Indiana County 2023 Hazard Mitigation Plan

Prepared for:

Indiana County Department Management Agency

85 Haven Dr.

Indiana, PA 15701

Prepared by:

MCM Consulting Group, Inc.

328 Innovation Boulevard

State College, PA 16803

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Certification of Annual Review Meetings

YEAR	DATE OF MEETING	PUBLIC OUTREACH ADDRESSED? *	SIGNATURE
2023			
2024			
2025			
2026			
2027			

**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)

Table of Contents

Figures

Tables

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/Sciences
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
SC:	Steering Committee
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 2022, the Indiana County Emergency Management Agency contracted the services of a consulting agency to revise and update the Indiana County Hazard Mitigation Plan. The plan was successfully updated in accordance with the requirements set forth by PEMA and FEMA. The updated Indiana County Hazard Mitigation Plan was adopted by the Indiana County Commissioners in 2023. Thirty-six of the thirty-eight municipalities adopted the 2018 Indiana County Hazard Mitigation Plan as the municipal hazard mitigation plan, and it is anticipated that all participating municipalities will adopt the 2023 Indiana County Hazard Mitigation Plan Update.

The Indiana County Commissioners secured a grant to complete the 2023 update to the Indiana 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 November 14, 2022.

The planning process for the 2023 Indiana 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 in person with a virtual option, 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:

- Invasive Species
- Pandemic, Epidemic and Infectious Disease
- Drought
- Flash Flood
- Extreme Temperatures (Suggested 2023)
- Windstorm
- Tornado
- Subsidence
- Radon Exposure
- Winter Storm
- Flood
- Landslide
- Earthquake
- Ice Jam Flood

Human-caused hazards:

- Emergency Services (Suggested 2023)
- Terrorism and Cyberterrorism
- Utility Interruption
- Environmental Hazards: Fixed Facility
- Transportation Accidents
- Opioid Epidemic
- Environmental Hazards: Transportation
- Blighted Properties (Suggested 2023)
- Civil Disturbance
- Dam Failure
- Levee Failure

A total of twenty-five hazards have been identified in the 2023 Indiana County Hazard Mitigation Plan. A total of twenty-two identified hazards were listed in the previous 2018 plan update. The new hazards include emergency services, extreme temperatures, and blighted properties.

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 fifty-six actions were developed for this plan update as they pertain to hazards identified by the local planning team. The 2018 Indiana County Hazard Mitigation Plan consisted of forty-nine 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 forty-seven project opportunity forms were submitted during the 2018 HMP update. A total of thirty-five project opportunities were submitted for this plan update.

The 2023 Indiana County Hazard Mitigation Plan is the cornerstone to reducing Indiana 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 2023 Indiana 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 Indiana 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 Indiana County and all of its thirty-eight municipalities. The Indiana County Emergency Management Agency was charged by the County Board of Commissioners to prepare the 2023 plan. The 2023 HMP has been utilized and maintained during the five-year life cycle.

The Indiana 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 Indiana County as a sub-grantee. The Indiana County Commissioners assigned the Indiana County Emergency Management Agency with the primary responsibility to update the hazard mitigation plan. MCM Consulting Group, Inc. was selected to complete the update of the HMP. A local hazard mitigation planning team was developed comprised of government leaders and citizens from Indiana County. This updated HMP will provide another solid foundation for the Indiana 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 Indiana County Multi-Jurisdictional Hazard Mitigation Plan serves as a framework for saving lives, protecting assets, and preserving the economic viability of the forty-eight municipalities in Indiana County. The HMP outlines actions designed to address and reduce the impact of a full range of natural hazards facing Indiana 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 Indiana 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

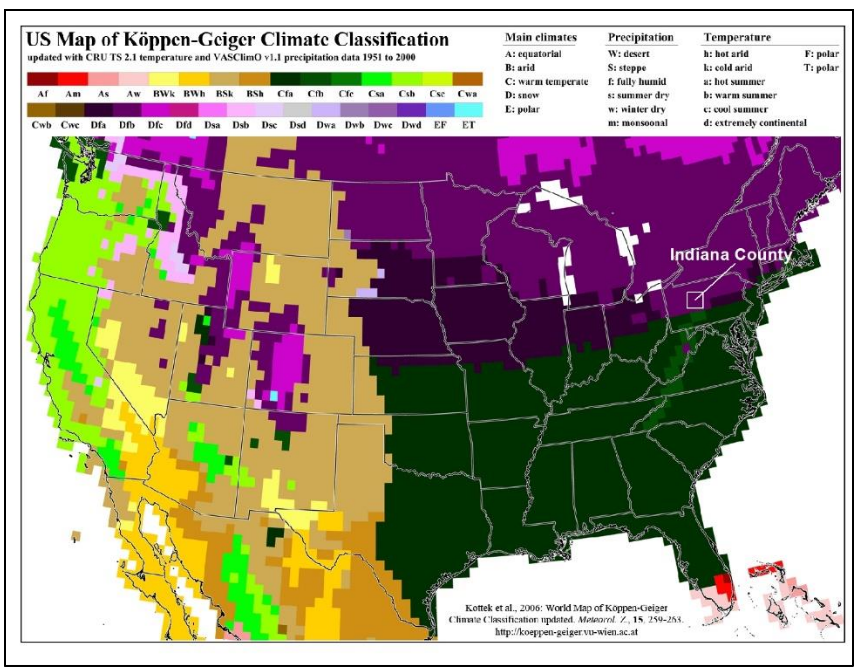
2.1. Geography and the Environment

Indiana County covers approximately 834 square miles and is situated in south-western Pennsylvania. The county is bordered by Armstrong and Westmoreland counties in the west and by Jefferson County to the north, Clearfield and Cambria counties to the east, and Westmoreland County to the south. Indiana County lies within one physiographic province of Pennsylvania—the Appalachian Plateaus Province. The county is the 36th ranked county in terms of population within the Commonwealth of Pennsylvania. There is a total of 827 square miles of land and 7 square miles of water.

Indiana County presents a wide range of topographic features. The surface ranges from almost level on plateaus and in valleys, to rolling and hilly in other areas. Elevations in the county range from a high of 2,153.67 feet near East Wheatfield in the southeast of the county to the northwest to a low of 816.56 feet at the Kiskiminetas River near Saltsburg.

The Köppen-Geiger Climate Areas map classifies Indiana County and the rest of Pennsylvania as Humid Continental, which can be seen in *Figure X – 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 - Koppen-Geiger Map



According to current data, the climate in Indiana County is temperate, characterized by moderately hot summers and moderately severe winters. In winter, the average temperature is 30.10˚F and the average daily minimum temperature is 28.6˚F. In summer, the average temperature is 69.53˚F and the average daily maximum temperature is 90.33˚F. The average amount of snowfall each winter is 12.75 inches.

River and stream valleys dominate the landscape of Indiana County. The Kiskiminetas River is the primary feature in Indiana County and the river through the entire county. Its major tributaries include Conemaugh River, the Conemaugh River Reservoir, and Sulphur Run. The Kiskiminetas River is itself a tributary to the Allegheny River.

Indiana County is comprised of four large watersheds and 180 small watersheds. The large watersheds are listed below and can be found in *Figure X – Indiana County Watersheds*:

Table 1 - Watersheds in Indiana County

Watersheds in Indiana County	
Name	**Area of County**
Conemaugh	Southeast
Kiskiminetas	Southwest
Middle Alleghany-Redbank	West and Northwest
Upper West Branch Susquehanna	Northeast

2.2. Community Facts

Indiana County was created from parts of Westmoreland and Clearfield counties in 1806. Indiana County is named so based on the history of the county and the Indiana Grant of 1768. The county seat is the borough of Indiana, which is home to Indiana University of Pennsylvania.

The following cities, boroughs and townships are located in Indiana County:

- Boroughs: Armagh, Blairsville, Cherry Tree, Clymer, Creekside, Ernest, Glen Campbell, Homer City, Indiana (County Seat), Marion Center, Plumville, Saltsburg, Shelocta, and Smicksburg.
- Townships: Armstrong, Banks, Black Lick, Brush Valley, Buffington, Burrell, Canoe, Center, Cherryhill, Conemaugh, East Mahoning, East Wheatfield, Grant, Green, Montgomery, North Mahoning, Pine, Rayne, South Mahoning, Washington, West Mahoning, West Wheatfield, White, and Young.

Indiana County is home to a large number of cultural places, historic buildings, and museums that make up an important part of the county. The county has four museums which include the Jimmy Stewart Museum, the Blairsville Area Underground Railroad Museum, the Rebecca B.

Hadden Stone House Museum, and the Indiana University of Pennsylvania (IUP) University Museum. The Jimmy Stewart Museum is located in the borough of Indiana and focuses on the career and life of Jimmy Stewart, a Hollywood actor who was born and raised in Indiana, Pennsylvania. The Blairsville Area Underground Railroad Museum is a museum that preserves and presents the history of the Underground Railroad in and around Indiana County. This museum is 100% volunteer. The Rebecca B. Hadden Stone House Museum is focused on local history and covers topics interesting to residents and visitors to Indiana County. This museum also displays period furnishings, artifacts, and historical records. Finally, the Indiana University of Pennsylvania (IUP) University Museum covers material history and the region around Indiana County to connect and encourage dialogue in those areas. The museums can be seen on *Figure X – Indiana County Museums and Historic Buildings*.

The National Register of Historic Places lists fifteen locations in Indiana County that are National Historic Places. These buildings and locations can be found in *Table X – Indiana County National Historic Places*, including the year that the building was added to the list and the municipality where it is located.

Table 2 - Indiana County National Historic Places

Indiana County National Historic Places		
Building/Location Name	**Date Added to NRHP**	**Municipality**
Blairsville Armory	12/22/1989	Blairsville Borough
Breezedale	03/29/1979	Indiana Borough
Buffalo, Rochester, & Pittsburgh Passenger Railway Station	05/10/1993	Indiana Borough
George Diehl Homestead	04/30/1987	Cherryhill Township
Graff's Market	12/04/1980	Indiana Borough
Indiana Armory	11/14/1991	Indiana Borough
Indiana Borough 1912 Municipal Building	09/07/1983	Indiana Borough
James Mitchell House	12/04/1978	Indiana Borough
John B. McCormick House	05/03/1974	South Mahoning Township
John Sutton Hall	09/17/1975	Indiana Borough
Old Indiana County Courthouse	10/29/1974	Indiana Borough
Old Indiana County Jail and Sheriff's Office	09/27/1979	Indiana Borough
Senator Joseph O. Clark House	09/08/2011	Glen Campbell Borough
Silas M. Clark House	06/15/1978	Indiana Borough
St. Peter's Episcopal Church and Rectory	05/09/1988	Blairsville Borough

2.3. Population and Demographics

The total population for Indiana County is 83,246 based on 2020 United States Census Bureau. The total change in population for Indiana County from 2010 to 2020 was a decrease of 5,634 and a change of -6.34%. The most populous municipality is White Township. The municipalities in the county that had the largest percentage of decrease from 2010 to 2020 were Cherry Tree Borough (-24.18%), Shelocta Borough (-21.54), and Burrell Township (-19.76%). The only municipality that had an increase percentage for the period from 2010 to 2020 was Smicksburg Borough (23.91%). *Table X – Population Change in Indiana 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 X – Indiana County Population Density* illustrates the average population density values per census track in the various municipalities of Indiana County.

Table 3 - Population Change in Indiana County

Population Change in Indiana County from 2010-2020			
Municipality	**2010 Census**	**2020 Census**	**Percent of Change 2010-2020**
Armagh Borough	122	103	-15.57%
Armstrong Township	2,998	2,786	-7.07%
Banks Township	1,018	914	-10.22%
Black Lick Township	1,237	1,133	-8.41%
Blairsville Borough	3,412	3,252	-4.69%
Brush Valley Township	1,858	1,695	-8.77%
Buffington Township	1,328	1,242	-6.48%
Burrell Township	4,393	3,525	-19.76%
Canoe Township	1,505	1,432	-4.85%
Center Township	4,764	4,443	-6.74%
Cherryhill Township	2,765	2,477	-10.42%
Cherry Tree Borough	364	276	-24.18%
Clymer Borough	1,357	1,336	-1.55%
Conemaugh Township	2,294	2,080	-9.33%
Creekside Borough	309	284	-8.09%
East Mahoning Township	1,077	975	-9.47%
East Wheatfield Township	2,366	2,161	-8.66%
Ernest Borough	462	422	-8.66%
Glen Campbell Borough	245	254	3.67%
Grant Township	741	639	-13.77%
Green Township	3,839	3,457	-9.95%
Homer City Borough	1,707	1,746	2.28%

Population Change in Indiana County from 2010-2020			
Municipality	**2010 Census**	**2020 Census**	**Percent of Change 2010-2020**
Indiana Borough	13,975	13,564	-2.94%
Marion Center Borough	451	413	-8.43%
Montgomery Township	1,568	1,439	-8.23%
North Mahoning Township	1,428	1,349	-5.53%
Pine Township	2,033	1,881	-7.48%
Plumville Borough	307	257	-16.29%
Rayne Township	2,992	2,809	-6.12%
Saltsburg Borough	873	780	-10.65%
Shelocta Borough	130	102	-21.54%
Smicksburg Borough	46	57	23.91%
South Mahoning Township	1,841	1,841	0.00%
Washington Township	1,808	1,670	-7.63%
West Mahoning Township	1,357	1,337	-1.47%
West Wheatfield Township	2,314	2,164	-6.48%
White Township	15,821	15.242	-3.66%
Young Township	1,775	1,709	-3.72%
TOTAL	**88,880**	**83,246**	**-6.34%**
Source: United States Census Bureau (2023), 2020 Census Data			

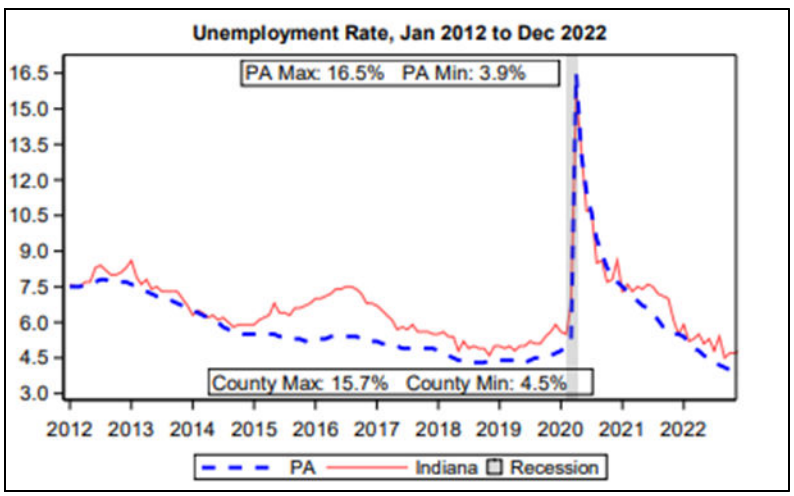
There are approximately 37,626 housing units in Indiana County, Pennsylvania. Of these housing units, there are an estimated 32,425 households within the county. Married couples make up a plurality of households in the county (48%), with an average household size of 3.07 persons. The estimated owner-occupied housing rate of Indiana County is 23,032, with an overall occupancy rate of 61.21% of all units. The median value of the owner-occupied housing units in Indiana County from 2016 to 2020 is $124,400.00. The median monthly owner's costs for a structure with a mortgage was $1,160.00 and the median monthly owner's costs for a structure without a mortgage was $473.00. The median gross rent for rental properties in Indiana County was $734.00 for the same date range.

