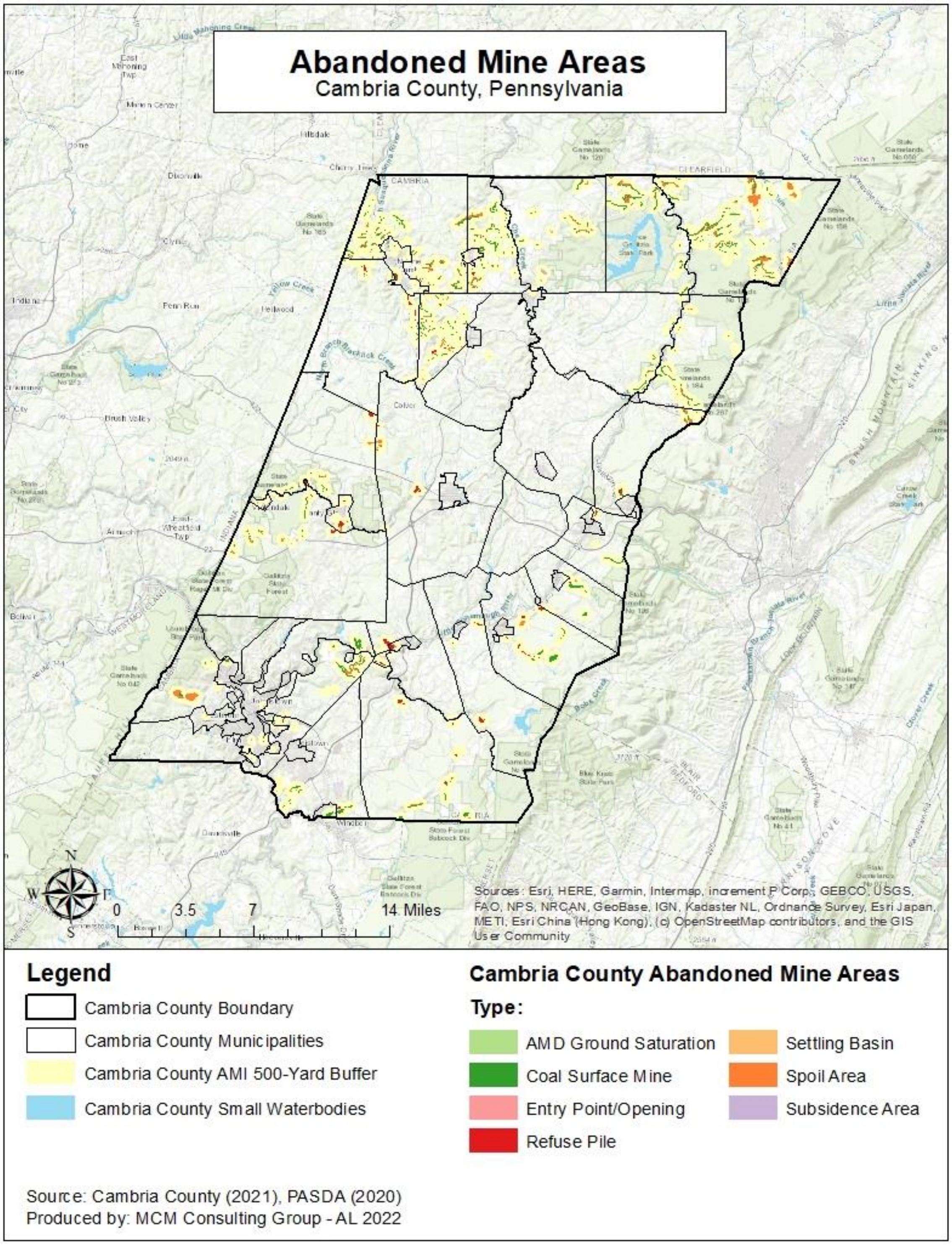


Figure 32 - Areas Unsuitable for Mining in Pennsylvania

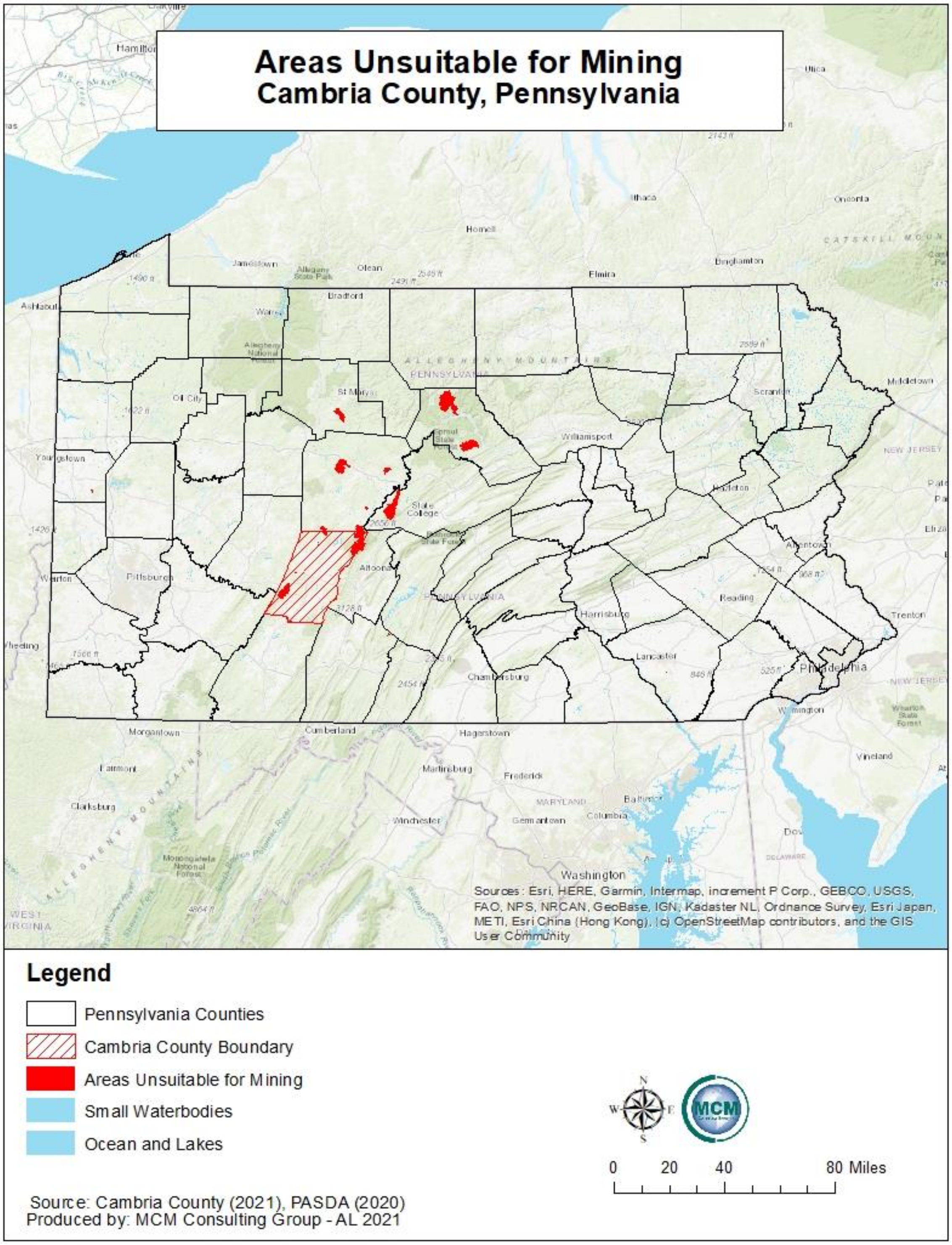
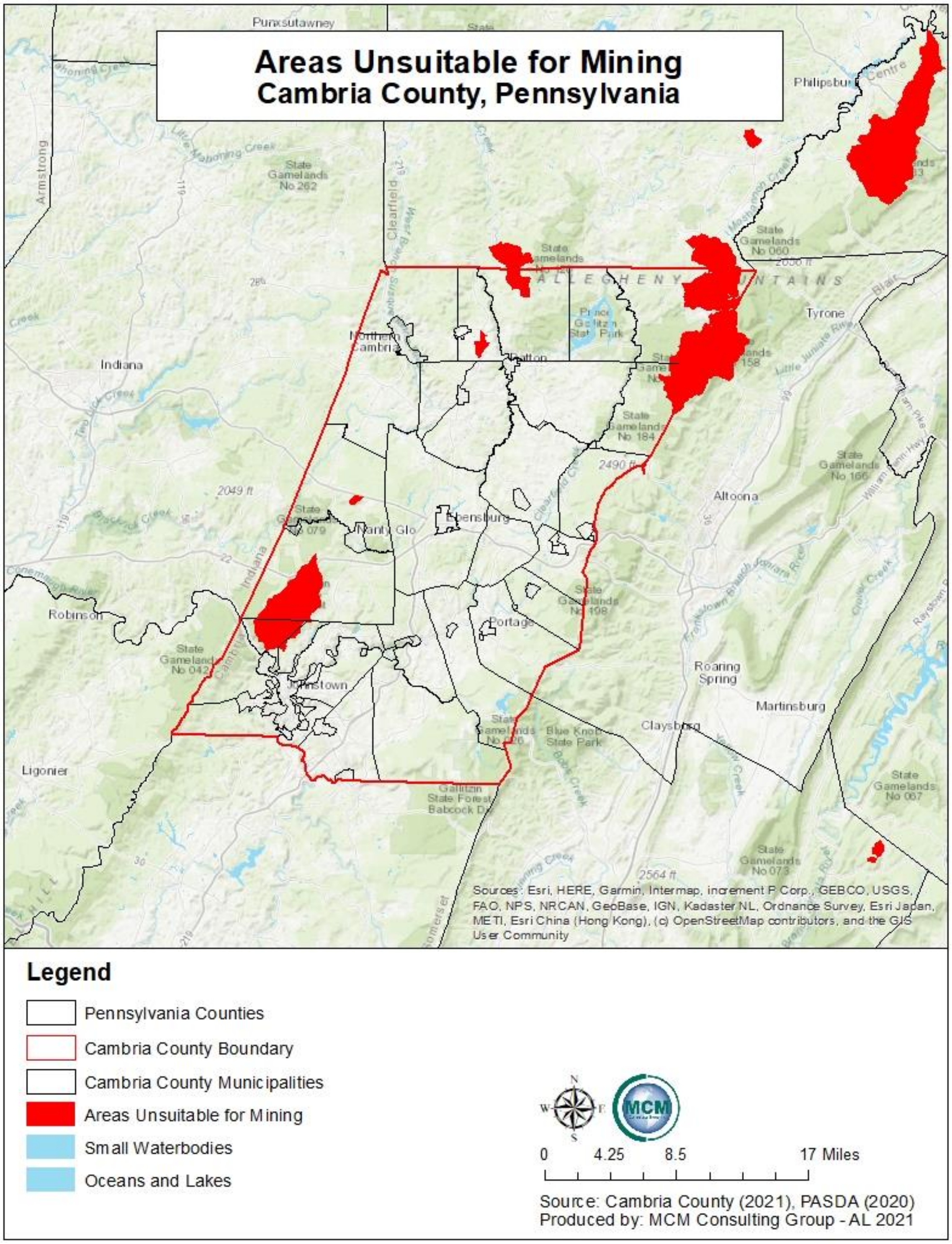


Figure 33 - Cambria County Unsuitable Areas for Mining



4.3.12. Tornadoes/Windstorm

4.3.12.1 Location and Extent

Tornadoes

Tornadoes and windstorms can occur throughout Cambria County and are usually localized in their location and extent. Severe thunderstorms may result in conditions favorable for the formation of numerous tornadoes. Tornadoes are nature's most violent storms and can cause fatalities and devastation to neighborhoods and municipalities within the county and region. Tornadoes can occur at any time during the day or night but are most frequent during the later after and early evening, which are typically the warmest hours of the day. Tornadoes are also most likely to occur in the spring and early summer months of March through June in a given year.

Tornado movement is characterized in two ways: direction/speed of spinning winds and the forward movement of the tornado, also known as the storm track. The rotational wind speeds can range from 100 to more than 250 miles per hour (mph). The speed of forward motion can range from 0 mph to 50 mph. On average, the maximum velocity of tornadoes is about 300 mph. Forward motion of a tornado path can be a few to several hundred miles in length. Widths of tornadoes vary from less than 100 feet in diameter to more than a mile wide in regard to the largest tornadoes on record. The National Centers for Environmental Information (NCEI) reports that, "the maximum winds in tornadoes are often confined to extremely small areas and vary tremendously over short distance", which explains why one house in a tornado's path may be completely demolished while a neighboring house could remain untouched. Some tornadoes never touch the ground and remain short lived, while others may touch the ground or "jump" along its path.

There are two main types of tornadoes: supercell and non-supercell. Supercell tornadoes are the most common and often the most dangerous type of tornado. A rotating updraft is key to the development of a supercell and, eventually, a tornado. Once the updraft is rotating and being fed by warm air, a tornado is formed. The other type of tornado is categorized as non-supercell, which is not as common as a supercell tornado. One type of non-supercell tornado is the "Quasi-Linear Convective Systems" (QLCS). The QLCS tornadoes typically arise during the late night or early morning hours and are typically weaker and more shorter-lived than supercell tornadoes. However, QLCS are more difficult to detect effectively. Another type of non-supercell tornado is a landspout. These tornadoes are narrow, rope-like funnels that form when a thundercloud grows with no rotating updraft, which causes the spinning motion common with tornadoes to appear near the ground more often. Waterspouts are similar to non-supercell tornadoes to the landspout but are unlikely to be found within Cambria County.

Windstorms

Windstorms are experienced on a region-wide scale. Windstorms may be caused by thunderstorms, hurricanes, and tornadoes, but the most frequent cause of windstorms in Pennsylvania are thunderstorms. Windstorms are defined as sustained wind speeds of 40 mph or greater, lasting for at least one hour, or winds of 58 mph or greater lasting for any duration. There are a wide variety of windstorm events that can take place in Cambria County. These include but are not limited to:

- Straight-line wind
- Downdraft
- Macroburst
- Microburst
- Downburst
- Gust Front
- Derecho

Straight-line winds are the most common wind event and are different from tornadic winds. A downdraft is a small-scale column of air that rapidly sinks toward the ground. A macroburst is the outward burst of strong winds that are near or at the surface with horizontal dimensions greater than 2 ½ miles. Microbursts winds may begin over a smaller area and then spread out to an even wider area, sometimes producing damage similar to a tornado. On the other hand, microbursts are smaller outward bursts of strong winds near or at the surface. Microbursts are less than 2 ½ miles in horizontal dimension and are typically short-lived winds that last a maximum of ten minutes, with windspeeds reaching up to 100 mph. Microburst events can be wet or dry events. Wet microbursts are typically associated with heavy precipitation at the surface. Dry microbursts do not have precipitation associated with them and are commonly found in the western portion of the United States. A downburst is typically used to describe the macro and microbursts. A gust front is characterized by wind shift, temperature drop, and gusty winds out ahead of a thunderstorm. Derecho is a long-lived windstorm that is associated with a band of rapidly moving showers or thunderstorms. A typical derecho contains various downbursts and microbursts. If the wind damage is more than 240 miles and includes wind gusts of at least 58 mph, the event would then be classified as a derecho.

4.3.12.2 Range of Magnitude

Each year tornadoes account for $1.1 billion in damages and cause over eighty deaths nationally. Thus far, 2011 was the second worst year on record for deadly tornadoes behind 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. 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 projectiles.

Damage and deaths can be significant when tornadoes move through populated and developed areas. The destruction that can be caused by tornadoes can range from minor to severe damage depending on the intensity, size, and duration of the storm. Typically, tornadoes cause the greatest damage 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. These scales classify U.S. tornadoes into six intensity categories based upon the estimated maximum winds occurring within the wind vortex. This scale can be seen in *Table 44 – Enhanced Fujita Scale*. Although F-Scale has been used for many years, this scale has limitations associated with it. Limitations of the F-Scale include the lack of damage indicators (DI), no account of construction quality and variability, and no definitive correlation between damage and wind speeds. These limitations are what led to a more accurate scaling method of the EF-Scale. The EF-Scale became effective on February 1st, 2007. 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. Previously recorded tornadoes are reported with the older F-Scale values, but *Table 44 – Enhanced Fujita Scale* shows F-Scale categories with corresponding EF-Scale wind speeds.

Figure 34 – Pennsylvania Wind Zones identifies wind speed zones across the Commonwealth of Pennsylvania. The figure 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. The majority of Pennsylvania falls within Zone III, meaning that design winds 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 a result of a tornado, hurricane, tropical storm, or windstorm incident. The western portion of the state falls within Zone IV, which indicates shelters can withstand up to 250 mph winds, while the eastern side falls within Zone II where shelters should be designed to withstand up to 160 mph. *Table 43 – Wind Zones and Counties Affected in Pennsylvania* identifies which county is located in specific wind zones throughout Pennsylvania. As shown in *Figure 34* and *Table 43*, Cambria County is situated in Wind Zone III.

Table 43 - Wind Zones and Counties Affected in Pennsylvania

Wind Zones and Counties Affected in Pennsylvania	
Wind Zones with Speed	**Counties Affected**
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

Wind Zones and Counties Affected in Pennsylvania	
Wind Zones with Speed	**Counties Affected**
Zone III (200 mph)	Adams, Armstrong, Bedford, **Cambria**, Cameron, Centre, Clearfield, Clinton, Columbia, Cumberland, Dauphin, Elk, Fayette, Franklin, Fulton, Greene, Huntingdon, Indiana, Juniata, Jefferson, Lycoming, McKean, Mifflin, Montour, Northumberland, Perry, Potter, Snyder, Somerset, Sullivan, Susquehanna, Tioga, Union, Westmoreland
Zone IV (250 mph)	Allegheny, Beaver, Butler, Clarion, Crawford, Erie, Forest, Lawrence, Mercer, Venango, Warren, Washington
Source: NOAA, 2019	

Since Cambria County falls within Zone III, shelters and critical facilities should be designed to withstand up to 200 mph winds, regardless of whether the gust is the result of a tornado, coastal storm, or windstorm event. Additionally, these structures should be able to withstand the wind speeds experienced in an EF4 tornado 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/windstorms of all types have caused the following problems in Cambria 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 of damage.
- Trees down or snapped off high above the ground/tree debris-fire fuel.
- Toppled high profile vehicles, including those containing hazardous materials.

Table 44 - Enhanced Fujita Scale

Enhanced Fujita Scale			
EF-Scale Number	**Wind Speed (MPH)**	**F-Scale Number**	**Description of Potential Damage**
EF0	65–85	F0-F1	**Minor damage**: Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e., those that remain in open fields) are always rated EF0.
EF1	86-110	F1	**Moderate damage**: Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111–135	F1-F2	**Considerable damage**: Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136–165	F2-F3	**Severe damage**: Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166–200	F3	**Devastating damage**: Well-constructed houses and whole frame houses completely leveled; cars thrown, and small projectiles generated.
EF5	>200	F3-F6	**Extreme damage**: 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.
Source: NWS, 2007			

Most of the tornadoes that have struck Cambria County have occurred countywide. In 1985, a total of twenty-three confirmed tornadoes touched down across Eastern Ohio, Southwestern New York, and Central/Western Pennsylvania. This outbreak remains the worst in recorded history for this area. Of these twenty-three tornadoes, eight were of violent intensity (F4 or F5) with estimated wind speeds over 200 mph.

4.3.12.3 Past Occurrences

Cambria County has experienced six tornado events since 1954 and 123 wind incidents between 2004 and summer of 2021 as seen in *Table 45 – Cambria County Tornado History* and *Table 46 – Cambria County High Wind History*. Numerous sources provide information in regard to past occurrences and losses associated with tornadoes/windstorms in Cambria County and the commonwealth as a whole. Due to the number of sources available with information, specific number of events and losses could vary slightly between sources. Tornado data was only present until 2009, while windstorm data was only available until 2019, even though more recent events could have possibly occurred. Historically, the county has experienced both severe windstorms and tornadoes.

The most recent tornado impacted Nanty Glo Borough on July 29th, 2021. That tornado was an EF0 and caused no property damage, deaths, or injuries. The most recent windstorm or strong wind event occurred July 7th, 2021, in Upper Yoder Township, Loretto Borough, Stonycreek Township, Jackson Township, and Ehrenfeld Borough. This wind event caused approximately $9,000.00 in damages to property but resulted in no injuries or fatalities. Each one of these events can cause power outages on a localized scale or on a regional scale.

Table 45 - Cambria County Tornado History

Cambria County Tornado History					
Location	**Date**	**Magnitude (F/EF Scale)**	**Deaths**	**Injuries**	**Property Damage**
Blacklick Township	08/30/1970	F1	0	0	$0*
Gallitzin Township	06/05/1975	F1	0	0	$0*
Chest Township	06/09/1980	F0	0	0	$0*
Portage Township	07/26/1981	F1	0	0	$0*
West Carroll Township	04/09/1991	F1	0	0	$0*
Gallitzin Township	06/08/1993	F1	0	0	$0*
Chest Township	09/26/1994	F2	0	0	$0*
White Township	07/19/1996	F2	0	6	$0*
City of Johnstown	06/16/1998	F1	0	0	$0*
Vintondale Borough	06/30/1998	F0	0	0	$0*
Patton Borough	09/27/1998	F1	0	0	$0*
Loretto Borough	06/13/2018	EF1	0	0	$0*

Cambria County Tornado History					
Location	**Date**	**Magnitude (F/EF Scale)**	**Deaths**	**Injuries**	**Property Damage**
Upper Yoder Township	05/23/2019	EF0	0	0	$10,000.00*
Nanty Glo Borough	07/29/2021	EF0	0	0	$0*
Source: NOAA NCEI, 2021 Estimated Values are marked*					

Table 46 - Cambria County High Wind History

Cambria County High Wind History				
Location	**Date**	**Magnitude (knots)**	**Injuries**	**Property Damage**
City of Johnstown	05/21/2004	50	0	$0*
City of Johnstown	05/25/2004	50	0	$0*
City of Johnstown	06/14/2004	50	0	$0*
City of Johnstown	06/17/2004	50	0	$0*
City of Johnstown	07/04/2004	50	0	$0*
Portage Township	08/04/2004	50	0	$0*
City of Johnstown	08/10/2004	50	0	$0*
City of Johnstown	08/29/2004	50	0	$0*
Carrolltown Borough	08/29/2004	50	0	$0*
City of Johnstown	09/29/2005	50	0	$0*
Lilly Borough	05/31/2006	50	0	$0*
City of Johnstown	05/31/2006	50	0	$0*
City of Johnstown	06/22/2006	50	0	$0*
Carrolltown Borough	06/22/2006	50	0	$3,000.00*
Ebensburg Borough	06/22/2006	50	0	$2,000.00*
City of Johnstown	07/02/2006	50	0	$0*
Nanty Glo Borough	08/03/2006	50	0	$0*
City of Johnstown	12/01/2006	50	0	$0*
Geistown Borough	12/01/2006	50	0	$0*
Nanty Glo Borough	06/01/2007	50	0	$0*
Cassandra Borough	06/01/2007	50	0	$0*
Brownstown Borough	06/08/2007	50	0	$0*
Portage Township	06/12/2007	50	0	$0*
Daisytown Borough	06/13/2007	50	0	$0*
City of Johnstown	06/27/2007	50	0	$0*
Patton Borough	08/08/2007	50	0	$0*
City of Johnstown	08/09/2007	50	0	$0*

Cambria County High Wind History				
Location	**Date**	**Magnitude (knots)**	**Injuries**	**Property Damage**
East Taylor Township	08/09/2007	50	0	$0*
City of Johnstown	08/09/2007	50	0	$0*
City of Johnstown	06/26/2008	61	4	$1,000.00*
Northern Cambria Borough	07/20/2008	50	0	$0*
Stonycreek Township	02/11/2009	50	0	$1,500.00*
Portage Township	05/28/2009	50	0	$10,000.00*
Northern Cambria Borough	07/11/2009	50	0	$5,000.00*
City of Johnstown	12/03/2009	50	0	$0*
City of Johnstown	04/16/2010	54	0	$0*
Jackson Township	05/08/2010	50	0	$5,000.00*
City of Johnstown	05/14/2010	50	0	$10,000.00*
Summerhill Borough	05/31/2010	50	0	$5,000.00*
Brownstown Borough	06/23/2010	50	0	$5,000.00*
City of Johnstown	06/23/2010	55	0	$0*
Vintondale Borough	07/25/2010	50	0	$5,000.00*
Summerhill Borough	07/25/2010	50	0	$5,000.00*
Conemaugh Township	08/04/2010	50	0	$5,000.00*
Geistown Borough	08/04/2010	50	0	$5,000.00*
City of Johnstown	04/26/2011	53	0	$0*
Daisytown Borough	04/26/2011	50	0	$5,000.00*
Ebensburg Borough	04/26/2011	50	0	$5,000.00*
Northern Cambria Borough	04/26/2011	50	0	$5,000.00*
Barr Township	06/10/2011	50	0	$5,000.00*
Carrolltown Borough	06/10/2011	50	0	$5,000.00*
Brownstown Borough	07/11/2011	50	0	$5,000.00*
City of Johnstown	05/27/2012	50	0	$5,000.00*
Brownstown Borough	05/29/2012	50	0	$5,000.00*
City of Johnstown	06/01/2012	50	0	$5,000.00*
Northern Cambria Borough	06/01/2012	50	0	$5,000.00*
Nanty Glo Borough	06/01/2012	50	0	$5,000.00*
Southmont Borough	07/18/2012	50	0	$5,000.00*
Northern Cambria Borough	07/26/2012	50	0	$5,000.00*
Ebensburg Borough	07/26/2012	50	0	$5,000.00*
Brownstown Borough	07/26/2012	50	0	$5,000.00*
Jackson Township	01/30/2013	60	0	$0*
City of Johnstown	04/24/2013	50	0	$2,000.00*
Conemaugh Township	05/10/2013	50	0	$5,000.00*

Cambria County High Wind History				
Location	**Date**	**Magnitude (knots)**	**Injuries**	**Property Damage**
Patton Borough	05/22/2013	50	0	$5,000.00*
Jackson Township	06/13/2013	50	0	$5,000.00*
City of Johnstown	06/25/2013	50	0	$5,000.00*
Hastings Borough	07/10/2013	50	0	$2,000.00*
Lorain Borough	07/10/2013	50	0	$0*
Lorain Borough	07/10/2013	50	0	$2,000.00*
Jackson Township	08/07/2013	50	0	$2,000.00*
City of Johnstown	11/01/2013	50	0	$0*
Patton Borough	11/17/2013	50	0	$0*
City of Johnstown	07/13/2014	50	0	$2,000.00*
Ferndale Borough	07/13/2014	50	0	$1,000.00*
Brownstown Borough	06/20/2015	50	0	$500.00*
City of Johnstown	06/20/2015	50	0	$500.00*
Jackson Township	07/07/2015	56	0	$0*
South Fork Borough	07/07/2015	50	0	$1,000.00*
Summerhill Borough	07/07/2015	50	0	$1,000.00*
Ebensburg Borough	06/16/2016	50	0	$1,000.00*
City of Johnstown	08/16/2016	52	0	$7,000.00*
Cambria Township	10/16/2016	70	0	$40,000.00*
Patton Borough	06/13/2017	52	0	$4,000.00*
Daisytown Borough	06/15/2007	52	0	$3,000.00*
Scalp Level Borough	08/19/2017	52	0	$0*
Vintondale Borough	08/22/2017	52	0	$3,000.00*
Ebensburg Borough	05/04/2018	52	0	$4,000.00*
Lorain Borough	05/04/2018	52	0	$2,000.00*
Patton Borough	06/13/2018	52	0	$4,000.00*
Hastings Borough	09/21/2018	52	0	$0*
Carrolltown Borough	09/21/2018	52	0	$0*
Jackson Township	05/19/2019	52	0	$3,000.00*
Reade Township	05/19/2019	52	0	$10,000.00*
Daisytown Borough	05/23/2019	70	0	$15,000.00*
Cresson Borough	05/28/2019	52	0	$5,000.00*
Ebensburg Borough	05/28/2019	52	0	$5,000.00*
Jackson Township	05/29/2019	52	0	$3,000.00*
Barr Township	05/29/2019	52	0	$4,000.00*
Jackson Township	07/02/2019	52	0	$3,000.00*
Scalp Level Borough	07/02/2019	52	0	$3,000.00*

Cambria County High Wind History				
Location	**Date**	**Magnitude (knots)**	**Injuries**	**Property Damage**
Southmont Borough	07/06/2019	52	0	$4,000.00*
Vintondale Borough	09/11/2019	52	0	$0*
Jackson Township	09/11/2019	52	0	$0*
Jackson Township	09/11/2019	52	0	$0*
Nanty Glo Borough	09/11/2019	52	0	$3,000.00*
Lorain Borough	04/08/2020	52	0	$3,000.00*
Southmont Borough	04/08/2020	52	0	$3,000.00*
Conemaugh Borough	04/13/2020	52	0	$4,000.00*
Summerhill Borough	04/13/2020	52	0	$3,000.00*
Jackson Township	07/05/2020	52	0	$6,000.00*
Dale Borough	07/16/2020	52	0	$1,000.00*
Upper Yoder Township	07/16/2020	52	0	$5,000.00*
Scalp Level Borough	07/21/2020	52	0	$4,000.00*
Daisytown Borough	08/28/2020	52	0	$12,000.00*
Jackson Township	05/26/2021	52	0	$2,000.00*
Cambria Township	06/21/2021	52	0	$4,000.00*
Upper Yoder Township	06/21/2021	52	0	$4,000.00*
Upper Yoder Township	07/07/2021	52	0	$0*
Stonycreek Township	07/07/2021	52	0	$0*
Ehrenfeld Borough	07/07/2021	52	0	$2,000.00*
Jackson Township	07/07/2021	52	0	$4,000.00*
Loretto Borough	07/07/2021	52	0	$3,000.00*
Source: NOAA NCEI, 2021 Estimated Values are marked*				

4.3.12.4 Future Occurrence

In the United States tornado activity has increased in variability with a general decrease in the number of days a year with activity but an increase in the number of tornadoes on those days. This is an increase in tornado outbreaks. The future probability of a disastrous tornado occurring in Cambria County is ranked as possible but not highly likely. According to the National Weather Service, the Commonwealth of Pennsylvania has an annual average of ten tornadoes with two related deaths. While the chance of being hit by a tornado in Cambria County is small, the damage that results when the tornado arrives can be devastating. 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. 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 country 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 uniquely high. The annual tornado seasoning has begun to lengthen, with the season starting earlier than it has historically and ending later. Pennsylvania had, for example, a record number of tornadoes in April and May of 2019 compared to any other April and May on record. Climate change is causing temperatures and air moisture to increase, and it is these changes that could result in an increase in the frequency and intensity of tornadoes and windstorms. There is a somewhat low confidence in these conclusions and there is still much uncertainty with the recurrence of tornadoes. Therefore, the number of future tornadoes and windstorm events could potentially increase due to many factors.

Based on historical incidents, there are three zones in Pennsylvania that can either experience less than one, one to four, or five to ten of EF-2 or above tornadoes per 3,700 square miles. Communities in Cambria County, as shown in *Figure 36 – Tornado Activity in Cambria County* below, are expected to have one to four tornadoes annually as a future occurrence. The approximation of one to four tornadoes annually assists with determining the rate of future tornado occurrences within Cambria County. Future tornadoes will be similar to those that affected the county in past events.

Windstorm events occur on a more frequent basis compared to tornadoes. Cambria County specifically experiences windstorm events more commonly than tornadoes, which causes power failure, loss of communication networks, and residents requiring temporary shelters and provision of supplies. Therefore, unlike tornadoes, this hazardous event has a highly likely probability for future events to occur within the county.

4.3.12.5 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, such as Pennsylvania. 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 but not limited to 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 associated with tornadoes which increase the vulnerability of Cambria County:

- Flash floods – 146 deaths annually nationwide.
- Lightning – 75 to 100 deaths annually nationwide.
- Damaging straight-line winds – reaching 140 mph wind speed.
- Large hail – can reach the size of a grapefruit and can cause several million in damages annually to property and crops

The economy of Cambria County is highly vulnerable to tornadoes. While there may be limited impact on financial and commercial systems of the economy, these storms, and the damage they cause, can disrupt business for long term. The local economy is vulnerable due to the 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 transportation of goods and services. Additionally, flooding cannot be discounted as it can destroy physical structures, merchandise, and equipment essential for business operation.

Cambria County's environment is also vulnerable to tornado events. However, since tornado events are typically localized, environmental impacts are rarely widespread. The impact of windstorms on the environment typically takes place over a large area. In either case, where these events occur, severe damage to plant species is likely. This include uprooting or total destruction of trees and an increased threat of wildfire in areas where dead trees are not removed. Most notably, hazardous material spills can pollute ground water systems and vegetation. In the case of hazardous material spills, the local environment can be negatively impact and can cause extensive cleanup and mitigation efforts. Cambria County is considered a rural county that has a great amount of tourism that occurs in the surrounding hills, mountains, and state parks. Not only is the environment at risk to tornadoes and windstorms, but hikers, tourists, and hunters are also at risk when out in the environment. Consequently, in the event of a tornado or severe storm, these tourists have limited emergency notification measures which result in high vulnerability. A storm potentially has the ability to destroy structures, damage private and public property, and injure citizens and tourists to the area. The elderly, disabled, special needs, and non-English speaking residents are at risk when faced with tornadoes. Without the assistance to evacuate and the difficulty understanding information, these at-risk populations may be unable to prepare themselves of their homes and other possessions to safely endure the storm.

High winds events may affect the entire county or small portions of the county at one time. Therefore, it is important to identify specific critical facilities and assets that are most vulnerable to this hazard. Critical facilities are highly vulnerable to high windstorms and tornado events. While many severe storms can cause exterior damage to structures, tornadoes can also complete destroy structures, along with their surrounding infrastructure and immediately halting function. Tornadoes are often accompanied by severe storms which can be threatening to critical facilities within the county. Many secondary effects from these disasters can jeopardize the operation of these critical facilities as well. Critical facilities are particularly vulnerable to power outages which can leave facilities functionless, potentially crippling infrastructure supporting the population of the county. Due to their lightweight and often anchored design, commercial trailers and mobile homes are also extremely vulnerable to high winds/tornadoes and will generally sustain the most damage.

Figure 34 - Pennsylvania Wind Zones

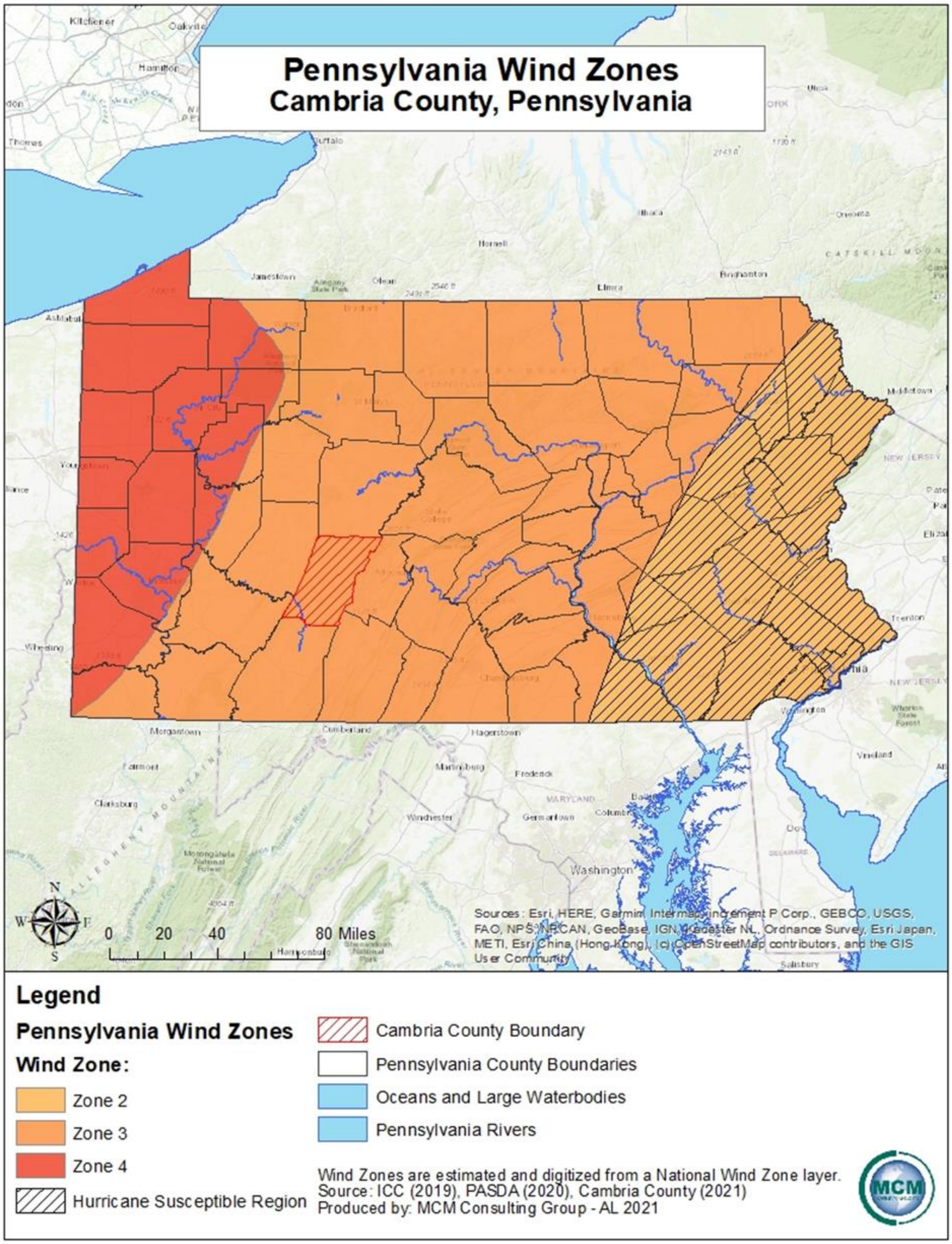


Figure 35 - Past Tornado Occurrences in Cambria County

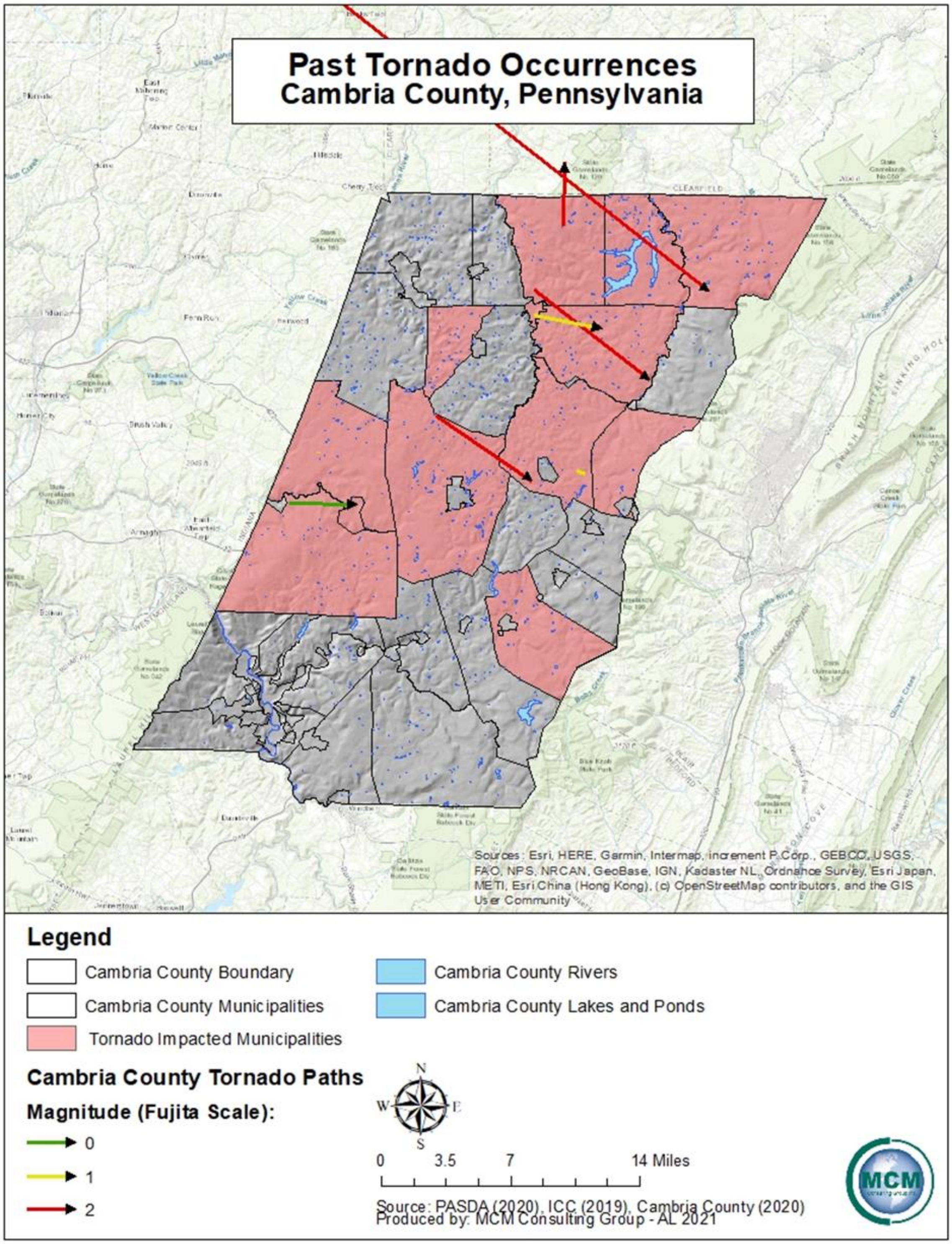
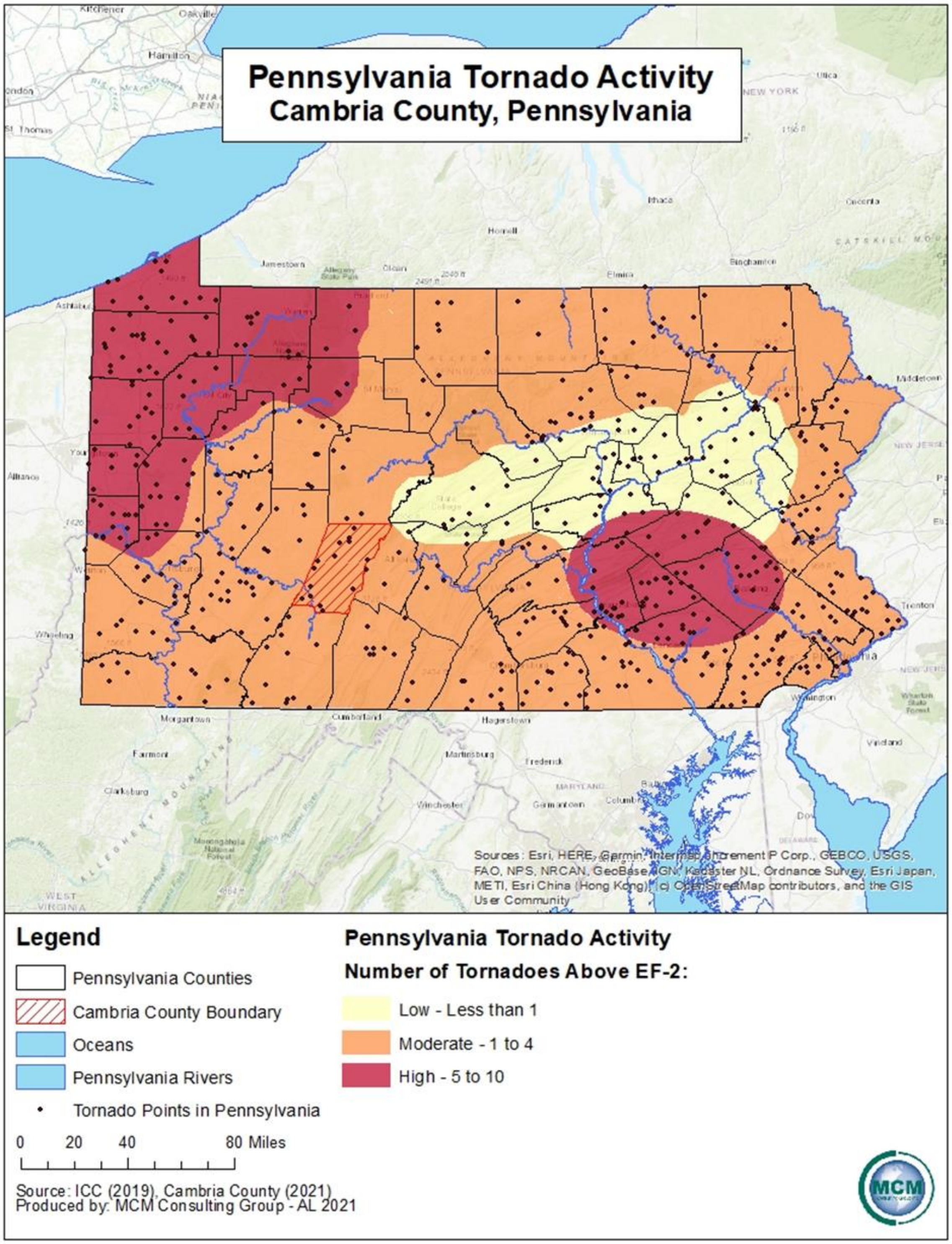


Figure 36 - Tornado Activity in Cambria County



4.3.13. Wildfire

4.3.13.1 Location and Extent

The most prevalent causes of devastating wildfires are droughts, lighting 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 and 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 forests where they can spread rapidly by feeding off of vegetation and combustible fuels. Wildfires are most prevalent under prolonged dry and hot spells, or general drought conditions.