The racial composition of the county is 94.6% White, 2.8% Black or African American, 1.5% Hispanic or Latino, 0.2% American Indian and Alaska Native, 1.1% Asian, 0% native Hawaiian and other Pacific Islander, and 1.3% two or more races. The median age of Indiana County is 40.1 years of age, which is lower than the median age of Pennsylvania at 40.9 and higher than the national median of 38.8 years of age. The percentage of Indiana County under the age of 5 years old is 2.4%, between the ages of 18 and 64 years old is 88.63%, and aged 65 years old and older is 8.97%.

The median household income for households in Indiana County is $52,023.00 and the poverty rate of Indiana County is 11.8% of the total population. The poverty rate for the Commonwealth of Pennsylvania as a whole is 12.1%. There are approximately 1,980 veterans in Indiana County. Of those veterans, approximately 1,398 were employed, 38 were unemployed, and 544 were not in the labor force. The unemployment rate among veterans in Indiana County was 2.6%.

The COVID-19 Pandemic created an increase in unemployment and interruptions in employment throughout the United States, to include Pennsylvania and Indiana County. According to Pennsylvania Department of Labor and Industry data, there was a large spike in unemployment both across the Commonwealth and Indiana County. At the height of the Covid-19 Pandemic in the spring of 2020, the unemployment rate for Indiana County hit 15.7% of the working population of the county. That is lower than the peak unemployment percentage for Pennsylvania, which peaked at 16.5% of the working population of the entire state. *Figure X – Unemployment Rate Jan. 2012 to Dec. 2022* illustrates the trend and large spike in unemployment. The unemployment rate for Indiana County in December, 2022 was 4.8%, which roughly accounted for 1,700 working age adults (ages 16 to 65). The total estimated workforce for Indiana County was 36,300 working age adults (ages 16 to 65) in December of 2022.

Figure 2 - Unemployment Rate Jan. 2012 to Dec. 2022



Source: Pennsylvania Department of Labor & Industry, 2022

Indiana County's leading industries are education, healthcare, social services, manufacturing, and retail trade. The primary employment providers within Indiana County are displayed below in ***Error! Reference source not found.***

Table 4 - Indiana County Top Employers

Indiana County Top Employers	
Ranking	**Company/Organization**
1	State Government
2	Indiana Regional Medical Center
3	Pennsylvania State System of Higher Education
4	Diamond Drugs, Inc.
5	Wal-Mart Associates, Inc.
6	S&T Bank
7	Indiana County
8	Rosebud Mining Company
9	First Commonwealth Bank
10	Indiana Area School District
Source: Pennsylvania Department of Labor & Industry, 2023	

The top employers' data was obtained through the Pennsylvania Department of Labor and Industry, 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 X – Quarterly Census of Employment and Wages, 2022 Annual Averages in Indiana County* only calls out how many locations per NAICS description and total number of employees.

Table 5 - Quarterly Census of Employment and Wages, 2022 Annual Averages in Indiana County

Quarterly Census of Employment and Wages, 2021 Annual Averages in Indiana County (PA DLI)					
NAICS	**Description**	**Number of Locations**	**Number of Employees**	**Employment Percentage**	**Average Wages**
11	Agriculture, Forestry, Fishing, and Hunting	35	236	.9	$36,342.00
21	Mining, Quarrying, and Oil & Gas	67	1,010	3.7	$78,565.00
22	Utilities	24	737	2.7	$115,394.00
23	Construction	158	1,237	4.6	$60,866.00
31-33	Manufacturing	84	1,992	7.4	$52,542.00
42	Wholesale Trade	73	1,481	5.5	$50,453.00

Quarterly Census of Employment and Wages, 2021 Annual Averages in Indiana County (PA DLI)					
NAICS	**Description**	**Number of Locations**	**Number of Employees**	**Employment Percentage**	**Average Wages**
44-45	Retail Trade	251	3,734	13.8	$30,667.00
48-49	Transportation and Warehousing	99	953	3.5	$41,812.00
51	Information	19	177	.7	$49,449.00
52	Finance and Insurance	96	1,382	5.1	$72,245.00
53	Real Estate, Rental, and Leasing	46	357	1.3	$152,884.00
54	Professional and Technical Services	130	1,002	3.7	$54,248.00
55	Management of Companies and Enterprises	14	212	.8	$115,213.00
56	Administrative and Waste Services	68	689	2.5	$40,938.00
61	Educational Services	46	2,691	9.9	$69,197.00
62	Healthcare and Social Assistance	344	4,454	16.5	$47,507.00
71	Arts, Entertainment, and Recreation	19	161	.6	$19,160.00
72	Accommodation and Food Services	152	2,137	7.9	$17,205.00
81	Other Services (Except Public Administration)	169	1,148	4.2	$39,605.00
92	Public Administration	60	1,281	4.7	$57,154.00
-	**Total, All Industries**	**1,954**	**27,071**	**100**	**$1,201,446.00**
NAICS (North American Industry Classification System)					

2.4. Land Use and Development

Indiana County is composed of thirty-eight municipalities, which include:

- 24 townships
- 14 boroughs

The majority of acreage in Indiana County is forested to some degree, while approximately 28.02% (or 148,288 acres) of the acreage is agriculture. The land use in the county consists of forestland and provides recreational opportunity and wildfire habitat along the many lakes, ponds, and streams in the county. A large portion of the land in Indiana County is also used for pasture of cropland.

Indiana County has approximately 529,280 acres of total land area, and 4,672 acres of total water area with a population per square mile of 101 persons based on 2020 data estimates. Indiana County is largely rural in character, with no large cities, and a large portion of the county undeveloped. The amount of undeveloped land in the county has decreased over the pasty fifty years due to an increase in active agriculture and land disturbance. Both of these practices are considered development form a land use classification perspective. Approximately 75% of the county is either deciduous or evergreen forest, or mixed of the two. Approximately 28% of the land cover is agriculture and .88% of the land cover is taken up by water. Only a small portion of Indiana County is designated as residential, as visualized in *Figure X – Indiana County Land Cover.*

Future development for land use and land cover was examined to determine where future expansion may occur in the county. Consideration was given to the location of existing infrastructure, as well as possible future infrastructure expansion in urban and densely populated areas. The following municipalities were identified as the most prominent locations of future development with the county:

- Indiana Borough
- Blairsville Borough
- Homer City Borough
- Clymer Borough

2.5. Data Sources

The following data sources were used during the update process:

- United States Census Bureau.
- United States National Park Service.
- 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 Management Agency (PEMA).
- Indiana County Comprehensive Plan 2012.

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 off of 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 of these categories. In an effort to include a comprehensive list of prior storm events for Indiana 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 community lifelines. For the purposes of this plan, critical infrastructure facilities and community lifeline 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 Indiana 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 Indiana 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.

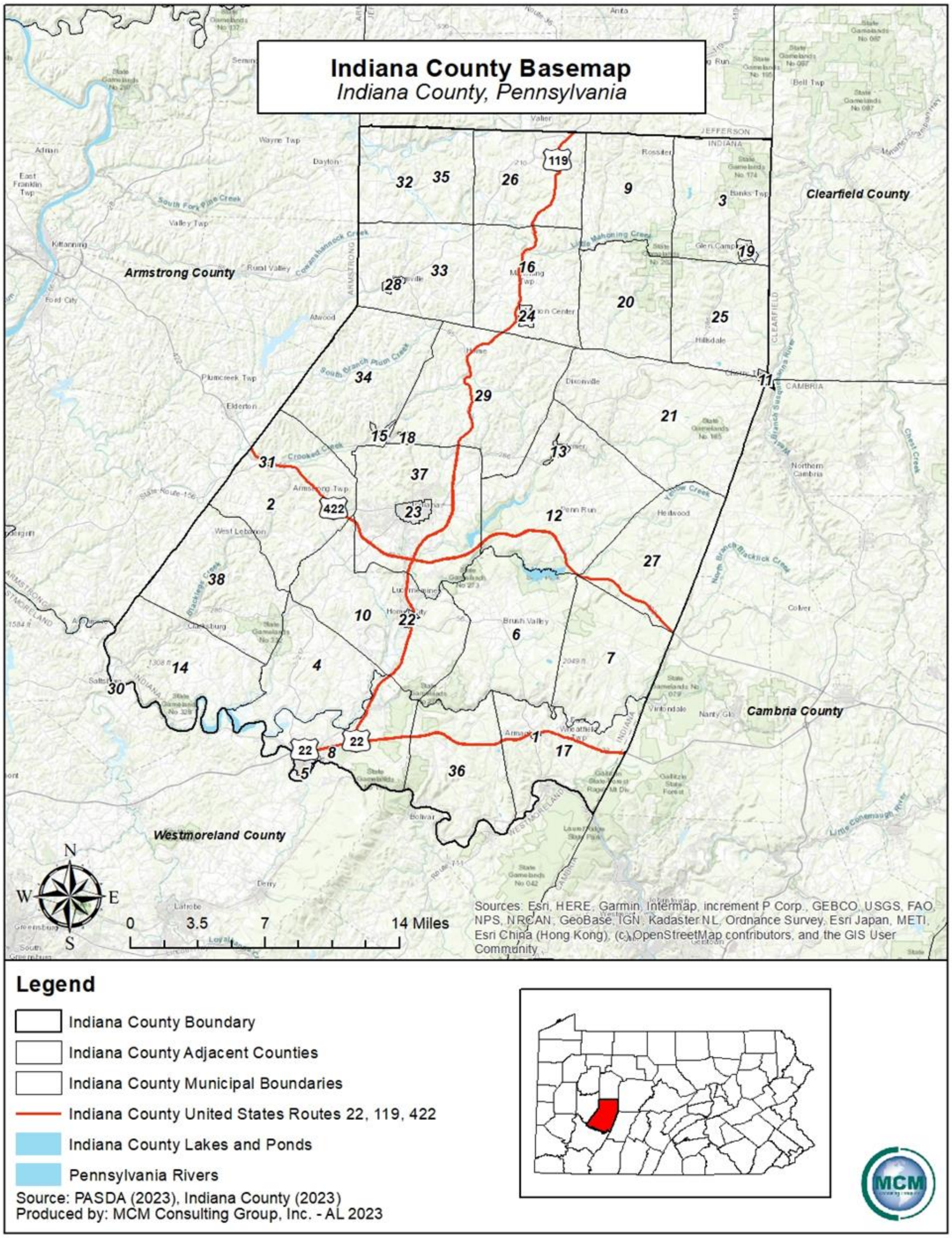
The Indiana County GIS Department provided the following layers for use in the development of hazard profiles and hazard profile mapping for the 2023 Hazard Mitigation Plan Update:

- Indiana County Addressable Structures
- Indiana County Boundary
- Indiana County Centerlines
- Indiana County EMS Stations
- Indiana County Fire Stations
- Indiana County Municipal Boundaries
- Indiana County Police Stations
- Indiana County Schools

The following GIS Data layers were developed for use in the 2023 Hazard Mitigation Plan Update:

- Indiana County Abandoned Mine Inventory
- Indiana County Community Lifelines
- Indiana County Electric Substations
- Indiana County Major Roadways
- Indiana County National Register of Historic Places
- Indiana County Powerplants
- Indiana County Rail Lines
- Indiana County Rivers
- Indiana County Slope Areas
- Indiana County Special Flood Hazard Area
- Indiana County State Roads
- Indiana County Tornado Tracks
- Indiana County Toxic Release Inventory Locations
- Indiana County Traffic Information
- Indiana County Zip Codes

Figure 3 - Indiana County Basemap



Basemap Continued:

Indiana County Basemap (Page 2)
Indiana County, Pennsylvania

Legend

- Indiana County Boundary
- Indiana County Adjacent Counties
- Indiana County Municipal Boundaries
- Indiana County United States Routes 22, 119, 422
- Indiana County Lakes and Ponds
- Pennsylvania Rivers

Municipalities:

1. Armaugh
2. Armstrong
3. Banks
4. Black Lick
5. Blairsville
6. Brush Valley
7. Buffington
8. Burrell
9. Canoe
10. Center
11. Cherry Tree
12. Cherryhill
13. Clymer
14. Conemaugh
15. Creekside
16. East Mahoning
17. East Wheatfield
18. Ernest
19. Glen Campbell
20. Grant
21. Green
22. Homer City
23. Indiana
24. Marion Center
25. Montgomery
26. North Mahoning
27. Pine
28. Plumville
29. Rayne
30. Saltsburg
31. Shelocta
32. Smicksburg
33. South Mahoning
34. Washington
35. West Mahoning
36. West Wheatfield
37. White
38. Young

Source: PASDA (2023), Indiana County (2023)
Produced by: MCM Consulting Group, Inc. - AL 2023

Figure 4 - Indiana County Watersheds

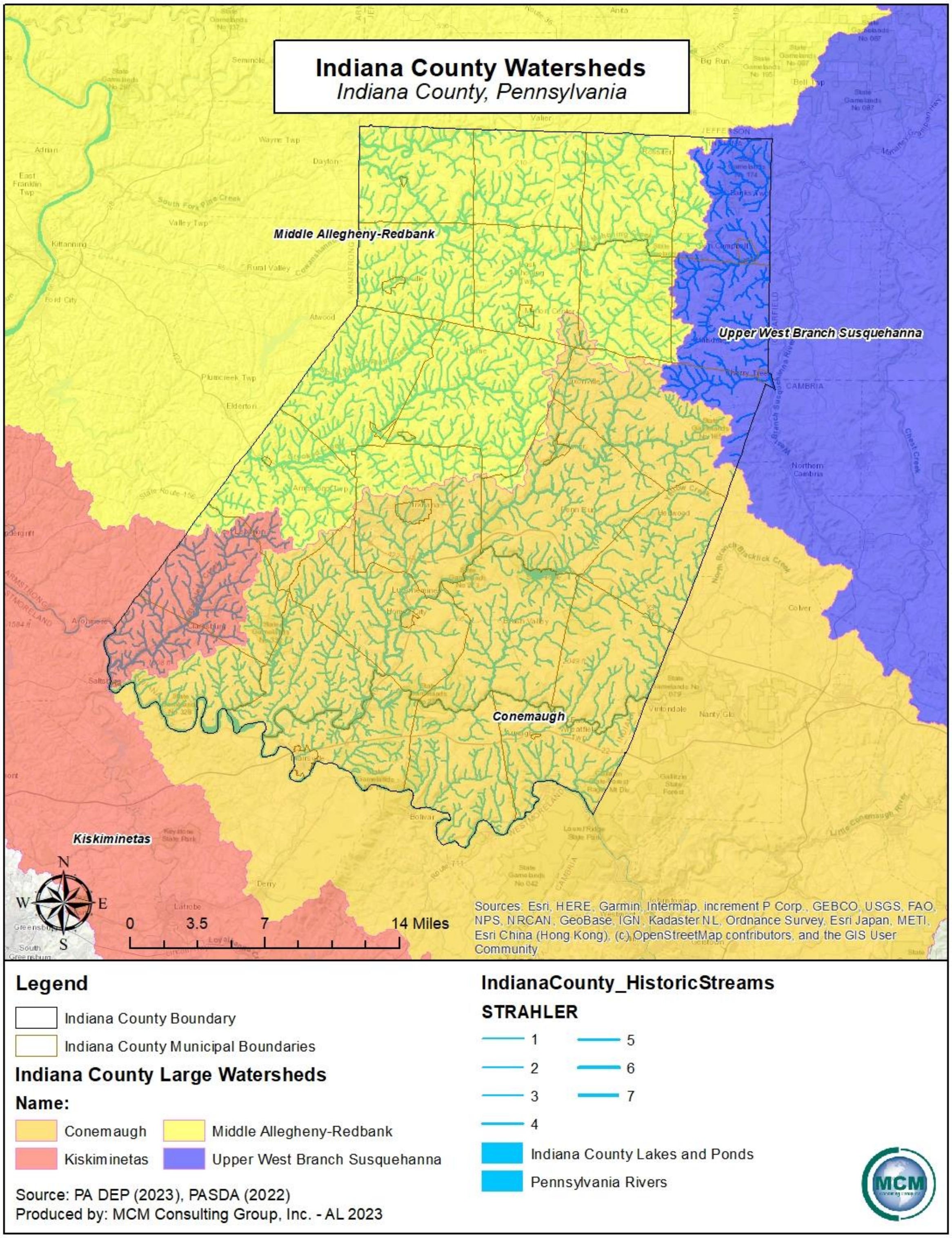


Figure 5 - Indiana County Population Density

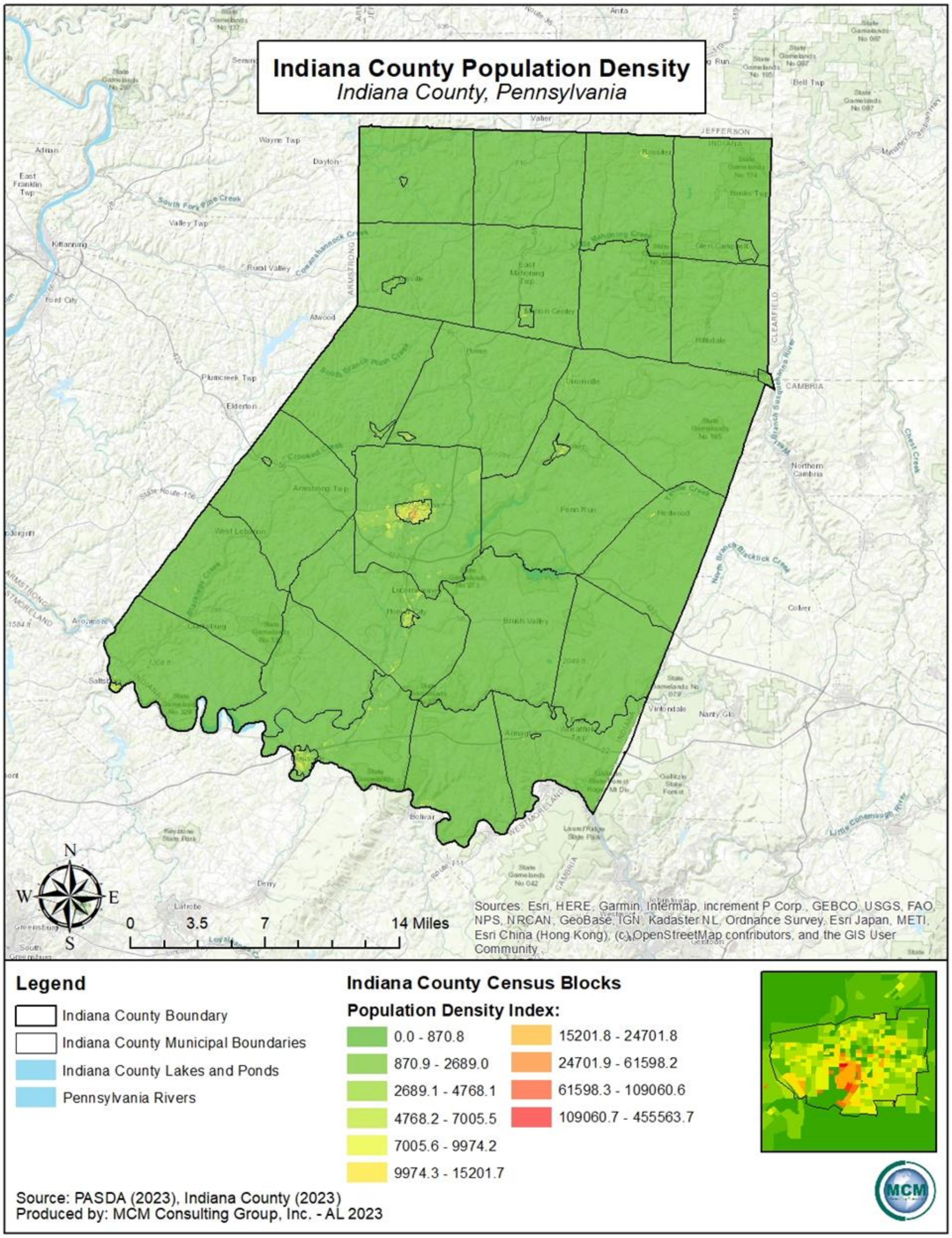


Figure 6 - Indiana County Land Cover

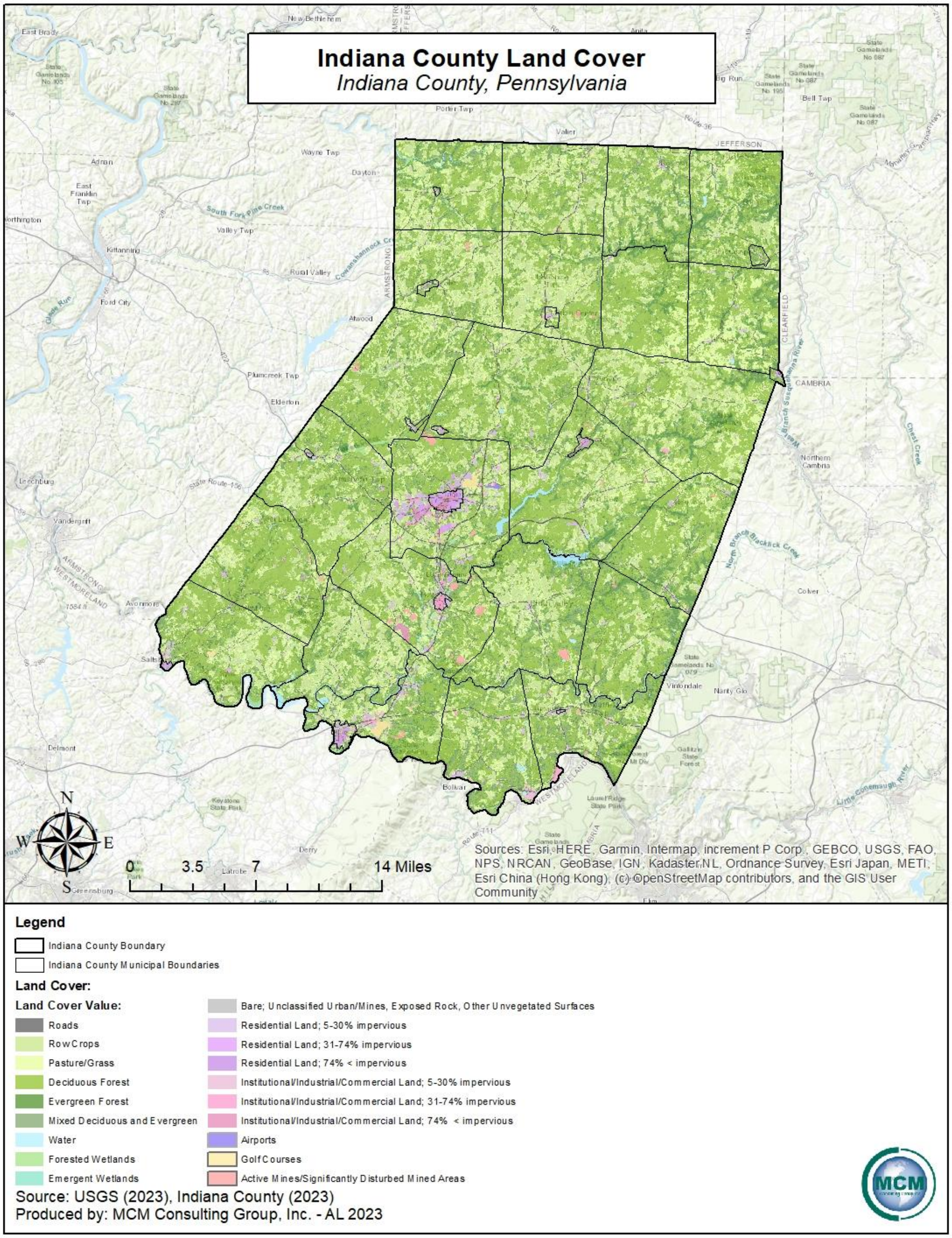
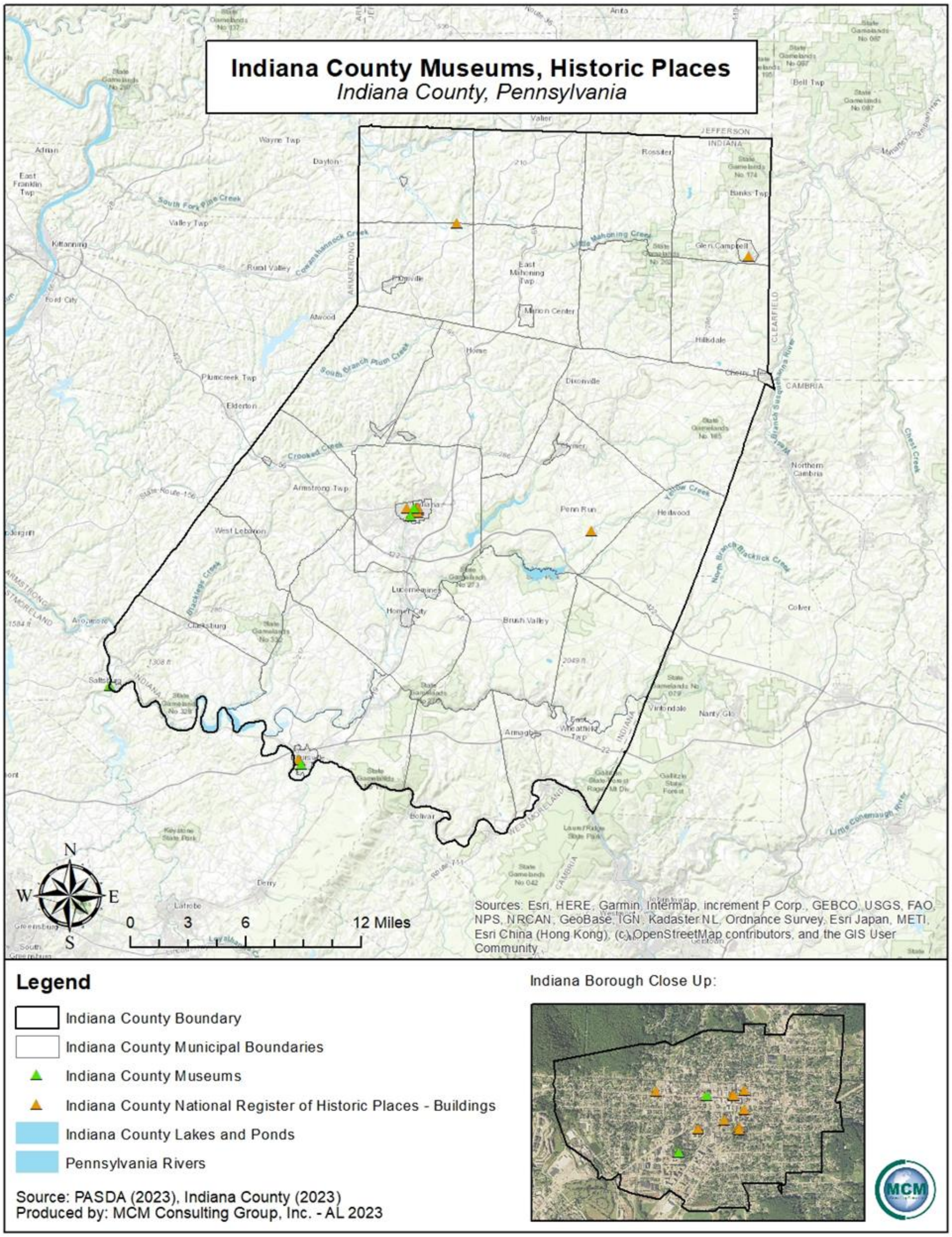


Figure 7 - Indiana County Museums and Historic Buildings



3. Planning Process

3.1. Update Process and Participation Summary

The Indiana County Hazard Mitigation Plan update began November 14, 2022. The Indiana County Commissioners were able to secure a hazard mitigation grant to start the process. The Indiana County Emergency Management Agency was identified as the lead agency for the Indiana County Hazard Mitigation Plan update. The planning process involved a variety of key decision makers and stakeholders within Indiana County. Indiana 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 Indiana County Emergency Management Agency 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 Indiana County Emergency Management Agency in coordinating and leading public involvement meetings, local planning team meetings, analysis, and the writing of the updated HMP. The Indiana 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 Indiana 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. Indiana 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 Indiana County Board of Commissioners.
- Plan submission to FEMA and PEMA.