A large portion of Cambria County is covered by either farmland or forested areas, increasing the geographic extent of wildfire vulnerability in the county. Under dry conditions or droughts, wildfires have the potential to burn forests as well as croplands. For recreational enjoyment, the county boasts several local parks and natural areas that include a series of trail systems – all of which are at risk for wildfires.

4.3.13.2 Range of Magnitude

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 including power outages may result. Other negative impacts of wildfires can include death of people, livestock, fish, and wildlife, and destruction of 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 wildfires 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 communities, most fires in Cambria County are contained before they cause damage or extensive property loss. However, the county recognizes that wildfires of some magnitude will continue to occur in Cambria County and will have more detrimental effects if development in and/or around the natural areas increases.

The United States Forest Service utilizes the Forest Fire Assessment System to classify the dangers of wildfire. *Table 47 – Wildland Fire Assessment System* identifies each threat classification and provides a description of the level.

Table 47 - Wildland Fire Assessment System

Wildland Fire Assessment System *(U.S. Forest Service)*	
Rank	**Description**
Low (L)	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.
Moderate (M)	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.
High (H)	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.
Very High (VH)	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.
Extreme (E)	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.

4.3.13.3 Past Occurrence

The Pennsylvania Department of Conservation and Natural Resources (DCNR) has an extensive history of reported wildfires in its state forestry system and districts. Due to the many acres of farmland, forested areas, and open space in the county, under the right conditions the potential exists for a significant wildfire. Cambria County lies entirely in forest District Six of the DCNR's Bureau of Forestry. This district encompasses Indiana, Cambria, and Blair counties. In 2020, there was a total of seventy-seven fires in District Six that were responsible for destroying 164.5 acres of land.

District Six reports the following twenty-one-year wildfire summary based on observed and reported wildfires. *Table 48 – Annual Summary of Wildfire Events* illustrates the number of acres burned in a certain number of fires for District SIX from the year 2000 to the year 2020.

Table 48 - Annual Summary of Wildfire Events

Annual Summary of Wildfire Events (DCNR 2021)		
Year	**Number of Fires**	**Acres**
2000	53	622.7
2001	49	400
2002	33	166
2003	28	310.3
2004	11	23.6
2005	54	282.5
2006	50	171.2
2007	20	36.3
2008	25	87.1
2009	93	398
2010	32	244.1
2011	16	130.9
2012	14	85.1
2013	11	30.6
2014	26	115.5
2015	18	56
2016	17	60.3
2017	17	314.8
2018	16	54.8
2019	24	21.6
2020	77	164.5

In recent years, the number of prescribed burns in Pennsylvania has been increasing. This corresponds to an understanding of the need for fire in many natural ecosystems and management strategies for reducing vulnerability to wildfire; it also improves hunting opportunities. As demonstrated in *Table 49 – Annual Summary of Prescribed Fire Events*, there have been numerous prescribed burns in publicly owned forests.

Table 49 - Annual Summary of Prescribed Fire Events

Annual Summary of Wildfire Events (DCNR 2021)		
Year	**Number of Prescribed Fires**	**Acres Burned**
2010	56	2,737
2011	70	6,301
2012	96	4,133
2013	142	8,058
2014	161	7,094
2015	244	14,553
2016	268	15,373
2017	253	19,373
2018	241	13,485
2019	363	14,066
2020	282	11,748

4.3.13.4 Future Occurrence

Annual occurrence of urban fires and wildfires in Cambria County are expected. Urban fires are most often the result of human errors, outdated wiring and occasionally, malintent (arson). The occurrence of large scale and intense 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.

Climate change is expected to bring an elongated wildfire season and more intense and long-burning fires (Pechony & Shindell, 2010). In some regions of the United States, this is a very real concern. Northern California has experienced unprecedented devastating wildfires in 2017, 2018, 2019, and 2020. The fires that have been occurring in California are thought to be burning faster and hotter due to worsening drought conditions caused by increased climate change (Cvijanovic et al., 2017). Wildfire conditions in Pennsylvania are not nearly as severe as in Northern California, but the intensification is a signal that the changes brought by climate change are relevant to wildfires. 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).

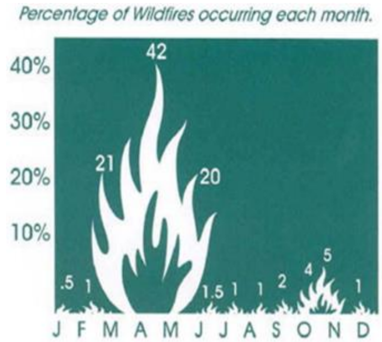
4.3.13.5 Vulnerability Assessment

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 drought, wildfires can be devastating. The highest risk for wildfires in Pennsylvania occurs during the spring (March to May) and the fall (October to November) months and 99% of all wildfires in Pennsylvania are caused by people. Approximately 83% of all Pennsylvania wildfires occur in the months outlined above. 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 37 – Seasonal Wildfire Percentage* shows the wildfire percentage occurrence during each month in Pennsylvania.

Firefighters and other first responders can encounter life-threatening situations due to forest and wildfires. 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 related housing density and vegetative density. The dataset provides a way to identify locations where larger numbers of people 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 refers to areas where housing and wildland vegetation intermingle, and interface refers to areas where housing is in the vicinity of a large area of dense wildland vegetation. The WUI was the fastest-growing land use type in the United States between 1990 and 2010. Factors behind the growth include population shifts, expansion of cities into the wildlands, and the expansion of new vegetation growth. The primary cause has been the migration of people, not vegetation growth.

Figure 37 - Seasonal Wildfire Percentage



Pennsylvania is among the states with the largest 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 illustrates this. *Figure 38 – Wildland Urban Interface* shows the extent of Cambria County and the critical infrastructure facilities, functional needs facilities, and fire stations. Wildfire hazard is defined by conditions that affect wildfire ignition and/or behavior such as fuel, topography, and local weather. The many addressable structures in the Wildland Urban Interface and Intermix zones are broken up by assessed parcel use codes.

Table 50 – Buildings in Wildfire Hazard Areas shows the total Cambria County addressable structures and critical facilities that are located in, near, adjacent to or among state game lands, state parks, state forests, 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 structures within the specified area.

There are eighty-seven fire departments that serve Cambria County, a list of which can be seen in *Table 56* of the emergency services profile. Each fire department conducts its own schedule of in-house training sessions for its members.

The response of firefighters is integral to the containment of wildfires in the county. There is a potential for fire stations and services to close, which affects response to a wildfire in Cambria County**.** *Figure 39 – Fire Stations Locations* illustrates the position of fire stations and the location of state game lands, state forests, and natural areas within Cambria County. It is recommended that each municipality assess vulnerabilities to department closures by building a relationship with their local providers and planning accordingly for if a local service were to close.

At the time of the writing of this plan, it is possible that the continuing COVID-19 pandemic will impact the availability of firefighters and their response times. Many fire departments have created and begun to enforce new regulations regarding responding to emergencies during the pandemic.

Table 50 - Buildings in Wildfire Hazard Areas

Buildings in Wildfire Hazard Areas						
Municipality	Wildland Urban Interface			Wildland Urban Intermix		
	High Density	Medium Density	Low Density	High Density	Medium Density	Low Density
Adams Township	287	843	132	0	504	1,134
Allegheny Township	0	21	110	0	13	534
Ashville Borough	37	82	0	0	7	5
Barr Township	11	55	155	3	76	520
Blacklick Township	57	76	16	0	107	733
Brownstown Borough	159	118	0	0	81	0
Cambria Township	446	454	184	0	213	1,048
Carrolltown Borough	37	247	0	0	20	0
Cassandra Borough	4	37	0	0	34	0
Chest Township	0	8	12	0	93	50
Chest Springs Borough	0	23	0	0	0	0
Clearfield Township	3	10	188	0	10	417
Conemaugh Township	30	280	57	0	134	499
Cresson Borough	482	216	0	11	6	0
Cresson Township	117	491	29	0	437	126
Croyle Township	32	118	174	0	180	582
Daisytown Borough	21	104	0	0	0	19
Dale Borough	30	63	0	0	0	0
Dean Township	10	39	0	0	49	24
East Carroll Township	7	21	8	0	61	355
East Conemaugh Borough	555	59	0	45	0	0
East Taylor Township	29	509	1	2	168	605
Ebensburg Borough	913	519	15	0	80	47
Ehrenfeld Borough	36	28	0	0	5	34
Elder Township	2	112	42	0	18	242
Ferndale Borough	584	180	0	0	0	0
Franklin Borough	147	29	2	0	18	0
Gallitzin Borough	500	237	4	0	44	9
Gallitzin Township	35	26	10	0	36	434
Geistown Borough	0	0	0	0	1	0
Hastings Borough	274	345	7	0	19	0

Buildings in Wildfire Hazard Areas						
Municipality	Wildland Urban Interface			Wildland Urban Intermix		
	High Density	Medium Density	Low Density	High Density	Medium Density	Low Density
Jackson Township	106	528	31	0	342	1,119
City of Johnstown	6,456	1,271	2	215	338	401
Lilly Borough	109	267	0	0	70	4
Lorain Borough	0	0	0	0	157	0
Loretto Borough	41	145	22	0	2	7
Lower Yoder Township	665	405	14	2	322	241
Middle Taylor Township	0	21	1	0	53	277
Munster Township	0	31	45	0	10	167
Nanty Glo Borough	560	453	2	0	276	7
Northern Cambria Borough	694	676	13	0	392	47
Patton Borough	387	332	5	0	106	1
Portage Borough	982	250	0	0	38	0
Portage Township	137	609	57	0	463	439
Reade Township	34	218	27	0	102	525
Richland Township	173	341	257	0	546	431
Sankertown Borough	73	159	0	0	54	0
Scalp Level Borough	206	135	12	0	0	32
South Fork Borough	275	124	0	0	71	0
Southmont Borough	581	326	0	0	45	0
Stonycreek Township	121	76	15	0	463	57
Summerhill Borough	94	116	0	0	50	0
Summerhill Township	249	102	93	0	209	402
Susquehanna Township	9	145	105	0	92	535
Tunnelhill Borough	0	70	0	0	46	0
Upper Yoder Township	379	901	27	0	449	440
Vintondale Borough	61	103	0	0	86	1
Washington Township	1	49	10	0	125	201
West Carroll Township	28	149	52	0	7	430
Westmont Borough	866	1,247	3	0	72	3
West Taylor Township	23	48	11	0	118	244
White Township	231	429	119	0	351	323
Wilmore Borough	8	82	5	0	12	1
Totals:	**18,394**	**15,158**	**2,074**	**278**	**7,881**	**13,752**

Figure 38 - Wildland Urban Interface

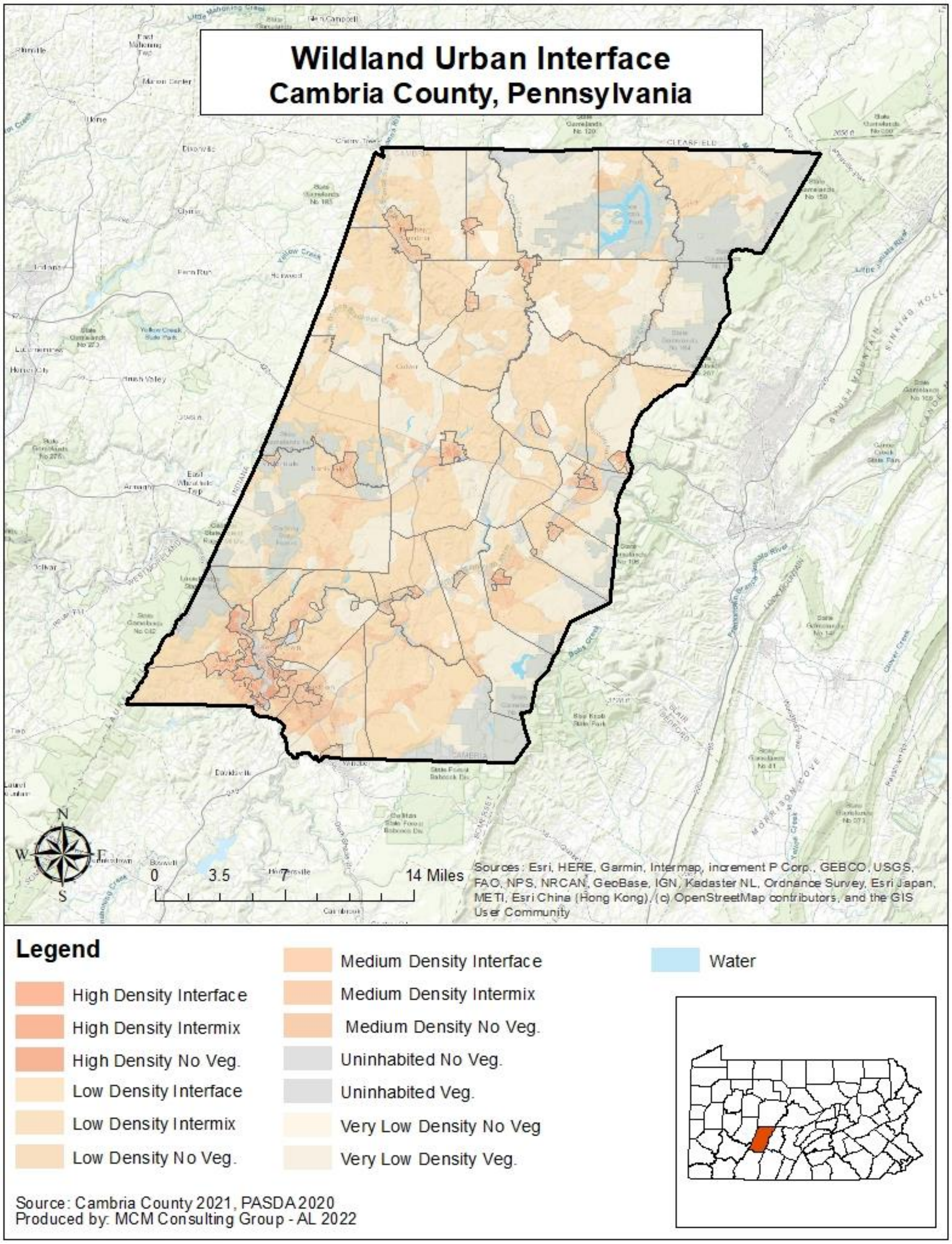
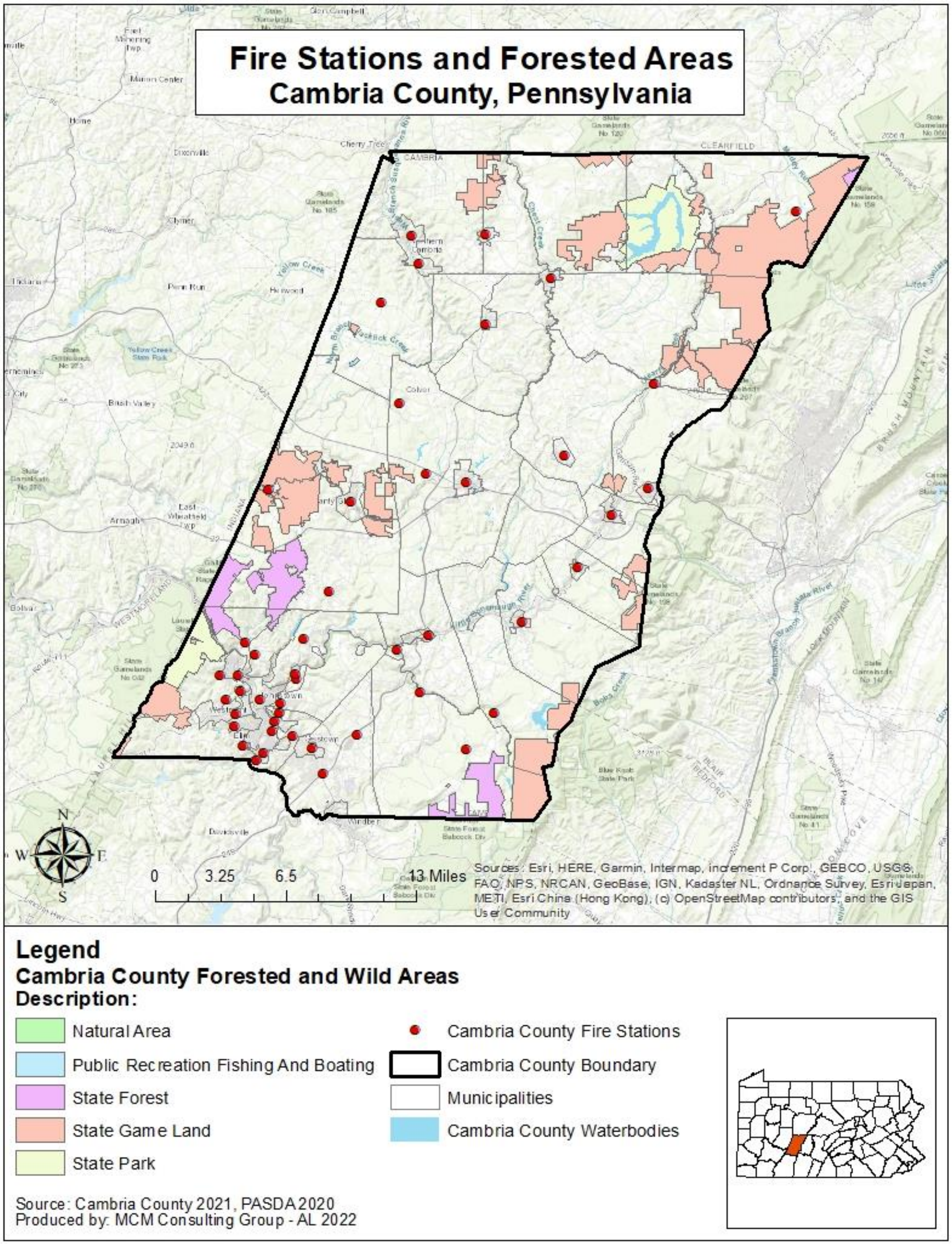


Figure 39 - Fire Station Locations



4.3.14. Building/Structural Collapse/Blighted Properties

4.3.14.1 Location and Extent

Blighted Properties

The presence of blighted properties in Cambria County is a nuisance for both residents and visitors to the county on a year-round basis. Blighted properties include areas of the county where the infrastructure is damaged and aging beyond occupation, habitation, and/or commercial use.

Blighted properties are described by the Pennsylvania State Statute 1945 Act 385 as:

1. Any premises which because of physical condition or use is regarded as a public nuisance at common law or has been declared a public in accordance with the local housing, building, plumbing, fire, and related codes.
2. Any premises which because of physical condition, use, or occupancy is considered an attractive nuisance to children, including but not limited to abandoned wells, shafts, basements, excavations, and unsafe fences or structures.
3. Any dwelling which because it is dilapidated, unsanitary, unsafe, vermin-infested, or lacking in the facilities and equipment required by the housing code of the municipality, has been designated by the department responsible for enforcement of the code as unfit for human habitation.
4. Any structure which is a fire hazard or is otherwise dangerous to the safety of persons or property.
5. Any structure from which the utilities, plumbing, heating, sewage, or other facilities have been disconnected, destroyed, removed, or rendered ineffective so that the property is unfit for its intended use.
6. Any vacant or unimproved lot or parcel of ground in a predominantly built-up neighborhood, which by reason neglect or lack of maintenance has become a place for the accumulation of trash or debris, or a haven for rodents or other vermin.
7. Any unoccupied property which has been tax delinquent for a period of two years prior to the effective date of Pennsylvania State Statute 1945 Act 385 or local municipality regulations and those in the future having a two-year tax delinquency.
8. Any property which is vacant but not tax delinquent, which has not been rehabilitated within one year of the receipt of notice to rehabilitate from the appropriate code enforcement agency.
9. Any abandoned property.

Building Collapse

Building collapse in regard to blighted properties is the collapse of a property due to damage to the buildings, unsuitable building materials, or aging of infrastructure because of little to no maintenance. Building collapse can occur with or without warning and can be devastating to both property damage and personal injury. With a good amount of warning time, building and structure collapses can be mitigated prior to a large amount of damage occurring.

4.3.14.2 Range of Magnitude

Blighted Properties

Cambria County has a large number of blighted properties that are located in urban environments, including the City of Johnstown, and the surrounding urban boroughs, like Ebensburg Borough. Most of the blighted properties in Cambria County are unsecured and highly unsafe due to one or more of the following issues: structure rot, infestation from vermin including but not limited to rats, mice, and insects, and occupation by squatters. These properties can create a risk for the county because they are unsafe for occupation and future construction.

Building Collapse

Building collapse is a large issue when blighted properties become structurally unsound or are no longer safe for human occupation. Structure collapse from blighted properties is most likely to occur in those blighted properties that are falling down, have degraded foundations or supports, or are being reclaimed by vegetation and nature. All of the blighted properties are at risk of structure and building collapse.

A collapse could be the direct result of the structural integrity of the blighted property, or it could be the result of a secondary event such as a thunderstorm, winter storm, blizzard, or flooding event. The ground topography in Cambria County also can be a contributing factor to the collapse of a blighted property. The City of Johnstown and other boroughs and urban areas have a higher probability of a structure or building collapse, but those municipalities also have a limited number of blighted properties.

4.3.14.3 Past Occurrence

Blighted Properties

The number of blighted properties in Cambria County has increased in recent years. Although some properties that are considered to be blighted in Cambria County have been demolished by the county itself. With recent market trends in real estate, a large number of vacant buildings in Cambria County are sold prior to them being blighted.

Building Collapse

There have not been any past recorded and documented building collapse events in Cambria County.

4.3.14.4 Future Occurrence

Blighted Properties

Blighted properties in Cambria County will continue to increase unless blighted property procedures are put into practice at the county and local levels. With the requisite policies put into place the number of blighted properties in Cambria County is liable to decrease.

Building Collapse

Building collapse in Cambria County will continue to remain low despite the increasing number of blighted properties in the county if not remediation occurs.

4.3.14.5 Vulnerability Assessment

Blighted Properties

Blighted properties are a significant concern when the health and safety of the citizens of Cambria County are impacted. Blighted properties, while being an eye sore, are also a threat to the health and safety of individuals. Buildings that are blighted often can be unsafe due to building materials exposed to the environment or to unintentional consumption by humans. Buildings that have utilized asbestos in construction can become a major health hazard if the building is not maintained, the asbestos exposed, and people breath in those particles because the property has become abandoned and blighted. Another large health issue is mold in blighted properties and buildings. After a property becomes blighted, the functional systems that prevent mold from growing and spreading are often rendered useless, thus facilitating the growth of harmful mold and fungi that pose a threat to human health.

Just as blighted properties can adversely affect the health and safety of humans, it can also hurt the environment of an area. The leaching of building materials from an open or fallen property into water features, such as streams and creeks, can damage the wildlife in a water feature and hurt the public supply of drinking water. As mentioned above, asbestos is a large concern if the blighted property is of older construction. Also, potential chemicals from a blighted property, like paints and oils, can make their way into water tables, streams, and creeks, thus polluting the water features.

Blighted properties also offer shelter for animals and vermin that may not be able to find a home, and an area for breeding in the wild. This can result in the spread of rats and other pests in an area with a large concentration of blighted properties. Along with the accumulation of pests like rats, there is also a high chance of that area also attracting vermin like cockroaches. The increase in vermin can also pose a threat to human health, as vermin and pests can carry diseases which can be contracted due to close contact.

Blight can also adversely affect the infrastructure and its ability to function if the blighted properties in Cambria County are adjacent to or near critical facilities and functional needs facilities. If a blighted property abuts a critical facility, it may be best for that structure to be torn down so that potential negative effects from the blighted property do not cause damage or limit the function of the critical facility.

Finally, blighted properties can be a problem for tourism and attracting new residents to Cambria County. If blighted properties flourish in the county, people who travel to Cambria County for please, whether that be for summer vacations or seasonal hunting, might reconsider that travel due to the presence of blighted properties.

Building Collapse

Building collapse also puts an area or a group of people at risk of property damage, bodily harm, or even death. The more urban areas of Cambria County are at a higher risk of building collapse than the more rural areas.

4.3.15. Civil Disturbance

4.3.15.1 Location and Extent

Civil disturbance refers to mass acts of disobedience where participants can become hostile to authority and there is a threat to maintaining public safety and order. Such disturbances can often be forms of protest in the face of socio-political problems. Riots 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 to precipitate civil disturbance.

Criminal activity refers to all criminality, including enemy attack, sabotage, physical or information break of security, workplace or school violence, harassment, and other crimes. Criminal activity is a very broad hazard category similar to civil disturbance. The scale and scope of criminal incidents or events vary widely.

4.3.15.2 Range of Magnitude

Civil disturbances can take the form of small gatherings or large groups blocking or impeding access to a building or disrupting normal activities by generating noise and intimidating people. They can range from a peaceful sit-in to a full-scale riot, in which a mob burns or otherwise destroys property and terrorizes individuals. Even in its more passive forms, a group that blocks roadways, sidewalks, or buildings interferes with public order. There are two types of large gatherings typically associated with civil disturbances: crowds and mobs. 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 demonstrators 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. Similar to 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.
- **Escape Mob**: An escape mob is a group attempting to flee from something such as a fire, bomb, flood, or other catastrophes. 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 a significant civil disturbance or criminal activity incident, 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 as a result 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.

Cambria County’s greatest likelihood for civil disturbance is in the borough of Ebensburg, the county seat. Citizens, property, and infrastructure could be affected if a large-scale disorder were to take place. As stated previously, government facilities, landmarks, prisons, and universities are common sites where crowds or mobs may gather. Cambria County is home to six universities and post-secondary education centers, including: the Greater Johnstown Career and Technology Center; Hiram G. Andrews Center; Mount Aloysius College; Penn Highlands Community College; St. Francis University; and, the University of Pittsburgh at Johnstown (UPJ).

4.3.15.3 Past Occurrence

The county has not experienced any *significant* civil disturbance events.

Following the death of George Floyd in Minneapolis, Minnesota in May 2020 at the hands of law enforcement, civil unrest erupted across the nation. A peaceful demonstration of support for *Black Lives Matter* (BLM) and law enforcement reform in downtown Johnstown included about 500 protestors on June 6, 2020. The group marched and shouted slogans on Market Street, and, briefly, lay prone on Route 56 at the intersection of Napoleon Street.

According to *The Tribune-Democrat*, some protesters brought attention to the 2012 death of Elip Cheatham, a 27-year-old black man who was shot by Johnstown police officers when he attempted to drive past them – at an estimated 60 mph. The names of the officers involved have never been publicly released. "So those kinds of things concern us, and they fester in the community, in the concerns of the community," said one protestor. "That's not a good thing."

In July 2021, 18 inmates at the Cambria County Prison were charged with various offenses related to an October 2020 prison riot. Warden Christian Smith told *The Tribune-Democrat* the riot was apparently triggered by high tensions and changes to meal procedures resulting from an outbreak of COVID-19 at the prison.

4.3.15.4 Future Occurrence

While unlikely, civil disturbances may occur in Cambria County, and it is difficult to accurately predict the probability of future occurrence for civil disturbance events over the long-term. However, *Table 51 - Civil Disturbance Events Reported to PEMA 2012-2018,* depicts the range of potential civil disturbances in Pennsylvania and gives the county some background for consideration of future occurrences.

Table 51 - Civil Disturbance Events Reported to PEMA 2012 - 2018

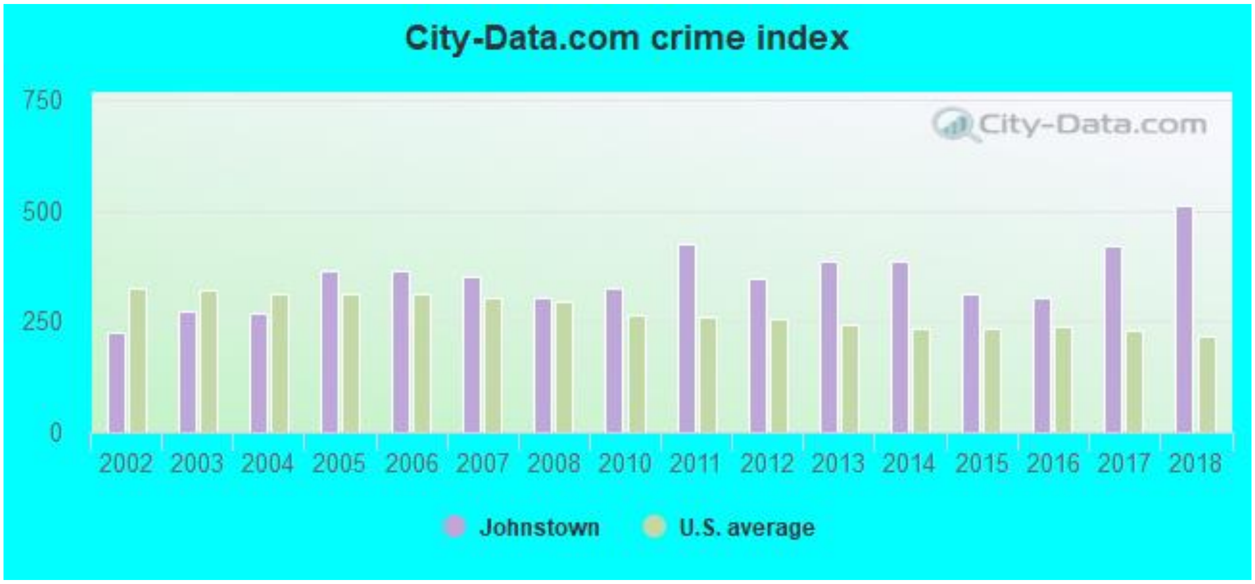
Table 4.3.18-2 Civil disturbance events reported to PEMA-KC, 2012-2018 (PEMA, 2018).							
EVENT TYPE	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Demonstration	1	3	9	3	3	3	3
Juvenile Detention Center	0	0	0	0	0	0	1
Prison Disturbance	0	2	0	0	0	1	0
Detainee Escape	2	4	3	4	0	2	1
Protest	4	24	49	35	64	78	13
Large Crowd Gathering	0	1	0	4	2	3	2
Riot	0	0	0	1	0	0	0
School Threat	1	2	0	2	0	2	0
Assault	2	8	2	2	3	4	0
Gun/Bomb Incident	3	15	3	7	2	3	0
Civil Disorder - totals	***13***	***59***	***66***	***58***	***74***	***96***	***20***
**Events totaled through 2018*							

According to the Pennsylvania State Hazard Mitigation Plan, from 2012 to 2018, the commonwealth experienced an average of fifty-five civil disturbance events each year. While that number is relatively low and the occurrences in Cambria County are rare, the local planning team (LPT) decided civil disturbance should be regarded as a high-risk hazard due to the current political trends and frictions across the country.

Like civil disturbance, it is extremely difficult to predict when criminal activity may take place in Cambria County and throughout the Commonwealth of Pennsylvania. According to the City-Data.com crime index, the 2018 crime rate in Johnstown (the county's highest population center) is 1.9 times greater than the U.S. average. It was higher than 96.1% of all U.S. cities. The 2018 Johnstown crime rate rose by 22% compared to 2017. In the last five years, Johnstown has seen a rise in violent crime and a decrease in property crime.

Read more: https://www.city-data.com/crime/crime-Johnstown-Pennsylvania.html.

Figure 40 - City-Data.com Crime Index



4.3.15.5 Vulnerability Assessment

All municipalities in Cambria County can be vulnerable to civil disturbance and criminal activity, 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. At the time of writing of this plan, the political temperature of the country as a whole continued to run high, making this hazard vulnerability one for consistent monitoring by public safety officials.

4.3.16. Dam Failure

4.3.16.1 Location and Extent

Dams

A dam restricts the flow of water or underground streams and often creates reservoirs for water storage. The reservoirs created by these barriers not only suppress floods but also provide water for activities such as irrigation, human consumption, industrial use aquaculture, and navigability.

Dam failures occur usually as a secondary effect of massive amounts of rainfall and flooding, causing too much water to enter the spillway system. This type of failure occurs with little to no warning. Spring thaws, severe thunderstorms, and heavy rainfall are also contributing factors to potential dam failures. Depending on the size of the body of water where the dam is constructed, additional water may come from distant upstream locations. Water contributions may also come from dam failures in adjoining counties that are along the same riverine or water features.

FEMA considers the following to be the most frequent causes of dam failures:

- Overtopping caused by floods that exceed the capacity of the dam
- Deliberate acts of sabotage
- Structural failure of materials used in dam construction
- Movement and/or failure of the foundation supporting the dam
- Settlement and cracking of concrete or embankment dams
- Piping and internal erosion of soil in embankment dams
- Inadequate maintenance and upkeep

Poor engineering or poor maintenance may also cause dam failure. The Pennsylvania Department of Environmental Protection (PA DEP) and the United States Army Corps of Engineers (USACE) awards permits for dams and also share inspection responsibilities. Inspection results are characterized as either safe or unsafe.

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 impound 50-acre-feet or more of water (an acre-foot is 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) There are seventeen high-hazard and low-hazard dams in Cambria County that are both publicly and privately owned and are registered with the USACE in the NID. There are also six dams with a hazard classification as significant. There are thirteen dams within the county that are high-hazard and require an emergency action plan. *Table 53 – Cambria County Dam Inventory* illustrates the dams located in Cambria County. *Table 52 – High-Hazard Dams Municipal Summary* summarizes the high-hazard dams in Cambria County by municipality. The municipalities not listed do not have high-hazard dams. *Table 54 – Dam Name and Purpose* lists the dams located in Cambria County and their purpose code and the description of purpose based on the Pennsylvania DEP codes.

Table 52 - High-Hazard Dams Municipality Summary

High-Hazard Dams – Municipal Summary (NID, 2021)	
Municipality	**Number of High-Hazard Dams**
Adams Township	1
Cambria Township	4
East Taylor Township	2
Ebensburg Borough	1
Portage Township	1
Reade Township	1
Summerhill Township	2
White Township	1
Total:	**13**

Table 53 - Cambria County Dam Inventory

Cambria County Dams (NID, 2021)							
Dam Name	**River**	**Owner Name**	**Year Completed**	**Dam Height (feet)**	**Drainage Area (acres)**	**Hazard**	**EAP**
Bakerton	West Branch Susquehanna River	West Carroll Township Water and Sewer Authority	1921	24	0.8	S	Y
Beaverdam Run	Beaverdam Run	Highland Sewer and Water Authority	1975	55	6.5	H	Y

Cambria County Dams (NID, 2021)							
Dam Name	**River**	**Owner Name**	**Year Completed**	**Dam Height (feet)**	**Drainage Area (acres)**	**Hazard**	**EAP**
Cambria Slurry Pond #4	Sanders Run	Robindale Energy Services, INC.	N/A	178	0.46	H	Y
Clear Spring Lake	Watershed S. Branch Blacklick Creek	P. H. Scaglione	1977	20	0.03	L	NR
Colver	North Branch Blacklick Creek	Cambria Township Water Authority	1994	52	5.3	H	Y
Cresson Lakes	Clearfield Creek	J. and C. King	1913	20	8	L	NR
Ebensburg Storage	Howells Run	Ebensburg Borough	1923	16	1.9	H	Y
Glendale	Beaverdam Run	PA DCNR	1960	60	41.9	H	Y
Hinckston	Hinckston Run	Cambria Somerset Authority	1905	84	10.6	H	Y
Howells Run	Howells Run	Ebensburg Borough	1964	64	1.4	H	Y
Lake Rowena	Howells Run	Ebensburg Borough	1951	17	4.5	L	NR
Lloydell	S. Fork Little Conemaugh River	Highland Sewer and Water Authority	1906	43	8	H	Y
Martindale	Trout Run	Portage Borough Municipal Authority	1910	22	1.17	H	Y

Cambria County Dams (NID, 2021)							
Dam Name	**River**	**Owner Name**	**Year Completed**	**Dam Height (feet)**	**Drainage Area (acres)**	**Hazard**	**EAP**
Mine 33 Sed Pond no. 1	N/A	Robindale Energy Services, Inc.	N/A	32	N/A	L	NR
Oval Road	Dutch Run	Glendale Year-round POA	N/A	8	1.81	S	N
Reservoir No. 4	TR Bradley Run	Gallitzin Borough Water Authority	1993	18	0.48	S	Y
Reservoir No. 5	TR Bradley Run	Gallitzin Borough Water Authority	1993	20	0.25	S	Y
Saltlick	Saltlick Run	Greater Johnstown Water Authority	1913	116	11.9	H	Y
Sandy Run	Sandy Run	PA DCNR	1964	33	1.85	H	Y
Shirfs Run	North Branch Black Lick Creek	Spangler Municipal Authority	1925	15	2.1	S	Y
Swartz	Swartz Run	R. R. Kuntz	N/A	12.7	2	S	N
Williams Run	Williams Run	Nanty Glo Water Authority	1956	43	4.45	H	Y
Wilmore	North Branch Little Conemaugh River	Cambria Somerset Authority	1908	48	25	H	Y

Table 54 - Dam Name and Purpose

Cambria County Dams and Purposes (PA DEP 2019 & NID 2021)		
Dam Name	**Purpose Code**	**Purpose Code Description**
Bakerton	S	Public Water Supply
Beaverdam Run	S	Public Water Supply
Cambria Slurry Pond #4	O	Farm Pond
Clear Spring Lake	R	Recreation
Colver	S	Public Water Supply
Cresson Lakes	R	Recreation
Ebensburg Storage	S	Public Water Supply
Glendale	CR	Flood Control, Recreation
Hinckston	S	Public Water Supply
Howells Run	S	Public Water Supply
Lake Rowena	R	Recreation
Lloydell	S	Public Water Supply
Martindale	S	Public Water Supply
Mine 33 Sed Pond #1	O	Farm Pond
Oval Road	R	Recreation
Reservoir No. 4	S	Public Water Supply
Reservoir No. 5	S	Public Water Supply
Saltlick	S	Public Water Supply
Sandy Run	R	Recreation
Shirfs Run	S	Public Water Supply
Swartz	R	Recreation
Williams Run	S	Public Water Supply
Wilmore	S	Public Water Supply

The Pennsylvania Department of Environmental Protection defines a high-hazard dam as “Any dam so located as to endanger populated areas downstream by its failure”. 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 (DEP, 2008).

4.3.16.2 Range of Magnitude

Dams

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 41 – Cambria County Dams* shows the location of dams within Cambria County as well as their hazard designation.

4.3.16.3 Past Occurrence

Dams

Although no past occurrences of dam failure have been recorded at the dams listed in *Table 53 – Cambria County Dam Inventory*, there is a major recorded incident of dam failure in Cambria County. The past occurrence of dam failure in Cambria County is one of the worst dam-related failures in the history of the United States.

The Johnstown Flood occurred on May 3, 1889, after a long period of rain and thunderstorms. The Johnstown Flood was the direct result of the dam failure located near what is currently South Fork in Cambria County. The Johnstown Flood remains one of the deadliest flooding events ever to occur in the United States, especially one that is not tied to a hurricane or tropical storm. The flood resulted in approximately 2,209 deaths and approximately $490 million in property damage. The dam failure at the old South Fork dam was caused by overtopping of the dam by the impounded water that then washed out the face of the dam, weakening it to a point of failure. The South Fork Dam failed due to the large amount of water pressing on the weakened dam and a lack of proper maintenance to the infrastructure of the dam.

After the dam failure, the water raced down the valleys of Cambria County and gained momentum and speed as the water progressed and picked up debris. The debris continued to destroy homes and property as it moved towards Johnstown. The damage from the flood was significant and catastrophic, as it destroyed a majority of Johnstown and the Cambria County steel and iron production facilities. It remains the costliest dam failure flood event in the history of the United States.

4.3.16.4 Future Occurrence

Dams

Although dam failures can occur at any time, given the right circumstances, the likelihood of a dam failure in Cambria County is considered to be 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 the 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, and abandonment of dams is reviewed and monitored by the PA DEP Division of Dam Safety. Dams are evaluated based on those categories such as slope stability, undermining seepage, and spillway adequacy. With more strict construction and design procedures in place, the future occurrence of a dam failure is increasingly small. The new procedures and rules protect public safety and both public and private property. Newly constructed dams are thoroughly examined by professional engineers to prevent future dam failure events.

4.3.16.5 Vulnerability Assessment

Dams

Property and populations located downstream from any dams are vulnerable to dam failures. The Pennsylvania Code (§105.91 Classification of dams and reservoirs) classifies doth dams by size and the amount of loss of life and economic loss expected in a failure event. *Table 55 – Dam Classification* displays the dam classification guide for the Commonwealth of Pennsylvania. Although the size of a dam may result in varying impacts, the hazard potential classification of category one dams is a more important indicator, since that will indicate the level of potential substantial loss of life and excessive economic loss.

Table 55 - Dam Classification

Dam Classification (PA Code 1980)		
Dam Size Classification		
Class	**Impoundment Storage (Acre-Feet)**	**Dam Height (Feet)**
A	Equal to or greater than 50,000	Equal to or greater than 100
B	Less than 50,000 but greater than 1,000	Less than 100 but greater than 40
C	Equal to or less than 1,000	Equal to or less than 40
Dam Damage Classification		
Category	**Loss of Life**	**Economic Loss**
1	Substantial	Excessive
2	Few	Appreciable
3	None Expected	Minimal

Dam failures can 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 with low slope stability. The economic and financial impact from damage and recovery ranges from minimal to severe, depending on the magnitude of damage and scale of failure event.

Emergency action plans are developed by the owners of high-hazard dams. These plans are then disseminated to first responders and other planning partners within the county. Vulnerable populations are those residents and businesses located downstream from a high-hazard dam within the inundation area. The emergency action plan identifies a call list to notify downstream at-risk populations. Emergency action plan exercises are held every five to seven years depending on local policy.

The characteristics of the thirteen high-hazard dams in Cambria County vary greatly. The Glendale Dam, located in White Township, has the largest drainage area with a total of 41.9 acres. The dams that were constructed most recently are the Colver Dam, located in Cambria Township, which was constructed in 1994, and the Reservoir No. 4 and Reservoir No. 5, in Gallitzin Township, which were constructed in 1993. The dam that is the oldest in the county is Lloydell Dam, which was constructed in 1906. The Cambria Slurry Pond #4 Dam is the tallest in the county with a height of 178 feet. Ebensburg Borough owns the most dams in Cambria County with a total of three. These dams are the Ebensburg Storage Dam, the Howells Run Dam, and the Lake Rowena Dam. The dams in Cambria County are owned by a mix of public and private owners and vary in almost every aspect. The county dams are distributed relatively evenly throughout the county and municipalities, with an even mix of high and low hazard dams in the municipalities.