The 2023 Indiana County HMP was completed May 15, 2023. The 2023 plan follows an outline developed by PEMA which provides a standardized format for all local HMPs in the Commonwealth of Pennsylvania. The 2023 HMP format is consistent with the PEMA recommended format. The 2023 Indiana 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 2023 Indiana County Hazard Mitigation Plan update was led by the Indiana County Steering Committee. The Indiana 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 X – Steering Committee* outlines the individuals that comprise this team.

Table 6 - Steering Committee

Indiana County Hazard Mitigation Plan Update Steering Committee		
Name	**Organization**	**Position**
Thomas Stutzman	Indiana County EMA	Director
John Pividori	Indiana County EMA	Deputy Director
Michael Rearick	MCM Consulting Group, Inc.	Director of Operations
Daniel Becker	MCM Consulting Group, Inc.	Consultant
Adam Leister	MCM Consulting Group, Inc.	Senior Consultant

Indiana County Hazard Mitigation Plan Update Steering Committee		
Name	**Organization**	**Position**
Valerie Zents	MCM Consulting Group, Inc.	Senior Consultant

In order to represent the county, the Indiana County Steering Committee developed a diversified list of potential local planning team (LPT) members. Members that participated in the 2018 hazard mitigation plan were highly encouraged to join the 2023 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 Indiana County Emergency Management Agency utilizing letters, email, and telephone calls. The LPT worked throughout the process to plan and hold meetings, collect information, and conduct public outreach.

The stakeholders listed in *Table X – Local Planning Team* served on the 2023 Indiana 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 7 - Local Planning Team

Indiana County Hazard Mitigation Plan Local Planning Team		
Name	**Organization**	**Position**
Thomas Stutzman	Indiana County EMA	Director
John Pividori	Indiana County EMA	Deputy Director
Michael Rearick	MCM Consulting Group, Inc.	Director of Operations
Daniel Becker	MCM Consulting Group, Inc.	Consultant
Adam Leister	MCM Consulting Group, Inc.	Senior Consultant
Valerie Zents	MCM Consulting Group, Inc.	Senior Consultant

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 X – 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 April 4, 2023. The draft was advertised on Indiana County's social media page and was made available digitally on the Indiana County website at:

https://www.indianacountypa.gov/departments/emergency-management/

The public comment period remained open until May 4, 2023. All public comments were submitted via an online survey or in writing to John Pividori the Indiana County Emergency Management Agency. 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 8 - HMP Process Timeline

Indiana County HMP Process Timeline		
Date	**Meeting**	**Description**
11/14/2022	Indiana County Steering Committee Kickoff Meeting	A meeting for initial Steering Committee Kickoff.
12/15/2022	Indiana County Local Planning Team Kickoff Meeting	A meeting for initial Local Planning Team Kickoff.
12/15/2022	Indiana County Municipal Kickoff Meeting	A meeting for initial Municipality Kickoff.
01/11/2023	Indiana County Local Planning Team Risk Assessment Meeting	A meeting for the Local Planning Team to complete the risk factor assessment and to review mitigation strategy from the 2018 HMP.
02/09/2023	Indiana County Local Planning Team First Mitigation Strategy Meeting	A meeting for the Local Planning Team to finalize mitigation strategy for the 2023 HMP.
02/09/2023	Indiana County Municipal Mitigation Strategy Meetings	Meetings held in three locations for municipal mitigation strategy meetings including completion of project opportunity forms.
02/23/2023	Indiana County Ad Hoc Municipal Project Opportunity Form Meeting	An ad hoc meeting for municipalities to review new project opportunity forms.
02/23/2023	Indiana County Public Meeting for Risk Assessment Section	A public meeting for Indiana County to review the risk assessment section of the HMP.

Indiana County HMP Process Timeline		
Date	**Meeting**	**Description**
03/20/2023	Indiana County Municipal Risk Assessment and Mitigation Strategy Meeting	A meeting for municipal worksheet and survey completion.
04/04/2023	Indiana County Public Meeting for Draft Plan Review	A public meeting for Indiana County to review the draft HMP.
04/04/2023 – 05/04/2023	Indiana County 2023 HMP Public Comment Period	Public comment period for the Indiana County 2023 HMP.

3.4. Public and Stakeholder Participation

Indiana 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 Indiana 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 Indiana County Emergency Management Agency or at meetings to solicit information, data, and comments from both local municipalities and other key stakeholders. Responses to these worksheets and surveys are available for review at the Indiana County Emergency Management Agency.

1. **Risk Assessment Hazard Identification and Risk Evaluation Worksheet**: Capitalizes on local knowledge to evaluate the change in the frequency of occurrence, magnitude, 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 2023 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

2023 municipal project opportunity forms are included as well, located in Appendix G, as well as section 4.X.

In an effort to capture public input, the Indiana County LPT held in person meetings and offered on-line surveys. Members of the public were also encouraged to contact Indiana County Emergency Management Agency or MCM Consulting Group, Inc. with any comments or questions regarding this update. Any public comment that was received during public meetings or during the draft review of the plan were documented and included in the plan. Copies of newspaper public meeting notices, website posted public notices, and other correspondence are included in Appendix C of this plan.

Indiana County invited all contiguous counties to review the 2023 draft hazard mitigation plan. A letter was sent to the emergency management coordinator in Armstrong, Cambria, Clearfield, Jefferson, and Westmoreland counties in Pennsylvania, on. Copies of these letters are included in Appendix C Multi-Jurisdictional Planning.

3.5. Multi-Jurisdictional Planning

Indiana 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 X – Municipality Worksheets, Surveys, and Forms Participation* reflects the municipalities participation by completing worksheets, surveys, and forms.

Table 9 - Municipality Worksheets, Surveys, and Forms Participation

Indiana County HMP Worksheets, Surveys, and Forms Participation				
Municipality/Organization	**Capability Assessment Survey**	**Risk Assessment Hazard Identification and Risk Evaluation Worksheet**	**NFIP**	**Hazard Mitigation Opportunity Form Review and Updates**
Armagh Borough				
Armstrong Township	X		X	X
Banks Township	X	X	X	X
Black Lick Township	X	X	X	X
Blairsville Borough				
Brush Valley Township	X			X

Indiana County HMP Worksheets, Surveys, and Forms Participation				
Municipality/Organization	**Capability Assessment Survey**	**Risk Assessment Hazard Identification and Risk Evaluation Worksheet**	**NFIP**	**Hazard Mitigation Opportunity Form Review and Updates**
Buffington Township				
Burrell Township				
Canoe Township	X	X	X	X
Center Township				
Cherry Tree Borough				
Cherryhill Township	X	X	X	X
Clymer Borough	X	X	X	
Conemaugh Township				
Creekside Borough	X	X	X	X
East Mahoning Township	X	X	X	X
East Wheatfield Township	X	X		X
Ernest Borough				
Glen Campbell Borough				
Grant Township				
Green Township	X	X	X	X
Homer City Borough				
Indiana Borough	X	X	X	X
Indiana University of PA	X	X	N/A	
Marion Center Borough		X		
Montgomery Township	X	X	X	
North Mahoning Township	X	X	X	
Pine Township	X	X	X	X
Plumville Borough				
Rayne Township	X	X	X	X
Saltsburg Borough				
Shelocta Borough				
Smicksburg Borough	X		X	
South Mahoning Township				
Washington Township	X	X	X	
West Mahoning Township				
West Wheatfield Township	X	X	X	
White Township	X	X	X	X
Young Township	X	X	X	

The majority of the thirty-eight municipalities within Indiana County adopted the 2023 Indiana County Hazard Mitigation Plan as the municipal hazard mitigation plan. The goal of the Indiana County Local Planning Team is to have 100% participation by municipalities in adopting the 2023 Indiana 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 Indiana County which updates their participation status.

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 Indiana County risk assessment provides in-depth knowledge of the hazards and vulnerabilities that affect Indiana 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 Indiana County Emergency Operations Plan (EOP), local EOPs and other public and private emergency management plans.

The Indiana 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 Indiana County Local Planning Team (LPT) reviewed and assessed the change in risk for all natural and human-caused hazards identified in the 2018 hazard mitigation plan. The mitigation planning team then identified hazards that were outlined within the Pennsylvania Hazard Mitigation Plan but not included in the 2018 Indiana County Hazard Mitigation Plan that could impact Indiana County. The team utilized the hazard identification and risk evaluation worksheet that was provided by the Pennsylvania Emergency Management Agency.

The Indiana County Steering Committee met with municipalities and provided guidance on how to complete the municipal hazard identification and risk evaluation worksheet. Twenty-five municipalities in Indiana 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 Indiana County assessment data to estimate loss to particular hazards. Risk factor was then assessed to each of the twenty-five 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 X – Presidential & Gubernatorial Disaster Declaration contains a list of all Presidential and Gubernatorial disaster declarations that have affected Indiana County and its municipalities from 1955 through 2022, according to the Pennsylvania Emergency Management Agency.

Table 10 - Presidential & Gubernatorial Disaster Declarations

Presidential Disaster Declarations and Gubernatorial Declarations and Proclamations		
Date	**Hazard Event**	**Action**
February, 2021	Severe weather event	Gubernatorial Proclamation of Emergency – All Counties
August, 2021	Severe weather event (Hurricane Ida)	Gubernatorial Proclamation of Emergency – All Counties
December, 2020	Severe weather event	Gubernatorial Proclamation of Emergency – All Counties
October, 2020	Civil disturbance	Gubernatorial Proclamation of Emergency – All Counties
March, 2020	COVID-19 Pandemic	Gubernatorial Proclamation of Emergency – All Counties
January, 2020	COVID-19 Pandemic	Presidential Disaster Declaration

Presidential Disaster Declarations and Gubernatorial Declarations and Proclamations		
Date	**Hazard Event**	**Action**
January, 2019	Severe weather event	Gubernatorial Proclamation of Emergency – All Counties
August, 2018	Severe weather event	Gubernatorial Proclamation of Emergency – All Counties
June, 2018	Severe weather event	Gubernatorial Proclamation of Emergency – All Counties
January, 2018	Opioid Crisis	Gubernatorial Proclamation of Emergency – All Counties
February, 2014	Severe winter storm	Presidential Proclamation of Emergency
February, 2014	Severe winter weather	Gubernatorial Proclamation of Emergency
January, 2014	Driver hours waived due to prolonged and continued severe winter weather	Gubernatorial Proclamation of Emergency
January, 2014	Extended prolonged cold	Gubernatorial Proclamation of Emergency
June, 2013	High winds, thunderstorms, heavy rain, tornado, flooding	Gubernatorial Proclamation of Emergency
October, 2012	Hurricane Sandy	Gubernatorial Proclamation of Emergency
April, 2012	Spring winter storms	Gubernatorial Proclamation of Emergency
September, 2011	Severe storms and flooding (Lee/Irene)	Gubernatorial Proclamation of Emergency
January, 2011	Severe winter storm	Gubernatorial Proclamation of Emergency
April, 2010	Severe winter storm	Presidential Emergency Declaration
February, 2010	severe winter storm	Gubernatorial Proclamation of Emergency
April, 2007	Severe winter storm	Gubernatorial Proclamation of Emergency
April, 2007	Severe storm	Gubernatorial Declaration

Presidential Disaster Declarations and Gubernatorial Declarations and Proclamations		
Date	**Hazard Event**	**Action**
February, 2007	waive the regulations regarding hours of service limitations for drivers of commercial vehicles	Gubernatorial Proclamation of Emergency
February, 2007	severe winter storm	Gubernatorial Proclamation of Emergency
September, 2006	Tropical depression Ernesto	Gubernatorial Proclamation of Emergency
June, 2006	Flooding	Presidential Proclamation of Emergency
September, 2005	Hurricane Katrina	Gubernatorial Proclamation of Emergency
September, 2005	Hurricane Katrina – to render mutual aid and to receive and house evacuees	Presidential Emergency Declaration
September, 2004	Tropical Depression Ivan	Presidential Disaster Declaration
September, 2003	Hurricane Isabel/Henri	Presidential Disaster Declaration
September, 1999	Hurricane Floyd	Presidential Disaster Declaration
July, 1999	Drought	Gubernatorial Declaration
January, 1996	Flooding	Presidential Disaster Declaration
January, 1996	Severe winter storms	Presidential Disaster Declaration
January, 1994	Severe winter storms	Presidential Disaster Declaration
March, 1993	Blizzard	Presidential Emergency Declaration
February, 1978	Blizzard	Gubernatorial Declaration
January, 1978	Heavy snow	Gubernatorial Declaration
July, 1977	Flash flood	Presidential Disaster Declaration
January, 1977	Gas shortage/severe winter weather	Presidential Emergency Declaration
February, 1974	Truckers strike	Gubernatorial Declaration
September, 1972	Flood	Presidential Disaster Declaration
June, 1972	Flood (Agnes)	Presidential Disaster Declaration
February, 1972	Heavy snow	Gubernatorial Declaration
January, 1966	Heavy snow	Gubernatorial Declaration
Source: Pennsylvania Emergency Management Agency and Federal Emergency Management Agency (2023)		

4.2.2. Summary of Hazards

The Indiana County LPT was provided the Pennsylvania Standard List of Hazards to be considered for evaluation in the 2023 HMP Update. Following a review of the hazards considered in the 2023 HMP and the standard list of hazards, the local planning team decided that the 2023 plan should identify, profile, and analyze twenty-five hazards. These twenty-five hazards include all of the hazards profiled in the 2018 plan. This resulted in nineteen hazard profiles. The list below contains the hazards that have the potential to impact Indiana County as identified through previous risk assessments, the Indiana County Hazard Vulnerability Analysis and input from those who participated in the 2023 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.

Earthquake

An earthquake is the motion or trembling of the ground produced by the sudden displacement of rock usually within the upper ten to twenty miles of the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of underground caverns. Earthquakes can affect hundreds of thousands of square miles, cause damage to property measured in the tens of billions of dollars, result in loss of life and injury to hundreds of thousands of persons and disrupt the social and economic functioning of the affected area. Most property damage and earthquake-related deaths are caused by the failure and collapse of structures die to ground shaking, which is dependent upon the amplitude and duration of the earthquake.

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.

Invasive Species

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

Landslide

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

Pandemic and Infectious 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.

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.

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.

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 infectious 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 Indiana 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). 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 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 combat 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 contributes to the depletion of ground and surface water. Droughts are regional climatic events, so when such an event occurs in Indiana 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.

Droughts are often the leading contributing factor to wildfires, as they leave areas with little to no moisture. Droughts can have adverse effects on farms and other water-dependent industries resulting in local economic loss. Areas of extensive agriculture use are particularly vulnerable to drought; 148,288 acres of Indiana County, or roughly 28.02% of the 529,280 total land acreage, make up farmland (United States Department of Agriculture [USDA], 2017 Census). The total number of farms for Indiana County is 951 and the average acreage for farms in Indiana County is 156 acres. Indiana County ranks 29th of sixty-seven counties in the commonwealth for agricultural production, totaling over $71.9 million annually. Agricultural production from crops, including nursery and greenhouse crops, accounts for more than $41.8 million in commerce annually. Production from livestock, poultry, and their products accounts for $30.1 million annually. Acreage for farming has increased since the 2012 USDA Census when there was a reported total of 138 farming and drought vulnerable acres.

4.3.1.2 Range of Magnitude

The average annual precipitation of 4.8” of rain occurs primarily during the spring and summer months and 3.52” of snow occurs primarily during the winter months of December, January, and

February. This value is derived from averaging ten years of mean annual precipitation data for Indiana County. Rural farming areas of Indiana County are most at risk when a drought occurs. A drought can create a significant financial burden for the community. Approximately 10.4% of Indiana County farms are family-owned and operated. Additionally 58% of the county farmland use is devoted to crop cultivation and 42% to livestock and poultry. Wildfires are often the most severe secondary effect associated with drought. Wildfires can devastate wooded and agricultural areas, structures near high wildfire loads, and farm production facilities, and threaten natural resources. 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.

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. Indiana County also has a growing agritourism business that would be threatened by long-term drought.

Local municipalities may, with the approval of the Pennsylvania Emergency Management Council, implement local water rationing. 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 mandatory water usage restrictions imposed by the commonwealth and/or local municipalities, procedures are provided for granting of variances to consider individual hardships and economic dislocations. *Table X – Drought Preparation Phases* shows the FEMA-defined levels of drought severity along with suggested actions, requests, and goals.

Table 11 - 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				

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 X – 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 12 - 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

Palmer Drought Severity Index (PDSI)	
Severity Category	**PDSI Value**
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

The effects of a drought can be far-reaching both economically and environmentally. Economic impacts include 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: *Table X – Economic and Environmental Impacts of Drought Events* qualifies the potential economic and environmental impacts from a drought event.

Table 13 - Economic and Environmental Impacts of Drought Events

Economic and Environmental Impacts of Drought Events	
Economic	**Environmental**
- Reduced productivity of aquatic resources - Mandatory water use restrictions - Well failures - Cutbacks in industrial production - Agricultural losses - Limited recreational opportunities	- Hydrologic effects - Adverse effects on animal populations - Damage to plant communities - Increased number and severity of fires - Reduced soil quality - Air quality effects - 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 2023 is shown in *Table X – Past Drought Events in Indiana County*.

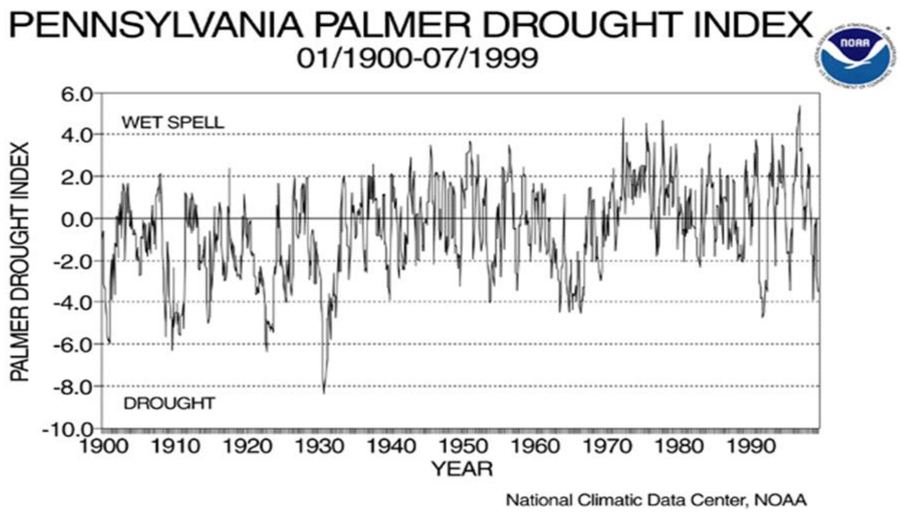
The National Oceanic and Atmospheric Administration (NOAA) has archived records showing extreme droughts for the commonwealth in 1931 and a prolonged event in the 1960s as seen in *Figure X – Pennsylvania Palmer Drought Index 1900 – 1999*.

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

Table 14 - Past Drought Events in Indiana County

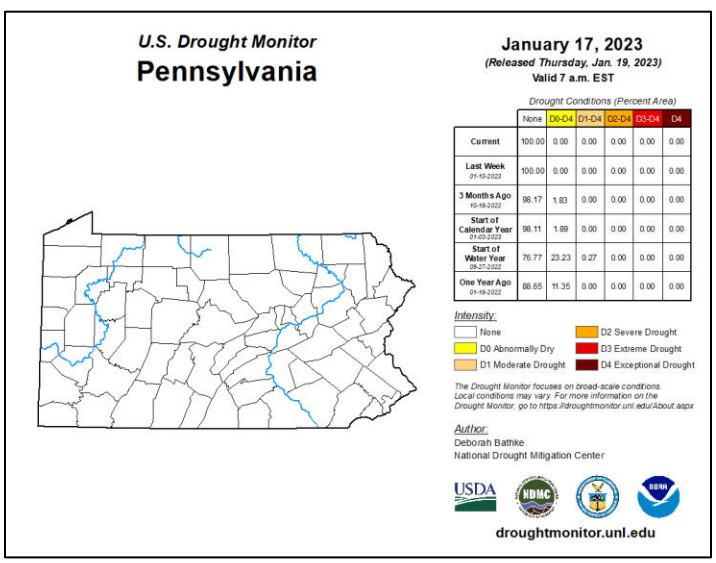
Past Drought Events in Indiana County			
Start	**End**	**Number of Days**	**Description**
10/22/1985	12/19/1985	58	Watch
07/07/1988	05/15/1989	312	Warning
06/28/1991	08/16/1991	49	Warning
08/16/1991	04/20/1992	248	Emergency
04/20/1992	09/11/1992	144	Warning
09/11/1992	01/15/1993	126	Watch
09/01/1995	12/18/1995	108	Watch
12/03/1998	12/08/1998	5	Watch
12/08/1998	03/15/1999	97	Warning
03/15/1999	06/18/1999	95	Watch
06/18/1999	07/20/1999	32	Warning
07/20/1999	09/30/1999	72	Emergency**
09/30/1999	02/25/2000	148	Warning
02/25/2000	05/05/2000	70	Watch
08/24/2001	05/13/2002	262	Watch
04/11/2006	06/30/2006	80	Watch
08/06/2007	09/05/2007	30	Watch
11/07/2008	01/26/2009	80	Watch
09/16/2010	12/17/2010	92	Watch
08/05/2011	09/02/2011	28	Watch
03/24/2015	07/10/2015	108	Watch
08/02/2016	11/03/2016	93	Watch
08/21/2020	11/17/2020	88	Watch
Source: Pennsylvania Department of Environmental Protection, 2023 **Gubernatorial Disaster Declaration			

Figure 8 - Pennsylvania Palmer Drought Index 1900 – 1999



The warmest July on record in Pennsylvania occurred in 2020, and sixteen counties entered Drought Watch status on August 21 of that year. In June 2021, dry conditions were again affecting the commonwealth. By 2022, most of Pennsylvania was experiencing normal conditions, with intermittent drought watches. *Figure X – U.S. Drought Monitor, Pennsylvania* illustrates the conditions of drought in Pennsylvania at the time of the report. Currently, Pennsylvania is under normal drought conditions.

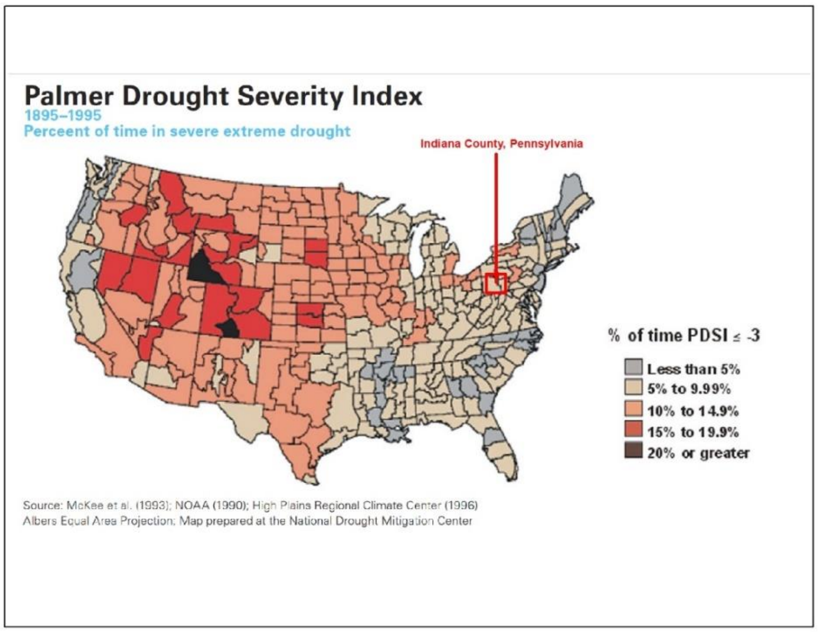
Figure 9 - U.S. Drought Monitor, Pennsylvania



4.3.1.4 Future Occurrence

It is difficult to forecast the exact severity and frequency of future drought events. Climate change will lead to increased uncertainty and extremity of climate events. As Indiana County has experienced severe drought between 5% to 10% of the time between 1895 and 1995 as seen in *Figure X – Palmer Drought Severity Index*. This report can be used to make a rough estimate of the future probability of drought in Indiana 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 10 - Palmer Drought Severity Index



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

4.3.1.5 Vulnerability Assessment

The magnitude of 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. Indiana County's farmland can be negatively impacted by a drought event. With 951 farms located in Indiana County as reported in the 2017 Census of Agriculture (CoA), with a total market value of $71,985,000.00, a drought could cause severe economic strain on the county, the local municipalities, and the residents. As stated above, a drought event could affect approximately 148,288 acres in Indiana County. Crop yields in Indiana County that could be negatively impacted by a potential drought event are worth approximately $41,829,000.00 based on the 2017 CoA information. That accounts for roughly 58% of the county market share in agricultural products. The most common crops vulnerable to drought in Indiana County are hay, corn, soybeans, and corn for silage. Indiana County is 29th in the state of Pennsylvania for crop production, which would be critically impacted by a drought event.