The failure or partial failure of a High-Hazard Potential Dam can have impacts that affect many different jurisdictions across Cambria County and counties adjacent to Cambria County. A failure at any of the dams in Cambria County would result in some inundation in at least those municipalities adjacent to the dam in question. A more comprehensive examination of risk inundation areas from High-Hazard Potential Dams can be conducted in future iterations of the Cambria County Hazard Mitigation Plan. This dataset was not readily accessible at the time of this writing and contact was made to attempt to obtain these datasets. However, each of those municipalities that could be affected by the failure of a High-Hazard Potential Dam could result in the inundation of police stations and fire departments, and some functional needs facilities including preschools, schools, and nursing homes / senior facilities.

Cambria County is at risk when high-hazard potential dams are considered. There are three types of risk related to high-hazard potential dams and they are listed below:

- **Incremental Risk:** The risk (likelihood and consequences) to the pool area and downstream floodplain occupants that can be attributed to the presence of the dam should the dam breach prior or subsequent to overtopping, or undergo component malfunction or misoperation, where the consequences considered are over and above those that would occur without dam breach. The consequences typically are due to downstream inundation, but loss of the pool can result in significant consequences in the pool area upstream of the dam.

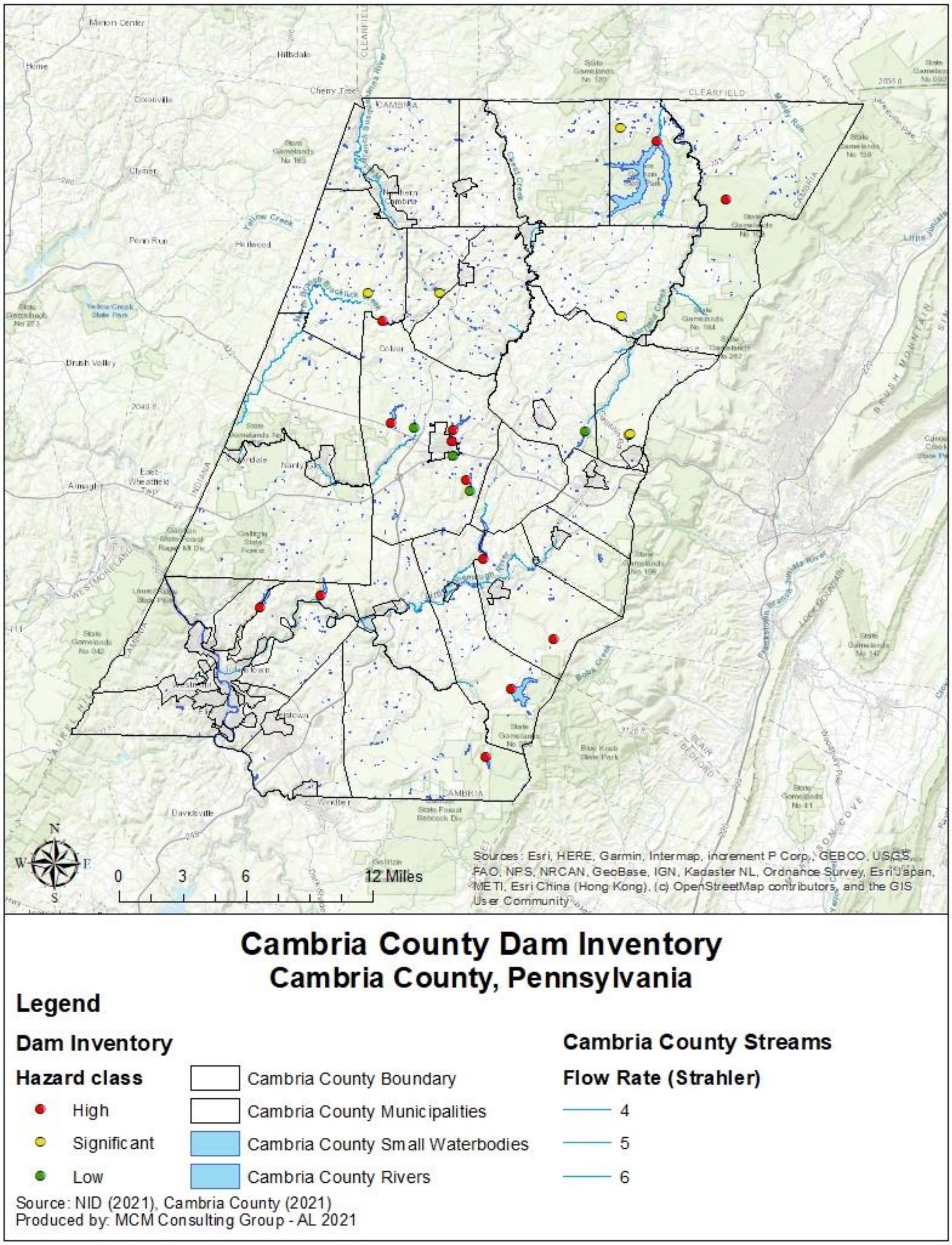
- **Non-Breach Risk:** The risk in the reservoir pool area and affected downstream floodplain due to 'normal' dam operation of the dam (e.g., large spillway flows within the design capacity that exceed channel capacity) or 'overtopping of the dam without breaching' scenarios.
- **Residual Risk:** The risk that remains after all mitigation actions and risk reduction actions have been completed. With respect to dams, FEMA defines residual risk as "risk remaining at any time" (FEMA, 2015, p A-2). It is the risk that remains after decisions related to a specific dam safety issue are made and prudent actions have been taken to address the risk. It is the remote risk associated with a condition that was judged to not be a credible dam safety issue.

Source: "Rehabilitation of High Hazard Potential Dams Grant Program Guidance," June 2020

At this time, insufficient information is available to conduct a substantive analysis of incremental, non-breach and residual risk relative to Cambria County's high hazard potential dams. However, it is acknowledged that incremental risk is "the risk (likelihood and consequences) to the pool area and downstream floodplain occupants that can be attributed to the presence of the dam should the dam breach prior or subsequent to overtopping, or undergo component malfunction or misoperation, where the consequences considered are over and above those that would occur without dam breach;" non-breach risk is "the risk in the reservoir pool area and affected downstream floodplain due to 'normal' dam operation of the dam (e.g., large spillway flows within the design capacity that exceed channel capacity) or 'overtopping of the dam without breaching' scenarios;" and residual risk) is "the risk that remains after decisions related to a specific dam safety issue are made and prudent actions have been taken to address the risk. It is the remote risk associated with a condition that was judged to not be a credible dam safety issue" (FEMA, 2020 Rehabilitation of High Hazard Potential Dams Grant Program Guidance)

The risk of high-hazard potential dams in Cambria County is present but at the time of this writing, there is insufficient data to identify in exact detail the vulnerable populations and assets in inundation areas for the high-hazard potential dams. The areas downstream from the high-hazard potential dams are more vulnerable to inundation than areas that are upstream from said dams. There are current datasets to address high-hazard potential dam impacts in greater detail, but these datasets are still in development from the Pennsylvania Department of Environmental Protection, Pennsylvania Emergency Management Agency, the United States Army Corp of Engineers, and the Federal Emergency Management Agency. Once these datasets have been published and inundation data is easier to acquire, this information will be used to develop more details risk assessment and vulnerability assessments for dam failure at the high-hazard potential dams.

Figure 41 - Cambria County Dams



4.3.17. Disorientation

4.3.17.1 Location and Extent

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. Cambria County has several parks and large forested areas that may attract locals and tourists due to the natural appeal of the landscape and the expanses of land, both state owned and otherwise. Cambria County is home to two state parks which are Prince Gallitzin State Park and Laurel Ridge State Park, as well as several state game lands. In the event of disorientation, search and rescue may be required for people who suffer from medical problems or injuries and those who become accidentally or intentionally disoriented. Search and rescue efforts are often focused in and around state forest and state park lands as they contain numerous miles of hiking and biking trails.

4.3.17.2 Range of Magnitude

Approximately 45.98% of Cambria County is undeveloped forest land (Comprehensive Plan, 2011). 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. Cambria County generally has a significant amount of water (1.44% of total land area is surface water), and during the warmer summer months shelter is less of a necessity than during winter months when extreme cold 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, and or volunteers from fire departments, and for longer term incidents, drones may be employed.

4.3.17.3 Past Occurrence

Wilderness search and often require considerable resources, sometimes resulting in the expenditure of hundreds of man-hours, both paid and volunteer. Cambria County utilizes a database system called JUVARE (formerly CORVENA and Knowledge Center™) to track various incidents within the county. However, no such data was available to refence for urban fires or explosions during the development of this report, and as such no detailed list of past disorientation events can be displayed at this time.

4.3.17.4 Future Occurrence

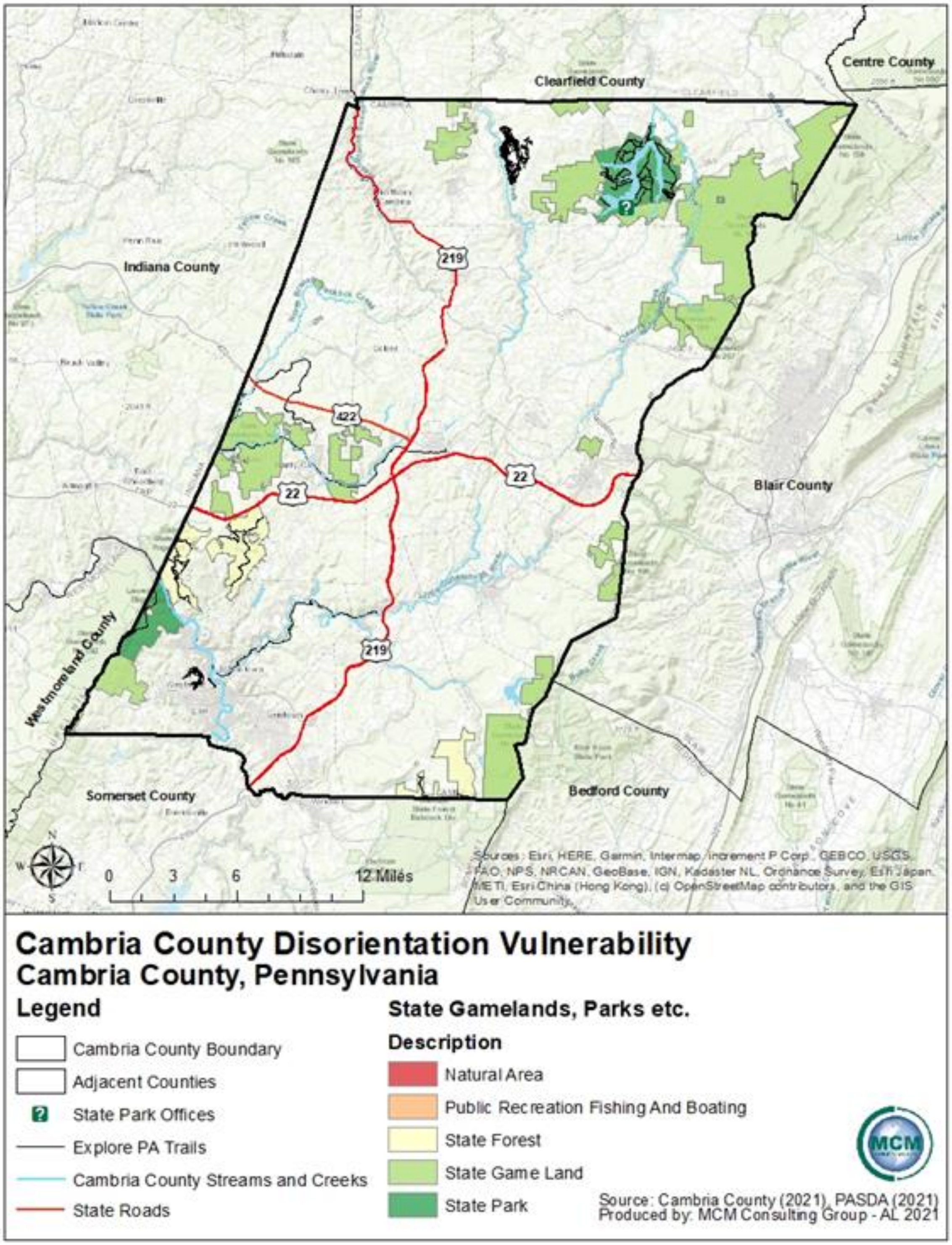
During the warm summer months, as activities such as hiking, biking and camping increase, so does the likelihood of individuals becoming disoriented. Many search and rescue events also occur in November due to individuals getting lost during hunting. Disorientation occurs most often in state parks and state forests where outdoor recreation is most abundant, and the woods are most dense. Additionally, medical emergencies occur regularly in the county, especially among the elderly, which could result in disorientation events.

4.3.17.5 Vulnerability Assessment

Individuals are most likely to become disorientated in areas of vast, open wilderness. Children and the elderly are most vulnerable to the exposure of elements. The elderly tend to be more vulnerable to disorientation due to medical/mental related issues that may occur outside of rugged tertian. Often, an individual with dementia or Alzheimer's will become disoriented in residential or wilderness locations.

The most dangerous period to become lost outdoors is during the winter months when heat and shelter are vital. Cambria 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. 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. *Figure 42 – Cambria County Disorientation Vulnerability* identifies areas within the county that are vulnerable to disorientation.

Figure 42 - Cambria County Disorientation Vulnerability



4.3.18. Drowning

4.3.18.1 Location and Extent

Drowning can be a significant hazard in communities with numerous water bodies (e.g. ponds, lakes, rivers, etc.) and extensive outdoor recreational activity. This profile focuses on the threat of drowning in natural bodies of water, rather than incidents that occur in swimming pools or other commercial/residential settings.

There are many rivers, lakes, and creeks located in Cambria County, including Blacklick Creek, Chest Creek, Canoe Creek Lake, Clearfield Creek, Beaverdale Reservoir Conemaugh River, Little Conemaugh River, Stonycreek River, and the West Branch Susquehanna River. Ice fishing also occurs in many locations in Cambria County during the cold winter months, including some of the previously mentioned lakes and other bodies of water.

These water-related recreation activities draw people to potentially remote areas, and possibly deep waters, where drowning is a high risk and response can take time significant due to the secluded nature of such locations. Other than those mentioned above, there are numerous other rivers, lakes, and ponds where such recreation takes place throughout the county.

4.3.18.2 Range of Magnitude

According to the Center for Disease Control (CDC), drowning is the third leading cause of death from unintentional injury worldwide. In the United States, children under the age of 5 and adults over the age of 85 had the highest risk to drowning. As surveyed above, there are many streams, lakes and ponds in Cambria County where various water recreation activities are common, and it follows that there are many places and times in Cambria County when drownings could occur.

A secondary hazard from a drowning is the potential for a rescuer to lose his or her life in the effort of rescuing a drowning person or recovering a drowned person's body. There is also a hazard of drowning during flash flooding. The National Weather Service has adopted the "Turn Around, Don't Drown" slogan to inform the public of the hazards of traveling through or near flood waters. People often underestimate the force generated by flowing water, especially flood water. Many of the deaths that occur take place in automobiles as they are swept downstream. The next highest percentage of flood-related deaths is due to walking into or near flood waters. A mere six inches of fast-moving water can knock over an adult, and it takes only two feet of rushing water to carry away most vehicles, including sizable pickup trucks and SUVs. *Figure 43 – Drowning Vulnerability Map* illustrates the locations where drowning may occur in Cambria County.

4.3.18.3 Past Occurrence

In May 2015, a fifteen-year boy from Gallitzin Township was pronounced dead after being pulled from a Gallitzin reservoir. The event occurred while the teen was swimming in the water with a group of friends. The boy was reported to have been seen swimming and splashing in the water before disappearing below the surface.

In June 2020, two men were found deceased on the water near the Wilmore Dam. The bodies were discovered by a group of kayakers. Reports indicate the two senior-aged men had gone fishing together when one suffered a cardiac arrest before falling into the water. The other then attempted to rescue his friend before succumbing to the elements. The incident was ruled an accidental drowning.

In June 2021, a Williamsburg man was discovered deceased in Canoe Creek Lake by Blair and Cambria County teams that were called in to participate in the search and dive efforts. Reports indicate the searchers were requested after the man submerged and was not seen resurfacing in the water.

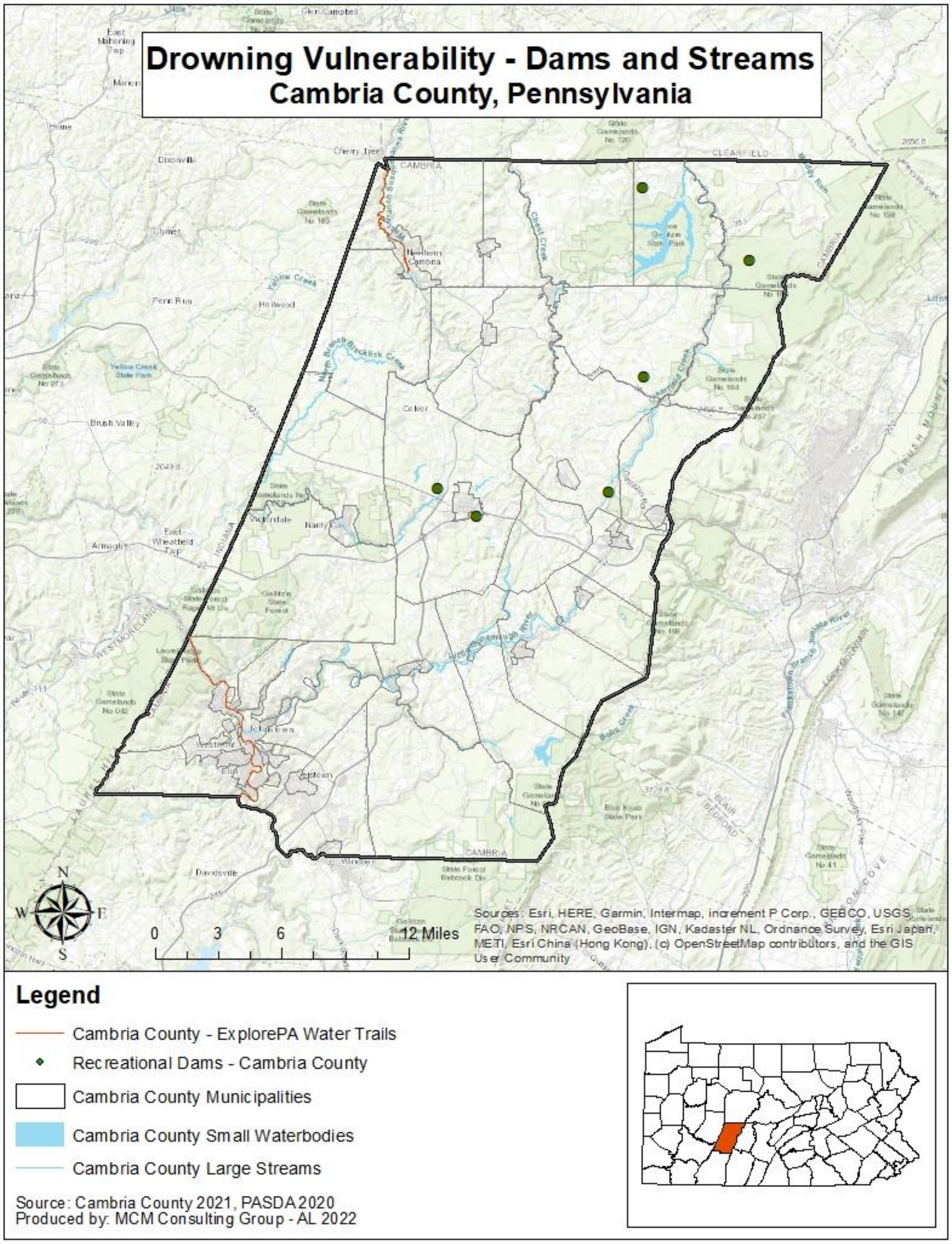
4.3.18.4 Future Occurrence

It is difficult to predict when drowning incidents will occur; however, knowledge of water based recreational activities in Cambria County could provide insight to where and when future drowning may be likely to occur. In the winter months, the county should be away of popular ice fishing locations. Whitewater rafting is most prevalent in March through May. During the warm summer months, as activities such as swimming, boating, and fishing increase, so does the likelihood of drowning at popular locations for such activities. There is a consistent possibility for drowning occurrences in Cambria County based on the many water recreational opportunities in the county.

4.3.18.5 Vulnerability Assessment

With the high number of waterways, some of which are listed above, as well as the numerous un-named ponds and other bodies of water, the potential for drowning is great. The natural water sources like the rivers, streams, lakes, and ponds mentioned above are identified as particularly prominent destinations and vulnerable locations. As tourism continues to increase in the county and number of visitors grow, drowning is likely to continue without mitigation actions in place. Children and the elderly are at a higher vulnerability than all other age groups; however, anybody partaking in water-related recreational activities can be vulnerable. The following map shows locations of popular water recreation locations as well as many of the other water features discussed above.

Figure 43 - Drowning Vulnerability Map



4.3.19. Emergency Services

4.3.19.1 Location and Extent

Fire, emergency medical services (EMS), local emergency management coordinators (LEMC), and law enforcement service agencies are defined per municipality in Cambria County. Regional and state-wide services are also available.

With the exception of law enforcement, most areas are served by volunteers instead of career personnel, which increases response time due to volunteer availability. Volunteers provide emergency services apart from their regular careers. Often agencies struggle with the availability of skilled personnel and resources at certain times of the day. The number of responders in general has decreased, in part due to issues including funding and retention of personnel.

Additionally, the time and expense obligations of required training are a factor in the decrease in number of responders. The initial training time for fire, EMS, and law enforcement can take several months to complete. Emergency medical services, requires a regular schedule of continued education to maintain certification. In the fire service, after the initial training, there are specialty courses offered, which are recommended, but not required. For law enforcement, skills such as firearms proficiency must be maintained, and updates to new laws and regulations continues throughout the officer's career.

4.3.19.2 Range of Magnitude

Finances, changing political climates, leadership, or a significant high-profile event can all trigger a system to be declared as a "success" or "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 may have many root causes. Labor participation 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. The remaining dollars go into infrastructure, fuel, medical supplies, insurances, fleet maintenance, dispatch, and other essential items, with hopefully, some left over for recapitalization or fund balance development.

4.3.19.3 Past Occurrence

There have been no official records kept on shortages to emergency services. However, there has been a decrease of new volunteers in the fire service for several years. Most agencies are private organizations that lack local funding and exist based on tax dollars, fund raising, and donations received from their community. The need for fund raising adds to availability issues of volunteers. Most services past practices are not sustaining the current needs for funding and manpower. Without financial support from the communities, services may not be able to remain in operation to serve those same communities. Recruitment and personnel retention are a key to success.

4.3.19.4 Future Occurrence

Historically, it has been difficult for small communities to have a paid fire or EMS service, therefore requiring volunteers. Fewer volunteers to perform the tasks associated with fire, medical, and rescue operations, can negatively affect a service's ability to respond to emergencies. Additionally, operational needs are impacted if there are fewer volunteers to raise funds. Without fundraising and community support these fire departments and volunteer EMS agencies will experience broader challenges. Municipalities can help offset some of the financial burdens to their local fire company with a fire tax.

There are also challenges for individuals who volunteer, including dedicating time beyond their current employment, family, and community commitments to dedicate to training, responding, and fundraising. Training is essential to provide for the general knowledge and safety of volunteers. Becoming certified as a volunteer firefighter requires hundreds of hours of training. With a decrease in the numbers of new volunteers, many current volunteers are aging and unable to perform at the same levels they once were.

Fire departments and EMS agencies, often are tasked with responding to a variety of emergencies, including not only fire and medical emergencies, but also incidents requiring rescue, containment of hazardous materials, or assistance to law enforcement. Volunteers need to be well trained and able to respond to different scenarios as needed.

4.3.19.5 Vulnerability Assessment

The possibility that EMS agencies and fire services could fail creates a vulnerability to all Cambria County communities. Occasionally, residents of communities mistakenly think that their local fire department is a paid service. Most municipal fire departments are volunteer agencies and need the support of their communities to maintain their departments.

Personnel shortages have been occurring in law enforcements for several reasons. More students are pursuing other professional careers instead of becoming public safety professionals than previously. This trend could be an effect of the recent changes in the social climate toward law enforcement, the increased number of college students pursuing graduate school degrees, or many other factors. As with any profession, becoming a law enforcement officer requires a commitment of time and money for training at local, state, or federal levels. The selection of law enforcement officers includes not only physical and mental aptitudes, but also a comprehensive physiological screening.

If any current public service agency fails to provide enough personnel to perform their required duties, then those duties must be provided for by another service agency that may be many miles away, creating an increased response time. An increased response time could lead to additional or greater severity in injury or property damage. Many communities in Pennsylvania have already experienced the closure of emergency response agencies.

It is recommended that each municipality assess their own vulnerabilities by maintaining and building relationships with their local providers and working with them to plan accordingly for if a local service were to close its operations. Consolidation of services is a possible solution for agencies that are struggling to maintain operations. Statistics, response times, and all times associated with units dispatched are easily obtainable from the county 911 center. Municipalities should research all of the factors which would be part of a consolidation of emergency services with neighboring communities.

The emergency services departments in Cambria County need to be supported to create and/or discover new ways to not only recruit but to retain volunteers. If left unattended, the issue will continue and the lack of response will grow, leaving communities more vulnerable to loss of life and loss of property. Community education is a key factor in the maintenance of emergency response agencies. In addition, continued support, and efforts to inform legislature could all prove to be important in assuring that these services remain in operation into the future. At the time of the writing of this plan, a number of bills have been introduced in both the House of Representative and the Senate as a result of a two-year study initiated by Senate Resolution 6 (SR6). The final report can be found here:

http://pehsc.org/wp-content/uploads/2014/05/SR-6-REPORT-FINAL.pdf.

Emergency response agencies that currently provide services within Cambria County are identified in the following tables, *Table 56 – Cambria County Fire Departments* identifies the municipalities served. All fire departments in Cambria County are volunteer. *Table 57 – Cambria County EMS Agencies* identifies each emergency medical service agency and the municipalities served. *Table 58 – Cambria County Law Enforcement Agencies* identifies each police department to include the Pennsylvania State Police (PSP) and the municipalities served. This information was provided by the Cambria County Emergency Services.

Table 56 - Cambria County Fire Departments

Cambria County Fire Departments	
Station name	**Municipalities covered**
Adams Township Volunteer Fire Company #1	Dunlo
Adams Township Volunteer Fire Company #2	St. Michael
Ashville Volunteer Fire Company	Ashville
Cambria Township Volunteer Fire Company	Colver
Carrolltown Fire Engine Company	Carrolltown
Cassandra Volunteer Fire Company	Cassandra
Community Fire Company	Lilly
Conemaugh Indepedence Volunteer Fire Company	Conemaugh
Cover Hills Volunteer Fire Company	Johnstown
Cresson Volunteer Fire Company	Cresson
Daisytown Volunteer Fire Company	Johnstown
Dale Borough Fire Company	Johnstown
Dale Borough Fire Company	Johnstown
Dauntless Volunteer Fire Company	Ebensburg
East Daisytown Volunteer Fire Company	Johnstown
East Taylor Township Volunteer Fire Company	Johnstown
Ferndale Volunteer Fire Company	Johnstown
Franklin Borough Volunteer Fire Company	Johnstown
Gallitzin Fire Company	Gallitzin
Geistown Volunteer Fire Company	Johnstown
Hastings Volunteer Fire Company #1	Hastings
Hope Volunteer Fire Company	Northern Cambria
Ideal Volunteer Fire Company	Johnstown
Jackson Township Volunteer Fire Company	Mineral Point
Johnstown Fire Department	Johnstown
Lorain Borough Fire Company	Johnstown
Loretto Volunteer Fire Company	Loretto
Lower Yoder Township Volunteer Fire Company	Johnstown
Menoher Heights Volunteer Fire Company	Johnstown
Middle Taylor Township Volunteer Fire Department	Johnstown
Nanty Glo Borogh Volunteer Fire Company	Nanty Glo
Nicktown Volunteer Fire Company	Nicktown
Oakland Volunteer Fire Company	Johnstown
Patton Volunteer Fire Company	Patton
Portage Volunteer Fire Company	Portage
Reade Volunteer Fire Company	Blandburg
Revloc Volunteer Fire Compan	Ebensburg
Richland Township Volunteer Fireman Association	Johnstown
Riverside Volunteer Fire Company	Johnstown
South Fork Fire Company	South Fork
Southmont Volunteer Fire Company	Johnstown

Cambria County Fire Departments	
Station name	**Municipalities covered**
Spangler Volunteer Fire Company	Northern Cambria
Summerhill Borough Fire Company	Summerhill
Summerhill Township Volunteer Fire Company	Beaverdale
Upper Yoder Volunteer Fire Company	Johnstown
Vintondale Volunteer Fire Company	Vintondale
West Hils Region Fire Department	Johnstown
West Taylor Township Volunteer Fire Department	Johnstown
Westwood Volunteer Fire Company	Johnstown

Table 57 - Cambria County EMS Agencies

Cambria County EMS Agencies		
Station name	**Service provided**	**Municipalities covered**
Blacklick Valley EMS	Nanty Glo	Nanty Glo Borough
		Vintondale Borough
		Blacklick Township
Carrolltown EMS	Carrolltown	Carrolltown Borough
		West Carroll Township
Cresson EMS	Cresson	Allegheny Township
		Ashville Borough
		Chest Springs Borough
		Clearfield Township
		Cresson Borough
		Cresson Township
		Gallitzin Borough
		Gallitzzin Township
		Lilly Borough
		Loretto Borough
		Munster Township
		Sankertown Borough
		Tunnelhill Borough
		Washington Township
East Hills Ambulance		Elton
		Geistown Borough
		Stonycreek Township
Ebensburg Ambluance	Ebensburg	Ebensburg
Forest Hills EMS	St. Michael	Forest Hills
Hastings EMS	Hastings	Hastings Borough

Table 58 - Cambria County Law Enforcement Agencies

Cambria County Police Departments
Station name
Adams Township Police Department
Ashville Borough Police Department
Blacklick Township Police Department
Cambria Township Police Department
Carrolltown Borough Police Department
Carrolltown Police Department
Conemaugh Township Police Department
Cresson Borough Police Department
Cresson Township Police Department
Croyle Township Police Department
Dale Borough Police Department
East Conemaugh Borough Police Department
East Taylor Township Police Department
Ebensburg Borough Police Department
Ferndale Borough Police Department
Gallitzin Borough Police Department
Gallitzin Township Police Department
Geistown Borough Police Department
Hastings Borough Police Department
Jackson Township Police Department
Johnstown Police Department
Lilly Police Department
Loretto Borough Police Department
Nanty Glo Borough Police Department
Northern Cambria Borough Police Department
Patton Borough Police Department
Portage Borough Police Department
Richland Township Police Department
Saint Francis University Police Department
Sankertown Borough Police Department
South Fork Borough Police Department
Stonycreek Township Police Department
Summerhill Township Police Department
Susquehanna Township Police Department
University of Pittsburgh – Johnstown Police Department
Upper Yoder Township Police Department
Vintondale Borough Police Department
West Hills Regional Police Department

4.3.20. Environmental Hazards/Hazardous Materials

4.3.20.1 Location and Extent

Environmental hazards in Cambria County mostly consists of hazardous materials release and petroleum/gas well incidents. These hazards result from human activities/industries and can result in injury or death to humans or damage to property. Cambria County has a total of 687 active wells present in the county. There are 1,214 wells in Cambria County which are either noted as active, abandoned, proposed, not drilled, or plugged. Of these wells, only fourteen are listed as abandoned wells.

Hazardous Material Release

Hazardous material release poses threats to the natural environment, the built environment, and public safety through the diffusion of harmful substances, materials, or products. Hazardous materials fall into the following categories: flammable and combustible materials, compressed gases, explosive and blasting agents, radioactive materials, oxidizing materials, poisons, and corrosive liquids. Most hazardous materials incidents are generally unintentional and are associated with transportation accidents or accidents at fixed facilities. However, hazardous materials can be released as a criminal or terrorist act. Regardless of how a release happens, the result can be injury or death, and contamination to the air, water, and/or soil.

Facilities that use, manufacture, or store hazardous materials in Pennsylvania must comply with both 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 reporting requirements under the Hazardous Materials Emergency Planning and Response Act (1990-165) as amended for the commonwealth. Communities are kept abreast of the presence and release of chemicals at individual facilities with the community right-to know reporting requirements. 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; these plans 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 twenty-six facilities classified as using or storing extremely hazardous substances as defined by the EPA under SARA Title III in Cambria County. The vulnerable facilities routes along roadways are shown in *Figure 44 - SARA Tier II Facilities*.

There are increasingly large numbers of chemicals, oils, radioactive materials, and other hazardous substances spilled as the result of highway, rail, and waterway accidents.

Transportation of hazardous materials along highways poses the greatest risk of release to Cambria County. Releases from rail transport are also a concern. On occasion, these events become a major disaster and force people to evacuate and/or lose their homes and businesses. The most traveled routes in the county include US Route 219, US Route 22, US Route 422, State Route 56, State Route 271, and State Route 403. These major roads pass through the more populous areas of Cambria County. Similarly, rail lines pass through cities, boroughs, and along major waterways where larger numbers of people could be vulnerable should a hazardous materials accident occur.

Pipelines also transport hazardous liquids and flammable substances such as natural gas. Incidents can occur when pipes corrode, are damaged during excavation, incorrectly operated, or damaged by other forces. Pipelines transporting natural gas compose most of the total pipeline miles in the Commonwealth. Pennsylvania has 9,935 miles of active natural gas transmission pipelines and 3,089 miles of active liquid pipelines. Of the liquid pipeline mileage, 1,148 miles carry highly volatile liquids.

Petroleum and Gas Well Incidents

More than 350,000 oil and gas wells have been drilled in Pennsylvania since the first commercial oil well was developed in 1859. PA DEP differentiates between conventional and unconventional oil and gas wells. Conventional wells are the traditional vertical wells, while unconventional wells are typically horizontally drilled wells commonly associated with the Marcellus Shale. There are active and abandoned oil/gas wells in 55 of Pennsylvania's 67 counties with the majority of activity occurring in the western portion of the Commonwealth, including Cambria County. Cambria County itself has 1,214 oil and gas wells. *Figure 45 – Active Oil and Gas Wells in Cambria County*, and *Figure 46 – Conventional and Unconventional Oil and Gas Wells in Cambria County* show the active, conventional, and unconventional wells present in Cambria County.

Private water supplies such as domestic drinking water wells in the vicinity of oil and gas wells are at risk of contamination from brine and other pollutants including methane which can pose a fire hazard. Private drinking water is largely unregulated and therefore the existing data is largely incomplete and/or inaccurate.

4.3.20.2 Range of Magnitude

Hazardous Material Release

Dispersion of hazardous material release can take place rapidly when transported by water and wind. However, often accidental release occurs as a result of human carelessness, intentional acts, or natural hazards. Whether its accidental or intentional, there are several potentially exacerbating circumstances that will affect the severity or impact of a hazardous materials release. Some of these conditions, or characteristics that can enhance or magnify the effects of a hazardous materials release, include the following:

- **Weather conditions**: Affect how the hazard occurs and develops.
- **Micro-meteorological effects of buildings and terrain**: Alters dispersion of hazardous materials.
- **Non-compliance with applicable codes (e.g., building or fire codes) and maintenance failures (e.g., fire protection and containment features)**: Can substantially increase the damage to the facility itself and to surrounding buildings.

The severity of any given hazardous materials incident is dependent not only on the circumstances described above, but also with the type of materials released and the distance and related response time for emergency response teams. Areas within close proximity to a release are generally at a greater risk, yet depending on the agent, a release can travel great distances or remain present in the environment for a long period of time resulting in extensive impacts on people and the environment. A worst-case scenario event of a hazardous material release would be if a release occurred in the most populous jurisdiction, the City of Johnstown. A hazardous material release would likely cause the evacuation of city residents, visitors, and employees.

Any type of drilling can cause stray methane gas in the subsurface; under certain conditions, to migrate to private water supply wells and ultimately into a building. This migration, if left unmitigated, can build up to explosive concentrations. A proper well vent allows methane to vent to the atmosphere rather than build up to explosive levels. The risk of an explosion from stray methane varies from location to location based on site-specific conditions.

Natural gas well fires occur when natural gas is ignited at the well site. Often, these fires erupt during drilling when a spark from machinery or equipment ignites the gas. The initial explosion and resulting flames have the potential to seriously injure or kill individuals in the immediate area. These fires are often difficult to extinguish due the intensity of the flame and the abundant fuel source. The potential impacts of oil and natural gas wells range in magnitude and extent to water, land, and air.

Petroleum and Gas Well Incidents

As is the case with hazardous material release, a variety of potential hazards exist with oil and gas extraction. Abandoned oil and gas wells that are not properly plugged can contaminate groundwater and consequently domestic drinking water wells. Surface waters and soil are sometimes polluted by brine, a salty wastewater product of oil and gas well drilling, and from oil spills occurring at the drilling site or from a pipeline breach. This can spoil public drinking water supplies and be particularly detrimental to vegetation and aquatic animals.

Methane can leak into domestic drinking wells and pose fire and explosion hazards. In addition, natural gas well fires can occur when natural gas is ignited at the well site. Often, these fires erupt during drilling when a spark from machinery or equipment ignites the gas. The initial explosion and resulting flames have the potential to seriously injure or kill individuals in the immediate area. These fires are often difficult to extinguish due to the intensity of the flame and the abundant fuel source. When methane gas from unplugged gas wells seeps into underground coal mines, miners are at risk of asphyxiation and are subject to impacts of explosion. The worst-case scenario for an oil or gas well incident would be if there was a discharge of pollutant material like frac fluid into the waterways of Cambria County.

The impacts of oil and gas wells range in magnitude and extent. There are several potential impacts, including those on water, land, and air. Common accidents involving gas well sites include “blowouts”, which are an explosion or failure of the rig, as well as the potential for chemical contamination.

4.3.20.3 Past Occurrence

Hazardous materials released in Cambria County can and have occurred from various material releases and spills. The majority of incidents in the past have involved fuel spill problems along the highways or leaks from a fixed source. Most of the incidents at fixed facilities are the result of leaks that have limited impacts on people and the environment. Yearly the number of hazardous materials being produced, stored, and transported continues to increase.

4.3.20.4 Future Occurrence

Future occurrence of an environmental hazard occurring in Cambria County is likely, however it is difficult to predict. It is difficult to predict when and where environmental hazards will arise as they are often related to equipment failure and/or human error. Traffic accidents involving hazardous materials can be caused by many different facets, such as weather conditions or drivers’ errors. As natural gas drilling and pipeline activities continue to grow in Cambria County, the inherent dangers persist. Pennsylvania is second only to the state of Texas. The natural gas production has increased dramatically in Pennsylvania since 2008. This has resulted in an increase to energy security, due to less dependence on fossil fuels from other parts of the world.

Adequate monitoring through the Department of Environment Protection (DEP) will reduce the likelihood of potential impacts to the community and the environment. Risk associated with conventional oil and gas drilling is expected to remain moderate, with some of the highest risk emerging from old conventional wells that are not properly mapped or whose caps and protective features have begun to deteriorate.

4.3.20.5 Vulnerability Assessment

There are many miles of roadways within Cambria County, of which most are owned and maintained by PennDOT. Therefore, the various highways and roadways in Cambria County are vulnerable to hazardous material releases. The railway network also is vulnerable to hazardous materials incidents. Jurisdictions where one or more TRI (EPA's Toxic Release Inventory) fixed facilities are in operation should be considered vulnerable to a release of hazardous material(s). These releases could be the result of severe weather conditions, power outages, acts of criminal activities or terrorism, and/or human error.

The vulnerability of a community and the environment to a spill or release of an extremely hazardous substance at a facility or from a transportation accident depends on many variables. These include: the specific chemical, the extent of the spill or release, the proximity of waterways, and the number of people residing in a radius from the facility of accident location that can reasonably be expected to be adversely affected. Furthermore, the vulnerability of a community and the environment to a hazardous material release from a transportation incident is directly related to several variables: mostly the mode and class of transportation. Each mode is further subject to several categories of hazard. Each mode of transportation (truck/highway, aircraft, rail, watercraft, or pipeline) has separate and distinct factors affecting the vulnerability.

All communities in Cambria County are vulnerable, on some level, to environmental hazards resulting from oil and gas well activity; to include drilling, pipeline construction, and distribution. Cambria County has a vulnerable population of 133,472 residents. Individual gas well drilling operators should have an Emergency Response Plan for their wells in place, however, the county's plan can substitute in an emergency. The Well Control Emergency Plan defines a well control emergency as uncontrolled flow of oil, gas, condensate, brine, sand, gravel, rock, and/or steam from a wellbore. The emergency plan lists procedures on how to deal with a blowout or control incident with or without fire, environmental release, injury on a rig, or other miscellaneous incidents.

Figure 44 - SARA Tier II Facilities

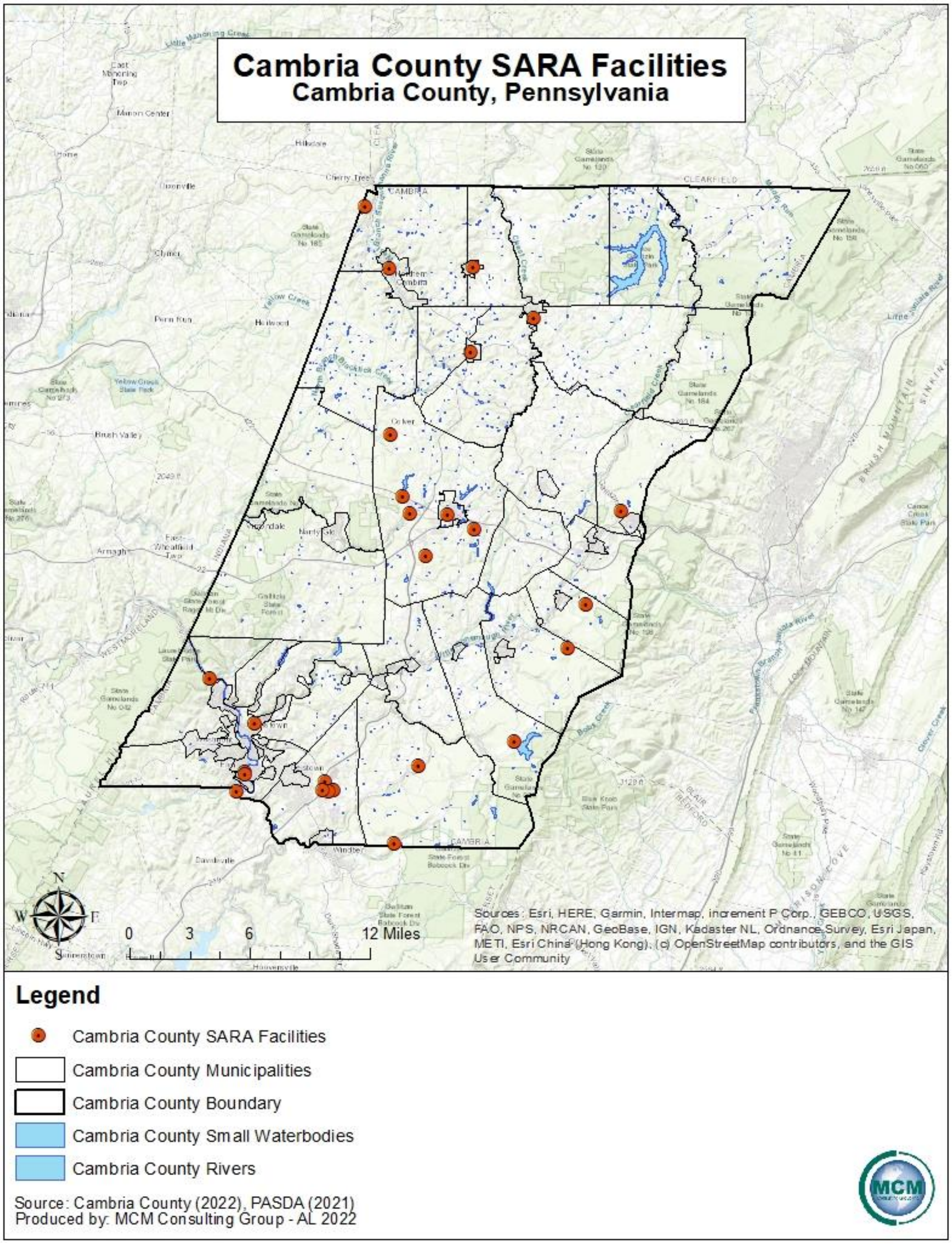


Figure 45 - Active Oil and Gas Wells in Cambria County

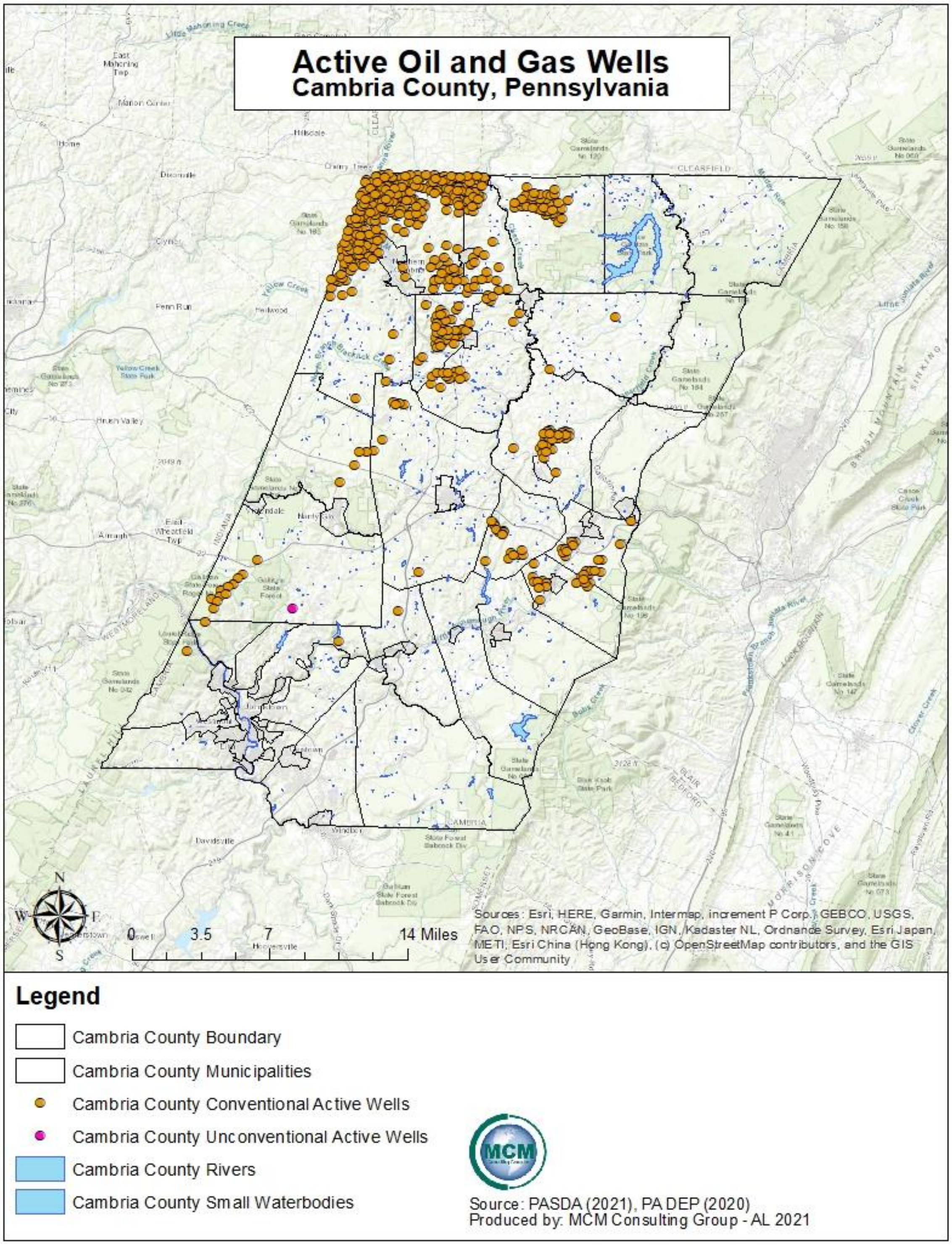
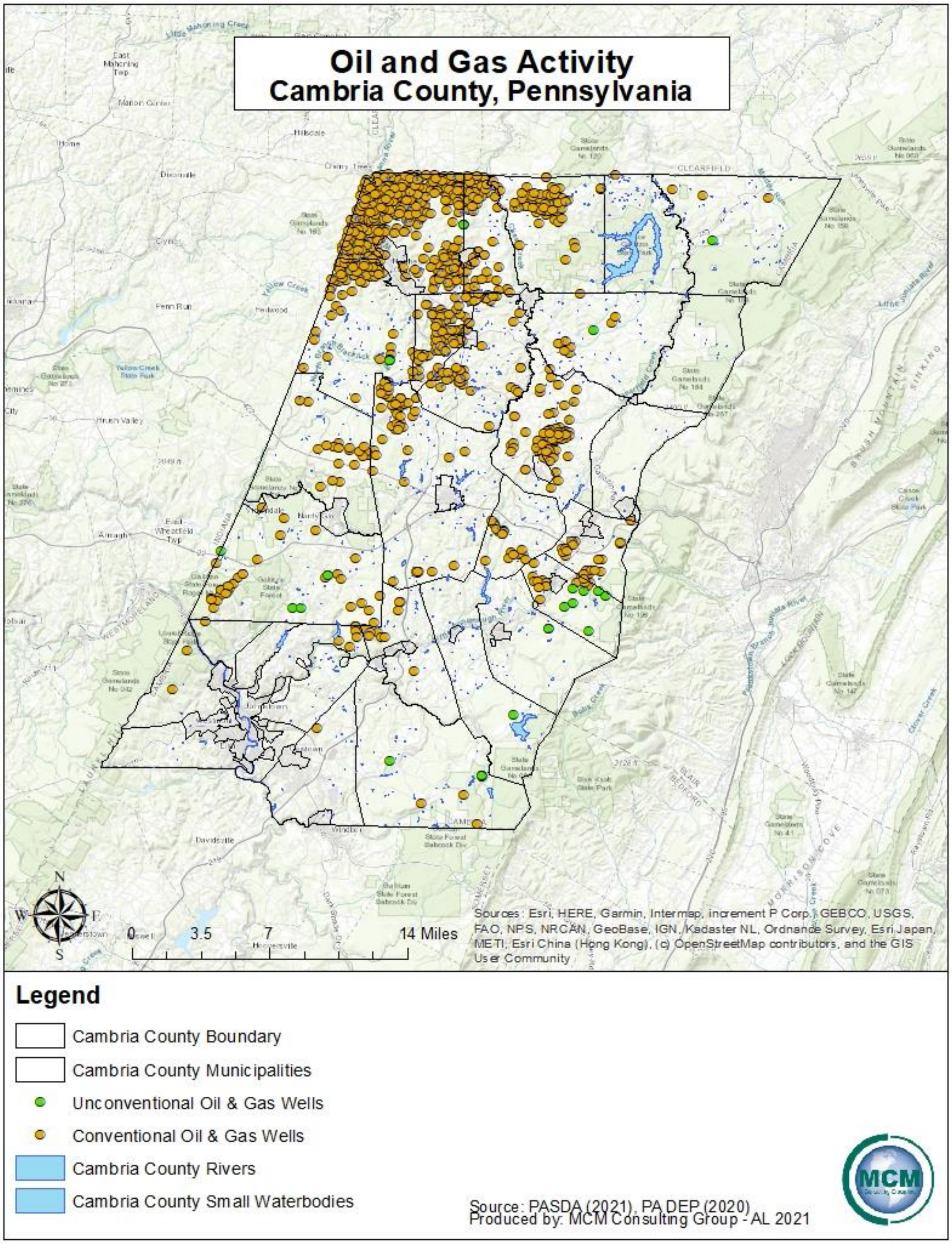


Figure 46 - Conventional and Unconventional Oil and Gas Wells in Cambria County



4.3.21. Levee Failure

4.3.21.1 Location and Extent

Levees

Levee failures have the potential to place large numbers of people and property 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 a flooding event. Levees do not serve a purpose beyond flood protection, unlike dams, which can serve to store water or generate energy in addition to protecting areas from flooding. The National Levee Database (NLD), like its counterpart of the National Inventory of Dams (NID), is maintained by the USACE and tracks levees across the United States. Cambria County is home to eighteen levee sections, which are detailed in *Table 59 – Cambria County Levee Inventory*.

Table 59 - Cambria County Levee Inventory

Cambria County Levee Inventory (National Levee Database, 2021)				
Levee Name	**Flood Source**	**Levee Type**	**Levee Bank Side**	**Levee Length (miles)**
Cherry Tree – West Branch	West Branch Susquehanna River	Earthen Mainline		0.96
Johnstown, PA – Left Stonycreek & Left Conemaugh	Stonycreek River	Earthen Mainline	Left	0.94
Johnstown, PA – Right Conemaugh & Little Conemaugh	Stonycreek River	Earthen Mainline	Right	0.15
Johnstown, PA – Right Stonycreek & Left Little Conemaugh	Stonycreek River	Earthen Mainline	Right	0.15
Nanty Glo – LB South Branch Blacklick Creek	South Branch Blacklick Creek	Earthen Mainline	Left	0.2
Nanty Glo – RB South Branch Blacklick Creek	South Branch Blacklick Creek	Earthen Mainline	Right	0.61
Nanty Glo – Right Bank Davis Run	Davis Run	Earthen Mainline	Right	0.07
Northern Cambria – W. Branch Susquehanna River	West Branch Susquehanna River	Earthen Mainline	Right	0.4

Cambria County Levee Inventory (National Levee Database, 2021)				
Levee Name	**Flood Source**	**Levee Type**	**Levee Bank Side**	**Levee Length (miles)**
Northern Cambria – Fox Run Levee	Fox Run	Earthen Mainline	Right	0.12
Patton	Chest Creek	Earthen Mainline	Right	1.38
Patton – Flannigan Run Diversion Dam	Flannigan Run	Earthen Mainline	N/A	0.07
Porter Run	West Branch Susquehanna River	Earthen Mainline	Right	0.5
Scalp Level - Little Paint Creek Levee	Little Paint Creek	Earthen Mainline	Left	0.25
Susquehanna	West Branch Susquehanna River	Earthen Mainline	Left	0.48
Vintondale – LB South Branch Blacklick Creek	South Branch Blacklick Creek	Earthen Mainline	Left	0.23
Vintondale – RB South Branch Blacklick Creel	South Branch Blacklick Creek	Earthen Mainline	Right	0.42
Walnut Run	West Branch Susquehanna River	Earthen Mainline	Right	0.21
Wilmore, PA – Right Bank	Little Conemaugh River	Earthen Mainline	Right	0.34

4.3.21.2 Range of Magnitude

Levees

Levee failure can be caused by a number of factors, and they can also cause catastrophic effects. Damage to the area my beyond a levee, if it fails, could be more significant than if the levee was not present. 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 deteriorate or decay. Regular maintenance of levees is critical. *Figure 47 – Cambria County Levee Locations* illustrates areas protected by the Cambria County levee systems. The figures following *Figure 47 – Cambria County Levee Locations* illustrate areas around Johnstown, Vintondale, Northern Cambria, and Nanty Glo that are heavily protected by levees. They are *Figure 48 – Levee Location – Johnstown, Figure 49 – Levee Locations – Nanty Glo, Figure 50 – Levee Locations – Vintondale, Figure 52 – Levee Locations*

– Patton, Figure 53 – Levee Locations – Scalp Level, Figure 54 – Levee Locations – Porter Run, and *Figure 51 – Levee Locations – Northern Cambria*.

A Levee failure of 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 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.

4.3.21.3 Past Occurrence

Levees

The National Levee Database (NLD) lists no occurrence of levee failures or major incidents occurring in Cambria County.

Some of the worst levee failures in the history of the United States have occurred in the American South, along parts of the Mississippi River delta. Levee failures in New Orleans, Louisiana during Hurricane Katrina from August 23 to August 31, 2005, resulted in an enormous amount of property damage and loss of lives. There were approximately fifty-three levee failures in constructed levees around the City of New Orleans. Hurricane Katrina precipitated the creation of more strict levee requirements for inspection and construction on the local, state, and federal level.

4.3.21.4 Future Occurrence

Levees

Although levee failures can occur at any time, given the right circumstances, the future occurrence of levee failures in Cambria County can be considered unlikely. 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 both smaller and larger floods.

4.3.21.5 Vulnerability Assessment

Levees

Each levee that is located in Cambria County is of different length and each protects areas from a different section of waterway and flood way. The Patton Levee is the largest in Cambria County with a length of 1.38 miles. The Nanty Glo – Right Bank Davis Run Levee and the Patton – Flannigan Run Diversion Dam Levee are the smallest in length in Cambria County with a length of 0.07 miles each.

The entire leveed areas for Cambria County protect a total of 4,499 structures within the county. Also protected are sixty-seven facility points with Cambria County that includes critical infrastructure (municipal buildings, hospitals, police/fire/EMS) and functional needs (schools, childcare centers, and nursing/care homes) facilities. Each levee in Cambria County is a mainline levee and protects along a variety land features. A failure of levee in the area of Johnstown or other urban areas in Cambria County would be catastrophic to life and property.

There are a large number of critical infrastructure and functional needs facilities within the levee protection areas for the levees around Cambria County. *Table 60 – Number of Vulnerable Structures within Leveed Areas* shows the number of addressable structures and facility type points in the largest levee protection areas within Cambria County based on NLD information from 2021. The features included in the table are particularly vulnerable to levee failure because they are protected by the system. Should the levee systems fail, the structures would be at an increased risk by their flood sources.

Table 60 - Number of Vulnerable Structure within Leveed Areas

Number of Vulnerable Structures within Leveed Areas		
Leveed Area Name	**Addressable Structures in Leveed Area**	**Facility Type Points in Leveed Area**
Johnstown, PA - Left Stonycreek & Left Conemaugh	1755	27
Johnstown, PA - Right Conemaugh & Little Conemaugh	742	8
Johnstown, PA - Rt Stonycreek & Lt Little Conemaugh	1714	24
Nanty Glo - RB South Branch Blacklick Creek	38	1
Nanty Glo - LB South Branch Blacklick Creek	6	0
Nanty Glo - Right Bank Davis Run	0	0
Northern Cambria - Fox Run Levee	88	2
Northern Cambria - W. Br. Susquehanna River Levee	0	0
Patton	25	2
Patton Flannigan Run Diversion Dam	1	0
Totals:	**4,369**	**64**

Figure 47 - Cambria County Levee Locations

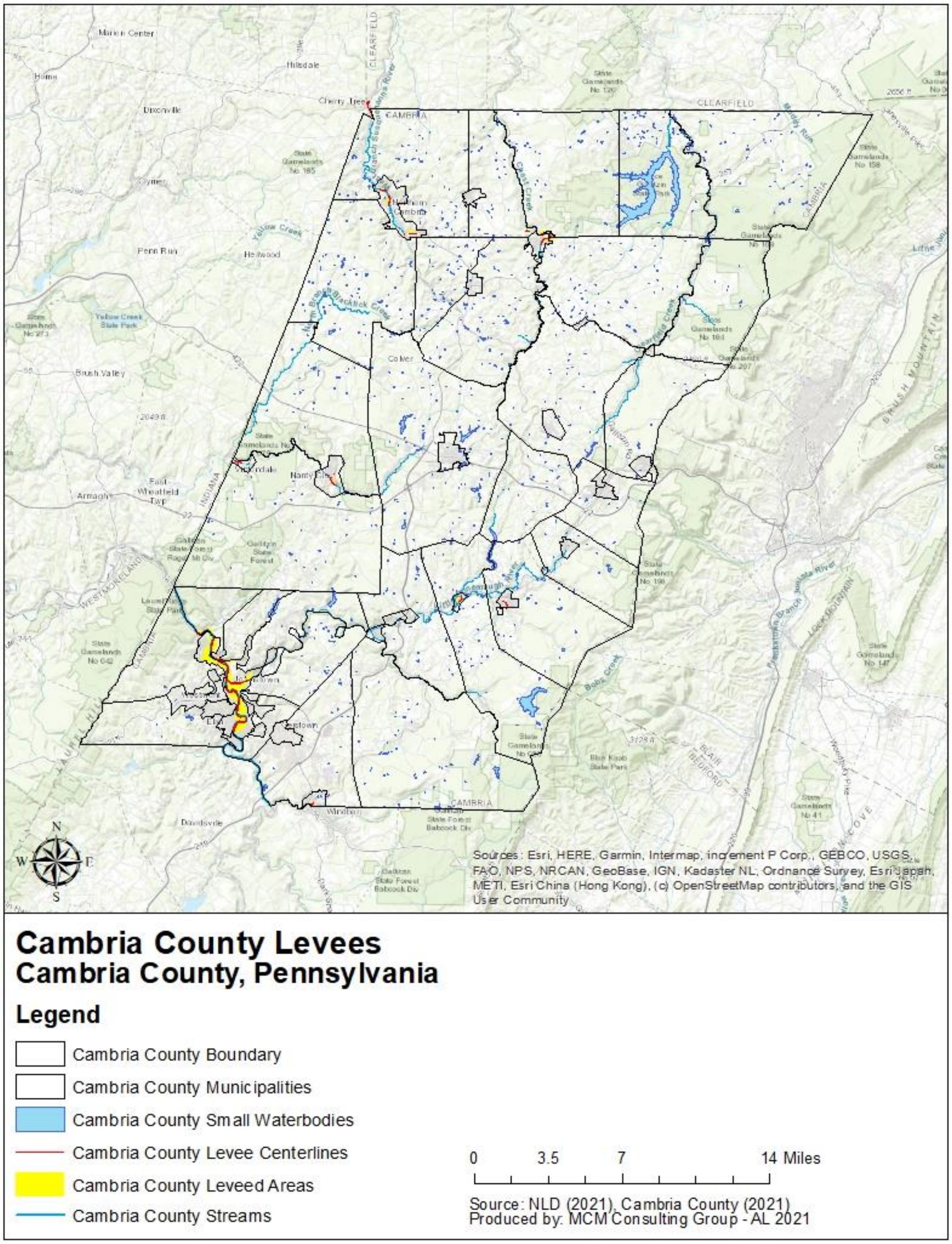


Figure 48 - Levee Locations - Johnstown

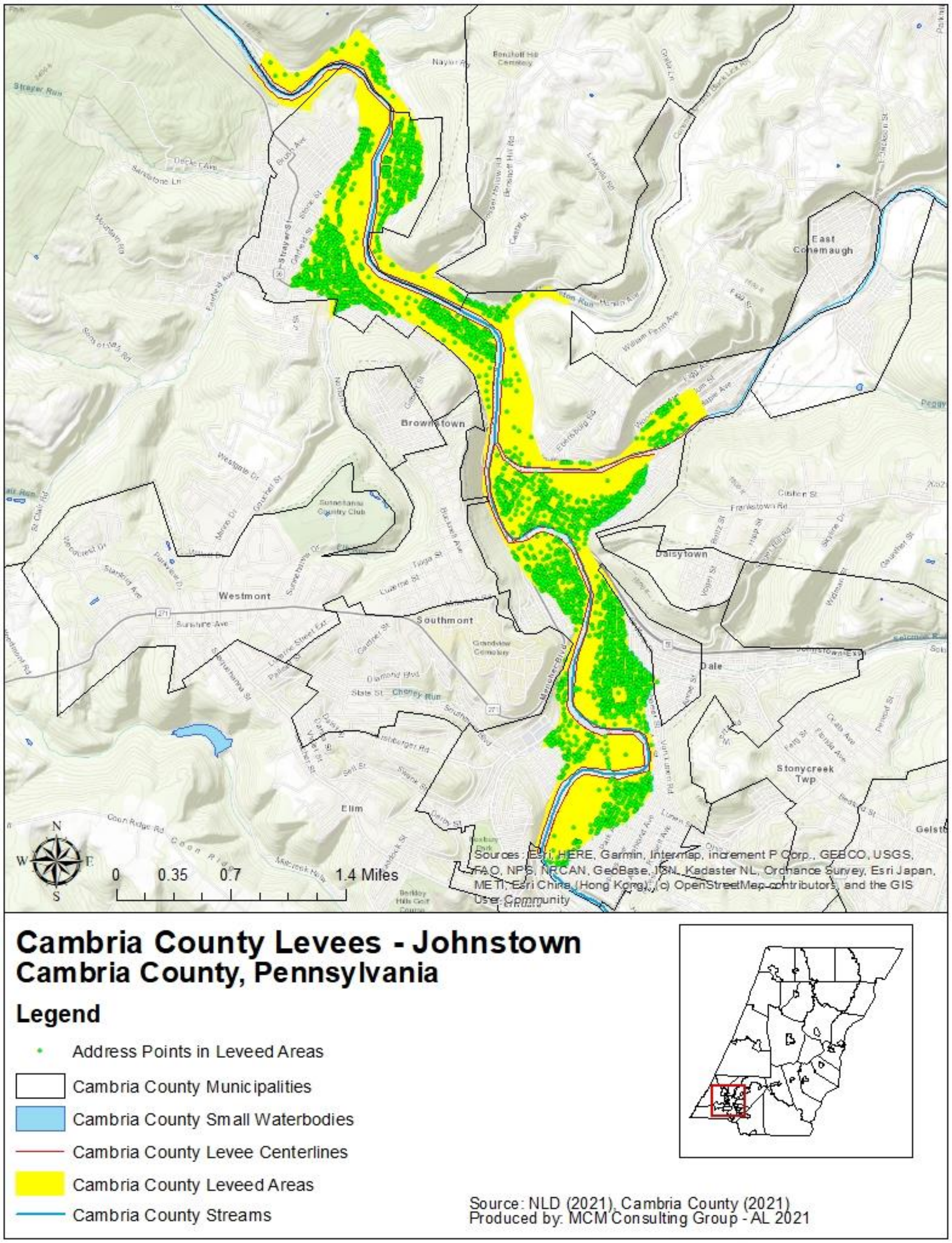


Figure 49 - Levee Locations - Nanty Glo

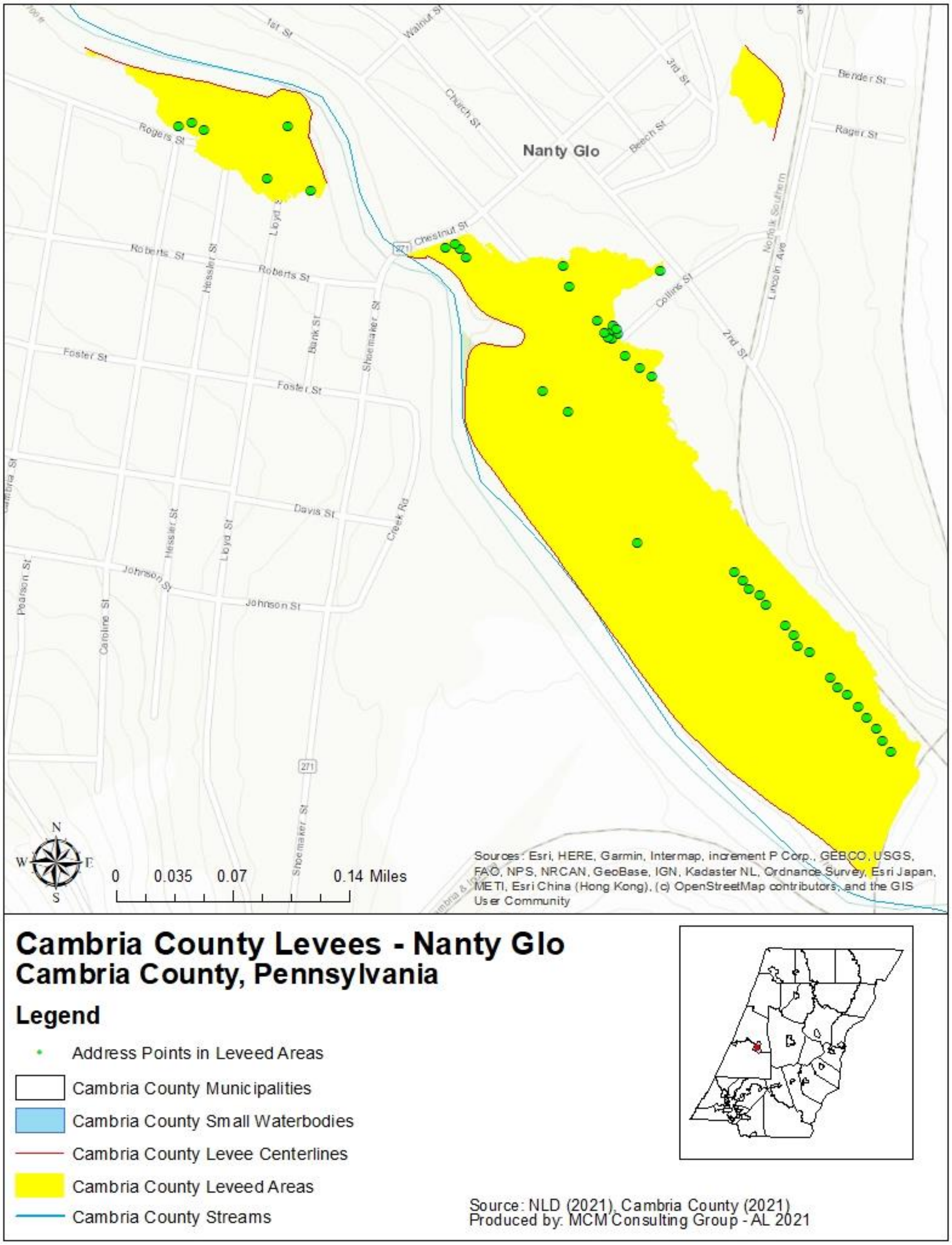


Figure 50 - Levee Locations – Vintondale

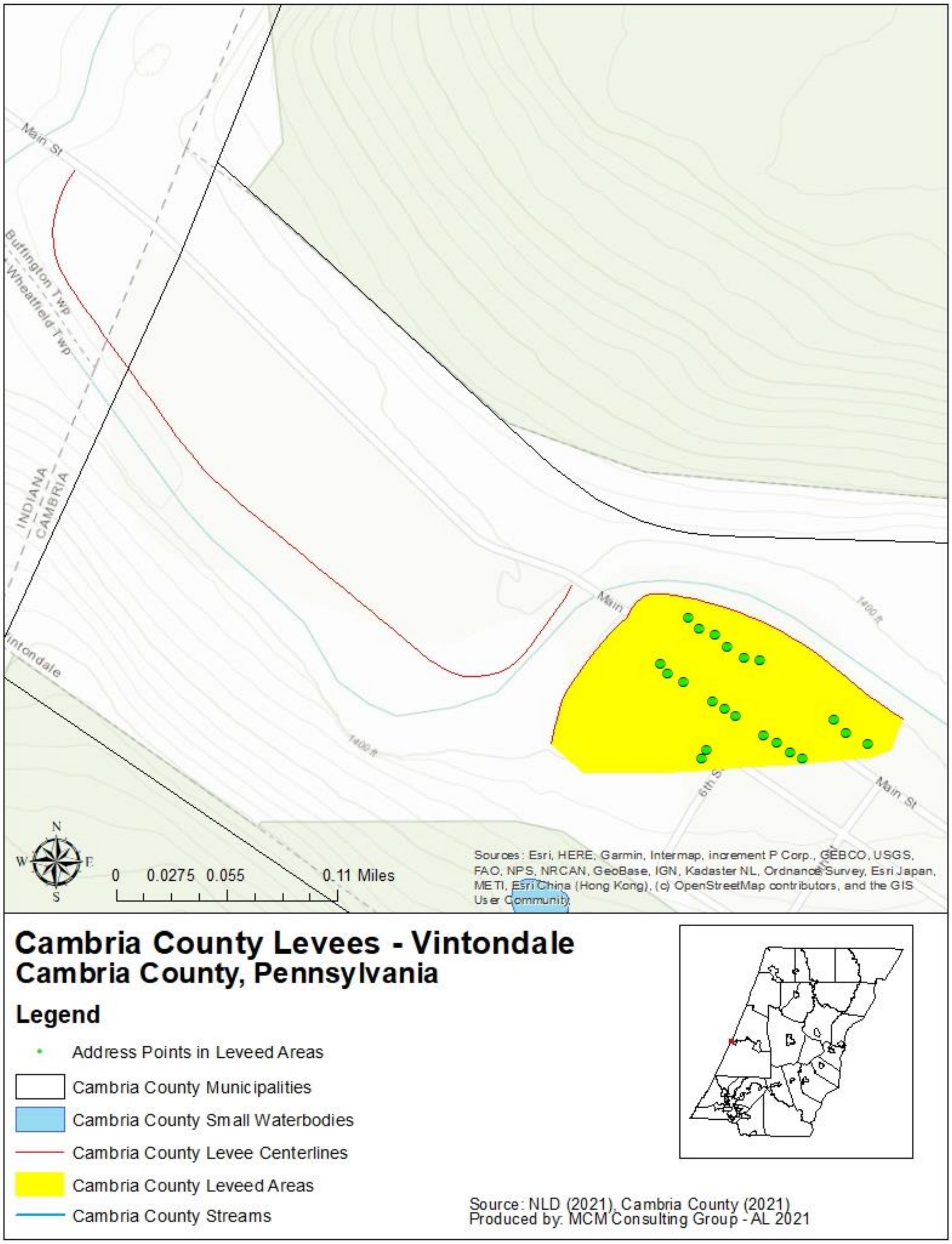


Figure 51 - Levee Locations - Northern Cambria

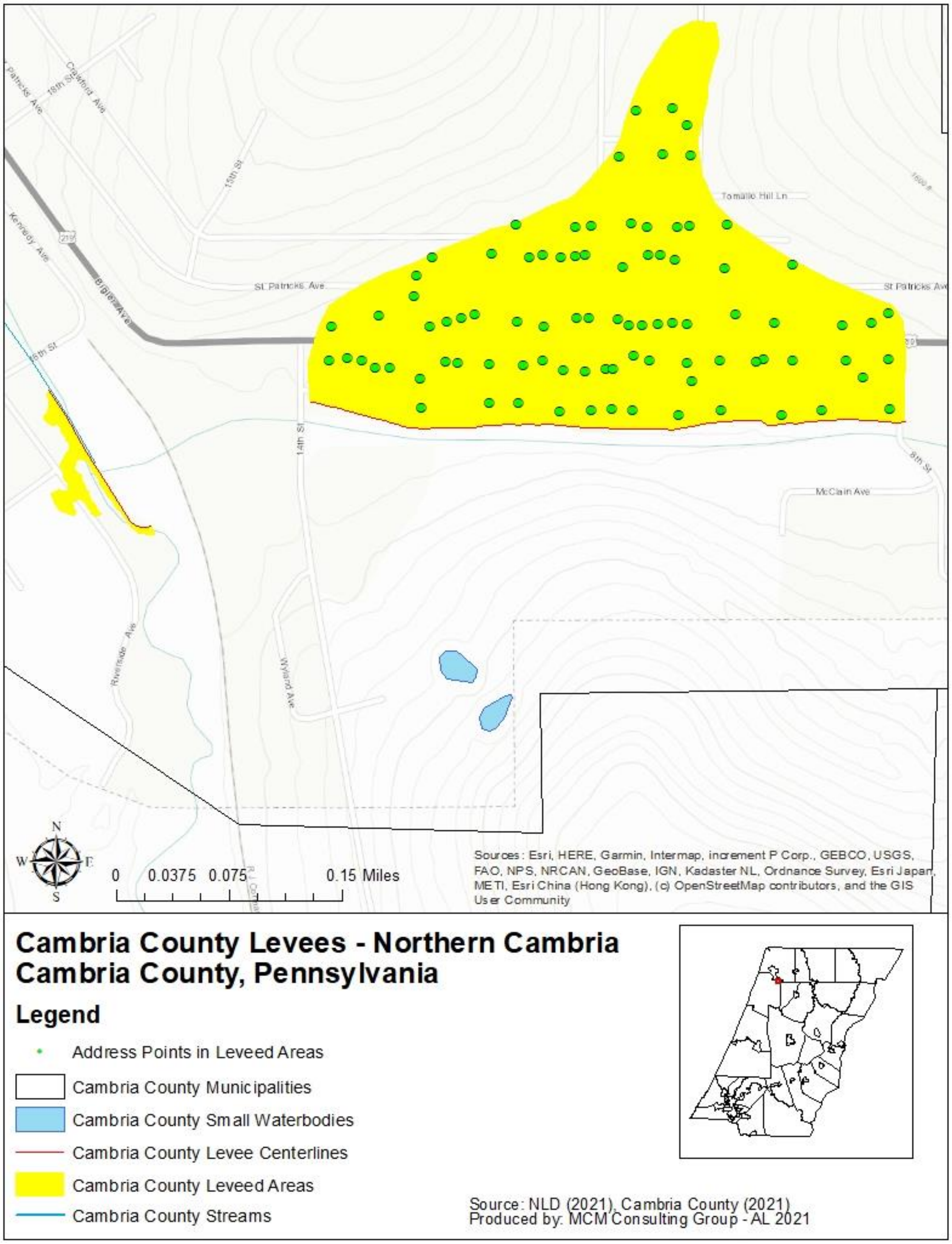


Figure 52 - Levee Locations - Patton

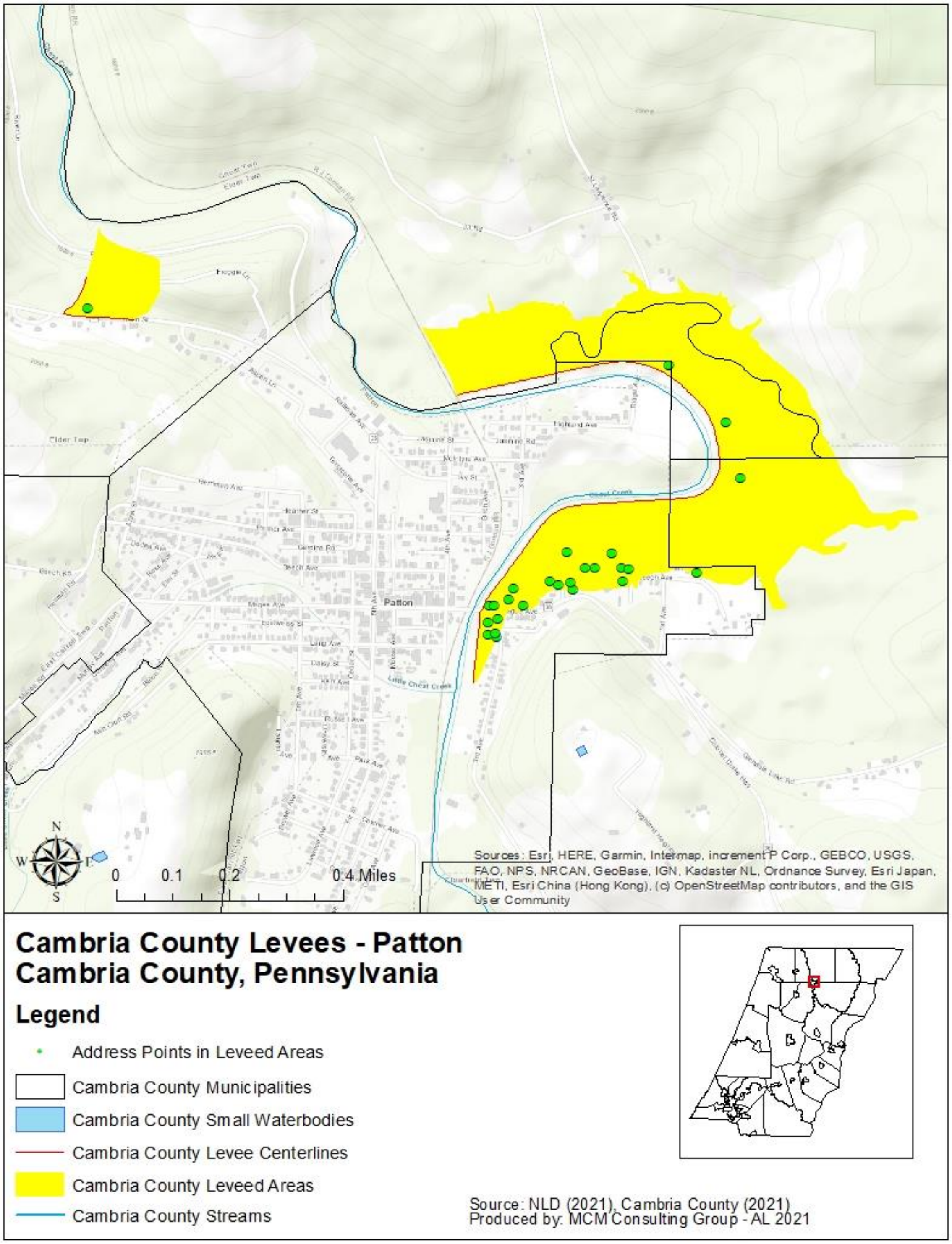


Figure 53 - Levee Locations - Scalp Level

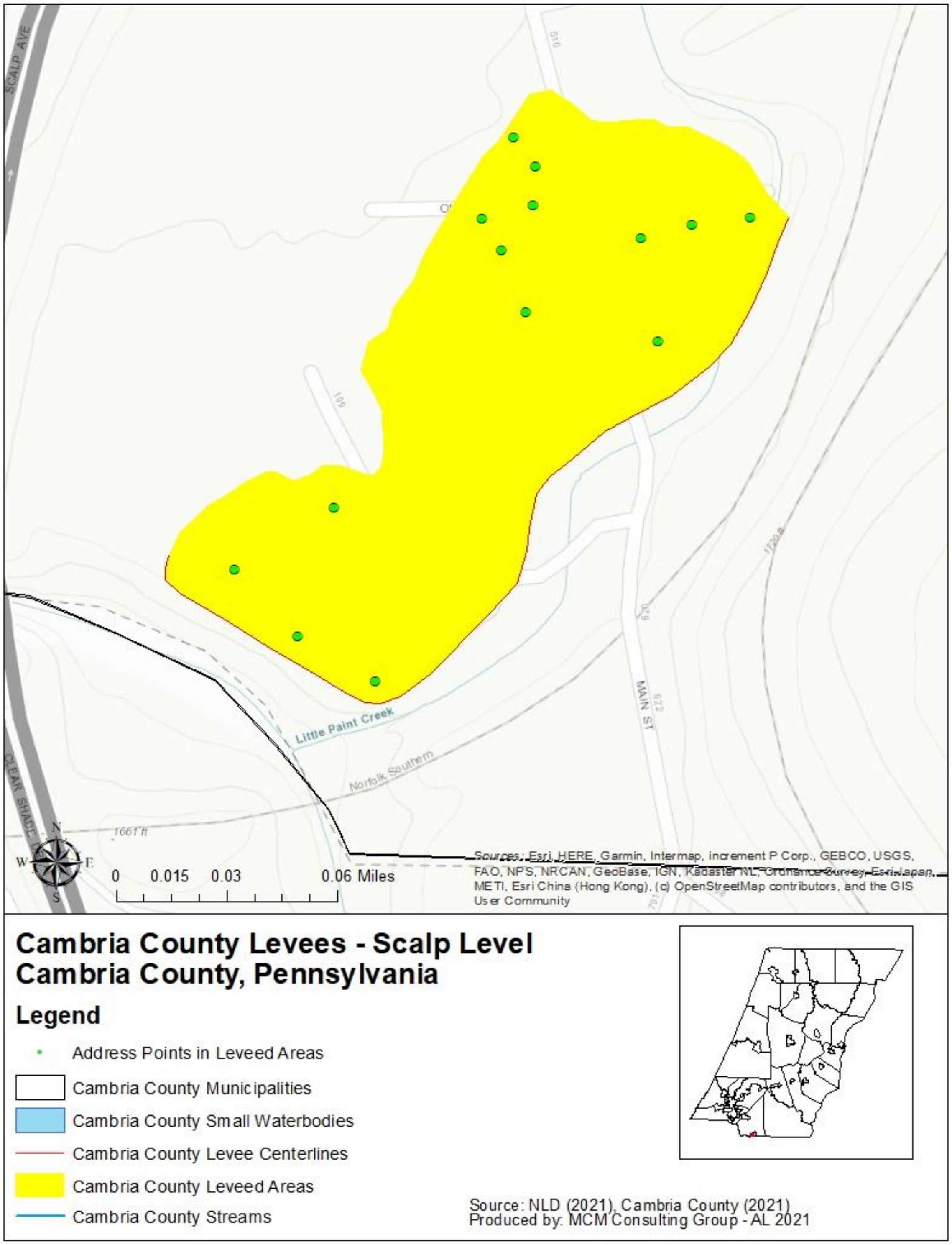
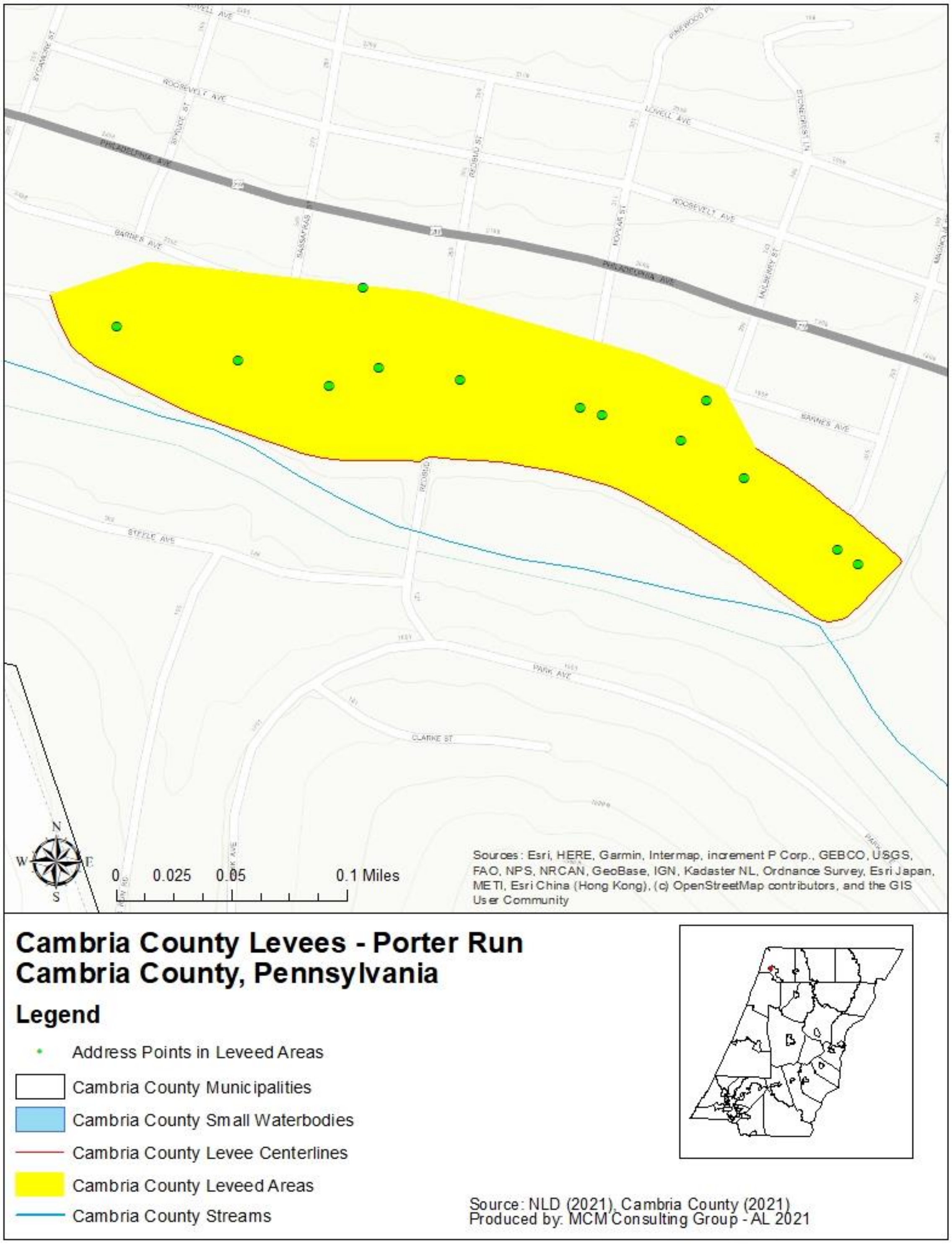


Figure 54 - Levee Locations - Porter Run



4.3.22. Opioid Epidemic

4.3.22.1 Location and Extent

Pennsylvania and the United States at large have been experiencing an epidemic of opioid drug abuse. According to the Pennsylvania Department of Health, the opioid overdose epidemic is the worst public health crisis in Pennsylvania. It affects Pennsylvanians across the state, from big cities to rural communities. Opioid addiction has increased drastically over the last year due to the hardships faced from the COVID-19 pandemic. Opioid use has increased since the beginning of the COVID-19 pandemic which is being attributed to the uncertainty people are feeling due to the pandemic.