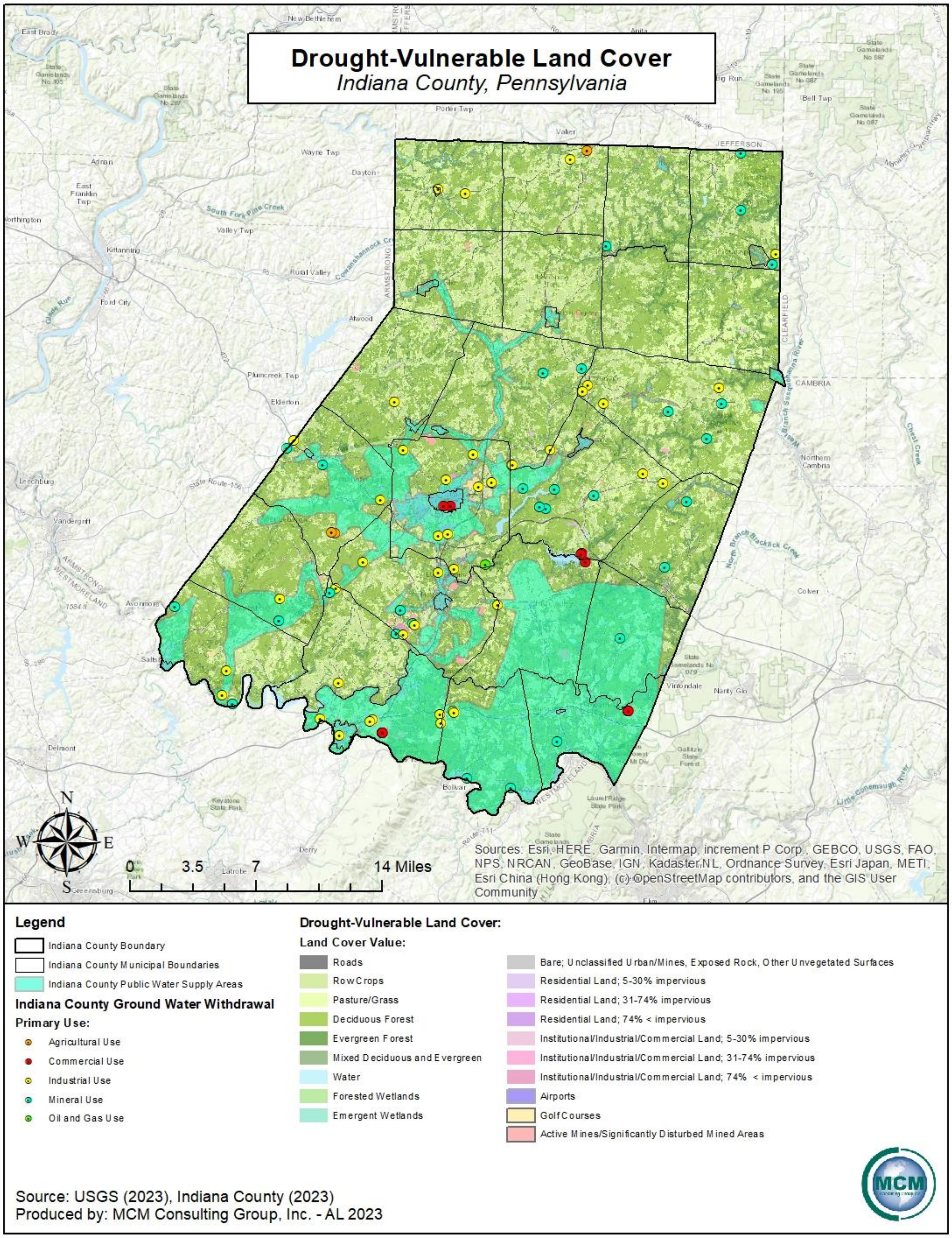
The Pennsylvania Groundwater Information System reports a large amount of active domestic wells spread across every municipality for the county. Wells may see a decrease in yield and water level when a drought event lasts for longer than a short period and can lead to utility interruptions for those using well water. A greater discussion on utility interruptions in Indiana County can be found in Section 4.3.19: Utility Interruption hazard profile.

There are many hazards that can be considered cascading hazards related to drought events. Wildfire is the most severe cascading hazard effect associated with drought. Wildfires can devastate wooded and agricultural areas, threatening natural resources and farm production facilities. With drought events, water infiltration into the ground becomes more difficult. This lack of infiltration can result in flash flooding events in areas of steep slopes, canyons, and rolling hills. A loss of vegetation from a drought can also increase the occurrence of landslides in areas of steep slopes with loose packed soil profiles. A discussion on the county's vulnerability to flash floods and landslides can be found in Section 4.3.3.5 and 4.3.5.5 respectively.

Additionally, emergency services can be adversely impacted by drought as a cascading hazard. Local fire departments often utilize ponds, creeks, and streams for water onboard fire apparatus. With low water levels in waterbodies, responders may be unable to draft enough water to efficiently respond to and extinguish a fire. Also, with an increased number of potential wildfires due to drought conditions, agencies may not have the personnel to efficiently respond to all fires in a timely manner.

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

Figure 11 - Drought-Vulnerable Land Use and Public Water Supply



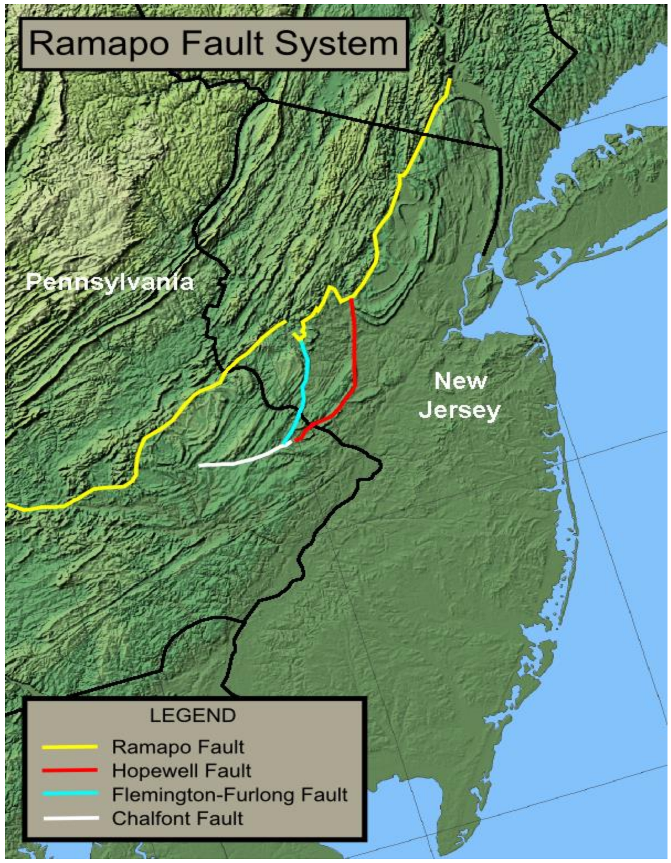
4.3.2. Earthquake

4.3.2.1 Location and Extent

An earthquake is sudden movement of the earth's surface caused by the release of stress accumulated within or along the edge off the earth's tectonic plates, a volcanic eruption, or by a human induced explosion (DCNR, 2007). Earthquake events in Pennsylvania, including Indiana County, are usually mild events, impacting areas no greater than 62 miles in diameter from the epicenter. A majority of earthquakes occur along boundaries between tectonic plates, and some earthquakes occur at faults on the interior of plates. Today, Eastern North America, including Indiana County, Pennsylvania, is far from the nearest plate boundary. That plate boundary is the Mid-Atlantic Ridge and is approximately 2,000 miles to the east, under the Atlantic Ocean. The Ramapo Fault System runs through New York, New Jersey, and eastern Pennsylvania (See *and there are currently twenty-three active* wells listed as active in Indiana County at the writing of this plan.

). This fault system is associated with some small earthquakes, and it is thought unlikely to produce significant disruption.

Figure 12 - Ramapo Fault System



When the supercontinent of Pangaea broke apart about 200 million years ago, the Atlantic Ocean began to form. Since then, many faults have developed. Locating all of the faults would be an ideal approach to identifying the region's earthquake hazard; however, many of the fault lines in this region have no seismicity associated with them. The best way to determine earthquake history for Indiana County is to conduct a probabilistic earthquake-hazard analysis with the earthquakes that have already happened in and around the county. (See ***Error! Reference source not found.***). Nevertheless, the United States Geological Survey (USGS) indicates that Indiana County has a low earthquake risk, and zero historical earthquake events have occurred.

Natural gas extraction of the Marcellus/Utica Shale formation (see *Figure X - Pennsylvania Oil and Gas Geology*) has occurred in many regions of the commonwealth, but eastern and southeastern Pennsylvania are not among them. Hydraulic fracturing, or fracking, is used to extract the gas, and the process is thought to lead to an increase in seismic activity (Meyer, 2016).

However, fracking does not appear to be linked to the increased rate of magnitude three and larger earthquakes (USGS 2014). In recent years, permits for extraction of the natural gas and oil in the commonwealth have been issued by the Pennsylvania Department of Environmental

Protection, and there are currently twenty-three active wells listed as active in Indiana County at the writing of this plan.

4.3.2.2 Range of Magnitude

Earthquakes result in the propagation of seismic waves, which are detected using seismographs. These seismograph results are measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake. *Table X – Richter Scale* summarizes Richter Scale magnitudes as they relate to the spatial extent of impacted areas. The Modified Mercalli Intensity Scale (***Error! Reference source not found.***) is an alternative measure of e arthquake intensity that is scaled by the impacts of the earthquake event. Earthquakes have many secondary impacts, including disrupting critical facilities, transportation routes, public water supplies and other utilities.

Table 15 - Richter Scale

Richter Scale	
Richter Magnitude	**Earthquake Effects**
Less than 3.5	Not generally felt but recorded.
3.5-5.4	Often felt, but rarely causes damage.
Under 6.0	At most, slight damage to well-designed buildings; can cause major damage to poorly constructed buildings over small regions.
6.1-6.9	Can be destructive in areas where people live up to about 100 kilometers across.
7.0-7.9	Major earthquake; can cause serious damage over large areas.
8.0 or greater	Great earthquake; can cause serious damage in areas several hundred kilometers across.

Table 16 - Modified Mercalli Intensity Scale

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

4.3.2.3 Past Occurrence

According to USGS, no known earthquakes have had an epicenter within Indiana County since 1724, before which local seismology cannot be known. However, several seismic events that occurred outside the county boundary may have been felt in the region.

On August 23, 2011, a 5.9 earthquake occurred in Virginia, and a 2.2 earthquake shook Reading, Pennsylvania (Berks County), on July 19, 2019. Further, a 3.4 earthquake struck Mifflintown (Juniata County) on June 13, 2019, and Bolivar (Westmoreland County) experienced a 2.9 event on October 6, 2020. Parts of the county may have experienced some of the shock waves from these minor earthquakes and others that have occurred around the region, most notably New

Jersey. The strongest recorded earthquake in Pennsylvania history (5.2) occurred on September 25, 1998 in northwestern Pennsylvania and is known as the Pymatuning Earthquake for its epicenter near Pymatuning Lake. The effects of the earthquake were felt across the commonwealth and were blamed for many wells in the epicentral region drying up, while new springs and old wells began to flow. A three-month date range revealed 120 dry household-supply wells on the ridge of Jamestown and Greenville, Pennsylvania. Declines of up to 100 feet were observed on a ridge where at least eighty of the wells resided. The degree of the damage varied. Some of the wells lost all power or could barely hold their yields and some of the water in wells turned black or began to smell of sulfur.

The most likely cause of the wells drying was because of the increase in hydraulic conductivity or "fracking" of shale rock under this area caused by the earthquake. The quake affected the existing faults and created new faults in the shale. This created more permeability for the water to leak down from the hilltops on the ridge down to the valleys following the contours of the Meadville shale.

Because the effects of large earthquakes can be felt hundreds of miles away, the historical earthquake epicenters *near* Indiana County are shown below at *Figure X – Pennsylvania Recorded Earthquake Events.* A wider depiction of earthquake occurrences in the northeastern United States may be found here: https://earthquake.usgs.gov/earthquakes/map/?extent=14.26438,-141.32813&extent=56.51102,-48.60352

4.3.2.4 Future Occurrence

Earthquake activity and intensities are difficult to predict, but a probabilistic analysis of prior earthquakes can assist in gauging the likelihood of future occurrences. ***Error! Reference source not found.*** in 4.3.2.1 shows that Indiana County is in a low hazard zone for earthquake activity according to the USGS (2014), suggesting a low probability of earthquake occurrence. However, according to the USGS, there has been a recent trend increasing the frequency of magnitude three and larger earthquakes in the central and eastern U.S. (***Error! Reference source not found.***). This uptick in seismicity is due to hydraulic fracturing activities, and specifically occurs as a result of wastewater from the fracking process being injected into the earth (Meyer, 2016). Recent studies have moved towards being able to predict such induced seismicity by looking at uplift after injections, but more work needs to be done to confirm uplift as a reliable indicator of induced seismicity (Shirzaei et al., 2016). It is important to note that seismicity can occur even after wells become inactive and injection rates decline (Shirzaei et al., 2016).

Isostatic Rebound is a hypothesis for earthquake occurrence that has been conceptualized for many years, according to Charles Scharnberger, a retired professor of geology at Millersville University, who monitors the seismic station there. Scharnberger said Pennsylvania earthquakes are somewhat of a mystery, but they could have something to do with the westward shift of the North American tectonic plate. Though the plates meet in California, where most of the seismic activity occurs, that movement still causes stress, squeezing and pressure along the entire length of the plate, reverberating as far back as the East Coast. A 3.4 earthquake like the one in Mifflintown, Juniata County in 2019 is in the medium range for Pennsylvania and may occur every couple of years. According to the USGS, this was the strongest earthquake felt or originating in Pennsylvania that year. It was followed by a 1.3 aftershock.

The chances of a devastating earthquake are low, but do exist, according to Scharnberger, His calculations on the probability of a severe earthquake based on the historic record indicate it is about a one in 200 chance in any given year.

Table 17 - Recent Earthquake Trends in Northeastern United States

Earthquake Trends in Northeastern U.S. ***(USGS, 2020)***	
Year	**Number of Magnitude 3+ Earthquakes**
2015	0
2016	3
2017	4
2018	0
2019	5
2020	3

4.3.2.5 Vulnerability Assessment

According to the U.S. Geological Society Earthquake Hazards Program, an earthquake hazard is anything associated with an earthquake that may affect a resident's normal activities. For Indiana County, this could include surface faulting, ground shaking, landslides, liquefaction, dried up or rejuvenated water wells, tectonic deformation, and seiches (sloshing of a closed body of water from earthquake shaking).

Earthquakes usually occur without warning and can impact areas a great distance from their point of origin (epicenter). Ground shaking is the greatest risk to building damage within Indiana County. Risk to public safety and loss of life from an earthquake is dependent upon the severity and proximity of the event. Injury or death to those inside buildings, or people walking below building ornamentation and chimneys is a higher risk to Indiana County's general public during an earthquake. Infrastructure is more at risk on the east coast than the west coast because its buildings are older.