Opioids, mainly synthetic opioids (other than methadone), are currently the main driver of drug overdose deaths. According to the Center for Disease Control and Prevention (CDC), 72.9% of opioid-involved overdose deaths involved synthetic opioids. Opioid addiction occurs when an individual becomes physically dependent on opioids. Opioids are a class of drug that reduces pain by interacting with receptors on nerve cells in the body and brain. The use of opioids is a broad term and includes opiates, which are drugs naturally extracted from certain types of poppy plants, and narcotics. Opioids can also be synthetically made to emulate opium. Opioid drugs are highly addictive and typically result in increasing numbers of overdose deaths both prescribed (e.g. fentanyl) and illicit (e.g. heroin) opioids. Overdose deaths from opioids occur when a large dose slows breathing, which can be likely when opioids are combined with alcohol or antianxiety drugs. While generally prescribed with good intentions, opioids can be over-prescribed, resulting in addiction.

According to the Drug Enforcement Administration (DEA), opioids come in various forms such as tablets, capsules, skin patches, powder, chunks in various colors from white to brown/black, liquid form for oral or injection use, syrups, suppositories, and lollipops. The Centers for Disease Control and Prevention (CDC) defines the following as the three most common types of opioids:

- **Prescription Opioids**: Opioid medication prescribed by doctors for pain treatment. These can be synthetic oxycodone (OxyContin), hydrocodone (Vicodin), or natural (morphine).
- **Fentanyl**: A powerful synthetic opioid that is 50 to 100 times more powerful than morphine and used for treating severe pain; illegally made and distributed fentanyl is becoming more prevalent.
- **Heroin**: An illegal natural opioid processed from morphine which is becoming more commonly used in the United States.

Opioids are highly addictive. They block the body's ability to feel pain and can create a sense of euphoria. Additionally, individuals often build a tolerance to opioids, which can lead to misuse and overdose.

While other addictive substances such as methamphetamines and alcohol can be problematic for the health of individuals in Cambria County, this profile focuses on opioid drugs and the opioid epidemic. The opioid crisis was declared to be a public health emergency on October 26, 2017. While the declaration provides validation for the scope and severity of the problem, it was not accompanied by any release of funding for mitigating actions. On January 10, 2018, Governor Tom Wolf declared the opioid epidemic to be a statewide public health disaster emergency for Pennsylvania. The declaration is intended to enhance response and increase access to treatment.

4.3.22.2 Range of Magnitude

Opioid addiction can lead to overdose, which can be fatal. This type of addiction can affect others that are not the user themselves. The most dangerous side effect of an opioid overdose is depressed breathing. The lack of oxygen to the brain causes permanent brain damage, leading to organ failure, and eventually death. Signs and symptoms include respiratory depression, drowsiness, disorientation, pinpoint pupils, and clammy skin. Opioid addiction can also be passed from mother to child in the womb. This condition, known as neonatal abstinence syndrome, has increased five-fold, according to the National Institute on Drug Abuse (NIDA). This results in an estimated 22,000 babies in the United States born with this condition. First responders such as paramedics, police officers, and firefighters are also affected by the opioid addiction crisis. First responders face exposure risk due to an increase in emergency calls due to an increase in the crisis, particularly to synthetic fentanyl. Two to three milligrams of fentanyl can cause an induced respiratory depression, arrest, and possibly death to occur. Since fentanyl is indistinguishable from several other narcotics and powdered substances, first responders must take extra precaution when dealing with calls related to drug abuse. A worst-case scenario with the opioid epidemic in Cambria County would be a high number of overdoses between residents and/or first responders throughout the county.

According to the Center for Disease Control and Prevention (CDC), more than 192 Americans die every day from an opioid overdose. In 2019, a total of 4,377 deaths related to opioid use occurred in Pennsylvania with the average age of thirty-six years old. From February 2019 to February 2020, there has been a 40.9% increase across the commonwealth of Pennsylvania. This could indicate a significant increase in opioid overdoses in Pennsylvania. Out of the fifty states, nineteen states, including Pennsylvanis, have had a significant increase in opioid overdoses during the same period. Heroin and fentanyl are the two drugs most often found in overdose deaths, and they are considered to be highly available and nearly ubiquitous in Pennsylvania.

4.3.22.3 Past Occurrence

In 2020, there was an estimated total of 81,000 drug-related overdose deaths in the United States. This is the highest number of overdose deaths ever recorded in a 12-month period, according to the recent provisional date from the CDC. Cambria County experienced a total of sixty-seven drug related deaths from 2015 – 2020. There was a total of fifty-seven overdose deaths in 2015, ninety-four deaths in 2016, eighty-seven deaths in 2017, sixty-one deaths in 2018, fifty-six deaths in 2019, and sixty-nine in 2020. The most common age group for opioid abuse in Cambria County is the 35 – 44 years of age demographic, only 2.5% higher than those 25-25 years of age. In Cambria County the overdose rate of males is greater than the overdose rate of females. Whites have the highest total rate of overdose deaths in Cambria County, while blacks have the highest per capita rate of overdose deaths when adjusted for population size. The most used opioid in Cambria County are fentanyl, heroin, cocaine, benzodiazepines, and Rx opioids.

Table 61 - Drugs Present in 2020 Pennsylvania Overdose Deaths

Drugs Present in 2020 PA Overdose Deaths (DEA, 2020)	
Drug Category	**Percent Reported Among 2020 Decedents**
Cannabis	25%
Cocaine	20%
Heroin	15%
Fentanyl	14%
Methamphetamine	10%
Prescription Opioids	5.5%
Cathinones	5.5%
Benzodiazepines	5%

4.3.22.4 Future Occurrence

Both Cambria County, and Pennsylvania as a whole, have seen a steady rise in opioid related deaths over the last several years, with drug-related death rates increasing at a high percentage. Future occurrences of opioid addiction and overdose are unclear as the state moves forward with overdose prevention initiatives through the use of Naloxone, alternative pain treatments, improvement of tools for families and first responders, and expansion of treatment access. The Wolf Administration has taken various approaches to help with the prevention of mass future occurrences across the Commonwealth. To help prevent future drug abuse and protect individual health among communities in Pennsylvania, the Pennsylvania's Prescription Drug Monitoring Program (PA PDMP) collects information on all filled prescriptions for controlled substances.

This information helps health care providers safely prescribe controlled substances and helps patients get correct treatment. The PA PDMP also has drug take-back boxes located in the counties for an easy, convenient location where anyone can dispose of their unused, expired, or unwanted prescriptions to help lower potential drug overuse. In Cambria County, there are twenty-one drug take-back boxes located throughout the county. The drug take-back box locations include Johnstown Police Department, Ebensburg Court House, Cambria Township Municipal Building, Ebensburg State Police Department, Richland Township Police Department, Carrolltown Borough Police Department, Conemaugh Township Police Department, Ferndale Borough Police Department, Geistown Borough Police Department, Hastings Borough Police Department, Jackson Township Municipal Building, Nanty-Glo Borough Police Department, Patton Borough Police Department, Saint Francis University Police Department, Stonycreek Township Police Department, Summerhill Township Police Department, Upper Yoder Township Police Department, Vintondale Borough Police Department, West Hills Region Police Department, Windber Borough Police Department, and the East Taylor Med Collection Box. These locations help reduce future occurrences of opioid use from occurring.

In the event of an opioid overdose, death can sometimes be prevented with the use of the drug naloxone. Pennsylvania Secretary of Health, Dr. Rachel Levine, has signed updated standing order prescriptions of naloxone. The updated standing orders include the 2mg dose auto injector which has recently become available. Naloxone is a medication that can reverse an overdose that is caused by an opioid drug (i.e., prescription pain medication or heroin). Naloxone is used to block the effects of opioid and is sold under the brand name of Narcan. When administered during an overdose, naloxone blocks the effects of opioids on the brain and restores breathing within two to eight minutes. Naloxone has been used safely by medical professionals for more than 40 years and has only one function to reverse the effects of opioids on the brain and respiratory system in order to prevent death. Emergency medical responders have access to the treatment, and as of 2015, naloxone is available without a prescription in Pennsylvania. Also, with the January 10, 2018, disaster declaration, emergency medical technicians (EMTs) are now allowed to leave naloxone behind at a scene, further increasing the distribution and accessibility of the lifesaving medication. According to a study published in September 2018, drug users reported that users often have multiple overdoses in the course of their drug use, and availability of naloxone has saved many lives. While the introduction of naloxone has been a significant benefit to the fight against opioid abuse, efforts to prevent future overdoses are still underway. Naloxone is another way to reduce future occurrences of the opioid epidemic from occurring in Cambria County.

Opioid drugs have been a problematic and addictive method for patients to deal with pain. Employing alternative approaches to pain management could prevent patients from ever being introduced to addictive opioids, especially considering the most common overdose drugs in Cambria County have been prescription opioids. A possible alternative pain treatment comes from hemp extracted cannabidiol, or CBD. Unlike THC (the psychoactive constituent of cannabis), CBD is non-psychoactive and does not have the same intoxicating effect as THC; however, CBD can provide relief from pain, inflammation, anxiety, and even psychosis. CBD is legal without a prescription throughout the United States of America.

4.3.22.5 Vulnerability Assessment

Opioid overdoses have resulted in many tragic deaths in Pennsylvania and many people have been affected by the epidemic through the loss of either a family member, a close friend, or member of their community. Opioid addiction is a direct detriment to the personal well being of addicts, a burden to their families and communities, and a strain to the emergency response system that cares for overdose victims. In general, jurisdictions that are more densely populated are more vulnerable to opioid addiction threats as access to the drugs increases. However, rural communities in general experience larger per-capita opioid-related deaths. Jurisdictional losses in the opioid addiction crisis stem from lost wages, productivity, and resources rather than losses to buildings or land. Many counties across the Commonwealth, including Cambria County, have seen an increase of time and resources devoted to the opioid epidemic as overdose and response increase.

The vulnerability in the county depends on the number of additional risk factors on the vulnerable population such as genetic, psychological, and environmental factors that play a role in addiction. The known risk factors of opioid misuse and addiction include poverty, unemployment, family and/or personal history of substance abuse, history of criminal activity, history of severe depression or anxiety, and prior drug/alcohol rehabilitation. In addition, women have a unique set of risk factors for opioid addiction. Women are more likely than men to have diagnosed chronic pain. Compared with men, women are also more likely to be prescribed opioid medications, to be given higher doses, and to use opioids for longer periods of time. Women may also have biological tendencies to become dependent on prescription pain relievers more quickly than men. Therefore, if the county were to have a population with a great amount of these risk factors, the county would be very vulnerable to the opioid epidemic.

The COVID-19 pandemic and its periods of quarantine caused vulnerability in opioid users throughout Cambria County. It is likely that the emergence of COVID-19 and subsequent disruptions in health care and social safety nets combined with social and economic stressors has fueled the opioid epidemic. The COVID-19 pandemic has taken many lives, and it has challenged vulnerable populations, including those with opioid use disorders. The opioid epidemic and COVID-19 pandemic are intersecting and presenting unprecedented challenges for families and communities. Opioid use affects respiratory and pulmonary health which may make those with opioid use disorders more susceptible to COVID-19. In addition, chronic respiratory disease is already known to increase overdose mortality risk among people taking opioids, and decreased lung capacity from COVID-19 could lead to similar health effects. Secondary impacts from the COVID-19 pandemic, including disruptions of treatment and recovery services, limited access to mental health services and peer support, disrupted routines, loss of work, and stress, may lead to increased opioid use and risk of relapse for those in recovery. Risk factors also arise from indirect factors including housing instability and incarceration. Those with opioid use disorders are at higher risk for housing insecurity, homelessness, and incarceration. Congregate living facilities such as homeless shelters, jails, and prisons are high-risk environments for coronavirus transmission, and there are challenges in implementing recommendations from the CDC such as social distancing and quarantine. Additionally, the pandemic took away the attention from the media, from legislators, and from public health agencies that was being focused on the opioid crisis. The opioid epidemic in Pennsylvania increased 22.9% since the beginning of the pandemic.

Additionally, first responders and medical personnel are also a very vulnerable population when dealing with the opioid epidemic. Fentanyl and related substances are hazardous materials, which cause the environment and the people around the substance to be vulnerable. Contact with fentanyl can impact first responders and others that are related to the opioid user. Depending on the potency of the drug, it can take as little as the equivalent of few grams of table salt to cause health complications. There have been several reports nationally of first responders accidentally overdosing on fentanyl or carfentanyl through brief skin contact or the drug becoming airborne. It is best for first responders to err on the side of caution to avoid any potential exposure. The American College of Medical Toxicology (ACMT) and the American Academy of Clinical Toxicology (AACT) suggest that nitrile gloves provide sufficient protection for handling fentanyl, and for "exceptional circumstances where the drug particles or droplets suspended in the air, an N95 respirator provides sufficient protection". Other environmental structures such as streams, rivers, and lakes have been known to contain traces of opioids and other drugs within them. These traces come from human urine, feces, or medications that have been discarded in the bathroom. The Environmental Protection Agency (EPA) suggests that while the risks of pharmaceuticals found in wastewater, ambient water, and drinking water are low, further research is needed. State facilities are not at risk to the opioid crisis, but there are some occupation-specific risks that may make some employees more vulnerable. State employees working in direct patient care are vulnerable to fentanyl exposure. However, the physical plant and facilities of the Commonwealth and Cambria County are not likely to experience losses from the opioid addiction crisis. Absenteeism associated with an opioid addiction in state facilities located in high-risk areas could lead to economic loss through lost productivity and increased medical costs. *Figure 55 – Opioid Overdose Deaths in Pennsylvania 2020* and *Figure 56 – Opioid Overdose Deaths in Pennsylvania 2019* illustrate the number of deaths per county in the state of Pennsylvania.

Figure 55 - Opioid Overdose Deaths in Pennsylvania 2020

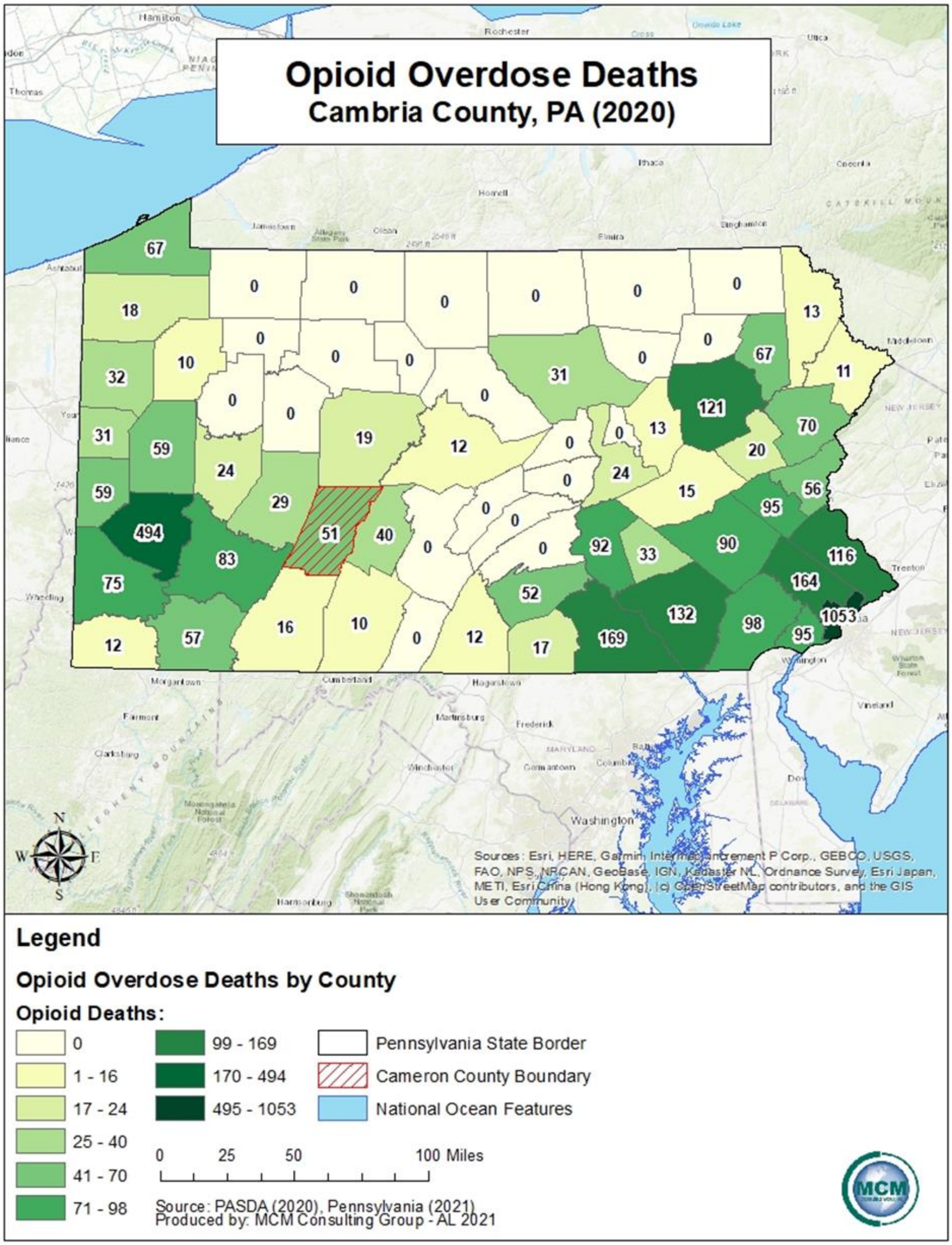
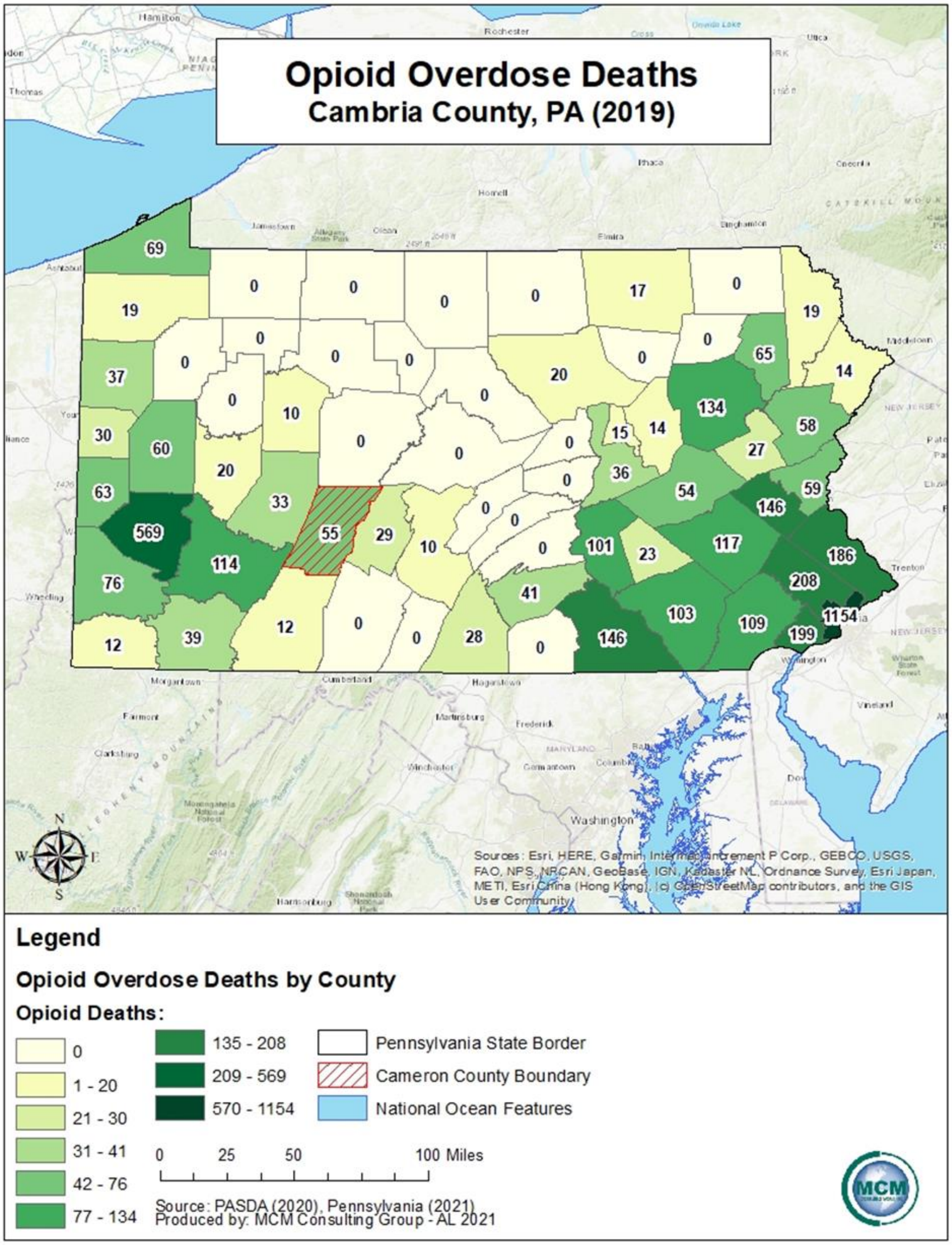


Figure 56 - Opioid Overdose Deaths in Pennsylvania 2019



4.3.23. Terrorism/Cyberterrorism Incidents

4.3.23.1 Location and Extent

Following several serious international and domestic terrorist incidents during the 1990s and early 2000s, 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)

Cyber-terrorism is the unlawful use of force and violence over technological methods to cause harm to financial security, identity information, personal information, and attacking personal computers, mobile phones, gaming systems, and other Bluetooth or wirelessly connected devices. Cyber-terrorism can be just as damaging to infrastructure as conventional terrorism, due to the large amount of business that is carried out over the internet, through wirelessly connected devices, or from employees of companies working remotely.

The Federal Bureau of Investigations (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 the 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 11th 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 hospitals and health care facilities, schools, childcare centers, fire stations, police departments, municipal buildings, and hazardous waste facilities. 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 major highway and marginalized groups such as LGBTQ persons and racial, religious, or other minorities.

Potential targets include:

- Commercial facilities
- 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
- Cultural sites
- Government facilities

4.3.23.2 Range of Magnitude

Terrorism may include use of Weapons of Mass Destruction (WMD) (including chemical, biological, radiological, nuclear, and explosive weapons) which include arson, incendiary, explosive, armed attacks, industrial sabotage, intentional release of hazardous materials, 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
- Release of hazardous materials
- Kidnapping
- Nuclear bomb
- 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 use taxpayer assets by deploying police, EMS and/or fire units. Cambria County has thirteen districts (public schools K through 12th grade) that include Blacklick Valley School District, Cambria Heights School District, Central Cambria School District, Conemaugh Valley School District, Ferndale Area School District, Forest Hills School District, Glendale School District, Greater Johnstown School District, Northern Cambria School District, Penn Cambria School District, Portage Area School District, Richland School District, Westmont Hilltop School District, and several private schools. Cambria-Rowe Business College, Commonwealth Technical Institute, Greater Johnstown Career and Technology Center, Hiram G Andrew Center, Mount Aloysius College, Pennsylvania Academy of Cosmetology Arts and Sciences, Pennsylvania Highlands Community College, Pennsylvania Highlands Community College – Ebensburg Center, Pennsylvania Institute of Taxidermy, Saint Francis University, and the University of Pittsburgh-Johnstown are the post-secondary institutions in Cambria County.

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 Ebensburg, 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 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 cyber terrorism threat to institutions comes from any processes that are networked or controlled via computers.

Ransomware continues to be the leading threat, with Maze ransomware accounting for nearly half of all known cases in 2020. Cybercriminals have increasingly begun to steal proprietary – and sometimes embarrassing – data before encrypting it. The cybercriminal will then threaten to publicly release the stolen files if the victims do not provide financial transactions.

4.3.23.3 Past Occurrence

In 2014, a Johnstown man purchased a pre-paid phone from a Bucks County Walmart and used it to call in a bomb threat to Cambria County communications center. The man claimed to have planted an explosive device near the Cambria County Courthouse. The suspect was detained within hours of the call through a coordinated effort by law enforcement, Walmart, Verizon, and other private- and public-sector personnel.

Significant international terrorism incidents in the United States include the World Trade Center bombing in 1993, the bombing of the Murrow Building in Oklahoma City in 1995, and the September 11th, 2001, attacks on the World Trade Center and the Pentagon. One of the aircrafts hijacked in the September 11th attacks 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.

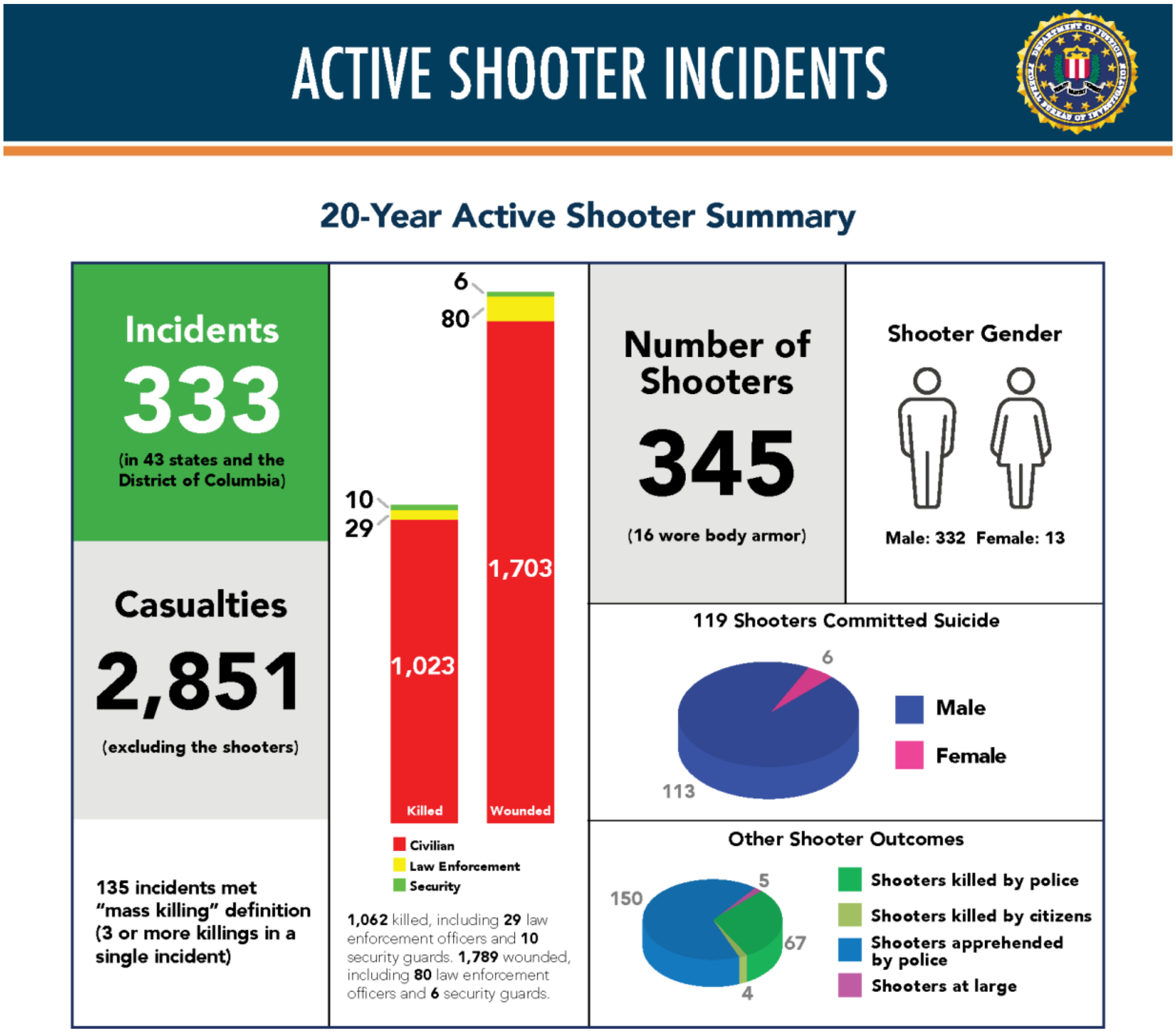
While the largest scale terrorist incidents have often had international stimuli, many other incidents are caused by home grown actors who may have become radicalized through hate groups either in person or via the internet, and who may struggle with mental health issues. Hate groups such as the Ku Klux Klan (KKK), Aryan Nation, the New Black Panther Party, and more recently, the Alt-Right, Antifa, anarcho-communists, Proud Boys, plus conspiracy theorist believers/promoters such as QAnon, have been part of domestic terrorism in different forms. During the May 2020 George Floyd protests, anti-police individuals associated with one or more of the groups created incendiary devices to burn down the Minneapolis Third Precinct. On January 6, 2021, individuals associated with one or more of the groups, stormed the United States Capitol to disrupt the certification of the 2020 presidential election, resulting in five deaths and evacuation of Congress.

Active Shooters

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 were a total of twenty-eight mass shooting incidents in the United States according to the FBI. Often these shooters are HVEs. Two significant events have occurred in Pennsylvania in recent history: one occurred on October 27, 2018, when eleven people were killed by a gunman in the Pittsburgh neighborhood of Squirrel Hill; the gunman was a homegrown violent extremist and attacked the congregation of 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. Another event occurred in January of 2019, where 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.

Other active shooter events in the United States in recent years include Virginia Tech (April 2007), Sandy Hook Elementary School (December 2012), San Bernardino, California (December 2015), an Aurora, Colorado movie theater (July 2012) a church in Charleston, South Carolina (June 2015). An *Active Shooter Incidents 20-Year Review* by the FBI concluded that there has been a significant recent increase in frequency of active shooter incidents, and that most shooters were male. The report documents data from all the incidents, including location, commercial environments, educational environments, open spaces, military and other government properties, residential locations, houses of worship, and health care facilities (FBI, 2021). *Figure 57 – Active Shooter Incidents – 20 Year Active Shooter Summary* is one page from the report that illustrates a numerical breakdown of shooting events for those twenty years. *Figure 58 – Education Environments* shows two more summary pages from the report that detail active shooter statistics in educational environments.

Figure 57 - Active Shooter Incidents - 20 Year Active Shooter Summary



Incidents: 333 (in 43 states and the District of Columbia). Total casualties: 2,851 (excluding the shooters). 135 incidents met "mass killing" definition (3 or more killings in a single incident). Killed: 1,062 (including 1,023 civilians, 29 law enforcement officers and 10 security guards). Wounded: 1,789 (including 1,703 civilians, 80 law enforcement officers, and 6 security guards). Number of shooters: 345 (16 wore body armor). Shooter gender: 332 male, 13 female. 119 shooters committed suicide (113 male, 6 female). Other shooter outcomes: 67 killed by police, 4 killed by citizens, 150 apprehended by police, 4 at large.

Active Shooter Incidents 20-Year Review, 2000-2019 4

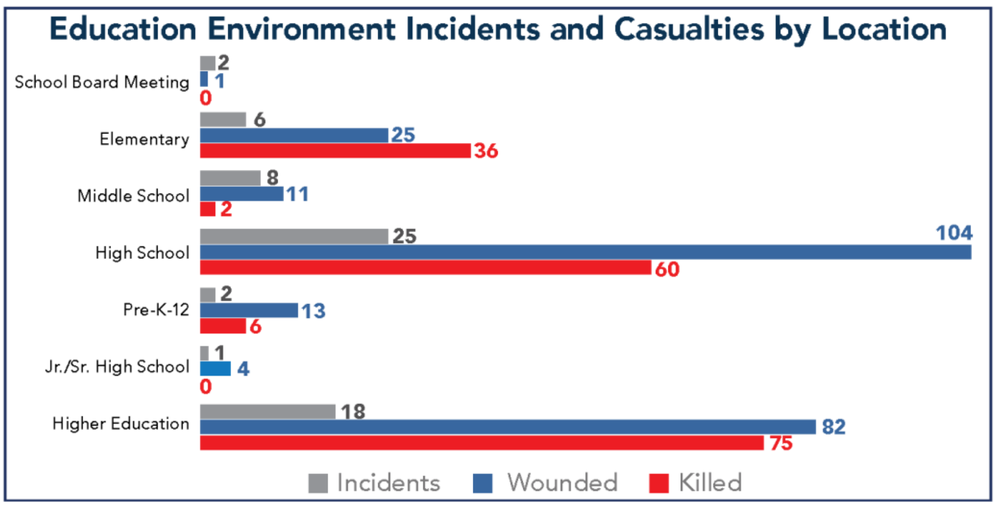
Figure 58 - Education Environments

ACTIVE SHOOTER INCIDENTS

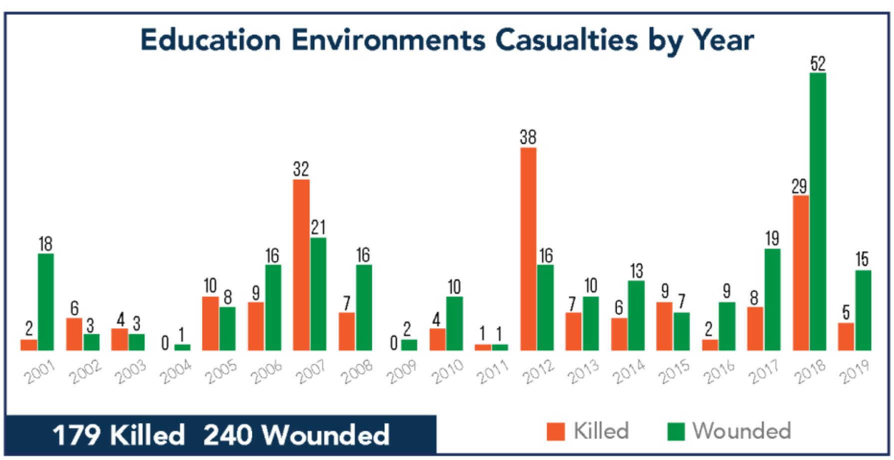
Education Environments

Quick Look:

Sixty-two incidents occurred in public and private educational settings, defined as schools covering pre-kindergarten to 12th grade, institutes of higher education, and school board meetings.



Education Environment Incidents and Casualties by Location: School Board Meeting (2 incidents, 1 wounded, 0 killed); Elementary (6 incidents, 25 wounded, 36 killed); Middle School (8 incidents, 11 wounded, 2 killed); High School (25 incidents, 104 wounded, 60 killed); Pre-K-12 (2 incidents, 13 wounded, 6 killed); Jr./Sr. High School (1 incident, 4 wounded, 0 killed); Higher Education (18 incidents, 82 wounded, 75 killed)

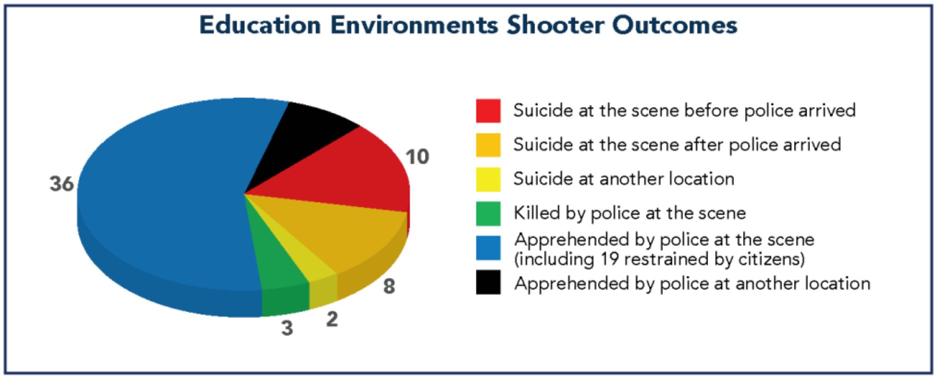


Education Environments Casualties by Year: 2001 (2 killed, 18 wounded); 2002 (6 killed, 3 wounded); 2003 (4 killed, 3 wounded); 2004 (0 killed, 1 wounded); 2005 (10 killed, 8 wounded); 2006 (9 killed, 16 wounded); 2007 (32 killed, 21 wounded); 2008 (7 killed, 16 wounded); 2009 (0 killed, 2 wounded); 2010 (4 killed, 10 wounded); 2011 (1 killed, 1 wounded); 2012 (38 killed, 16 wounded); 2013 (7 killed, 10 wounded); 2014 (6 killed, 13 wounded); 2015 (9 killed, 7 wounded); 2016 (2 killed, 9 wounded); 2017 (8 killed, 19 wounded); 2018 (29 killed, 52 wounded); 2019 (5 killed, 15 wounded)

Active Shooter Incidents 20-Year Review, 2000-2019 13

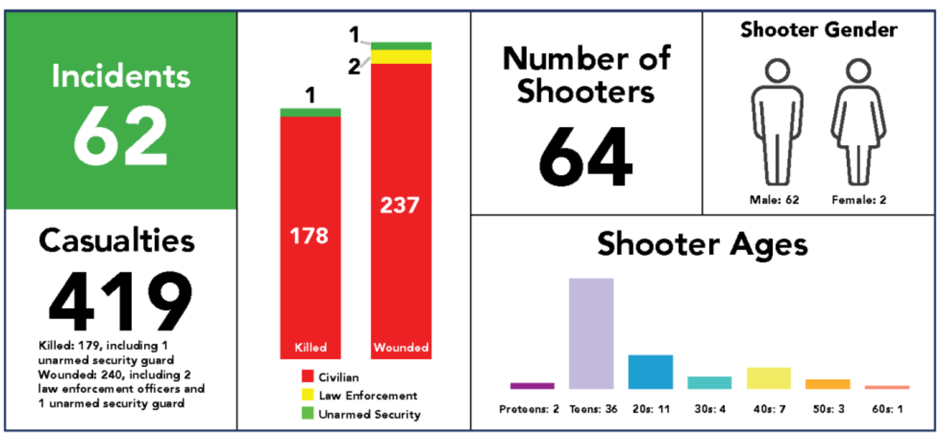
ACTIVE SHOOTER INCIDENTS

Education Environments



Education Environments Shooter Outcomes: Suicide at the scene before police arrived (10); Suicide at the scene after police arrived (8); Suicide at another location (2); Killed by police at the scene (3); Apprehended by police at the scene (induding 19 restrained by citizens) (36); Apprehended by police at another location (5)

.Key Findings:



Incidents: 62. Total casualties: 419. Killed: 179 (induding 178 civilians and 1 unarmed security guard). Wounded: 240 (including 237 civilians, 2 law enforcement officers, and 1 unarmed security guard). Number of shooters: 64. Shooter gender: 62 male, 2 female. Shooter ages: Preteens (2); Teens (36); 20s (11); 30s (4); 40s (7); 50s (3); 60s (1).

Active Shooter Incidents 20-Year Review, 2000-2019 14

The complete report may be found here: https://www.fbi.gov/file-repository/active-shooter-incidents-20-year-review-2000-2019-060121.pdf/view.

Cyber-Threats

While Cambria Cunty has not been the target of any critical cyber terrorist events, the county has seen multiple security breaches due to online phishing and other scams. In early 2019, the Cambria County District Attorney's office and police began investigating a phishing scam that targeted a Cambria County commissioner and a local educator which caused an individual's paycheck to be sent to a fraudulent recipient. While the breach did not lead to critical consequences, IT professionals from the Pennsylvania Highlands Community College began training the educators to better recognize scams to prevent future security breaches. Two of the most serious cyber-attacks to occur in the country occurred during the writing of this plan.

One hack attack took down the largest fuel pipeline in the U.S. and led to massive gasoline shortages; it was the result of a single compromised password. Hackers gained entry into the networks of Colonial Pipeline Company on April 29, 2021 through a virtual private network account, which allowed employees to remotely access the company's computer network. On May 7, 2021, a ransom of $4.4 million was demanded by the hackers, causing Colonial to shut down the entire supply line, immediately prompting temporary gasoline shortages and panic buying up and down the East Coast. The hackers, who were an affiliate of a Russian-linked cybercrime group known as *DarkSide*, were paid the ransom. The hackers also stole nearly 100 gigabytes of data from Colonial Pipeline and threatened to leak it if the ransom was not paid, according to Bloomberg News.

Then, in early June 2021, JBS , the world's largest meat company by sales, paid an $11 million ransom to cybercriminals who temporarily knocked out plants that process roughly one-fifth of the nation's meat supply. The ransom payment, in bitcoin, was made to shield JBS meat plants from further disruption and to limit the potential impact on restaurants, grocery stores and farmers that rely on JBS, according to the company.

The attack on JBS was part of a wave of incursions using ransomware, in which companies are hit with demands for multimillion-dollar payments to regain control of their operating systems. The attacks show how hackers have shifted from targeting data-rich companies such as retailers, banks and insurers to essential-service providers such as hospitals, transport operators and food companies.

4.3.23.4 Future Occurrence

The likelihood of Cambria County being a primary target for a major international terrorist attack is small and unlikely. More likely terrorist activity in Cambria County includes bomb threats or other incidents at schools. Cambria County has thirteen school districts consisting of thirty-seven public schools. Several private schools and colleges/universities are also located in Cambria County. These locations are considered soft targets and may be vulnerable, especially to domestic incidents.

4.3.23.5 Vulnerability Assessment

Cambria County should stay prepared for terroristic events. 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 experiences. It is important to note that the use of 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 person(s) must be quarantined, livestock culled, and/or crops destroyed.

Although previous events have not resulted in what are considered to be 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.

Acronis, a global technology company that develops on-premises and cloud software for backup, disaster recovery, and secure file sync and share and data access, issues an annual threat scape report on cybercrime. Entitled *The Acronis Cyberthreats Report*, it 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 activities as criminals pivot their attacks from data encryption to data exfiltration and "will be the year of extortion."

The major points illustrated in the report are as follows:

- Attacks against remote workers will increase due to the movement of workers to less secure working areas.
- Ransomware will look for new victims and will become more automated.
- Legacy IT and technical solutions will struggle to keep pace with ransomware and cybercrime attacks.

According to a study carried out on the data sourced from the Federal Bureau of Investigation, Pennsylvania is ranked second worst among states when it comes to handling cyber-attacks. The study made by Information Network Associates – an international security consulting company – says an increase of 25% was witnessed in cyber-attacks between 2016 and 2017. This illustrates the amount of preparation that must occur in the commonwealth so that it can better respond to potential cybercrime attacks.

The probability of terrorist activity is more difficult to quantify than some other hazards. Instead of considering the likelihood of occurrence, vulnerability is assessed in terms of specific assets. By identifying potentially at-risk terrorist targets in communities, planning efforts can be put in place to reduce the risk of attack. Planning should work towards identifying potentially at-risk critical infrastructure and functional needs facilities in the community, prioritizing those assets and locations, and identifying their vulnerabilities relative to known potential threats.

All communities in Cambria 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.

4.3.24. Transportation Accidents

4.3.24.1 Location and Extent

Transportation accidents are defined as accidents involving highway, air, and rail travel. These incidents are collectively the costliest of all hazards in the Commonwealth in terms of lives lost, injuries, and economic losses. The sheer amount of roadway, coupled with the high volume of traffic, creates the potential for serious accidents along the roads and bridges. In Cambria County there are 332 state-maintained and eighty-seven locally maintained bridges, according to PennDOT. Major transportation routes in Cambria County include US Route 219, US Route 22, US Route 422, State Route 56 (Johnstown Expressway) State Route 271, and State Route 403. Other state routes are also present in the county including State Route 36, State Route 53, State Route 160, State Route 271, and State Route 756. *Figure 59 – Major Transportation Routes* shows the major transportation systems in Cambria County.

Cambria County has two public airports; John Murtha Johnstown – Cambria County Airport is a commercial service airport and is located at 479 Airport Road, Johnstown, and Ebensburg Airport is a general aviation airport located at 3920 Admiral Peary Highway, Ebensburg. There exists a potential extent for air transportation accidents to occur due to the amount of commercial air traffic that flies over the county every day. However, a five-mile radius around each airport can be considered a high-risk area since most aviation incidents occur near take-off and landing sites. *Figure 60 – Airports and Vulnerability Zones*.

There are several freight and passenger rail lines in Cambria County. The railroad companies that operate within Cambria County, include Amtrak for passengers, and R.J. Corman Railroad/Pennsylvania Lines (RJCP), Norfolk Southern Corporation (NS), and CSX Corporation (CSXT) for freight. With the ability of these railroads for interchanging with other companies, goods can be transported virtually anywhere via rail from Cambria County. Rail transportation accidents are generally classified as one of these three types:

- Derailment – an accident on a railway in which a train leaves the rails
- Collision – an accident in which a train strikes something such as another train or highway motor vehicle
- Other – accidents caused by other circumstances like obstructions on rails, fire, or explosion

Rail transportation is divided into two major categories: freight and passenger. Each category can be subdivided according to carrier type: major carrier and local/regional carriers. Rail accidents can occur anywhere along the miles of rail located in Cambria County.

There are 1,214 oil and gas wells located in Cambria County. Pipeline infrastructure is seen throughout the county. There are six major pipeline companies that transport hazardous materials in and through Cambria County. Of these six major pipelines, two are for natural gas only, one is for natural gas and propane, one is for ethane and propane, one is for diesel fuel, fuel oil, gasoline, jet fuel, kerosene, and propane, and the last one is for butane, ethane, fuel oil, aviation fuel, turbine engine, gasoline, light cycle oil, propane, diesel, and kerosene. *Figure 62 – Utility Pipelines Vulnerability* shows the various pipelines that run through Cambria County.

4.3.24.2 Range of Magnitude

Significant passenger vehicle, air, and rail transportation accidents can result in a wide range of outcomes from damage solely to property to serious injury or even death. The majority of motor vehicle crashes in Pennsylvania are non-fatal, but PennDOT estimates that every hour nine people are injured in a car crash, and every seven hours someone dies as a result of a car crash. Most fatal crashes occur in May and June, but the highest number of crashes overall occur in October, November, and December. Inclement weather and higher traffic volumes and speeds increase the risk for automobile accidents.

Railway and roadway accidents have the potential to result in hazardous materials release. Railroad accidents occur with less frequency than highway accidents. However, when these types of incidents occur, they often cause extensive property damage and have the potential to cause serious injuries or deaths. Aviation incidents most often occur near landing or take-off sites; a five-mile radius around each airport in Cambria County is to be a considered high-risk area.

The worst-case scenario for a transportation accident impacting the county would be a road or rail accident which results in a hazardous material spill in Johnstown City, which is a densely populated area. Such an event would constitute an immediate health hazard to the population and require evacuation.

4.3.24.3 Past Occurrence

Table 62 – PennDOT Crash Report for Cambria County shows crash statistics recorded by the Pennsylvania Department of Transportation between 2010 and 2020. Reports for 2021 were not available at the time of this report. The year 2010 had the most total crashes in Cambria County while 2020 had the least total cashes. The number of total crashes has declined over the span of ten years between 2010 and 2020 in the county. The most train with vehicle crashes occurred in 2011 with a total of two crashes happening in the county.

The majority of municipalities noted, on the municipality hazard identification worksheet they received, that there has not been a change in the frequency of transportation accidents since the last hazard mitigation plan was written; however, Adams Township noted the vehicular traffic through the township had increased, causing a greater number of accidents.

Table 62 - PennDOT Crash Report for Cambria County

PennDOT Crash Report for Cambria County								
Year	Vehicle accidents for Cambria County				Vehicle Accident Deaths for Cambria County			Train/Trolley with Motor Vehicle Crashes/ Fatalities
	Total	Fatal Accidents	Injury Crashes	Property Damage Only	Total Vehicle Accident Fatalities	Alcohol-Related Fatalities	Pedestrian Fatalities	
2010	1,388	13	644	731	14	5	1	0
2011	1,352	17	647	688	18	5	2	0
2012	1,212	15	552	645	17	8	1	0
2013	1,293	11	572	710	11	5	0	0
2014	1,218	13	527	678	13	6	0	0
2015	1,197	8	484	705	9	2	3	0
2016	1,227	11	498	718	12	2	1	0
2017	1,218	12	487	719	12	5	1	2/0
2018	1,205	9	488	708	9	2	0	0
2019	1,188	12	497	679	12	2	1	0
2020	957	7	386	564	7	3	0	1/0

4.3.24.4 Future Occurrence

Cambria County's population has decreased over the last decade, so it can be assumed that local traffic has decreased slightly as well. However, with the increasing volume of goods being moved by truck through the county, transportation accidents will continue to occur routinely. Hazardous material release through transportation accidents is difficult to predict but can be assumed to happen in future events as well. The U.S. Census Bureau reports the mean travel time to work for those aged 16 plus is approximately twenty-four minutes. Automobile accidents occur frequently, and typically occur more frequently than a rail or aviation accident. In the case of highway accidents, PennDOT has taken great strides to reduce the number of highway transportation accidents through programs such as the Pennsylvania Highway Safety Corridor. In this program, PennDOT designates sections of highway where traffic citation fines are doubled in the hopes that higher fines will deter unsafe driving and reduce accidents. Transportation accidents are impossible to predict accurately; however, areas prone to these hazards can be located, quantified through analysis of historical records, and plotted on countywide and municipal base maps.

4.3.24.5 Vulnerability Assessment

A transportation accident can occur anywhere in Cambria County. However, severe accidents are more likely to occur on the county's major highways due to the heavier traffic volumes which make highways extremely vulnerable. The vulnerability for accidents on either highway, railway, or aviation, are directly related to the population and traffic density within the county. The vulnerability increases if there are hazardous materials involved. Hazards associated with causing transportation accidents can be natural hazards that affect the environment such as winter storms or heavy rains causing slippery roadways or mud slides; to windstorms or tornadoes that cause high-profile vehicles or train cars to be toppled over. Loss of roadway use, and public transportation services would affect commuters, employment, delivery of critical municipal and emergency services, and day-to-day operations within the county.

With highway accidents, there is an added vulnerability that stems from the age and upkeep of bridges throughout the county. Unrepaired, deficient bridges may be more likely to break, thus leading to highway transportation damages or deaths. Nine percent of Cambria County bridges are in poor condition, indicating an increased vulnerability to transportation accidents, while 50% remain in fair condition.

Studying traffic and potential transportation accident patterns could provide information on vulnerability of specific road segments and nearby populations. Increased understanding of the types of hazardous materials transported through the county will also support mitigation efforts. Maintaining a record of these frequently transported materials can facilitate development of preparatory measures for response to a release. *Figure 61 – Average Daily Traffic on Major Highway Vulnerability* identifies all major highways and railroads within Cambria County.

Figure 59 - Major Transportation Routes

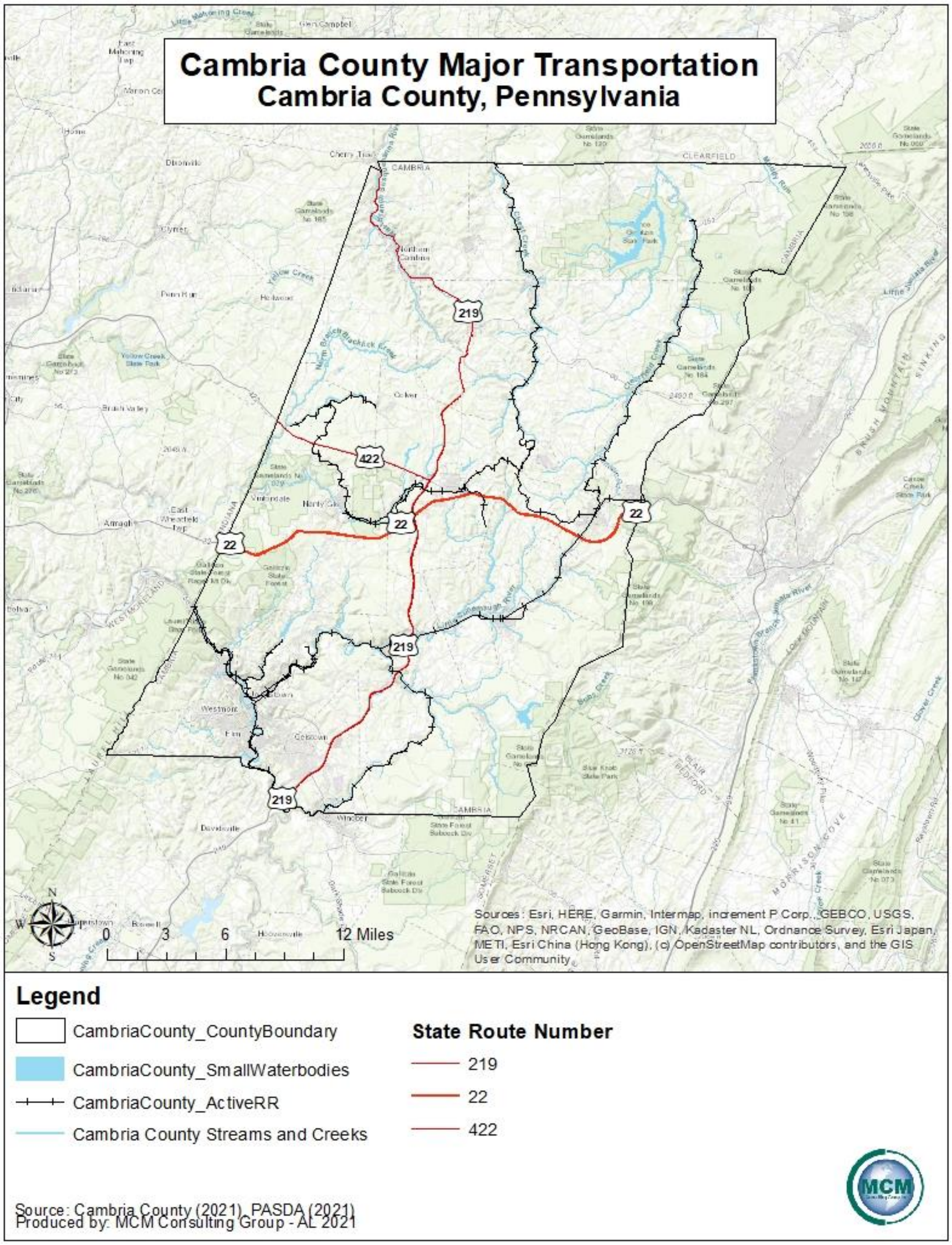


Figure 60 - Airports and Vulnerability Zones

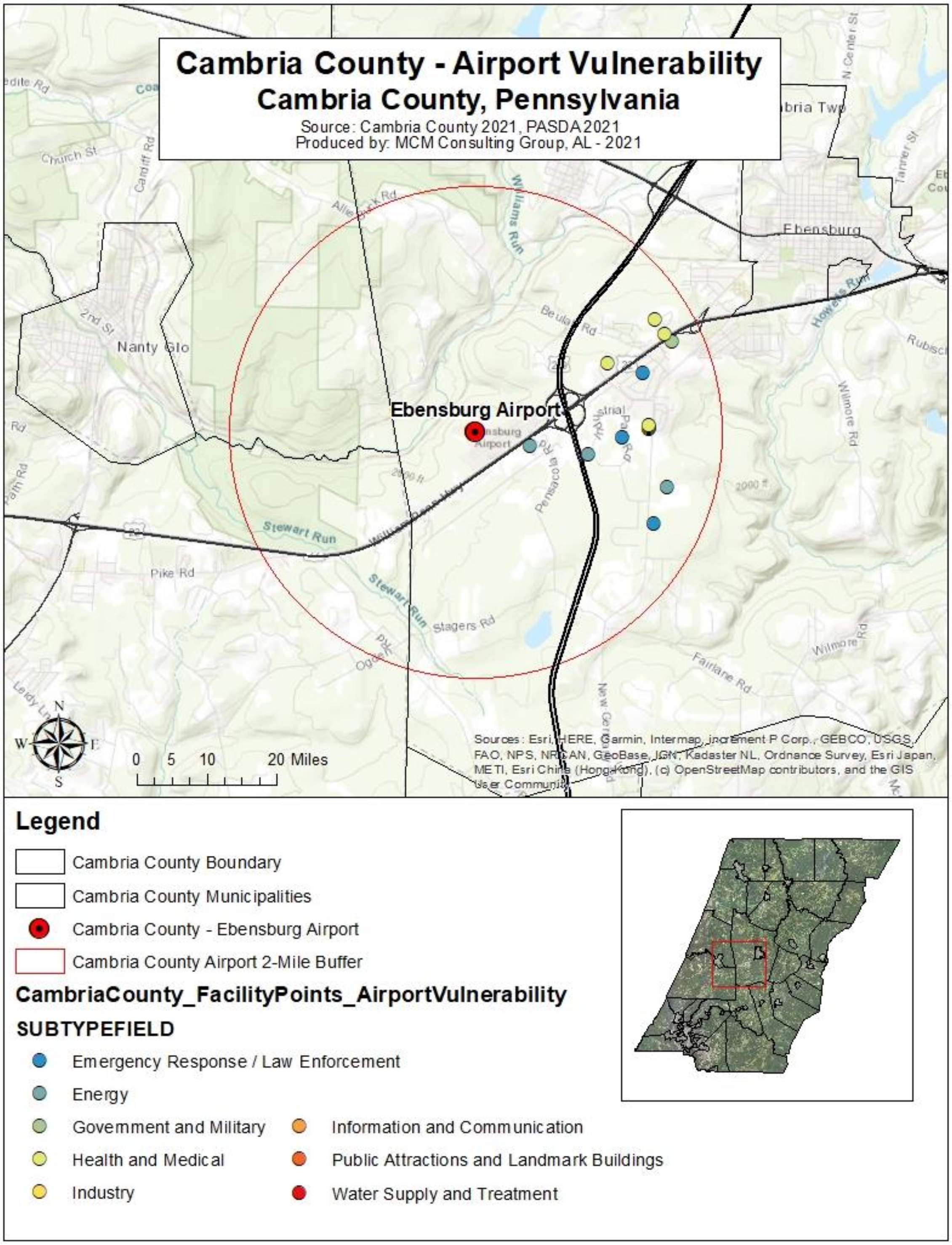


Figure 61 - Average Daily Traffic on Major Highway Vulnerability

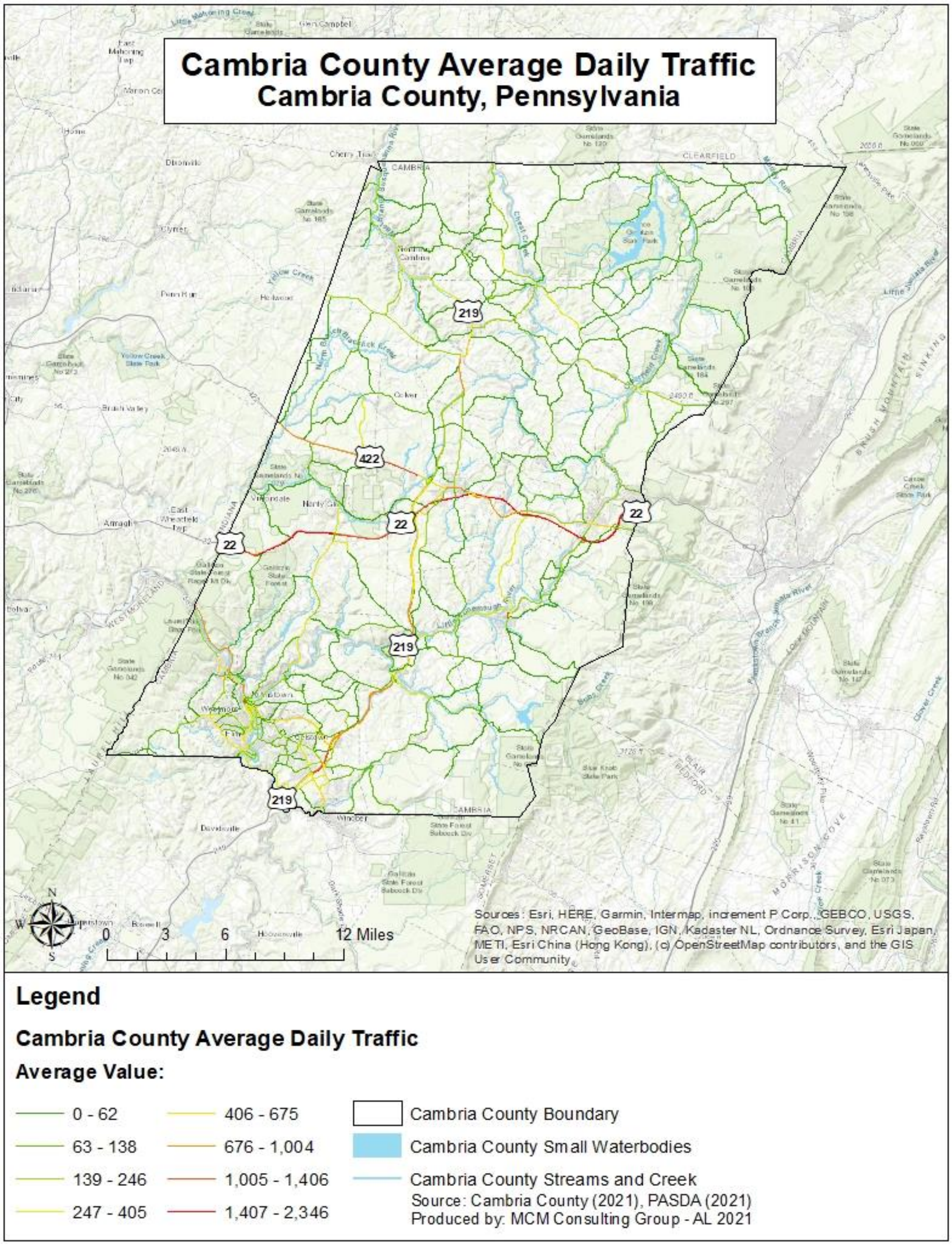
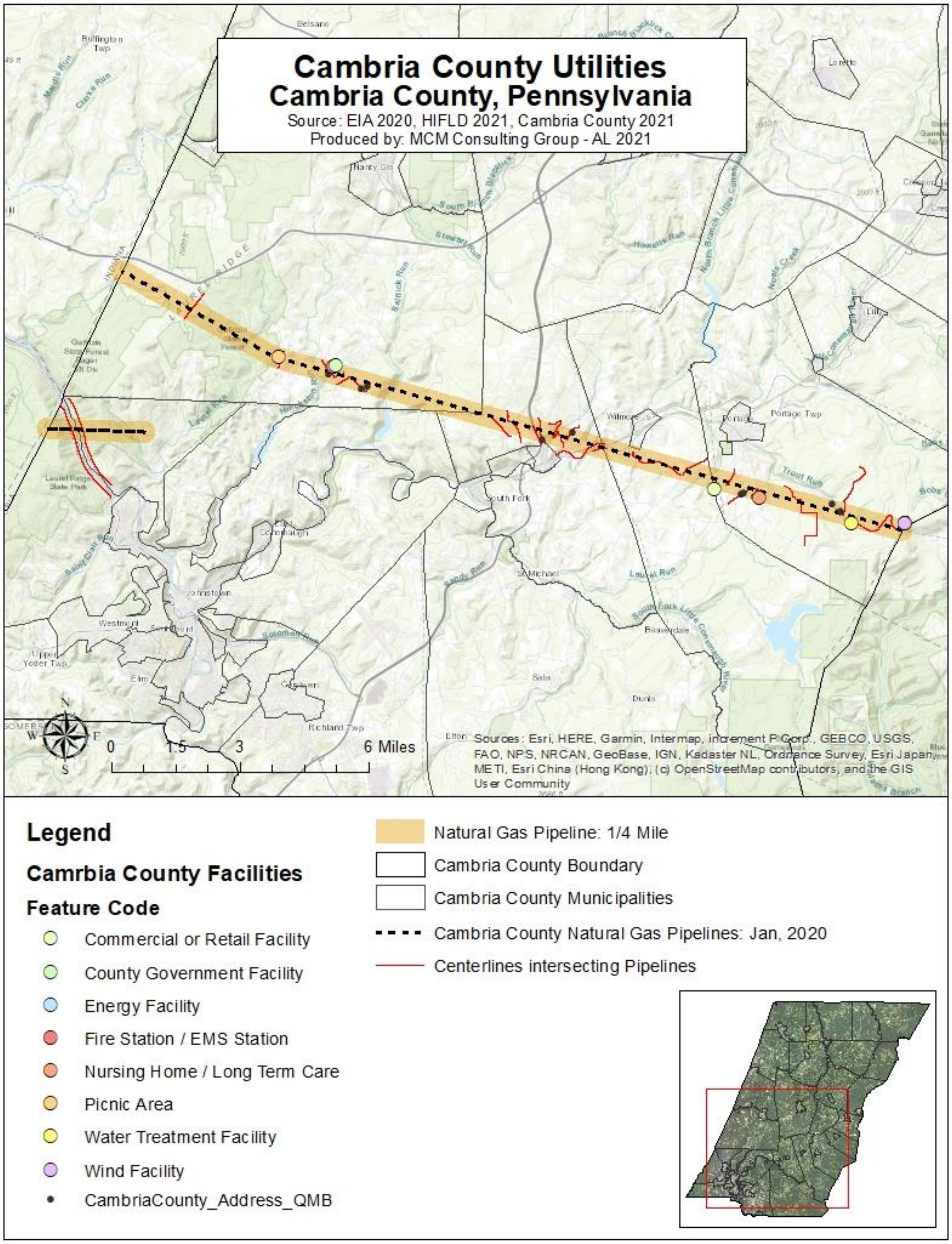


Figure 62 - Utility Pipelines Vulnerability



4.3.25. Urban Fire and Explosions

4.3.25.1 Location and Extent

Urban fire and explosion hazards incorporate vehicle and building/structure fires, as well as overpressure ruptures, overheat explosions, or other explosions that do not ignite. Statewide, this hazard is most problematic in the denser, and more urbanized areas, occurring most often in residential structures (US Fire Administration, 2009). Urban fires can more easily spread from building to building in denser urban areas.

According to the U.S. Census Bureau, 2020 U.S. Census, Cambria County has approximately 64,395 housing units. Buildings that were constructed fifty or more years ago are at a higher risk of urban fires since there have been improvements in fire safety engineering practices since that time. Nearly 40% of all structures in Cambria County were built before 1959, with a majority of the housing units being built before 1979.

Fires can start from numerous causes, such as human error or electrical malfunctions. Most fires are small and have little impact on the greater community other than possibly increasing insurance rates. Oftentimes large urban fires are the result of other hazards such as storms, droughts, transportation accidents, hazardous material spills, arson, or terrorism. Natural gas exploration and extraction sites can be associated with fires and explosion events. Well flares regularly burn off excess gas, and if improperly managed, such activities can be dangerous for the surrounding areas.

4.3.25.2 Range of Magnitude

Urban fires can occur in any populated area, and fires affecting one structure happen quite often. Urban fires are most threatening when the fire can rapidly spread from one structure to another. Cambria County is largely rural/semi-rural and does not have significant expanses of dense population.

Damages from fire and explosions range from minor smoke inhalation and/or water damage to the destruction of buildings. A worst-case scenario for any fire and or explosion would be in injuries and/or death of the occupants of the structures and the potential of injury or death of firefighters.

There are economic consequences related to a fire and explosion hazard, including:

- Loss in wages due to temporarily or permanently closed businesses
- Destruction and damage to business and personal assets

- Loss of tax base
- Recovery costs
- Loss related to the ability of public, private, and non-profit entities to provide post-incident relief

The secondary effects of urban fire and explosion events relate to the ability of public, private, and non-profit entities to provide post-incident relief. Human services agencies (community support programs, health and medical services, public assistance programs and social services) can be affected by urban fire and explosion events. Effects include causing physical damage to facilities and equipment, disruption of emergency communications, loss of health and medical facilities and supplies, and an overwhelming load of victims who are suffering from the effects of the urban fire, including loss of their home or place of business.

4.3.25.3 Past Occurrence

From 1910 to 1990, the Commonwealth of Pennsylvania experienced thirteen major fires in suburban and urban settings, and ten of those fires occurred after 1980. Between 1978 and 1982, the average number of deaths per fire was 2.7. After October 1990, the average number of deaths per fire has decreased.

As of December 2021, there were three active natural gas wells in Cambria County (PA DEP, 2018). These locations should be closely monitored, and safety protocols should be strictly adhered to in order to avoid explosions and starting fires. Cambria County utilizes a database system called JUVARE (formerly CORVENA and Knowledge Center™) to track incidents within the county. However, no such data was available to refence for urban fires or explosions during the development of this report, and as such no detailed report of past events can be displayed at this time.

4.3.25.4 Future Occurrence

Small urban fires occur regularly and usually cause little damage. Because of housing density and age of structures, Johnstown and Ebensburg are most at risk for urban fires and explosions. Any new construction must comply with the PA Department of Labor's statewide uniform construction codes. One requirement in the construction codes is automatic sprinklers for buildings other than one- and two-family dwellings. In most cases, this requirement will contain fires to the point of origin.

4.3.25.5 Vulnerability Assessment

Fire and explosion vulnerability greatly depends on the vulnerability of other hazards. Most fires result from the secondary effect of another hazard. The probability of a fire or explosion occurring increases with population and economic growth. The natural gas industry and exploration is active and growing in Cambria County, and with it comes greater risk for fire and explosion. Urban fire risk also increases as the use of wood burning and kerosene space heaters increases. The elderly (those 65 years and older) tend to be more vulnerable to structure fires than other age groups, and often experience the highest number of deaths per fire. Older structures are more vulnerable to urban fire, and fires can spread faster in areas with higher concentrations of housing. Potential secondary effects of urban fires include utility interruption and hazardous material spills.

4.3.26. Utility Interruption

4.3.26.1 Location and Extent

Utility interruptions can occur from an internal system failure or as a secondary impact of another hazard, such as windstorm or a traffic accident. Examples of other hazards that could cause utility interruptions include but are not limited to severe thunderstorms, winter storms, and ice storms. Strong adverse weather conditions and storms can cause widespread disruptions in electric and telecommunications service due to power lines being brought down across a region. Strong heat waves may result in rolling blackouts where power may not be available for an extended period. Space weather, specifically solar flares, can also pose a threat to utility service across the globe. Although uncommon, the northeastern seaboard and the north central regions of the United States are particularly susceptible to this hazard.

The age of utility infrastructure also plays a role in interruptions, causing longer periods of outages in a larger area. Natural gas, water, telecommunications, and electric capabilities can all experience disruptions. Worker strikes at power generation facilities have also been known to cause minor and temporary power outages and failures. Other causes for minor power outages include but are not limited to falling tree limbs, vehicle accidents, and wire destruction due to animals or wildlife. Outages can also be caused by blown transformers or tripped circuit breakers in the electric system. Major power outages typically occur on a regional scale and can last both short term and long term.

The list of utility providers in Cambria County is shown in *Table 63 – Cambria County Utility Providers*.

Table 63 - Cambria County Utility Providers

Cambria County Utility Providers (*PA Public Utility Commission*)	
Utility Type	**Name of Utility Provider**
Electricity	Penelec (First Energy) REA Energy Cooperative
Telephone/9-1-1/Wireless	Windstream Pennsylvania Verizon Verizon North LLC Blue Jay Wireless Budget Prepay Cricket Wireless StandUP Wireless Qlink Wireless TAG Mobile T-Mobile d/b/a InReach

Cambria County Utility Providers (*PA Public Utility Commission*)	
Utility Type	**Name of Utility Provider**
	Tracfone d/b/a Safelink Virgin Mobile d/b/a Assurance Wireless YourTel Wireless
Natural Gas	Peoples Natural Gas
Water Water	Adams Township Water Authority Barr Area Municipal Authority Blacklick Valley Municipal Authority Cambria Township Water Authority Carrolltown Boroughugh Municipal Authority Cresson Boroughugh Water System Cresson Township Municipal Authority Croyle Township Water Authority Dean Township Water System East Taylor Municipal Authority Ebensburg Boroughugh Municipal Authority Elder Township Water Authority Federal Correctional Institute – Loretto Gallitzin Boroughugh Water Authority Glendale Valley Municipal Authority Greater Johnstown Water Authority – Riverside Greater Johnstown Water Authority – Saltlick Hastings Municipal Authority Highland Sewer and Water Authority – Beaverdam Highland Sewer and Water Authority – Lloydell Highland Sewer and Water Authority – Northern End Jackson Township Water Authority Lilly Municipal Water Works Marsteller Community Water Authority Nanty Glo Water Authority Northern Cambria Municipal Water Authority Patton Boroughugh Water Department Portage Boroughugh Municipal Authority Reade Township Municipal Authority Sankertown Boroughugh Water System Southwestern Cambria County Authority Teakettle Run Water Authority Tri Township Water Authority Watkins Area Water Authority West Carroll Township Water Authority West Carroll Water Authority – Bakertown

4.3.26.2 Range of Magnitude

Utility interruptions do not typically lead to large-scale problems by themselves. Typically, human casualties are not a direct result from outages. Many utility interruptions occur during storms or other severe weather events, and they can have secondary consequences. Typical secondary effects from a power outage could be a delay in emergency response services from poor communications or a lack of potable drinking water.

Electricity:

Interruptions or power failures could have the following impacts:

- Public safety concerns
- Food spoilage
- Loss of heating or air conditioning
- Basement flooding due to sump pump failure
- Loss of indoor lighting
- Loss of internet service
- Flashing traffic signals
- Stopped and stalled elevators
- Interrupted retail sales

Of all the above listed impacts, the loss of heating or air conditioning poses the greatest risk to the elderly and very young populations during times of extreme temperature. Prolonged power outages also pose a risk to residents that rely on home-based medical equipment such as home-supply oxygen units. Some of the issues that are listed above can be considered more of a nuisance than a hazard, such as food spoilage due to long-term electrical outages. However, significant damage or harm can occur depending on the population affected, the duration, and the severity of the outage.

A worst-case scenario for the utility interruptions would be a county-wide power outage during winter months, forcing the evacuation of vulnerable populations to facilities outside of the county or to warming shelters within the county.

Fuel:

Interruptions of the transportation of gas and other products used for fuel can lead to a loss of heating and manufacturing capabilities. This can adversely affect the economic stability of a region and the production of needed products for consumption.

Telecommunications:

Interruptions to telecommunications systems include impacts to the 9-1-1 capabilities of a region, telephone, and internet service. The greatest risk in losing this utility to interruption is the risk of an emergency not being able to be reported to a public safety answering point (PSAP). Extensive loss of telephone and internet service can be detrimental to government, businesses, and to residents. With much of the country now dependent on wireless networks, signal interruptions can cause a large issue for people who are utilizing wireless telecommunications for work. There are also many concerns regarding safety and internet security due to an increase in people working over wireless networks during the COVID-19 pandemic. These interruptions and issues can be detrimental for the Cambria County workforce.

4.3.26.3 Past Occurrence

Minor utility interruptions occur annually in Cambria County and occur most often in conjunction with winter weather and/or windstorms. Cambria County utilizes a database system called *JUVARE* (formerly *CORVENA* and *Knowledge Center*[TM]) to track incidents within the county. However, no such data was available for refence, from 2015 through 2021, during the development of this report. *Table 64 – Utility Interruptions in Cambria County* illustrates the number of interruptions to electric, natural gas, telecommunications, and water services from entries into the database between 2011 and 2015.

Table 64 - Utility Interruptions in Cambria County

Utility Interruptions in Cambria County (*JUVARE*)		
Date	**Event Type**	**Municipality**
01/24/2011	Power Outage	Stonycreek Township, City of Johnstown
02/18/2011	Power Outage	Summerhill Township
03/01/2011	Power Outage	Ebensburg Borough
03/12/2011	Power Outage	Dale Borough
03/23/2011	Power Outage	Summerhill Township
03/30/2011	Power Outage	City of Johnstown
05/07/2011	Power Outage	Adams Township
09/03/2011	Power Outage	City of Johnstown, Dale Borough, Stonycreek Township, Geistown Borough
12/23/2011	Power Outage	Conemaugh Township
01/03/2012	Power Outage	Northern Cambria Borough, Carrolltown Borough, Loretto Borough, Barr Township, Allegheny Township, East Carroll Township, Cambria Township
01/14/2012	Power Outage	East Taylor Township
01/15/2012	Power Outage	Reade Township
04/23/2012	Power Outage	Countywide

Utility Interruptions in Cambria County (*JUVARE*)		
Date	**Event Type**	**Municipality**
05/27/2012	Power Outage	Countywide
07/04/2013	Power Outage	Ferndale Borough
07/18/2012	Power Outage	Conemaugh Township, East ConemaughBorough, East Taylor Township, Franklin Borough, Jackson Township, Middle Taylor Township, Upper Yoder Township
07/20/2012	Power Outage	Richland Township, Geistown Borough
07/26/2012	Power Outage	Countywide
09/03/2012	Power Outage	Cambria Township, Ebensburg Borough
10/28/2012	Power Outage	Countywide
01/30/2013	Power Outage	Hastings Borough, Elder Township
04/24/2013	Power Outage	City of Johnstown
06/26/2013	Power Outage	Countywide
06/28/2013	Power Outage	City of Johnstown
10/30/2013	Power Outage	City of Johnstown
11/26/2013	Power Outage	Countywide
11/27/2013	Power Outage	Cresson Borough
01/04/2014	Power Outage	Northern Cambria County
01/07/2014	Power Outage	East Taylor Township, Portage Township, Cambria Township
01/27/2014	Power Outage	Cambria Township
06/06/2014	Power Outage	City of Johnstown
06/12/2014	Power Outage	Countywide
07/27/2014	Power Outage	Ferndale Borough
09/23/2014	Power Outage	City of Johnstown
10/01/2014	Power Outage	City of Johnstown
12/13/2014	Power Outage	Barr Township, Northern Cambria Borough
01/09/2015	Power Outage	Elder Township
01/15/2015	Power Outage	Cambria Township
02/02/2015	Power Outage	Croyle Township
02/24/2015	Power Outage	Ferndale Borough, Upper Yoder Township
04/22/2015	Power Outage	Upper Yoder Township
08/04/2015	Power Outage	City of Johnstown
09/17/2015	Power Outage	Stonycreek Township
10/30/2015	Power Outage	City of Johnstown, Dale Borough
12/21/2015	Power Outage	Northern Cambria Borough
12/27/2015	Power Outage	Portage Borough
12/29/2015	Power Outage	Tunnelhill Borough, Washington Township, Cresson Township, Vintondale Borough

The planning team identified some specific incidents and issues:

- East Conemaugh Borough: Upgrades to the municipal-owned electrical infrastructure have been completed, but the borough needs assistance with catastrophic event planning and backup; *First Energy* link upkeeps are needed.
- Geistown Borough: Both storm and non-storm related outages are increasing.
- Nanty Glo Borough: Utilities, especially the electrical system, are aging; in the past few years, there have been sporadic power outages in the area, the longest lasting for approximately 24 hours; potable water is a concern due to the primary water supply for Nanty Glo Borough having a turbidity issue (which decreases water production) – the turbidity issue is amplified by an increase in runoff events; sanitary sewer service experiences infiltration and inflow of stormwater during runoff events due to an old system with bad pipes and joints.
- Scalp Level Borough: Public works failures are a concern.
- Summerhill Township: Transformers continue to malfunction by Smith's Corner (in Wilmore by Gary's) and on Route 53; most recent incident was the September 1, 2021, flooding event.
- Vintondale Borough: Utilities, especially the electrical system, are aging; in the past few years, there have been sporadic power outages in the area, the longest lasting for approximately 24 hours.
- West Taylor Township: Utilities, especially the electrical system, are aging; in the past few years, there have been sporadic power outages in the area, the longest lasting for approximately 24 hours.

The Pennsylvania Public Utility Commission tracks the reliability of electric distribution companies (EDC) and outages. *Table 65 – 2018 Winter Storms Riley and Quinn Power Outages* by EDC compares the customers affected by power outage in Pennsylvania during these storm events and compares the to statistics from Nika from 2014 and Sandy from 2012. Some of the EDCs were not impacted by Winter Storm Quinn. PP&L customers experienced power outages for a duration of eight days with Winter Storm Quinn and Winter Storm Riley, whereas during Sandy in 2012, the duration was nine days. Nika in 2014 had a duration of just over three days.

Table 65 - 2018 Winter Storms Riley and Quinn Power Outages

2018 Winter Storms Riley and Quinn Power Outages			
Electric Distribution Company	**Customers affected by storms Riley and Quinn 2018**	**Customers affected by Nika 2014**	**Customers affected by Sandy 2012**

	(Percentage of total customers)	(Percentage of total customer)	(Percentage of total customers)
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%)
PP&L	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			

4.3.26.4 Future Occurrence

Utility Interruptions are difficult to predict, and minor interruptions may occur several times a year to all utilities. Even so, utility interruptions occur more frequently as a secondary factor to severe weather events or transportation accidents.

Space weather is getting more attention as an infrastructure risk due in part to a March 2020 report by the United States Geological Survey (USGS). The report noted that geomagnetic storms caused by the dynamic action of the Sun and solar wind on the space environment surrounding the Earth can generate electric fields in the Earth's crust and mantle. These electric fields can interfere with the operation of grounded electric power-grid systems. Geomagnetic storms occur only occasionally, but when sufficiently energetic they can produce blackouts on a large scale.

As utility infrastructure ages, interruption events could occur more frequently if the maintenance of the infrastructure is not maintained. Utility providers can reduce Cambria County's vulnerability to power outages by implementing improvement plans for utility infrastructure. Total replacement is not a feasible solution to the issue, but compromises can be reached to ensure that the new and old equipment along a utility line can work together efficiently.

4.3.26.5 Vulnerability Assessment

Resources such as electricity, communications, gas, and water supply are critical to ensure the health, safety, and general welfare of the citizenry. *Figure 63 – Cambria County Utilities* illustrates the approximate locations of service lines and pipelines throughout Cambria County.

Power outages can cause even greater detriment to at-risk and vulnerable populations, such as elderly (e.g., supplemental oxygen power needs) or those with functional and access needs to consider. All critical infrastructure is vulnerable to the effects of a power surge. The probability of a large-scale, extended utility failure is low; however, small-scale failures lasting short periods of time occur annually.

Long-term care facilities, senior centers, hospitals, and emergency medical facilities are all vulnerable to utility interruptions. Often back-up power generators are used at these facilities to offset electrical needs during extreme hot or cold temperature events. However, these back-up power generators must be maintained, and fuel supplies must be secured in advance of the utility interruption to ensure a seamless transition from the everyday, grid power source to the emergency generator. When officials consider maintenance and supplies for a facility, long-term use of back-up generators should be planned.

Electricity:

Severe weather is one of the largest causes of power loss. The electric power grid infrastructure can be damaged by snow, ice, high winds, lightning, flooding, falling tree limbs, and vehicle accidents involving utility poles. Small animals can also cause minor power outages by climbing along the lines and shorting out the system.

Causes of a regional scale power outage or failure could be from infrastructure failure, sabotage, human error, or worker strikes. Critical infrastructure is vulnerable to utility interruptions, especially the loss of power. The establishment of reliable backup power at these facilities is extremely important to provide continued support of the health, safety, and well-being of Cambria County residents and visitors.

Water:

Water distribution can be affected in three ways.

- The amount of water available (depends on nature)
- The quality of the water (depends on human responsibility)
- The viability of the physical components of the distribution system

Well contamination or water shortages due to drought could pose a high vulnerability to local water distribution.

Water contamination can occur naturally, by human error, or intentionally. Releases of manure and milk into the water supply can cause contamination. Overflows from sewage systems and lagoons on farms can also cause contamination of groundwater and drinking water. There are times when accidental spills and releases of hazardous materials contaminate water supplies, thereby, water supplies along transportation routes may be affected.

Gas and Liquid Pipelines:

Interruptions to natural gas distribution lines could be affected by:

- Deterioration of line and facilities
- Puncturing the distribution lines by humans (either intentional or accidental)

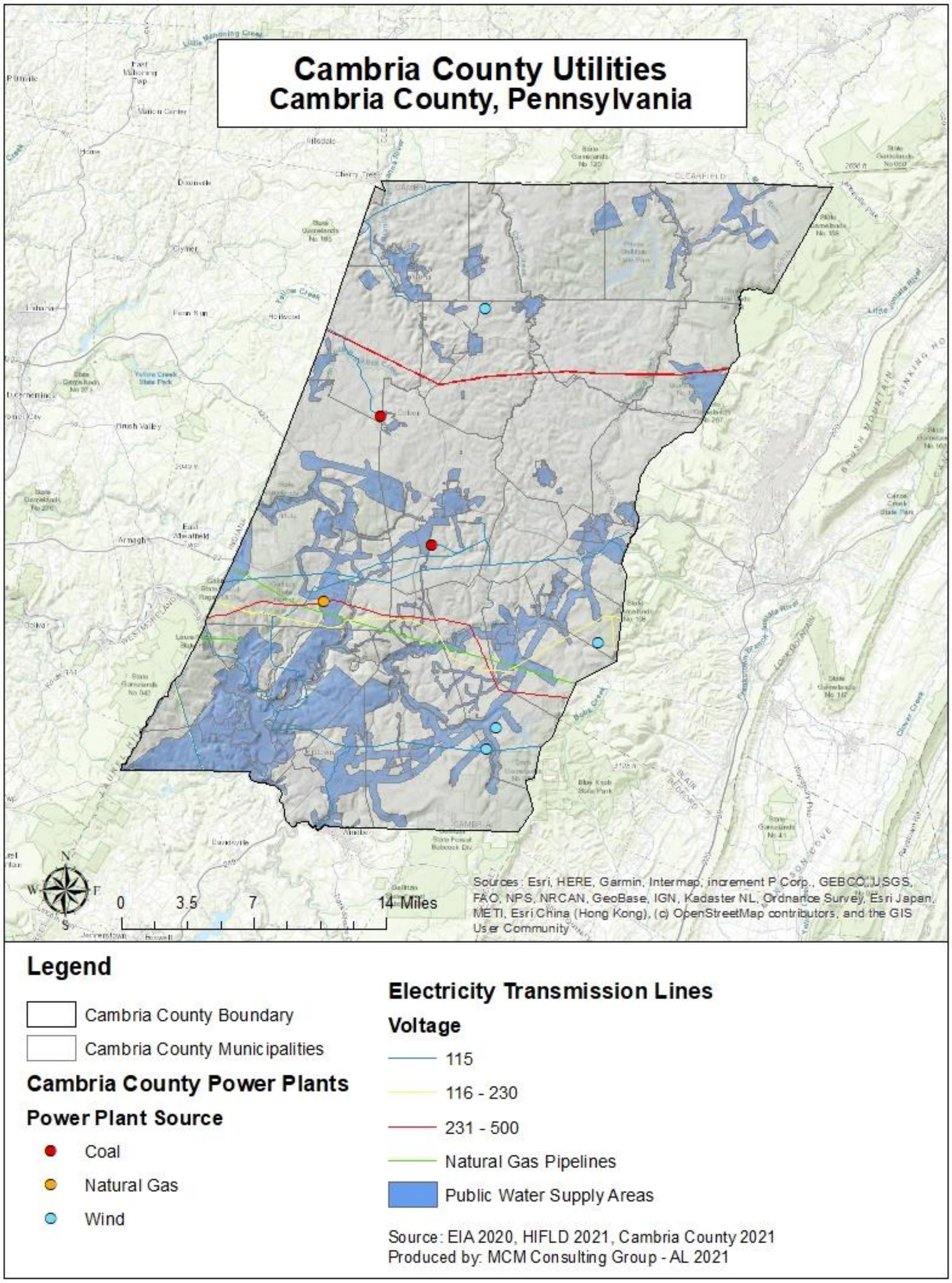
- Coastal or winter storms
- Extreme heat or cold events
- Transportation accidents

Communications:

Interruptions in communications could be caused as a secondary effect of storms or high winds, infrastructure failure, or by humans (intentional or accidental). A loss of communications by emergency services would be devastating to the population of Cambria County if 9-1-1 calls could not be received, or if emergency units could not be dispatched properly and/or timely.