Indiana County's infrastructure is at particular risk to earthquakes because of the age of infrastructure within the county. Vulnerability to infrastructure issues, and also earthquake damage, increases once a building or housing unit is over fifty years of age. For the purposes of this assessment, any building constructed in 1979 or prior is considered at an increased vulnerability due to the way in which data is presented in the American Community Survey (ACS) by the United States Census Bureau for 2021. In Indiana County, there are approximately 25,609 housing units that were constructed in the calendar year 1979 or earlier. This is 67.8% of the total housing units reported in the ACS, which is 37,788 housing units. This number is approximately two-thirds of the housing units in Indiana County.

The following list of historic homes and properties listed in the National Register of Historic Places for Indiana County also lists construction characteristics to evaluate the vulnerability to earthquakes:

Indiana County National Historic Places	
Building/Location Name	**Construction (Foundation)**
Blairsville Armory	Stone
Breezedale	Brick
Buffalo, Rochester, & Pittsburgh Passenger Railway Station	Wood
George Diehl Homestead	Wood
Graff's Market	Brick (Stone)
Indiana Armory	Brick
Indiana Borough 1912 Municipal Building	Brick
James Mitchell House	Brick
John B. McCormick House	Stone
John Sutton Hall	Brick
Old Indiana County Courthouse	Brick (Stone)
Old Indiana County Jail and Sheriff's Office	Brick
Senator Joseph O. Clark House	Wood
Silas M. Clark House	Brick
St. Peter's Episcopal Church and Rectory	Brick (Stone)

Each of these structures is vulnerable to earthquakes, with a greater vulnerability for those buildings with stone, sandstone, or concrete foundations. The likelihood of damage to these facilities from an earthquake is low, but the vulnerability is moderate to high if a major earthquake event were to occur.

More populous areas including Indiana Borough and Blairsville Borough are at a higher vulnerability to earthquake damage due to the increased building and population density. Rural areas of the county can also be damaged by an earthquake, but the damage a building can sustain from neighboring structures is less than in a more densely developed area. Structure level data, including type of construction, is not included in this assessment, due to the limit of information available from data sources, including Indiana County and the United States Census Bureau.

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 Indiana 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 X – 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 Indiana 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 X – Flood Hazard High Risk Zones*. Appendix D of this hazard mitigation plan includes a flooding vulnerability map for each municipality in Indiana County with vulnerable structures and community lifeline facilities identified using the most current DFIRM data for Indiana 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 community lifeline 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 13 - Flooding and Floodplain Diagram

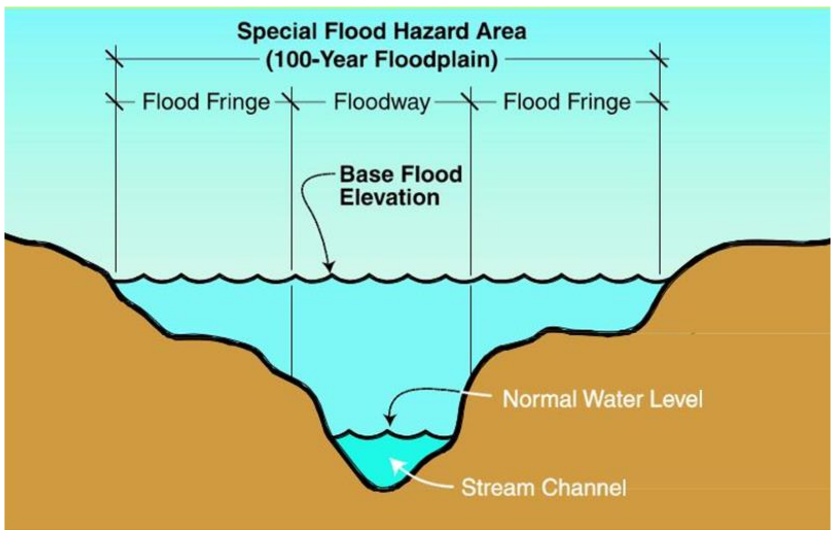


Table 18 - Flood Hazard High Risk Zones

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 Allegheny River Basin has caused significant flooding in Indiana County, specifically on the following streams, creeks, and their tributaries:

- Kiskiminetas River
    - Conemaugh River
    - Conemaugh River Reservoir

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 Indiana 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 Indiana 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. Flash floods can occur very quickly and with little warning. A 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. 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 community lifeline 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 vulnerable populations 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.

Severe flooding also comes with secondary effects that could have long lasting impacts on the population, economy, and infrastructure within Indiana 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. Community lifelines, 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 Indiana 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 Indiana County. The FEMA Global Flood Risk Report and other 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 X – HAZUS Building Economic Loss Figures*. The total business interruption vales occurring from a proposed 100-year flood based on FEMA HAZUS data is illustrated in *Table X – HAZUS Business Interruption Economic Loss Figures*. *Figure X – Loss by Occupancy Type* illustrates the breakdown of economic losses by either residential, commercial, industrial, or other use type.

Table 19 - HAZUS Building Loss Figures

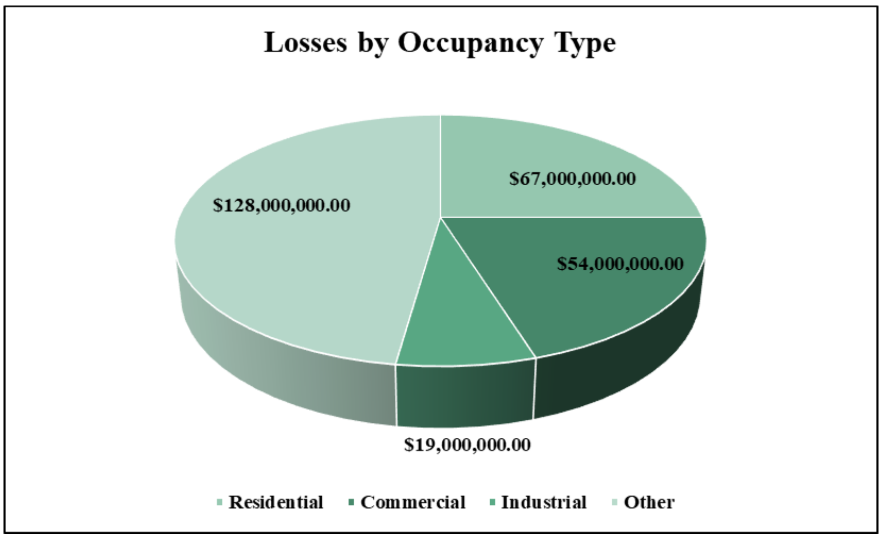
HAZUS Building Economic Loss Figures					
	Residential	**Commercial**	**Industrial**	**Other**	**Total**
Building:	$37,840,000.00	$7,180,000.00	$5,050,000.00	$2,910,000.00	**$52,980,000.00**
Content:	$17,160,000.00	$19,930,000.00	$11,220,000.00	$16,060,000.00	**$64,370,000.00**
Inventory:	$0.00	$470,000.00	$2,060,000.00	$100,000.00	**$2,630,000.00**
Subtotal:	$55,000,000.00	$27,580,000.00	$18,330,000.00	$19,070,000.00	**$119,980,000.00**
Source: HAZUS, 2023					

Table 20 - HAZUS Business Interruption Economic Loss Figures

HAZUS Business Interruption Economic Loss Figures					
	Residential	**Commercial**	**Industrial**	**Other**	**Total**
Income:	$130,000.00	$10,460,000.00	$170,000.00	$2,520,000.00	$13,280,000.00

HAZUS Business Interruption Economic Loss Figures					
	Residential	**Commercial**	**Industrial**	**Other**	**Total**
Relocation:	$8,630,000.00	$2,360,000.00	$140,000.00	$1,880,000.00	$13,010,000.00
Rental Income:	$2,830,000.00	$1,740,000.00	$30,000.00	$180,000.00	$4,780,000.00
Wage:	$320,000.00	$11,870,000.00	$250,000.00	$103,920,000.00	$116,360,000.00
Subtotal:	$11,910,000.00	$26,430,000.00	$590,000.00	$108,500,000.00	$147,430,000.00
Source: HAZUS, 2023					

Figure 14 - 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

Indiana 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 Indiana County from January 1996 to January 2023 is found in *Table X – Past Flood and Flash Flood Events*. Details of each event can be found in NOAA's National Center for Environmental Information (NCEI) database.

Table 21 - Past Flood and Flash Flood Events

Past Flood and Flash Flood Events				
Event Location	**Event Date**	**Event Type**	**Property Damage Estimate**	**Crop Damage**
Cherry Tree Borough	05/29/2017	Flood	$10,000.00*	$0.00*
Green Township	05/29/2017	Flood	$0.00*	$0.00*
North Mahoning Township	05/29/2017	Flood	$10,000.00*	$0.00*
Shelocta Borough	06/23/2017	Flood	$0.00*	$0.00*
Washington Township	02/16/2018	Flood	$0.00*	$0.00*
Cherry Tree Borough	02/16/2018	Flood	$0.00*	$0.00*
Green Township	02/16/2018	Flood	$0.00*	$0.00*
East Mahoning Township	02/16/2018	Flood	$0.00*	$0.00*
North Mahoning Township	02/16/2018	Flood	$0.00*	$0.00*
East Wheatfield Township	02/16/2018	Flood	$0.00*	$0.00*
Green Township	02/16/2018	Flood	$0.00*	$0.00*
Smicksburg Borough	07/02/2018	Flash Flood	$1,000.00*	$1,000.00*
Pine Township	07/30/2018	Flash Flood	$10,000.00*	$5,000.00*
Blairsville Borough	09/09/2018	Flood	$0.00*	$0.00*
Blairsville Borough	05/28/2019	Flash Flood	$1,000.00*	$0.00*
White Township	05/29/2019	Flash Flood	$5,000.00*	$5,000.00*
West Mahoning Township	10/31/2019	Flood	$0.00*	$0.00*
Shelocta Borough	06/27/2020	Flash Flood	$0.00*	$0.00*
West Wheatfield Township	09/01/2021	Flash Flood	$0.00*	$0.00*
White Township	09/01/2021	Flash Flood	$0.00*	$0.00*
Armstrong Township	05/07/2022	Flood	$20,000.00*	$0.00*
		Total:	**$57,000.00***	**$11,000.00***
Source: NCEI NOAA, 2023 *Property Damage Values are estimated and are not exact figures. Data from NCEI.				

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 X – 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 Enter Number (Data from FEMA) repetitive loss properties in Indiana County. *Table X – Summary of Type of Repetitive Loss Properties by Municipality* illustrates the breakdown of type of repetitive loss properties in Indiana 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 X – Severe Repetitive Loss Properties* illustrates the communities within Indiana 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 Indiana County participate in the NFIP. Information of each participating municipality can be found in *Table X – Municipal NFIP Policies & Vulnerability*.

Table 22 - Repetitive Loss Properties

Repetitive Loss Properties – (Awaiting Data from NFIP)						
Community Name	**Community Number**	**Cumulative Building Payment**	**Cumulative Contents Payment**	**Sum of Total Paid**	**Losses**	**Properties**
		$	$	$		
		$	$	$		
	Total:	**$**	**$**	**$**		
Source: FEMA, 2023						

Table 23 - Summary of Type of Repetitive Loss Properties by Municipality

Summary of Type of Repetitive Loss Properties by Municipality – (Awaiting Data from NFIP)					
Municipality	**Type**				
	Non-Residential	**2-4 Family**	**Single Family**	**Condo**	**Other Residential**

Source: FEMA, 2023

Table 24 - Severe Repetitive Loss Properties

Severe Repetitive Loss Properties – (Awaiting Data from NFIP)						
Community Name	**Community Number**	**Cumulative Building Payments**	**Cumulative Contents Payments**	**Sum of Total Paid**	**Losses**	**Properties**
		$	$	$		
		$	$	$		
		$	$	$		
	Total:	**$**	**$**	**$**		
Source: FEMA, 2023						

Table 25 - Municipal NFIP Policies & Vulnerability

Municipal NFIP Policies – (Awaiting Data from NFIP)					
Community Name	**Community Number**	**Contract Count**	**Policy Count**	**Total Coverage**	**Premium and Policy Fee**
				$	$
				$	$
	Total:			**$**	**$**
Source: FEMA, 2023					

4.3.3.4 Future Occurrence

Flooding is a frequent problem throughout the Commonwealth of Pennsylvania. Indiana County will certainly be impacted by flooding events in the future, as Indiana 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 flood 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 a flood of this magnitude every year. 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 X – Flood Probability Summary*.

Table 26 - Flood Summary Probability

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

Indiana 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.

County community lifelines are the most vulnerable buildings and services when riverine and stream flooding is considered. Community lifeline 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 Indiana County, with vulnerable structures and community lifeline facilities that are located within the special flood hazard area.

Table X – 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 two facilities that are estimated to be at least moderately damaged by a 100-year flooding event in the HAZUS scenario that was completed for Indiana County. Of those facilities that are estimated to be moderately damaged by the scenario, two of those facilities will undergo a loss of use. No fire stations or police stations will experience a loss of use. The hospital in Indiana County will not experience a loss of use, but plans should still be made to assist in the treatment of patients at alternate facilities if a flooding event of a greater magnitude were to occur. Also, no schools will experience enough damage to result in loss of use. Plans for such damage that would result to essential facilities, must be in place to successfully mitigate the potential disruption to community lifeline facilities.

Table 27 - 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	25	2	0	2
Hospitals	1	0	0	0
Police Stations	9	0	0	0
Schools	71	0	0	0

Table X - 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 community lifeline facilities. This information was compiled using the Special Flood Hazard Area and GIS data provided by the Indiana County GIS Department.