No data regarding economic impacts from utility interruptions in Cambria County are available. However, utility interruptions can cause economic impacts stemming from lost income, spoiled food and other goods, costs to the owners or operators of the utility facilities, and costs to government and community service groups.

Figure 63 - Cambria County Utilities



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 66 – 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:

Table 66 - Risk Factor Approach Summary

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

Table 67 – 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.

Table 67 - 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	
PROBABILITY *What is the likelihood of a hazard event occurring in a given year?*	**UNLIKELY**	LESS THAN 1% ANNUAL PROBABILITY		1	30%
	POSSIBLE	BETWEEN 1 & 10% ANNUAL PROBABILITY		2	
	LIKELY	BETWEEN 10 &100% ANNUAL PROBABILITY		3	
	HIGHLY LIKELY	100% ANNUAL PROBABILTY		4	
IMPACT *In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?*	**MINOR**	VERY FEW INJURIES, IF ANY. ONLY MINOR PROPERTY DAMAGE & MINIMAL DISRUPTION ON QUALITY OF LIFE. TEMPORARY SHUTDOWN OF CRITICAL FACILITIES.		1	30%
	LIMITED	MINOR INJURIES ONLY. MORE THAN 10% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR MORE THAN ONE DAY.		2	
	CRITICAL	MULTIPLE DEATHS/INJURIES POSSIBLE. MORE THAN 25% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR MORE THAN ONE WEEK.		3	
	CATASTROPHIC	HIGH NUMBER OF DEATHS/INJURIES POSSIBLE. MORE THAN 50% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR 30 DAYS OR MORE.		4	
SPATIAL EXTENT *How large of an area could be impacted by a hazard event? Are impacts localized or regional?*	**NEGLIGIBLE**	LESS THAN 1% OF AREA AFFECTED		1	20%
	SMALL	BETWEEN 1 & 10% OF AREA AFFECTED		2	
	MODERATE	BETWEEN 10 & 50% OF AREA AFFECTED		3	
	LARGE	BETWEEN 50 & 100% OF AREA AFFECTED		4	
WARNING TIME *Is there usually some lead time associated with the hazard event? Have warning measures been implemented?*	**MORE THAN 24 HRS**	SELF-DEFINED	*(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	
DURATION *How long does the hazard event usually last?*	**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	

4.4.2. Ranking Results

Using the methodology described in Section 4.4.1, *Table 68 – Risk Factor Assessment* lists the risk factor calculated for each of thirty-three 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 68 - Risk Factor Assessment

Cambria County Hazard Ranking Based on RF Methodology.							
HAZARD RISK	HAZARD NATURAL(N) OR HUMAN-CAUSED (H)	RISK ASSESSMENT CATEGORY					RISK FACTOR (RF)
		PROBABILITY	ECONOMIC IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	
HIGH	Extreme Temperatures	4	3	4	1	3	**3.3**
	Opioid Epidemic	4	3	3	2	4	**3.3**
	Invasive Species (New)	4	2	4	1	4	**3.1**
	Pandemic/Health Emergency	3	3	4	1	4	**3.1**
	Utility Interruptions	4	2	3	4	2	**3**
	Winter storm (New)	4	2	3	2	3	**2.9**
	Blighted Properties (New)	4	2	3	2	3	**2.9**
	Flash Flooding	4	2	2	4	3	**2.9**
	Flooding (100 year flood)	1	4	4	1	4	**2.8**
	Urban Fire and Explosions	3	2	3	4	2	**2.7**
	Emergency Services (New)	3	2	3	2	3	**2.6**
	Hurricane/Tropical Storm (New)	3	2	3	2	2	**2.5**
	Wind storm	3	2	3	2	2	**2.5**
	Wildfire	3	2	2	3	3	**2.5**
	Cyber Attack (New)	3	2	2	3	3	**2.5**
MODERATE	Landslide	2	3	1	4	3	**2.4**
	Subsidence/Sinkhole	3	2	2	2	3	**2.4**
	Transportation Accidents	3	2	2	3	2	**2.4**
	Dam Failure	1	3	3	3	3	**2.4**
	Drought	2	2	3	1	4	**2.3**

Cambria County Hazard Ranking Based on RF Methodology.							
HAZARD RISK	HAZARD NATURAL(N) OR HUMAN-CAUSED (H)	RISK ASSESSMENT CATEGORY					RISK FACTOR (RF)
		PROBABILITY	ECONOMIC IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	
	Lightning Strike	3	2	2	3	1	**2.3**
	Building/Structure Collapse	3	2	2	2	2	**2.3**
	Drowning	2	2	2	4	2	**2.2**
	Environmental Hazards - Transportation HazMat	2	2	2	4	2	**2.2**
	Environmental Hazards - Fixed Facility HazMat	2	2	2	4	2	**2.2**
	Tornado	2	2	2	3	2	**2.1**
	Terrorism Attack	2	2	2	3	2	**2.1**
LOW	Levee Failure	1	2	2	3	2	**1.8**
	Civil Disturbance (New)	2	1	2	3	1	**1.7**
	Hailstorm	2	1	1	4	1	**1.6**
	Radon	2	1	1	2	3	**1.6**
	Disorientation	2	1	1	3	2	**1.6**
	Ice Jam Flooding	1	1	1	4	3	**1.5**

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

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 69 – Countywide Risk Factor Assessment* shows the different municipalities in Cambria 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 4.3.19.

Table 69 - Countywide Risk Factor

Calculated Countywide Risk Factor by Hazard and Comparative Jurisdictional Risk									
IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR									
JURISDICTION	Extreme Temperatures	Opioid Epidemic	Invasive Species (New)	Pandemic/Health Emergency	Utility Interruptions	Winter Storm (New)	Blighted Properties (New)	Flash Flooding	Flooding (100-year flood)
	3.3	**3.3**	**3.1**	**3.1**	**3**	**2.9**	**2.9**	**2.9**	**2.8**
Adams Township	=								
Allegheny Township	=								
Ashville Borough	=								
Barr Township	<	<	<	=	=	=	=	=	<
Blacklick Township	>	=	=	<	>	=	<	=	>
Brownstown Borough	=								
Cambria Township	=								
Carrolltown Borough	=	=	=	=	>	>	=	>	>
Cassandra Borough	=								
Chest Township	=	<	=	=	=	=	<	<	<
Chest Springs Borough	=	<	=	=	>	>	=	=	=
Clearfield Township	=								
Conemaugh Township	=								
Cresson Borough	=								
Cresson Township	=	>	=	=	=	>	=	=	=
Croyle Township	=	=	<	=	=	=	>	<	<
Daisytown Borough	=								
Dale Borough	<	<	<	<	<	<	>	<	<
Dean Township	>	=	>	=	=	>	>	=	=
East Carroll Township	=								
East Conemaugh Borough	=								
East Taylor Township	=	<	=	>	>	=	=	>	>
Ebensburg Borough	=								
Ehrenfeld Borough	=	=	<	=	=	=	>	<	<

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<tr><td>Munster Township</td><td>></td><td>></td><td>></td><td>></td><td>=</td><td>></td><td>></td><td>></td><td>></td></tr>
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<tr><td>South Fork Borough</td><td>=</td><td>=</td><td><</td><td>=</td><td>=</td><td>=</td><td>></td><td><</td><td><</td></tr>
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JURISDICTION	Extreme Temperatures	Opioid Epidemic	Invasive Species (New)	Pandemic/Health Emergency	Utility Interruptions	Winter Storm (New)	Blighted Properties (New)	Flash Flooding	Flooding (100-year flood)
	3.3	**3.3**	**3.1**	**3.1**	**3**	**2.9**	**2.9**	**2.9**	**2.8**
Southmont Borough	=								
Stonycreek Township	=								
Summerhill Borough	=	=	<	=	=	=	>	<	<
Summerhill Township	=	=	>	<	=	<	<	<	<
Susquehanna Township	=								
Tunnelhill Borough	=								
Upper Yoder Township	=								
Vintondale Borough	=								
Washington Township	=								
West Carroll Township	<	=	<	=	=	>	=	=	=
Westmont Borough	=								
West Taylor Township	=								
White Township	=								
Wilmore Borough	=								

Calculated Countywide Risk Factor by Hazard and Comparative Jurisdictional Risk									
IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR									
JURISDICTION	Urban Fire and Explosions	Emergency Services (New)	Hurricane/Tropical Storm (New)	Wind Storm	Wildfire	Cyber Attack (New)	Landslide	Subsidence/Sinkhole	Transportation Accidents
	2.7	**2.6**	**2.5**	**2.5**	**2.5**	**2.5**	**2.4**	**2.4**	**2.4**
Adams Township	=								
Allegheny Township	=								
Ashville Borough	=								
Barr Township	<	<	<	=	<	<	<	<	=
Blacklick Township	>	=	>	=	=	<	=	=	<
Brownstown Borough	=								
Cambria Township	=								
Carrolltown Borough	=	=	=	=	=	=	=	>	=
Cassandra Borough	=								
Chest Township	<	=	=	=	<	=	<	<	=
Chest Springs Borough	=	=	=	>	=	>	<	=	>
Clearfield Township	=								
Conemaugh Township	=								
Cresson Borough	=								
Cresson Township	=	=	=	>	=	=	=	=	>
Croyle Township	=	=	<	<	<	=	<	=	>
Daisytown Borough	=								
Dale Borough	<	<	<	<	<	<	<	<	<
Dean Township	=	>	>	>	>	<	<	=	=
East Carroll Township	=								
East Conemaugh Borough	=								
East Taylor Township	=	=	<	>	=	=	=	=	=
Ebensburg Borough	=								
Ehrenfeld Borough	=	=	<	<	<	=	<	=	>
Elder Township	=	=	<	>	=	=	=	>	=

Calculated Countywide Risk Factor by Hazard and Comparative Jurisdictional Risk

IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR

JURISDICTION	Urban Fire and Explosions	Emergency Services (New)	Hurricane/Tropical Storm (New)	Wind Storm	Wildfire	Cyber Attack (New)	Landslide	Subsidence/Sinkhole	Transportation Accidents
	2.7	**2.6**	**2.5**	**2.5**	**2.5**	**2.5**	**2.4**	**2.4**	**2.4**
Ferndale Borough	<	=	<	=	<	<	<	<	=
Franklin Borough	=								
Gallitzin Borough	=								
Gallitzin Township	=								
Geistown Borough	=	=	=	=	<	<	<	=	=
Hastings Borough									
Jackson Township	=								
Johnstown City	=								
Lilly Borough	=	>	=	=	>	=	=	<	<
Lorain Borough	=	>	=	=	>	<	=	=	=
Loretto Borough	=								
Lower Yoder Township	=								
Middle Taylor Township	=	=	=	=	>	=	=	=	=
Munster Township	>	=	>	>	>	>	>	>	>
Nanty Glo Borough	=								
Northern Cambria Borough	=								
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Sankertown Borough	=								
Scalp Level Borough	=	>	=	>	=	=	<	=	=
South Fork Borough	=	=	<	<	<	=	<	=	>
Southmont Borough	=								

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</table>

Calculated Countywide Risk Factor by Hazard and Comparative Jurisdictional Risk

IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR

JURISDICTION	Dam Failure	Drought	Lightning Strike	Building/Structure Collapse	Drowning	Environmental Hazards – Transportation HazMat	Environmental Hazards – Fixed Facility HazMat	Tornado	Terrorism Attack
	2.4	**2.3**	**2.3**	**2.3**	**2.2**	**2.2**	**2.2**	**2.1**	**2.1**
Adams Township					=				
Allegheny Township					=				
Ashville Borough					=				
Barr Township	<	=	=	<	<	=	=	=	<
Blacklick Township	>	>	=	<	>	=	=	<	>
Brownstown Borough					=				
Cambria Township					=				
Carrolltown Borough	>	=	=	=	=	=	=	=	=
Cassandra Borough					=				
Chest Township	<	=	=	<	<	=	<	=	<
Chest Springs Borough	<	>	=	<	=	=	<	>	>
Clearfield Township					=				
Conemaugh Township					=				
Cresson Borough					=				
Cresson Township	<	<	=	=	<	>	>	=	=
Croyle Township	=	<	=	=	<	>	<	<	=
Daisytown Borough					=				
Dale Borough	<	<	<	<	<	<	<	<	<
Dean Township	=	=	=	=	=	=	=	=	=
East Carroll Township					=				
East Conemaugh Borough					=				
East Taylor Township	<	=	=	=	>	>	=	<	<
Ebensburg Borough					=				
Ehrenfeld Borough	=	<	=	=	<	>	<	<	=
Elder Township	=	=	=	=	=	=	=	=	=

Calculated Countywide Risk Factor by Hazard and Comparative Jurisdictional Risk									
IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR									
JURISDICTION	Dam Failure	Drought	Lightning Strike	Building/Structure Collapse	Drowning	Environmental Hazards – Transportation HazMat	Environmental Hazards – Fixed Facility HazMat	Tornado	Terrorism Attack
	2.4	**2.3**	**2.3**	**2.3**	**2.2**	**2.2**	**2.2**	**2.1**	**2.1**
Ferndale Borough	<	<	<	<	<	<	<	<	<
Franklin Borough	=								
Gallitzin Borough	=								
Gallitzin Township	=								
Geistown Borough	<	=	=	=	<	=	=	<	<
Hastings Borough	=								
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Johnstown City	=								
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Lorain Borough	<	=	=	>	=	=	=	<	<
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Munster Township	>	>	>	>	>	>	>	>	>
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<tr><td>Reade Township</td><td colspan="6">=</td></tr>
<tr><td>Richland Township</td><td colspan="6">=</td></tr>
<tr><td>Sankertown Borough</td><td colspan="6">=</td></tr>
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<tr><td>South Fork Borough</td><td><</td><td>=</td><td>=</td><td>=</td><td>=</td><td><</td></tr>
<tr><td>Southmont Borough</td><td colspan="6">=</td></tr>
<tr><td>Stonycreek Township</td><td colspan="6">=</td></tr>
<tr><td>Summerhill Borough</td><td><</td><td>=</td><td>=</td><td>=</td><td>=</td><td><</td></tr>
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<table>
<tr><th colspan="7">Calculated Countywide Risk Factor by Hazard
and Comparative Jurisdictional Risk</th></tr>
<tr><th colspan="7">IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR</th></tr>
<tr><th>JURISDICTION</th><th>Levee Failure</th><th>Civil Disturbance (New)</th><th>Hailstorm</th><th>Radon Exposure</th><th>Disorientation</th><th>Ice Jam Flooding</th></tr>
<tr><td></td><td>1.8</td><td>1.7</td><td>1.6</td><td>1.6</td><td>1.6</td><td>1.5</td></tr>
<tr><td>Summerhill Township</td><td>=</td><td>=</td><td>=</td><td>=</td><td>=</td><td>=</td></tr>
<tr><td>Susquehanna Township</td><td colspan="6">=</td></tr>
<tr><td>Tunnelhill Borough</td><td colspan="6">=</td></tr>
<tr><td>Upper Yoder Township</td><td colspan="6">=</td></tr>
<tr><td>Vintondale Borough</td><td colspan="6">=</td></tr>
<tr><td>Washington Township</td><td colspan="6">=</td></tr>
<tr><td>West Carroll Township</td><td><</td><td><</td><td>=</td><td>=</td><td>=</td><td>></td></tr>
<tr><td>Westmont Borough</td><td colspan="6">=</td></tr>
<tr><td>West Taylor Township</td><td colspan="6">=</td></tr>
<tr><td>White Township</td><td colspan="6">=</td></tr>
<tr><td>Wilmore Borough</td><td colspan="6">=</td></tr>
</table>

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:

<u>Replacement Value</u>: 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.

Flooding Loss Estimation:

Flooding is a high-risk natural hazard in Cambria 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 Cambria County municipality is outlined in section 4.3.3 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 Cambria County are estimated to equal $729 million with 15.98% 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 $1.62 billion.

4.4.4. Future Development and Vulnerability

The 2020 census population for Cambria County is 133,472 which is 10,207 fewer than the 2010 census. There was an overall decrease of 7.65% in population based on the data. Six municipalities have seen population increases while the remaining fifty-seven had decreases in the period between 2010 and the 2020, except for Clearfield Township which had no reported population change as identified in *Table 70 – Population Change in Cambria County from 2010-2020.*

Table 70 - 2010 - 2020 Population Change

Population Change in Cambria County from 2010-2020				
Municipality	**2010 Census**	**2015 Estimates**	**2020 Census**	**Percent of Change 2010-2020**
Adams Township	5,972	5,840	5,752	-3.82%
Allegheny Township	2,851	2,812	2,815	-1.28%
Ashville Borough	227	199	213	-6.57%
Barr Township	2,056	1,977	2,049	-0.34%
Blacklick Township	2,013	2,033	1,876	-7.30%
Brownstown Borough	744	766	696	-6.90%
Cambria Township	6,099	6,002	5,814	-4.90%
Carrolltown Borough	853	859	1051	18.84%
Cassandra Borough	147	155	162	9.26%
Chest Township	349	317	457	23.63%
Chest Springs Borough	149	196	140	-6.43%
Clearfield Township	1,604	1,523	1,604	0.00%
Conemaugh Township	2,012	2,063	1,941	-3.66%
Cresson Borough	1,711	1,675	1,525	-12.20%
Cresson Township	4,336	3,381	2,839	-52.73%
Croyle Township	2,339	2,219	2,307	-1.39%
Daisytown Borough	326	352	298	-9.40%
Dale Borough	1,234	1,138	1,008	-22.42%
Dean Township	391	402	328	-19.21%
East Carroll Township	1,654	1,530	1,425	-16.07%
East Conemaugh Borough	1,220	1,141	1082	-12.75%
East Taylor Township	2,726	2,647	2,422	-12.55%
Ebensburg Borough	3,351	3,265	3,404	1.56%
Ehrenfeld Borough	228	211	203	-12.32%
Elder Township	1,038	1,009	1028	-0.97%
Ferndale Borough	1,636	1,578	1,547	-5.75%
Franklin Borough	323	299	278	-16.19%
Gallitzin Borough	1,668	1495	1536	-8.59%
Gallitzin Township	1,324	1,371	1,273	-4.01%
Geistown Borough	2,467	2,368	2,363	-4.40%

Population Change in Cambria County from 2010-2020				
Municipality	2010 Census	2015 Estimates	2020 Census	Percent of Change 2010-2020
Hastings Borough	1,278	1,253	1,213	-5.36%
Jackson Township	4,392	4,271	4,236	-3.68%
Johnstown City	20,978	20,369	18,411	-13.94%
Lilly Borough	968	802	879	-10.13%
Lorain Borough	759	801	589	-28.86%
Loretto Borough	1,302	1,238	1,196	-8.86%
Lower Yoder Township	2,699	2,629	2,388	-13.02%
Middle Taylor Township	727	771	660	-10.15%
Munster Township	690	616	653	-5.67%
Nanty Glo Borough	2,734	2,657	2,511	-8.88%
Northern Cambria Borough	3,835	3,716	3,560	-7.72%
Patton Borough	1,769	1,920	1,728	-2.37%
Portage Borough	2,638	2,561	2,459	-7.28%
Portage Township	3,640	3,556	3,432	-6.06%
Reade Township	1,619	1,599	1,441	-12.35%
Richland Township	12,814	12,447	12,233	-4.75%
Sankertown Borough	675	659	630	-7.14%
Scalp Level Borough	778	801	744	-4.57%
South Fork Borough	928	960	954	2.73%
Southmont Borough	2,284	2,204	2,045	-11.69%
Stonycreek Township	2,844	2,758	2,771	-2.63%
Summerhill Borough	490	451	479	-2.30%
Summerhill Township	2,467	2,414	2,303	-7.12%
Susquehanna Township	2,007	1,985	1,889	-6.25%
Tunnelhill Borough	245	243	207	-18.36%
Upper Yoder Township	5,449	5,328	5,147	-5.87%
Vintondale Borough	414	395	412	-0.49%
Washington Township	875	1,041	832	-5.17%
West Carroll Township	1,296	1,242	1,186	-9.27%
Westmont Borough	5,181	5,039	4,982	-3.99%
West Taylor Township	795	712	729	-9.05%

Population Change in Cambria County from 2010-2020				
Municipality	**2010 Census**	**2015 Estimates**	**2020 Census**	**Percent of Change 2010-2020**
White Township	836	868	931	10.20%
Wilmore Borough	225	252	206	-9.22%
TOTAL	**143,679**	**139,381**	**133,472**	**-7.65%**

Recently, the 2020 census population totals were released for Cambria County. The 2020 report identified the population in Cambria County as 133,472. This was a decrease of 10,207 people, -7.65% since the 2010 census. All estimations since the 2010 census indicate the population in Cambria County is declining. Cresson Township experienced the greatest rate of population decline at negative 52.73% growth, closely followed by Loraine Borough at negative 28.86%, between 2010 and 2020. While the general rate of growth was negative throughout the county, several municipalities witnessed significant population increases. Carrolltown Borough underwent 18.84% growth from a total population increase of 198 residents. The most significant rate of increase occurred in Chest Township which experienced 23.63% population growth from a total of 108 newly registered residents.

The 2019 census estimates indicates that there are approximately 38,078 housing units in Cambria County, Pennsylvania. Of those, 85.18% of the structures are occupied-housing units. The significant county-wide population changes indicate a potential alteration to overall hazard vulnerability. Municipalities that undergo widespread population reductions may have more difficulty meeting personnel demands than would expanding jurisdictions. However, certain municipalities, such as Carrolltown Borough and Chest Township, experienced significant resident increases and, thus, may be more vulnerable to certain hazards due to development and residential growth. Although expanding population zones may be especially vulnerable to hazards outlined in section 4.3 of this hazard mitigation plan update, natural and human caused hazards could potentially occur at any time regardless of population change. The Cambria County Hazard Mitigation Local Planning Team will conduct annual reviews of this plan and the impacts all hazards have on the county and new development every year and within a time frame after a disaster or major emergency.

5. Capability Assessment

5.1. Update Process Summary

The capability assessment is an evaluation of Cambria County's governmental structure, political framework, legal jurisdiction, fiscal status, policies and programs, regulations, 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 Cambria County officials. These meetings were designed to seek input from the 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 fifty 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. Therefore, these capability assessments consider the various characteristics and capabilities of municipalities under study.

The evaluation of the following categories – political framework, legal jurisdictions, 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 Cambria County, and its municipalities have the capacity to do and provides an understanding of what must be changed to mitigate loss.

Cambria County has several 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

Fifty-three of the sixty-three municipalities in Cambria 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 residents. Local policies and 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, 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, and adoption of the Pennsylvania Floodplain Management Act (Act 166 of 1978) established even higher floodplain management 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 Cambria County and municipal legal capabilities to mitigate the profiled hazards. It identifies the county and the municipal 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 that exist in that area. Consequently, structures that are built according to applicable codes are inherently resistant to many hazards, such as intense winds, floods, and earthquakes; and can help mitigate regional hazards, such as wildfires. In 2003, Pennsylvania implemented the Uniform Construction Code (UCC) (Act 45), a comprehensive building code that establishes minimum regulations for most new construction, including additions and renovations to existing structures.

The code applies to almost all buildings, excluding manufactured and industrialized housing (which are covered by other laws), agricultural buildings, and certain utility and miscellaneous buildings. The UCC requires builders to use materials and methods that have been professionally evaluated for quality and safety, as well as inspections to ensure compliance.

The initial election period, during which all of Pennsylvania's 2,565 municipalities were allowed to decide whether the UCC would be administered and enforced locally, officially closed on August 7, 2004. The codes adopted for use under the UCC are the 2003 International Codes issued by the International Code Council (ICC). Supplements to the 2003 codes have been adopted for use over the years since.

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. If a municipality has "opted-out", the Pennsylvania 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. Historical buildings may be exempt from such inspections and Act 45 provides quasi-exclusion from UCC requirements.

The municipalities in Cambria County adhere to the standards of the Pennsylvania Uniform Code (Act 45). None of the municipalities in Cambria County have opted-in on building code enforcement, although all municipalities enforce their own 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.

Subdivision Ordinance

Subdivision and land development ordinances include regulations to control the layout of streets, the planning lots and the provision of utilities and other site improvements. The objectives of 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 congestions; 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. Of the 63 municipalities in Cambria County, some have subdivision/land use ordinances, some have zoning regulations – some have both and some have neither (Cambria County Planning Commission, January 2022).

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 Pennsylvania Department of Environmental Protection (PA DEP), which may grant an extension of time for 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. 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 ordinance depends on the extent of existing and projected land 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 Cambria 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 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.

Regarding 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 consider floodplains and other areas of special hazards and other similar uses. The MPC also requires comprehensive plans to include a plan for community facilities and services that recommends considering storm drainage and floodplain management.

Cambria County last updated its comprehensive plan in 2018.

Article III of the MPC enables municipalities to prepare a comprehensive plan: however, development of a comprehensive plan is voluntary. Twenty of the 63 municipalities in Cambria County have adopted their own comprehensive plans.

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.

The City of Johnstown, which has been in Pennsylvania's Act 47 program for distressed municipalities since 1992, until recently had no money in its capital budget. However, the 2021 capital fund started at $4,509,000, with money the city obtained by selling its sewer collection system to the Greater Johnstown Water Authority. One of the projects is for $400,000 in flood protection for Sam's Run (Tribune-Democrat, January 2020). In addition, the U.S. Army Corps of Engineers completed the City of Johnstown Fairfield Avenue Project in 2021 through the authority of Section 313 of the Water Resources Development Act of 1992, as amended. The existing Fairfield Avenue sewer interceptor had exceeded its life expectancy and was subject to severe inflow and infiltration due to age. The project corrected these problems by replacing the existing system to meet current and future demand and reduce inflow, infiltration, and sanitary sewer overflows into local waterways.

Participation in the National Flood Insurance Program (NFIP)

Floodplain management is the operation of programs or activities that may consist of both corrective and preventative 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) require every municipality identified by the Federal Emergency Management Agency (FEMA) to participate in the National Flood Insurance Program 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 ensures that the risk of flood damage is not increased by property development.

The Pennsylvania Emergency Management Agency (PEMA) was appointed by legislation in September 2021 to coordinate the Commonwealth NFIP and employ the State NFIP Coordinator. For many years prior, these roles were held by the Pennsylvania Department of Community and Economic Development (DCED), which still offers support to communities through its Floodplain Mitigation Program. PEMA provides communities, based on 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, the below.

1. Prohibiting manufactured homes in the floodway
2. Prohibiting manufactured homes within the area measured fifty 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 structure
5. Prohibiting new construction and development within the area measured fifty 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 established 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. PEMA 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 established 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.

According to the State NFIP Coordinator, all but four of Cambria County’s 63 municipalities have floodplain regulations in place that meet requirements set forth by the NFIP. Currently, no 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.

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, fifty-three 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 nineteen boroughs, thirty townships, and one city within Cambria County. Each of these municipalities conducts it 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. Other municipalities choose to operate independently and provide such services internally. Municipalities vary in staff size, resource availability, fiscal status, service provision, constituent population, overall size, and vulnerability to the profile hazards. Technical capability relates to an adequacy of knowledge and technical expertise of local government employees or the ability to contract resources for this expertise in order to effectively execute mitigation activities. Common examples of skill sets, and technical personnel needed for hazard mitigation include: planners with knowledge of land development and management practices, engineers or professionals trained in construction practices related to buildings and/or infrastructure (e.g. building inspectors), planners or engineers with an understanding of natural and/or human caused hazards, emergency managers, floodplain managers, land surveyors, scientists familiar with hazards in the community, staff with education of expertise to assess community vulnerability to hazards, personnel skilled in geographic information systems, resource development staff or grant writers, fiscal staff to handle complex grant application processes.

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 what form an agency will possess. A governing body can create a planning commission, a planning department, or both. The Cambria County Planning Commission assists all municipalities in the county as needed.

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. Most municipalities in Cambria County have a municipal engineer under contract to perform these duties.

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 a very robust Cambria County GIS Department, which is available to assist all the county's municipalities. In 2021, the City of Johnstown Redevelopment Authority staffed its own GIS capability. GIS data is an important tool to use in hazard mitigation planning and is instrumental in assessing the risk of municipalities to various hazards.

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. Hence, the National Preparedness Goal of 2011 also defines what it means for the whole community to be prepared for all types of disasters and emergencies and lists five mission areas which support preparedness: prevention, protection, mitigation, response, and recovery – doubling the emphasis on mitigation activities in an emergency management program.

The Pennsylvania Emergency Management Services Code (PA Title 35) requires Cambria County and its municipalities to have an emergency management coordinator.

The Cambria County Department of Emergency Services coordinates countywide emergency management efforts. Each municipality has a designated local emergency management coordinator who possesses a unique knowledge of the impact hazardous events have on their community.

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 §7633.

- Prepare and maintain a current disaster emergency management plan
- Establish, equip, and staff an emergency operations center
- Provide individual and organizational 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 public
- Participate in all tests, drills, and exercises, including remedial drills and exercises, scheduled by the agency or by the federal government

PA Title 35 requires that all municipalities in the Commonwealth have a local emergency operations plan (EOP) which is updated every two years. A majority of Cambria County municipalities have adopted the county EOP. The notification and resource section of the plan was developed individually by each municipality.

Federal Agency Assistance

There are many federal agencies that can provide technical assistance for mitigation activities, and these include, but are not limited to:

- United States Army Corps of Engineers (USACE)
- Department of Housing and Urban Development (HUD)
- Department of Agriculture (DOA)
- Economic Development Administration
- Emergency Management Institute (EMI)
- Environmental Protection Agency (EPA)
- Federal Emergency Management Agency (FEMA)
- Small Business Administration (SBA)

State Agency Assistance

There are many commonwealth agencies that can provide technical assistance for mitigation activities, and these include but are not limited to:

- Pennsylvania Emergency Management Agency (PEMA)
- Pennsylvania Department of Community and Economic Development
- Pennsylvania Department of Conservation and Natural Resources
- Pennsylvania Department of Environmental Protection

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. *Table 71 – Cambria County Community Political Capability* summarizes the results of political capability.

Table 71 - Cambria County Community Political Capability

Cambria County Community Political Capability						
Municipality Name	**Capability Ranking**					
	0	**1**	**2**	**3**	**4**	**5**
Adams Township						X
Allegheny Township				X		
Ashville Borough				X		
Barr Township				X		
Blacklick Township				X		
Brownstown Borough					X	
Cambria Township						X
Carrolltown Borough	Not Completed by Municipality					
Cassandra Borough	Not Completed by Municipality					
Chest Township				X		
Chest Springs Borough	Not Completed by Municipality					
Clearfield Township				X		
Conemaugh Township	Not Completed by Municipality					

Cambria County Community Political Capability						
Municipality Name	Capability Ranking					
	0	1	2	3	4	5
Cresson Borough						X
Cresson Township	Not Completed by Municipality					
Croyle Township					X	
Daisytown Borough	Not Completed by Municipality					
Dale Borough	Not Completed by Municipality					
Dean Township	Not Completed by Municipality					
East Carroll Township	Not Completed by Municipality					
East Conemaugh Borough	Not Completed by Municipality					
East Taylor Township	Not Completed by Municipality					
Ebensburg Borough				X		
Ehrenfeld Borough						X
Elder Township				X		
Ferndale Borough	Not Completed by Municipality					
Franklin Borough					X	
Gallitzin Borough	Not Completed by Municipality					
Gallitzin Township	Not Completed by Municipality					
Geistown Borough			X			
Hastings Borough						X
Jackson Township	Not Completed by Municipality					
Johnstown City				X		
Lilly Borough				X		
Lorain Borough	Not Completed by Municipality					
Loretto Borough	Not Completed by Municipality					
Lower Yoder Township				X		
Middle Taylor Township						X
Munster Township	Not Completed by Municipality					
Nanty Glo Borough				X		
Northern Cambria Borough						X
Patton Borough	Not Completed by Municipality					
Portage Borough	Not Completed by Municipality					
Portage Township			X			

Cambria County Community Political Capability						
Municipality Name	Capability Ranking					
	0	1	2	3	4	5
Reade Township				X		
Richland Township	Not Completed by Municipality					
Sankertown Borough						X
Scalp Level Borough				X		
South Fork Borough						X
Southmont Borough				X		
Stonycreek Township					X	
Summerhill Borough	Not Completed by Municipality					
Summerhill Township						X
Susquehanna Township				X		
Tunnelhill Borough	Not Completed by Municipality					
Upper Yoder Township	Not Completed by Municipality					
Vintondale Borough				X		
Washington Township				X		
West Carroll Township				X		
Westmont Borough						X
West Taylor Township				X		
White Township	Not Completed by Municipality					
Wilmore Borough				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 mechanisms that could enhance of further such strategies. In response to the survey questionnaire, local officials classified each of the capabilities as wither “L = Limited”, “M = Moderate”, or “H = High.” *Table 72 – Capability Self-Assessment Matrix* summarizes the results of the self-assessment survey. Thirty-two municipalities returned this section of the assessment completed.

Table 72 - Capability Self-Assessment Matrix

Cambria County Capability Self-Assessment Matrix				
Municipality Name	**Capability Category**			
	Planning and Regulatory Capability	**Administrative and Technical Capability**	**Fiscal Capability**	**Community Political Capability**
Adams Township	M	M	M	M
Allegheny Township	L	L	L	L
Ashville Borough	L	L	L	L
Barr Township	Not Completed by Municipality			
Blacklick Township	M	M	L	M
Brownstown Borough	M	L	L	M
Cambria Township	M	M	M	M
Carrolltown Borough	Not Completed by Municipality			
Cassandra Borough	L	L	L	L
Chest Township	L	L	L	L
Chest Springs Borough	Not Completed by Municipality			
Clearfield Township	L	M	M	M
Conemaugh Township	M	M	L	L
Cresson Borough	Not Completed by Municipality			
Cresson Township	M	M	M	H
Croyle Township	L	L	L	L
Daisytown Borough	L	L	L	L
Dale Borough	M	M	M	M
Dean Township	L	L	L	L
East Carroll Township	L	L	L	L
East Conemaugh Borough	Not Completed by Municipality			
East Taylor Township	M	M	M	M
Ebensburg Borough	M	M	M	M
Ehrenfeld Borough	N/A	L	N/A	L
Elder Township	M	M	M	M
Ferndale Borough	Not Completed by Municipality			
Franklin Borough	L	L	L	L
Gallitzin Borough	Not Completed by Municipality			

Cambria County Capability Self-Assessment Matrix				
Municipality Name	Capability Category			
	Planning and Regulatory Capability	Administrative and Technical Capability	Fiscal Capability	Community Political Capability
Gallitzin Township	Not Completed by Municipality			
Geistown Borough	L	L	L	L
Hastings Borough	L	L	L	L
Jackson Township	L	L	L	L
Jackson Township	L	L	L	L
Johnstown City	M	M	M	M
Lilly Borough	M	M	L	M
Lorain Borough	L	M	M	L
Loretto Borough	L	L	L	L
Lower Yoder Township	M	M	L	M
Middle Taylor Township	M	M	M	M
Munster Township	Not Completed by Municipality			
Nanty Glo Borough	M	M	L	M
Northern Cambria Borough	M	M	M	M
Patton Borough	Not Completed by Municipality			
Portage Borough	Not Completed by Municipality			
Portage Township	L	L	L	L
Reade Township	L	L	L	L
Richland Township	M	H	H	H
Sankertown Borough	Not Completed by Municipality			
Scalp Level Borough	M	M	M	M
South Fork Borough	L	L	L	L
Southmont Borough	M	M	L	M
Stonycreek Township	M	M	M	M
Summerhill Borough	Not Completed by Municipality			
Summerhill Township	L	L	L	L
Susquehanna Township	L	L	L	L
Tunnelhill Borough	Not Completed by Municipality			
Upper Yoder Township	Not Completed by Municipality			

Cambria County Capability Self-Assessment Matrix				
Municipality Name	Capability Category			
	Planning and Regulatory Capability	Administrative and Technical Capability	Fiscal Capability	Community Political Capability
Vintondale Borough	M	M	L	M
Washington Township	M	M	M	M
West Carroll Township	M	M	M	L
Westmont Borough	M	M	L	M
West Taylor Township	M	M	L	M
White Township	L	L	L	L
Wilmore Borough	M	M	M	M

In addition to the institutional capability of the municipal government structure described above, the county itself can engage in mitigation activities. The county has its own staff, resources, budget, and objectives, which may or may not be like those of its constituent municipalities. Therefore, the county has its own capabilities to mitigate the profiled hazards through planning and coordination of local mitigation efforts. The Cambria County GIS Department can provide needed skills in the analysis of geographic data. Other local organizations that can and do act as partners include: the Cambria County Planning Commission; the Cambria County Conservation District; the Cambria County Redevelopment Authority; Johnstown Public Works and Code Enforcement; the 1889 Foundation and the Jefferson Center for Population Health; the Cambria County Area Agency on Aging; the Fire Advisory Committee and Regional Firefighters Association; business development organizations such as the Cambria Regional Chamber of Commerce and the Community Foundation for the Alleghenies; and historical or cultural agencies such as the Cambria County Library System and Johnstown Area Heritage Association.

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

Grant programs that may be utilized to accomplish hazard mitigation objectives include the: Pennsylvania Department of Community and Economic Development Community Development Block Grant (CDBG); Land Use Planning and Technical Assistance (LUPTAP); Shared Municipal Services (SMS); Community Revitalization (CR) and Floodplain Land Use Assistance Programs; the PA DEP's Growing Greener; Act 167 Stormwater Management; Source Water Protection; and Flood Protection Programs. The Flood Protection Programs include the PA DCNR's Community Conservation Partnership Program, PEMA's Pre-Disaster Mitigation (PDM) Grant, Flood Mitigation Assistance Grant Programs (FMA), and Hazard Mitigation Grant Program.

Below are some of the other state programs that may provide financial support for mitigation activities:

- DCED Flood Mitigation Program
- DCED H2O PA Flood Control Projects
- DCED H2O PA High Hazard Unsafe Dam Projects
- DCED H2O PA Water Supply, Sanitary Sewer and Storm Water Projects
- DCED PA Small Water and Sewer
- DCNR Community Conservation Partnerships Program
- DCNR Pennsylvania Heritage Areas Program

- DCNR Pennsylvania Recreational Trails Program
- DCNR Land and Water Conservation Fund

Below are some of the federal programs that may provide financial support for mitigation activities:

- FEMA Community Assistance Program – State Support Services Element (CAP-SSSE)
- FEMA Community Disaster Loan Program
- FEMA Community Rating System
- FEMA Emergency Management Performance Grants (EMPG)
- FEMA Environmental Planning and Historic Preservation Program (EHP)
- FEMA Flood Mitigation Assistance Program
- FEMA Hazard Mitigation Grant Program (HMGP)
- FEMA Individuals and Households Program (IHAP)
- FEMA National Dam Safety Program
- FEMA National Flood Insurance Program
- FEMA Pre-Disaster Mitigation Program
- FEMA Public Assistance Program (PA)
- FEMA Regional Catastrophic Preparedness Grant Program
- FEMA Repetitive Flood Claims Program (RFC)
- FEMA Severe Repetitive Loss Grant Program
- USACE Continuing Authorities Program
- USACE Flood Plain Management Services Program (FPMS)
- USACE Inspection of Completed Works Program (ICW)
- USACE National Levee Safety Program
- USACE Planning Assistance to States
- USACE Rehabilitation and Inspection Program (RIP)

Capital Improvement Financing

Because most of the 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 are always priorities.

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 recreational facilities. Voter approval for this may be required.

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 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 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 one of the principal activities of the local government facilities' financing authorities. An operating water authority issues bonds to purchase existing facilities 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.

U.S. Department of Agriculture Circuit Riding Program (Engineer)

The Circuit Riding Program is an example of intergovernmental cooperation. This program offers municipalities the ability to join 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

Cambria County conducts an education and outreach program. The Cambria County Department of Emergency Services 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.

Education activities that directly impact hazard mitigation in Cambria County predominantly revolve around the first responders. Providing fire, medical, search and rescue training, and education enhances the response and recovery capabilities of response agencies in the county. Newly appointed emergency management coordinators are trained in both Duties and Responsibilities and damage assessment – which includes a discussion on mitigation; this training can be translated into teaching municipal employees or local emergency services to assist them during a disaster.

For the COVID-19 pandemic response, the county maintenance department was trained in the correct methods and appropriate chemicals to be used to disinfect large areas that were contaminated by an infected employee. And, as a member of the Southwestern Pennsylvania Regional Counter-Terrorism Task Force, Region 13, Cambria County participates in regional training and education events for all hazards.

The county also has several websites and social media accounts that can educate residents about hazard mitigation and risk while also communicating information in the event of a disaster:

https://www.cambriacountypa.gov/department-of-emergency-services/#158-159-public-safety-tips-information; https://www.cambriacountypa.gov/conservation-district/; https://www.cambriacountypa.gov/gis/; https://cambriaplanning.org/; https://www.facebook.com/cambriacountyema; https://www.facebook.com/groups/279426386404 (county animal response team).

The Cambria County GIS Department website has an education and outreach capability, particularly with the county map viewer, which could be updated to include hazard mitigation data. The websites of the Cambria County Department of Emergency Services (DES) and the Cambria County Planning Commission also post information to educate residents, particularly in disaster preparedness, floodplain management, and zoning requirements. The Cambria County Planning Commission currently provides access to planning documents and educational brochures about the benefits of planning and helpful guides. The DES also holds quarterly Local Emergency Planning Committee (LEPC) meetings that are open to the public, which serve as another means to conduct outreach and educate the public about hazard mitigation.

The Johnstown Flood Museum and the public flood museum in South Fork also serve as educational tools for hazards and mitigation. The libraries in the county coordinate special events for flood anniversaries, showing their history and prevention measures.

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 Cambria County Local Planning Team will identify actions necessary to complete this.

5.2.5. Plan Integration

Plan integration recognizes that hazard mitigation is most effective when it works in efficient coordination with other plans, regulations, and programs. Plan integration promotes safe, resilient growth, effective management, an overall reduction of risk, by ensuring that the goals and actions established in the Hazard Mitigation Plan are included in the comprehensive planning efforts so they can affect future land use and development. Some of the most important areas of planning and regulatory capabilities which hazard mitigation goals and actions should be integrated include comprehensive plans, the hazard mitigation plans from all surrounding or encompassing areas, Emergency Operations Plans, building codes, floodplain ordinances, subdivision, land development ordinances, stormwater management plans and ordinances, and zoning ordinances. (The January 2022 listing of municipal ordinances and plans can be found in Appendix C.) All of these tools provide mechanisms for the implementation of adopted mitigation strategies.

Cambria County Comprehensive Plan

Overview

Comprehensive plans establish the overall vision, goals, and objectives for a community's growth. The Alleghenies Ahead Regional Comprehensive Plan was adopted by the Cambria County Commissioners on June 27, 2018. The plan is a collaborative effort between the six counties in the Southern Alleghenies region and contains both regional priorities and action plans for each county in the region. The plan establishes countywide goals and objectives, describes environmental and demographic characteristics, identifies potential capital improvement projects, and inventories existing planning initiatives and tools in the county.

As part of the update process, the HMPC reviewed goals and objectives in the 2018 Comprehensive Plan and identified those that are currently supportive of hazard mitigation goals and principles. The plan also identified opportunities to integrate goals and objectives from the 2016 Hazard Mitigation Plan and 2022 HMP Update into the next update of the comprehensive plan.

There are many actions in the Alleghenies Ahead Regional Comprehensive Plan that are supportive of hazard mitigation. Key goals that relate to hazard mitigation are found in all sections of the comprehensive plan, but particularly in the Land Use and Regulation, Community Facilities and Services, Infrastructure and Utilities, and Environment and Natural Resources sections.

Recommendations for Continued and Future Integration

As discussed, many of the goals and objectives outlined in the Cambria County Comprehensive Plan are related to the hazard mitigation risks and goals established in the HMP. Several could be revised to include updated information from this HMP. Additionally, the comprehensive plan can identify the places of higher vulnerability that are identified in this plan for all the high-risk hazards, and include objectives aimed at reducing the risk to these vulnerable areas. For example, an objective of the comprehensive plan could be to encourage elevation and flood proofing of structures in the Special Flood Hazard Area (SFHA) by seeking Flood Mitigation Assistance (FMA) grants and strictly enforcing floodplain management ordinances in certain communities (See Section 4.3.3 for Flooding and Flash Flooding information). Similarly, an objective for communities that are most vulnerable to subsidence and land failure, such as Lower Yoder Township, could be to educate property owners about mine subsidence, associated risks, and actions to take in the event of an emergency. These types of objectives could also be created for medium-risk hazards when appropriate; for example, an objective could be created for Allegheny Township, which is at moderate risk to wildfire, to join fire education programs and educate property owners about defensible space and appropriate landscaping techniques.

Another key opportunity for further integration of hazard mitigation into planning and regulatory tools is to incorporate hazard mitigation goals and objectives into the ongoing Cambria County Comprehensive Plan update.

Finally, it is expected that there will be some emphasis on Continuity of Operations Plans (COOP) based on lessons learned during and through the COVID-19 pandemic. There may be some opportunities for integration of COOP goals and objectives into the county comprehensive plan update and county and municipal EOPs, e.g.: loss of use of business and government workplaces; employee notification systems; and/or public information campaigns.

2040 Long Range Transportation Plan

Overview

The Cambria County Planning Commission is a standing member of the Metropolitan Planning Organization (MPO) and acts as its official secretary. The MPO is primarily responsible for preparing and updating a county-wide transportation plan consistent with the requirements of both the Federal and State governments. Additionally, the Planning Commission prepared the County’s 25-Year Transportation Plan. This plan lists all the major highway, bridge, mass transit and airport improvement projects to be undertaken within Cambria County. The 2021-2045 Long-Range Transportation Plan (LRTP) serves as the official adopted plan for Cambria County and guides the expenditure of transportation dollars for a 25-year period. The plan documents current and future transportation demand and identifies long-term improvements and projects to meet those needs. This plan also informs the 12-year Transportation Improvement Program (TIP), which is a regional, fiscally constrained transportation programming document that includes the proposed expenditure of the region's state and federal transportation funds.

Both the 2021-2024 Cambria County Transportation Improvement Program and 2021- 2045 Cambria County Long Range Transportation Plan can support the activities of the Cambria County Hazard Mitigation Plan. The LRTP sections of water quality, hydrology, public open space and recreation, and farmland in the Environmental Analysis in Chapter 9 are most germane.

Recommendations for Continued and Future Integration

There are several opportunities to integrate hazard mitigation into the county's LRTP. The plan could discuss hazards that may potentially impact the county's transportation system, such as extreme weather and other natural hazards. The plan could also inventory vulnerable assets, identify evacuation routes, and discuss the need for redundancy in the transportation network in the event of hazard or hazard event. The goals and objectives highlighted above could also be revised to address additional goals and objectives related to mitigation and added to the next update of the plan. Additionally, hazard mitigation could be discussed in more detail in the environmental mitigation chapter of the plan. Instead of solely discussing mitigation of environmental impacts of transportation projects in this section, this section could also describe how reducing impacts on the environment can mitigate hazards. For example, integrating stormwater management improvements into roadway projects not only reduces pollution in nearby waterways, but it can also alleviate the impacts of floods. Likewise, mitigating hazard impacts will help preserve transportation infrastructure throughout Cambria County.

6. Mitigation Strategy

6.1. Update Process Summary

Mitigation goals are general guidelines that explain what the county wants to achieve. Goals are usually expressed as broad policy statements representing desired long-term results. Mitigation objectives describe strategies or implementation steps to attain the identified goals. Objectives are more specific statements than goals; the described steps are usually measurable and can have a defined completion date. There were three goals and four objectives identified in the 2016 hazard mitigation plan. The 2022 Cambria County Hazard Mitigation Plan Update has five goals and sixteen objectives. Objectives have been added and arranged in order to associate them with the most appropriate goal. These changes are noted in *Table 73 – 2016 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 forty actions identified in the 2016 mitigation strategy. A review of the 2016 mitigation actions was completed by the local planning team. The results of this review are identified in *Table 74 – 2016 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 73 - 2016 Mitigation Goals and Objectives Review

2016 Mitigation Goals and Objectives Review		
GOAL Objective	**Description**	**Review**
GOAL 1	**Provide mitigation related educational and awareness and educational opportunities to county and municipal stakeholders.**	The LPT decided to add in an all-hazard statement and to remove County and municipal and replace with “all stakeholders and the public” The LPT also decided to remove 2nd educational
Objective 1.1	Increase public awareness and education on the potential impacts of natural, technological, and	The LPT decided to remove this objective.

2016 Mitigation Goals and Objectives Review		
GOAL Objective	**Description**	**Review**
	human-caused hazards and activities to reduce their impacts.	
GOAL 2	**Develop new or strengthen existing relationships among county and municipal stakeholders relative to hazard mitigation.**	The LPT decided to remove this goal and update with the new goal identified below.
Objective 2.1	Strengthen county and local capabilities to reduce the potential impacts of flooding and other hazards on existing and future public/private assets, including structures, critical facilities, and infrastructure.	
Objective 2.2	Increase intergovernmental stakeholder cooperation and build public-private partnerships to implement activities that will reduce the impacts of natural, technological, and human-caused-all-hazards.	The LPT decided to change verbiage by removing the word intergovernmental and adding stakeholder.
GOAL 3	**Mitigate the effects of natural, technological and human-caused hazards through cost effective strategies**	The LPT decided to remove natural, technological and human-cause and replace with all hazards. Also, to remove strategies and add actions and project opportunities
Objective 3.1	Enhance planning and emergency response efforts among county and local emergency management and public health agencies.	

Table 74 - 2016 Mitigation Actions Review

Cambria County Mitigation Actions Review Worksheet						
Existing Mitigation Actions *(2016 HMP)*	***Status***					***Review Comments***
	No Progress/ Unknown	**In Progress/Not Yet Complete**	**Continuous**	**Completed**	**Discontinued**	
1.1 Provide four annual outreach/educational opportunities for the public, stakeholders, and municipal officials on hazards encountered in Cambria County.		X				LPT decided to pull this action into the next plan.
1.2 Provide two annual trainings on hazard mitigation techniques and processes available to the public, stakeholders, and municipal officials.			X			LPT decided to pull this action into the next plan
1.3 Provide outreach opportunities on the need for flood insurance in municipalities with levees.	X					LPT decided to review the verbiage of this action.
2.1 Develop or strengthen regulations and ordinances that limit development in flood-prone and other hazard-prone areas over the next five-year update period.			X			LPT decided to update verbiage to state: “in Special Flood Hazard Area”
2.2 Over the next five-year update period, increase the number of property owners in the 1-percent-annual-chance floodplain with flood insurance.			X			LPT decided to update verbiage to state: “in the Special Flood Hazard Area”
2.3 Encourage municipalities with properties in the 1-percent- annual-chance floodplain to edit or adopt floodplain regulations or ordinances that exceed federal requirements as a step to improve their CRS rating.			X			LPT decided to update verbiage to state: “in the Special Flood Hazard Area”

Cambria County Mitigation Actions Review Worksheet						
Existing Mitigation Actions *(2016 HMP)*	*Status*					*Review Comments*
	No Progress/ Unknown	In Progress/Not Yet Complete	Continuous	Completed	Discontinued	
2.4 Conduct an analysis of critical facilities regarding the impacts of natural, technological, and human-caused hazards over the next five-year update period.			X			LPT decided to roll this into the next plan.
2.5 Encourage elevation or acquisition of flood-prone properties with repetitive loss properties having priority over other properties.			X			LPT decided to roll this into the next plan.
3.1 During the first year of the update period, conduct an audit to determine why the majority of municipalities have a limited capability for implementing mitigation strategies.		X				LPT decided to change the verbiage of this action: During the first year of the update period, conduct an assessment of the capacity of local municipalities to implement mitigation strategies.
3.2 During year two and continuing throughout the update period and based on the year one audit, initiate actions to improve municipal capabilities for implementing mitigation strategies.		X				LPT decided to reflect the same change.
4.1 Collaborate with local public health agencies to maintain awareness and receive recommendations for mitigating seasonal flu, emerging infectious diseases, or other public health threats.			X			LPT decided to change verbiage: Collaborate with local public health agencies to maintain awareness and receive recommendations for mitigating, seasonal flu, COVID-19, emerging infectious diseases, opioid crisis, or other public health threats.

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 five goals and sixteen corresponding objectives was developed. *Table 75 – 2022 Goals and Objectives* details the mitigation goals and objectives established for the 2021 Cambria County Hazard Mitigation Plan.

Table 75 - 2022 Goals and Objectives

2022 Cambria County Mitigation Goals and Objectives	
GOAL Objective	**Description**
GOAL 1	**Provide all-hazard mitigation related educational and awareness opportunities to all stakeholders and the public**
Objective 1.1	Develop, organize, and disseminate hazard mitigation related hard copy items like brochures, pamphlets and flyers
Objective 1.2	Develop a clearing house location for hazard mitigation information
Objective 1.3	Utilize multiple resources for electronic dissemination of information (Internet bases, website, social media)
Objective 1.4	Conduct various workshops, seminars, educational activities to enhance the hazard mitigation program
GOAL 2	**Coordinate and collaborate with all stakeholders to integrate hazard mitigation planning principles**
Objective 2.1	Strengthen county and local capabilities to reduce the potential impacts of flooding and other hazards on existing and future public/private assets, including structures, critical facilities, and infrastructure
Objective 2.2	Increase intergovernmental stakeholder cooperation and build public-private partnerships to implement activities that will reduce the impacts of natural, technological, and human-caused all-hazards
Objective 2.3	Ensure adequate and consistent enforcement of ordinances and codes within and between jurisdictions
GOAL 3	**Mitigate the effects of all hazards through cost effective actions and project opportunities**
Objective 3.1	Protect natural resources through the implementation of cost effective and technically feasible mitigation projects
Objective 3.2	Protect and maintain infrastructure and critical facilities in each municipality in Cambria County.
GOAL 4	**Reduce potential injury, death, and damage to existing community assets due to flooding, flash flooding or ice jam flooding**
Objective 4.1	Continue to use stormwater management planning as a means to reduce flood losses

2022 Cambria County Mitigation Goals and Objectives	
GOAL Objective	**Description**
Objective 4.2	Recommend that flood insurance policies remain affordable through government programs, especially through the NFIP's Community Rating System.
Objective 4.3	Complete actions and projects to acquire, elevate, demolish or demolish/reconstruct properties, repetitive loss properties and severe repetitive loss properties
Objective 4.4	Continue to provide resources to the community on flood insurance related to dams and levees.
GOAL 5	**Participate in FEMA's High-Hazard Potential Dam Program (HHPD)**
Objective 5.1	Educate Cambria County municipalities, property owners, and businesses about FEMA's HHPD program
Objective 5.2	Reduce long-term vulnerabilities from eligible high-hazard potential dams that pose an unacceptable risk to the public
Objective 5.3	Identify, by area, locations in Cambria County that could potentially be impacted by FEMA's HHPD program.

Goal 5 and Objective 5.1, Objective 5.2, and Objective 5.3 relate to multiple mitigation actions in Table 77 – 2022 Mitigation Action Plan. Mitigation Action 5.1.1 relates to Objective 5.1, Mitigation Action 5.2.1 relates to Objective 5.2, and Mitigation Action 5.3.1 relates to Objective 5.3. All three of the mitigation actions are covered by Goal 5 of the goals and objectives for the 2022 Hazard Mitigation Plan. These mitigations reduce the vulnerability of county populations and structures by educating the public on the HHPD program, enhancing local policies and procedures for HHPD planning, and digitizing dam inundation areas for future analysis and prevention of losses.

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 structure or protects the structure from a specific hazard. The new or renovated structures are therefore protected or have a reduced impact of hazards.

Natural Systems 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 impacts of hazards.

Table 76 – 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 77 – 2022 Mitigation Action Plan*.

Table 76 - Mitigation Strategy Technique Matrix

Cambria County Mitigation Strategy Technique Matrix				
Hazard	MITIGATION TECHNIQUE			
	Local Plans and Regulations	Structural and Infrastructure	Natural Systems Protection	Education and Awareness
Blighted Properties	X	X		X
Building/Structure Collapse	X	X		X
Civil Disturbance	X	X		X

Cambria County Mitigation Strategy Technique Matrix				
Hazard	**MITIGATION TECHNIQUE**			
	Local Plans and Regulations	**Structural and Infrastructure**	**Natural Systems Protection**	**Education and Awareness**
Cyber Attack	X	X		X
Dam and Levee Failures	X	X		X
Disorientation	X	X		X
Drought	X	X		X
Drowning	X	X		X
Emergency Services	X	X		X
Environmental Hazards – Transportation HazMat	X	X		X
Environmental Hazards – Fixed Facility HazMat	X	X		X
Extreme Temperatures	X	X		X
Flash Flooding	X	X		X
Flooding (100-year flood)	X	X		X
Hailstorm	X	X		X
Hurricane/Tropical Storm	X	X		X
Ice Jam Flooding	X	X		X
Invasive Species	X	X	X	X
Landslide	X	X		X
Lightning Strike	X	X		X
Opioid Epidemic	X	X		X
Pandemic	X	X		X
Radon	X	X		X
Subsidence/Sinkhole	X	X		X
Terrorism	X	X		X
Tornado	X	X		X
Transportation Accidents	X	X		X
Urban Fire and Explosions	X	X		X
Utility Interruptions	X	X		X
Wildfire	X	X		X

Cambria County Mitigation Strategy Technique Matrix				
Hazard	**MITIGATION TECHNIQUE**			
	Local Plans and Regulations	**Structural and Infrastructure**	**Natural Systems Protection**	**Education and Awareness**
Windstorm	X	X		X
Winter Storm	X	X		X

6.4. Mitigation Action Plan

The Cambria 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 2016 HMP mitigation strategy section. A review of the previous goals, objectives, actions, and project opportunities documented in the 2016 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 virtual platforms or in-person meetings. 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 2022 Cambria County HMP are listed in the mitigation action plan. *Table 77 – 2022 Mitigation Action Plan* is the 2022 Cambria County Mitigation Action Plan. This plan outlines mitigation actions and projects that comprise a strategy for Cambria 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 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 77 – 2022 Mitigation Action Plan* is a matrix that identifies the county and/or municipalities responsible for mitigation actions in the new mitigation action plan. *Table 78 – Municipal Hazard Mitigation Actions Checklist* shows which actions tie to specific municipalities for responsibilities. *Table 79 – Objective to Action Checklist* shows that each mitigation objective has a mitigation action item related to it. *Table 80 – Actions Tied to Hazards* illustrates the specific actions that are tied to each hazard outlined in the hazard mitigation plan.

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

BRIC: Building Resilient Infrastructure and Communities (BRIC) Program, 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

HMRF: Hazardous Material Response Fund, administered by the Pennsylvania Emergency Management Agency

HMERP: Hazard Mitigation Emergency Response Program administered by the Pennsylvania Emergency Management Agency

HHPD: Rehabilitation of High-Hazard Potential Dams Grant Program, administered by the Federal Emergency Management Agency

Table 77 - 2022 Mitigation Action Plan

Cambria County 2022 Mitigation Action Plan									
	Mitigation Actions			Prioritization			Implementation		
Action Number	**Category**	**Description/ Action Items**	**Hazard Vulnerability**	**High**	**Medium**	**Low**	**Schedule**	**Funding**	**Local Champion**
1.1.1	Education and awareness	Provide four annual outreach/educational opportunities for the public, stakeholders, and municipal officials on all hazards encountered in Cambria County.	All Hazards		**X**		2022 – 2027	HMRF, EMPG, Local	Cambria County Department of Emergency Services

Cambria County 2022 Mitigation Action Plan									
Action Number	Mitigation Actions			Prioritization			Implementation		
	Category	Description/ Action Items	Hazard Vulnerability	High	Medium	Low	Schedule	Funding	Local Champion
1.2.1	Education and awareness	Conduct an assessment of the Cambria County website to determine if it could house a clearing house location for hazard mitigation information.	All Hazards		**X**		2022 - 2023	HMRF, EMPG, Local	Cambria County Department of Emergency Services
1.3.1	Education and awareness	Utilize county social media pages and county website to update the public on hazard mitigation planning and future hazard mitigation development.	All Hazards		**X**		2022 – 2027	HMRF, EMPG, Local	Cambria County Department of Emergency Services
1.3.2	Education and awareness	Post extreme weather safety information on county social media pages and the county website to foster preparedness for an extreme weather event (extreme hot or extreme cold).	Extreme Temperatures	**X**			2022-2027	HMRF, EMPG, Local	Cambria County Department of Emergency Services
1.3.3	Education an awareness	Post winter storm and blizzard information on county social media pages and county website to foster preparedness for a winter storm event.	Winter Storm			**X**	2022 - 2027	HMRF, EMPG, Local	Cambria County Department of Emergency Services
1.3.4	Education and awareness	Utilize GIS to identify emergency snow routes throughout county to increase stakeholder awareness of contingent roadways during winter storm events.	Winter Storm			**X**	2022 - 2027	HMRF, EMPG, Local	Pennsylvania Department of Transportation Cambria County Department of Emergency Services

Cambria County 2022 Mitigation Action Plan									
Action Number	Mitigation Actions			Prioritization			Implementation		
	Category	Description/ Action Items	Hazard Vulnerability	High	Medium	Low	Schedule	Funding	Local Champion
1.3.5	Education and awareness	Disseminate online videos to both the county and the public to further the understanding of Act 167 Stormwater Planning and decrease the impact of stormwater runoff in the entire county.	Flooding Flash Flooding		**X**		2022 - 2027	FMA Local	Cambria County Conservation District
1.4.1	Education and awareness	Provide two annual trainings on hazard mitigation techniques and processes available to the public, stakeholders, and municipal officials.	All Hazards	**X**			2022 – 2027	HMRF, EMPG, Local	Cambria County Department of Emergency Services
2.1.1	Planning and regulations	Over the next five-year update period, increase the number of property owners in the Special Flood-Hazard Area with flood insurance.	Flooding Flash Flooding		**X**		2022 – 2027	FMA Local	Local Municipalities
2.1.2	Education and awareness	Based on the GIS analysis of structures within the Special Flood Hazard Area, mail personalized letters to homeowners and business owners stating the location of the structure is in the Special Flood Hazard Area.	Flooding Flash Flooding			**X**	2022 - 2027	HMRF, EMPG, Local	Cambria County Department of Emergency Services
2.2.1	Planning and regulations	Conduct an analysis of critical facilities regarding the impacts of natural, technological, and human-caused hazards over the next five-year update period.	All Hazards		**X**		2022 - 2027	HMRF, EMPG, Local	Cambria County Department of Emergency Services

Cambria County 2022 Mitigation Action Plan									
	Mitigation Actions			Prioritization			Implementation		
Action Number	**Category**	**Description/ Action Items**	**Hazard Vulnerability**	**High**	**Medium**	**Low**	**Schedule**	**Funding**	**Local Champion**
2.2.2	Planning and regulations	Work with municipalities to determine facilities of local interest that could be impacted by all hazards.	All Hazards		**X**		2022 – 2027	Local	Cambria County Planning Commission Cambria County GIS Department Cambria County Department of Emergency Services
2.2.3	Education and awareness	Collaborate with local public health agencies to maintain awareness and receive recommendations for mitigating, seasonal flu, COVID-19, emerging infectious diseases, opioid crisis, or other public health threats.	Pandemic and Infectious Disease Opioid Epidemic		**X**		2022 – 2027	Local	Cambria County Commissioners and Cambria County Department of Emergency Services
2.2.4	Natural system protection	Continue to work with local municipalities to determine the status of invasive species within local jurisdictions and work to mitigate the effects of those species.	Invasive Species			**X**	2022 - 2027	Local	Cambria County Conservation District
2.2.5	Education and awareness	Increase county-wide interoperability by implementing a social media aggregation dashboard for county and municipal offices on the county website.	All Hazards			**X**	2022-2027	Local	Cambria County Department of Emergency Services

Cambria County 2022 Mitigation Action Plan										
Action Number	Mitigation Actions			Prioritization			Implementation			
	Category	Description/ Action Items	Hazard Vulnerability	High	Medium	Low	Schedule	Funding	Local Champion
2.3.1	Planning and regulations	Encourage municipalities with properties in the Special Flood-Hazard Area to edit or adopt floodplain regulations or ordinances that exceed federal requirements	Flooding Flash Flooding		**X**		2022 – 2027	FMA Local	Cambria County Planning Commission
3.1.1	Planning and regulations	During the first year of the update period, conduct an assessment of the capacity of local municipalities to implement mitigation strategies.	All Hazards		**X**		2022 – 2023	Local	Cambria County Local Planning Team
3.1.2	Planning and regulations	During year two and continuing throughout the update period and based on the year one assessment, initiate actions to improve municipal capabilities for implementing mitigation strategies.	All Hazards		**X**		2023 – 2027	Local	Cambria County Local Planning Team
3.2.1	Structure and infrastructure	Develop an inspection program of critical facilities for the entire planning period to determine if any infrastructure problems exist or have occurred since the last planning period.	All Hazards	**X**			2022 - 2027	HMRF, EMPG, Local	Cambria County Department Emergency Services
3.2.2	Structure and infrastructure	Conduct an inventory of emergency generators at critical facilities, including but not limited to police stations, municipal buildings, and water treatment plants.	Utility Interruptions	**X**			2022 - 2027	HMRF, EMPG, Local	Cambria County Department of Emergency Services
3.2.3	Structure and infrastructure	Examine snow emergency route signage throughout the county and determine signs in need of replacement.	Winter Storm			**X**	2022 - 2027	Local	Pennsylvania Department of Transportation

Cambria County 2022 Mitigation Action Plan									
Action Number	Mitigation Actions			Prioritization			Implementation		
	Category	Description/ Action Items	Hazard Vulnerability	High	Medium	Low	Schedule	Funding	Local Champion
3.2.4	Structure and infrastructure	Determine the location of high-risk blighted properties adjacent to critical infrastructure facilities within the county.	Blighted Properties		**X**		2022 - 2027	Act 152 Funds and CDBG Funds	Cambria County Planning Commission Cambria County Redevelopment Authority Cambria County GIS Department
3.2.5	Structure and infrastructure	Utilizing hazardous material inventories, determine the locations of flammable substances in urban areas (boroughs, and cities).	Urban Fire and Explosions	**X**			2022 - 2027	Act 165 funds	Laurel Municipal Inspection Agency
3.2.6	Structure and infrastructure	Examine aging buildings and construction to inspect electrical systems for the potential of a fire.	Urban Fire and Explosions	**X**			2022 - 2027	Local	Cambria County Fire Departments
3.2.7	Structure and infrastructure	Conduct a GIS analysis to determine which housing and commercial structures lie within the Special Flood Hazard Area to determine the vulnerability of infrastructure to flooding and flash flooding events.	Flooding Flash Flooding		**X**		2022-2024	FMA Local	Cambria County GIS Department
4.1.1	Planning and regulations	Continue to consult in the creation and enforcement of enhanced stormwater ordinances to reduce flood losses.	Flooding Flash Flooding		**X**		2022 - 2027	Act 147	Cambria County Planning Commission

Cambria County 2022 Mitigation Action Plan									
Action Number	Mitigation Actions			Prioritization			Implementation		
	Category	Description/ Action Items	Hazard Vulnerability	High	Medium	Low	Schedule	Funding	Local Champion
4.2.1	Planning and regulations	Research the capability and feasibility of municipalities to utilize the National Flood Insurance Program's Community Rating System.	Flooding Flash Flooding	**X**			2022 – 2027	FMA Local	Cambria County Planning Commission
4.2.2	Planning and regulations	Assist any municipality that elects to participate in the National Flood Insurance Program's Community Rating System.	Flooding Flash Flooding		**X**		2022 - 2027	FMA Local	Cambria County Planning Commission
4.3.1	Structure and infrastructure	Encourage elevation or acquisition of flood-prone properties with repetitive loss properties having priority over other properties.	Flooding Flash Flooding		**X**		2022 - 2027	FMA BRIC Local	Cambria County Planning Commission
4.4.1	Education and awareness	Provide outreach opportunities on the need for flood insurance in municipalities with levees.	Flooding Flash Flooding Dam and Levee Failure		**X**		2022 - 2027	FMA Local	Cambria County Office of Emergency Services
5.1.1	Education and awareness	Distribute educational pamphlets about the HHPD program.	Dam Failure			**X**	2022 – 2027	Local	Cambria County Office of Emergency Services
5.2.1	Planning and regulations	Enhance local mitigation policies and programs that address high-hazard potential dams.	Dam Failure	**X**			2022 – 2027	Local	Cambria County Office of Emergency Services
5.3.1	Planning and regulations	Acquire or develop digitized dam inundation polygons in GIS to determine at risk populations for dams designated High-Hazard Potential Dams by FEMA.	Dam Failure		**X**		2022 - 2027	Local	Cambria County Office of Emergency Services

Cambria County 2022 Mitigation Action Plan									
Action Number	Mitigation Actions			Prioritization			Implementation		
	Category	Description/ Action Items	Hazard Vulnerability	High	Medium	Low	Schedule	Funding	Local Champion
5.3.2	Planning and regulations	Coordinate planning efforts regarding HHPD related items with the Pennsylvania Department of Environmental Protection Dam Safety personnel for the next planning period.	Dam Failure		**X**		2022 - 2027	Local	Cambria County Office of Emergency Services

Table 78 - Municipal Hazard Mitigation Actions Checklist

Municipal Hazard Mitigation Actions Checklist									
Municipality	1.1.1	1.2.1	1.3.1	1.3.2	1.3.3	1.3.4	1.3.5	1.4.1	2.1.1
Adams Township	X					X	X		X
Allegheny Township	X					X	X		X
Ashville Borough	X					X	X		X
Barr Township	X					X	X		X
Blacklick Township	X					X	X		X
Brownstown Borough	X					X	X		X
Cambria Township	X					X	X		X
Carrolltown Borough	X					X	X		X
Cassandra Borough	X					X	X		X
Chest Township	X					X	X		X
Chest Springs Borough	X					X	X		X
Clearfield Township	X					X	X		X
Conemaugh Township	X					X	X		X
Cresson Borough	X					X	X		X
Cresson Township	X					X	X		X
Croyle Township	X					X	X		X
Daisytown Borough	X					X	X		X
Dale Borough	X					X	X		X
Dean Township	X					X	X		X
East Carroll Township	X					X	X		X
East Conemaugh Borough	X					X	X		X
East Taylor Township	X					X	X		X
Ebensburg Borough	X					X	X		X

Municipal Hazard Mitigation Actions Checklist									
Municipality	1.1.1	1.2.1	1.3.1	1.3.2	1.3.3	1.3.4	1.3.5	1.4.1	2.1.1
Ehrenfeld Borough	X					X	X		X
Elder Township	X					X	X		X
Ferndale Borough	X					X	X		X
Franklin Borough	X					X	X		X
Gallitzin Borough	X					X	X		X
Gallitzin Township	X					X	X		X
Geistown Borough	X					X	X		X
Hastings Borough	X					X	X		X
Jackson Township	X					X	X		X
Johnstown City	X					X	X		X
Lilly Borough	X					X	X		X
Lorain Borough	X					X	X		X
Loretto Borough	X					X	X		X
Lower Yoder Township	X					X	X		X
Middle Taylor Township	X					X	X		X
Munster Township	X					X	X		X
Nanty Glo Borough	X					X	X		X
Northern Cambria Borough	X					X	X		X
Patton Borough	X					X	X		X
Portage Borough	X					X	X		X
Portage Township	X					X	X		X
Reade Township	X					X	X		X
Richland Township	X					X	X		X
Sankertown Borough	X					X	X		X
Scalp Level Borough	X					X	X		X
South Fork Borough	X					X	X		X
Southmont Borough	X					X	X		X
Stonycreek Township	X					X	X		X
Summerhill Borough	X					X	X		X
Summerhill Township	X					X	X		X
Susquehanna Township	X					X	X		X
Tunnelhill Borough	X					X	X		X
Upper Yoder Township	X					X	X		X
Vintondale Borough	X					X	X		X
Washington Township	X					X	X		X
West Carroll Township	X					X	X		X
Westmont Borough	X					X	X		X
West Taylor Township	X					X	X		X
White Township	X					X	X		X

Municipal Hazard Mitigation Actions Checklist									
Municipality	1.1.1	1.2.1	1.3.1	1.3.2	1.3.3	1.3.4	1.3.5	1.4.1	2.1.1
Wilmore Borough	X					X	X		X
Cambria County	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**

Municipal Hazard Mitigation Actions Checklist									
Municipality	2.1.2	2.2.1	2.2.2	2.2.3	2.2.4	2.2.5	2.3.1	3.1.1	3.1.2
Adams Township	X	X	X	X	X	X	X		
Allegheny Township	X	X	X	X	X	X	X		
Ashville Borough	X	X	X	X	X	X	X		
Barr Township	X	X	X	X	X	X	X		
Blacklick Township	X	X	X	X	X	X	X		
Brownstown Borough	X	X	X	X	X	X	X		
Cambria Township	X	X	X	X	X	X	X		
Carrolltown Borough	X	X	X	X	X	X	X		
Cassandra Borough	X	X	X	X	X	X	X		
Chest Township	X	X	X	X	X	X	X		
Chest Springs Borough	X	X	X	X	X	X	X		
Clearfield Township	X	X	X	X	X	X	X		
Conemaugh Township	X	X	X	X	X	X	X		
Cresson Borough	X	X	X	X	X	X	X		
Cresson Township	X	X	X	X	X	X	X		
Croyle Township	X	X	X	X	X	X	X		
Daisytown Borough	X	X	X	X	X	X	X		
Dale Borough	X	X	X	X	X	X	X		
Dean Township	X	X	X	X	X	X	X		
East Carroll Township	X	X	X	X	X	X	X		
East Conemaugh Borough	X	X	X	X	X	X	X		
East Taylor Township	X	X	X	X	X	X	X		
Ebensburg Borough	X	X	X	X	X	X	X		
Ehrenfeld Borough	X	X	X	X	X	X	X		
Elder Township	X	X	X	X	X	X	X		
Ferndale Borough	X	X	X	X	X	X	X		
Franklin Borough	X	X	X	X	X	X	X		
Gallitzin Borough	X	X	X	X	X	X	X		
Gallitzin Township	X	X	X	X	X	X	X		
Geistown Borough	X	X	X	X	X	X	X		
Hastings Borough	X	X	X	X	X	X	X		
Jackson Township	X	X	X	X	X	X	X		
Johnstown City	X	X	X	X	X	X	X		

Municipal Hazard Mitigation Actions Checklist									
Municipality	2.1.2	2.2.1	2.2.2	2.2.3	2.2.4	2.2.5	2.3.1	3.1.1	3.1.2
Lilly Borough	X	X	X	X	X	X	X		
Lorain Borough	X	X	X	X	X	X	X		
Loretto Borough	X	X	X	X	X	X	X		
Lower Yoder Township	X	X	X	X	X	X	X		
Middle Taylor Township	X	X	X	X	X	X	X		
Munster Township	X	X	X	X	X	X	X		
Nanty Glo Borough	X	X	X	X	X	X	X		
Northern Cambria Borough	X	X	X	X	X	X	X		
Patton Borough	X	X	X	X	X	X	X		
Portage Borough	X	X	X	X	X	X	X		
Portage Township	X	X	X	X	X	X	X		
Reade Township	X	X	X	X	X	X	X		
Richland Township	X	X	X	X	X	X	X		
Sankertown Borough	X	X	X	X	X	X	X		
Scalp Level Borough	X	X	X	X	X	X	X		
South Fork Borough	X	X	X	X	X	X	X		
Southmont Borough	X	X	X	X	X	X	X		
Stonycreek Township	X	X	X	X	X	X	X		
Summerhill Borough	X	X	X	X	X	X	X		
Summerhill Township	X	X	X	X	X	X	X		
Susquehanna Township	X	X	X	X	X	X	X		
Tunnelhill Borough	X	X	X	X	X	X	X		
Upper Yoder Township	X	X	X	X	X	X	X		
Vintondale Borough	X	X	X	X	X	X	X		
Washington Township	X	X	X	X	X	X	X		
West Carroll Township	X	X	X	X	X	X	X		
Westmont Borough	X	X	X	X	X	X	X		
West Taylor Township	X	X	X	X	X	X	X		
White Township	X	X	X	X	X	X	X		
Wilmore Borough	X	X	X	X	X	X	X		
Cambria County	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**

Municipal Hazard Mitigation Actions Checklist									
Municipality	3.2.1	3.2.2	3.2.3	3.2.4	3.2.5	3.2.6	3.2.7	4.1.1	4.2.1
Adams Township	X	X		X		X	X	X	X
Allegheny Township	X	X		X		X	X	X	X
Ashville Borough	X	X		X	X	X	X	X	X
Barr Township	X	X		X		X	X	X	X
Blacklick Township	X	X		X		X	X	X	X
Brownstown Borough	X	X		X	X	X	X	X	X

Municipal Hazard Mitigation Actions Checklist									
Municipality	3.2.1	3.2.2	3.2.3	3.2.4	3.2.5	3.2.6	3.2.7	4.1.1	4.2.1
Cambria Township	X	X		X		X	X	X	X
Carrolltown Borough	X	X		X	X	X	X	X	X
Cassandra Borough	X	X		X	X	X	X	X	X
Chest Township	X	X		X		X	X	X	X
Chest Springs Borough	X	X		X	X	X	X	X	X
Clearfield Township	X	X		X		X	X	X	X
Conemaugh Township	X	X		X		X	X	X	X
Cresson Borough	X	X		X	X	X	X	X	X
Cresson Township	X	X		X		X	X	X	X
Croyle Township	X	X		X		X	X	X	X
Daisytown Borough	X	X		X	X	X	X	X	X
Dale Borough	X	X		X	X	X	X	X	X
Dean Township	X	X		X		X	X	X	X
East Carroll Township	X	X		X		X	X	X	X
East Conemaugh Borough	X	X		X	X	X	X	X	X
East Taylor Township	X	X		X		X	X	X	X
Ebensburg Borough	X	X		X	X	X	X	X	X
Ehrenfeld Borough	X	X		X	X	X	X	X	X
Elder Township	X	X		X		X	X	X	X
Ferndale Borough	X	X		X	X	X	X	X	X
Franklin Borough	X	X		X	X	X	X	X	X
Gallitzin Borough	X	X		X	X	X	X	X	X
Gallitzin Township	X	X		X		X	X	X	X
Geistown Borough	X	X		X	X	X	X	X	X
Hastings Borough	X	X		X	X	X	X	X	X
Jackson Township	X	X		X		X	X	X	X
Johnstown City	X	X		X	X	X	X	X	X
Lilly Borough	X	X		X	X	X	X	X	X
Lorain Borough	X	X		X	X	X	X	X	X
Loretto Borough	X	X		X	X	X	X	X	X
Lower Yoder Township	X	X		X		X	X	X	X
Middle Taylor Township	X	X		X		X	X	X	X
Munster Township	X	X		X		X	X	X	X
Nanty Glo Borough	X	X		X	X	X	X	X	X
Northern Cambria Borough	X	X		X	X	X	X	X	X
Patton Borough	X	X		X	X	X	X	X	X
Portage Borough	X	X		X	X	X	X	X	X
Portage Township	X	X		X		X	X	X	X
Reade Township	X	X		X		X	X	X	X

Municipal Hazard Mitigation Actions Checklist									
Municipality	3.2.1	3.2.2	3.2.3	3.2.4	3.2.5	3.2.6	3.2.7	4.1.1	4.2.1
Richland Township	X	X		X		X	X	X	X
Sankertown Borough	X	X		X	X	X	X	X	X
Scalp Level Borough	X	X		X	X	X	X	X	X
South Fork Borough	X	X		X	X	X	X	X	X
Southmont Borough	X	X		X	X	X	X	X	X
Stonycreek Township	X	X		X		X	X	X	X
Summerhill Borough	X	X		X	X	X	X	X	X
Summerhill Township	X	X		X		X	X	X	X
Susquehanna Township	X	X		X		X	X	X	X
Tunnelhill Borough	X	X		X	X	X	X	X	X
Upper Yoder Township	X	X		X		X	X	X	X
Vintondale Borough	X	X		X	X	X	X	X	X
Washington Township	X	X		X		X	X	X	X
West Carroll Township	X	X		X		X	X	X	X
Westmont Borough	X	X		X	X	X	X	X	X
West Taylor Township	X	X		X		X	X	X	X
White Township	X	X		X		X	X	X	X
Wilmore Borough	X	X		X	X	X	X	X	X
Cambria County	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**

Municipal Hazard Mitigation Actions Checklist									
Municipality	4.2.2	4.3.1	4.4.1	5.1.1	5.2.1	5.3.1			
Adams Township	X	X			X				
Allegheny Township	X	X			X				
Ashville Borough	X	X			X				
Barr Township	X	X			X				
Blacklick Township	X	X			X				
Brownstown Borough	X	X			X				
Cambria Township	X	X			X				
Carrolltown Borough	X	X			X				
Cassandra Borough	X	X			X				
Chest Township	X	X			X				
Chest Springs Borough	X	X			X				
Clearfield Township	X	X			X				
Conemaugh Township	X	X			X				
Cresson Borough	X	X			X				
Cresson Township	X	X			X				
Croyle Township	X	X			X				

Municipal Hazard Mitigation Actions Checklist									
Municipality	4.2.2	4.3.1	4.4.1	5.1.1	5.2.1	5.3.1			
Daisytown Borough	X	X			X				
Dale Borough	X	X			X				
Dean Township	X	X			X				
East Carroll Township	X	X			X				
East Conemaugh Borough	X	X			X				
East Taylor Township	X	X			X				
Ebensburg Borough	X	X			X				
Ehrenfeld Borough	X	X			X				
Elder Township	X	X			X				
Ferndale Borough	X	X			X				
Franklin Borough	X	X			X				
Gallitzin Borough	X	X			X				
Gallitzin Township	X	X			X				
Geistown Borough	X	X			X				
Hastings Borough	X	X			X				
Jackson Township	X	X			X				
Johnstown City	X	X	X		X				
Lilly Borough	X	X			X				
Lorain Borough	X	X			X				
Loretto Borough	X	X			X				
Lower Yoder Township	X	X			X				
Middle Taylor Township	X	X			X				
Munster Township	X	X			X				
Nanty Glo Borough	X	X	X		X				
Northern Cambria Borough	X	X	X		X				
Patton Borough	X	X	X		X				
Portage Borough	X	X			X				
Portage Township	X	X			X				
Reade Township	X	X			X				
Richland Township	X	X			X				
Sankertown Borough	X	X			X				
Scalp Level Borough	X	X	X		X				
South Fork Borough	X	X			X				
Southmont Borough	X	X			X				
Stonycreek Township	X	X			X				
Summerhill Borough	X	X			X				
Summerhill Township	X	X			X				
Susquehanna Township	X	X	X		X				
Tunnelhill Borough	X	X			X				

Municipal Hazard Mitigation Actions Checklist									
Municipality	4.2.2	4.3.1	4.4.1	5.1.1	5.2.1	5.3.1			
Upper Yoder Township	X	X			X				
Vintondale Borough	X	X	X		X				
Washington Township	X	X			X				
West Carroll Township	X	X			X				
Westmont Borough	X	X			X				
West Taylor Township	X	X			X				
White Township	X	X			X				
Wilmore Borough	X	X			X				
Cambria County	**X**	**X**	**X**	**X**	**X**	**X**			

Table 79 - Objective to Action Checklist

Objective	Number of Actions
Objective 1.1	1
Objective 1.2	2
Objective 1.3	5
Objective 1.4	1
Objective 2.1	2
Objective 2.2	5
Objective 2.3	1
Objective 3.1	2
Objective 3.2	7
Objective 4.1	1
Objective 4.2	2
Objective 4.3	1
Objective 4.4	1
Objective 5.1	1
Objective 5.2	1
Objective 5.3	1

Table 80 - Actions Tied to Hazard

Hazard	Actions Tied to Hazard
Blighted Properties (New)	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1, 3.2.4

Hazard	Actions Tied to Hazard
Building/Structure Collapse	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Civil Disturbance (New)	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Cyber Attack (New)	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Dam and Levee Failure	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1, 4.4.1, 5.1.1, 5.2.1, 5.3.1
Disorientation	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Drought	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Drowning	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Emergency Services (New)	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Environmental Hazards - Transportation HazMat	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Environmental Hazards - Fixed Facility HazMat	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Extreme Temperatures	1.1.1, 1.2.1, 1.3.1, 1.3.2, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Flash Flooding	1.1.1, 1.2.1, 1.3.1, 1.3.5, 1.4.1, 2.1.1, 2.1.2, 2.2.1, 2.2.2, 2.2.5, 2.3.1, 3.1.1, 3.1.2, 3.2.1, 3.2.7, 4.1.1, 4.2.1, 4.2.2, 4.3.1, 4.4.1
Flooding (100-year flood)	1.1.1, 1.2.1, 1.3.1, 1.3.5, 1.4.1, 2.1.1, 2.1.2, 2.2.1, 2.2.2, 2.2.5, 2.3.1, 3.1.1, 3.1.2, 3.2.1, 3.2.7, 4.1.1, 4.2.1, 4.2.2, 4.3.1, 4.4.1
Hailstorm	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Hurricane/Tropical Storm (New)	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Ice Jam Flooding	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Invasive Species (New)	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.4, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Landslide	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Levee Failure	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1

Hazard	Actions Tied to Hazard
Lightning Strike	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Opioid Epidemic	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.3, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Pandemic/Health Emergency	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.3, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Radon	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Subsidence/Sinkhole	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Terrorism Attack	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Tornado	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Transportation Accidents	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Urban Fire and Explosions	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1, 3.2.5, 3.2.6
Utility Interruptions	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1, 3.2.2
Wildfire	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Wind Storm	1.1.1, 1.2.1, 1.3.1, 1.3.3, 1.3.4, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1
Winter storm (New)	1.1.1, 1.2.1, 1.3.1, 1.4.1, 2.2.1, 2.2.2, 2.2.5, 3.1.1, 3.1.2, 3.2.1, 3.2.3

7. Plan Maintenance

7.1. Update Process Summary

Monitoring, evaluating, and updating this plan is critical to maintaining its value and success in Cambria 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. This HMP update also defines the municipalities' role in updating and evaluating the plan. Finally, the 2022 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 Cambria County is a responsibility of all levels of government (i.e., county, and local), as well as the citizens of the county. The Cambria 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 and risk analysis reflect the 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 Cambria 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 with the county.

- Complete a review and update of the capability assessment section. Identify any capability weaknesses since the last review.
- Complete a review of the mitigation strategy section. Review the goals and objectives identified in the 2022 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 Cambria County Department of Emergency Services will maintain a copy of these records and place them in Appendix I of this plan. Cambria County will continue to work with all municipalities regarding hazard mitigation projects, especially those municipalities that did not submit projects for inclusion in this plan.

7.3. Continued Public Involvement

The Cambria County Department of Emergency Services will ensure that the 2022 Cambria County Hazard Mitigation Plan is posted and maintained on the Cambria County website and will continue to encourage public review and comment on the plan. The Cambria County website that the plan will be located at is as follows:
https://sites.google.com/view/cambriacountyema/home/planning-resource-documents

The public will have access to the 2022 Cambria County HMP through their local municipal office, the Cambria County Planning Commission, or the Cambria County Department of Emergency Services. Information on upcoming events related to the HMP or solicitation for comments will be announced via newsletters, newspapers, mailings, and the county website.

The citizens of Cambria County are encouraged to submit their comments to elected officials and/or members of the Cambria County HMP Local Planning Team. To promote public participation, the Cambria County Local Planning Team will post a public comment form as wells 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 Cambria County Hazard Mitigation Planning Team.

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 2022 Cambria County Hazard Mitigation Plan. Copies of the adopting resolutions are included in this plan in Appendix J. FEMA Region III in Philadelphia, Pennsylvania is the final approval authority for the Hazard Mitigation Plan. PEMA also reviews the plan before submission to FEMA.

1. Appendices

APPENDIX A:	**References**
APPENDIX B:	**FEMA Local Mitigation Review Tool**
APPENDIX C:	**Meetings and Support Documents**
APPENDIX D:	**Municipal Flood Maps**
APPENDIX E:	**Critical and Special Needs Facilities**
APPENDIX F:	**2021 HAZUS Reports**
APPENDIX G:	**2021 Mitigation Project Opportunities**
APPENDIX H:	**2021 Mitigation Action Evaluation & Prioritization**
APPENDIX I:	**Annual Review Documentation**
APPENDIX J:	**Cambria County & Municipal Adoption Resolutions**