Table 28 - County Structures Within Special Flood Hazard Area

County Structures Within Special Flood Hazard Area		
Municipality	**Site Structure Address Points Within Flood Area**	**Community Lifelines within Flood Area**
Armagh Borough	0	0
Armstrong Township	53	0
Banks Township	1	0
Black Lick Township	16	0

County Structures Within Special Flood Hazard Area		
Municipality	**Site Structure Address Points Within Flood Area**	**Community Lifelines within Flood Area**
Blairsville Borough	10	0
Brush Valley Township	8	0
Buffington Township	10	1
Burrell Township	6	0
Canoe Township	22	0
Center Township	37	0
Cherryhill Township	13	0
Cherry Tree Borough	98	3
Clymer Borough	125	2
Conemaugh Township	69	1
Creekside Borough	72	1
East Mahoning Township	11	0
East Wheatfield Township	16	2
Ernest Borough	0	0
Glen Campbell Borough	1	0
Grant Township	1	0
Green Township	71	1
Homer City	52	0
Indiana Borough	345	0
Marion Center Borough	4	0
Montgomery Township	0	0
North Mahoning Township	4	0
Pine Township	4	0
Plumville Borough	5	1
Rayne Township	17	0
Saltsburg Borough	82	0
Shelocta Borough	60	1
Smicksburg Borough	0	0
South Mahoning Township	5	0
Washington Township	21	1
West Mahoning Township	4	0
West Wheatfield Township	14	0
White Township	133	0
Young Township	14	0
Totals:	**1,404**	**14**

Table X – Community Lifeline Facilities Additional Information illustrates the additional information including name, the municipality, and the type of facility for each community lifeline facility that falls within the Special Flood Hazard Area for Indiana County. This information was compiled using Indiana County's GIS information with the assistance of the Indiana County GIS Department.

Table 29 - Community Lifeline Facilities Additional Information

Community Lifeline Facilities Additional Information	
Municipality:	**Type of Facility**
Community Lifelines	
Buffington Township	Post Office (1)
Cherry Tree Borough	Fire Station (1)
	Police Station (1)
	Post Office (1)
Clymer Borough	Fire Station (1)
	Grocery Store (1)
Conemaugh Township	Post Office (1)
Creekside Borough	Post Office (1)
East Wheatfield Township	Power Plant (1)
	Electric Substation (1)
Green Township	Post Office (1)
Plumville Borough	Fire Station (1)
Shelocta Borough	Post Office (1)
Washington Township	Fire Station (1)

Flash Flooding

Flash flooding is a common occurrence in Indiana 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 Indiana 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 X – Past Flood and Flash Flood Events* above.

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

- Pine Township
- Shelocta Borough

- Smicksburg Borough
- West Wheatfield Borough
- White Township

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

4.3.4. Invasive Species

4.3.4.1 Location and Extent

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

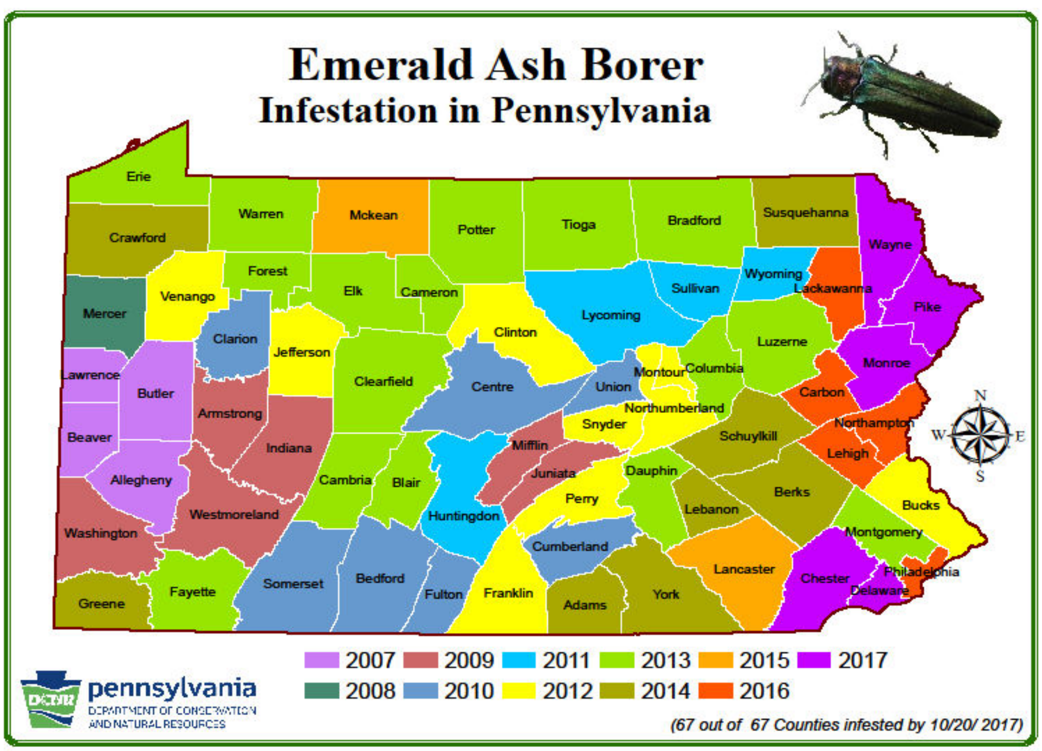
Terrestrial Invasive Species (TIS) are nonnative plants, vertebrates, arthropods, or pathogens that complete their lifecycle on land instead of in an aquatic environment and whose introduction does or is likely to cause economic/environmental damage or harm to human health.

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 X - Prevalent Invasive Species* lists invasive species that have been found in Indiana County.

4.3.4.2 Range of Magnitude

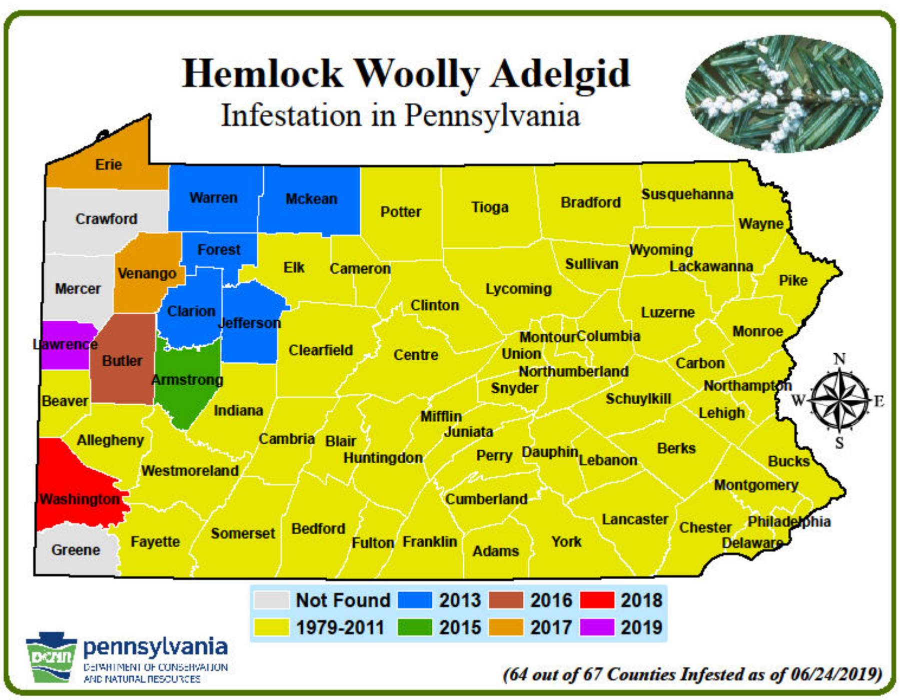
The magnitude of invasive species threats ranges from nuisance to widespread killer. Some invasive species are not considered agricultural pests, and do not harm humans or cause significant ecological problems. For example, Brown Marmorated Stink Bugs are not considered to be an agricultural pest and 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 Indiana County and the surrounding region (see *Figure X - Emerald Ash Borer Infestation in Pennsylvania*).

Figure 15 - Emerald Ash Borer Infestation in Pennsylvania



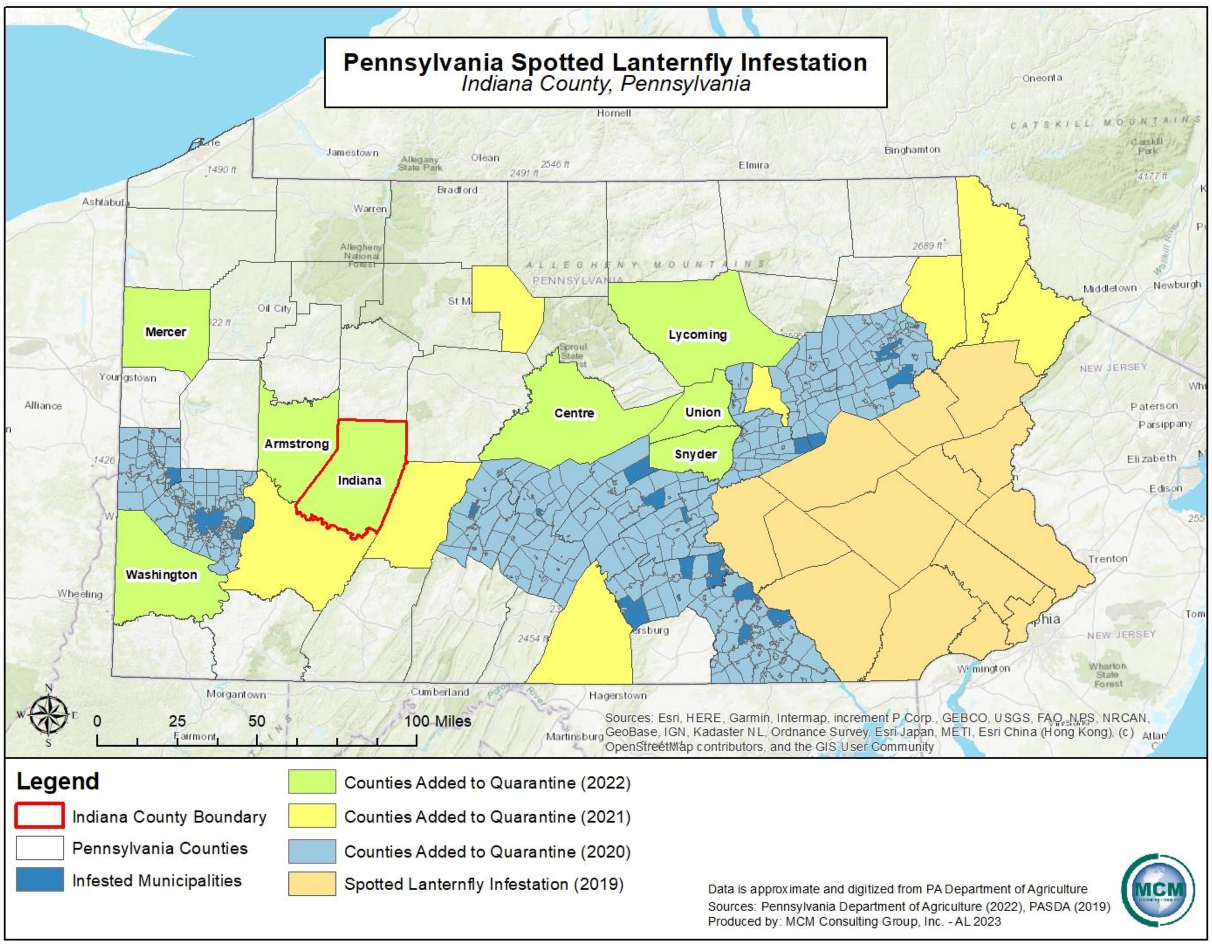
Another example of an invasive pest is the hemlock woolly adelgid. Hemlock woolly adelgid is a fluid-feeding insect that feeds on hemlock trees throughout eastern North America, including Pennsylvania. The egg sacs of these insects look like the tips of cotton swabs clinging to the undersides of hemlock 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 Indiana County, have been infested with this insect. See *Figure X - Hemlock Woolly Adelgid Infestation in Pennsylvania*. Currently, Crawford, Mercer, and Greene counties are the three counties in the commonwealth not reporting an infestation. 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 16 - 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 Spotted Lanternfly was found in Indiana County in 2022. However, the Spotted Lanternfly is undoubtedly continuing to spread. The State Department of Agriculture gives the total number of infected counties as forty-five, as of 2022. *Figure X – Pennsylvania Spotted Lanternfly Infestation* illustrates the counties in Pennsylvania that are considered to be in the quarantine zone for this pest.

Figure 17 - Pennsylvania Spotted Lanternfly Infestation



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.

4.3.4.3 Past Occurrence

Invasive species have been entering Pennsylvania since the arrival of European settlers, but not all occurrences required government action. Indiana County is known for its great number of geographic features. There are various state game lands within the area which include state game lands 79, 153, 174, 185, 248, 262, 273, 276, 328, and 332. Other parks, forests or recreation areas in the county that have significant amounts of forest land and lakes as well, which species may invade. Due to the vast area of forests, there are many invasive terrestrial species that have been widespread in Indiana County that are common problems throughout the Commonwealth. Some of the most popular problematic species in, and around, Indiana County include:

- Emerald Ash Borer
- Brown Marmorated Stink Bug
- Japanese Beetle
- 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 Indiana County. In 2014, the spotted lanternfly was found in the commonwealth, however, it was not until 2022 that Indiana County had entered the quarantine zone for the Spotted Lanternfly infestation.

Table X - Prevalent Invasive Species lists problematic non-native species that are established in Indiana County. While all species listed here are not native to Indiana 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**
Alosa pseudoharengus	Alewife	Animal
Trifolium hybridum	Alsike Clover	Plant

Prevalent Invasive Species (EDDMaps, 2021; iMapInvasives, 2021; PA DCNR, 2019)		
Scientific Name	**Common Name**	**Type**
Lonicera maackii	Amur Honeysuckle	Plant
Corbicula fluminea	Asiatic Clam	Animal
Commelina communis	Asiatic Dayflower	Plant
Elaeagnus umbellata	Autumn Olive	Plant
Aegopodium podagraria	Bishop's Goutweed	Plant
Rumex obtusifolius	Bitter Dock	Plant
Medicago lupulina	Black Medic	Plant
Ligustrum obtusifolium	Border Privet	Plant
Saponaria officinalis	Bouncing-bet	Plant
Cirsium vulgare	Bull Thistle	Plant
Poa compressa	Canada Bluegrass	Plant
Solanum dulcamara	Climbing Nightshade	Plant
Tussilago farfara	Colt's-foot	Plant
Cyprinus carpio	Common Carp	Animal
Stellaria media	Common Chickweed	Plant
Veronica officinalis	Common Speedwell	Plant
Hypericum perforatum	Common St. John's-wort	Plant
Holcus lanatus	Common Velvetgrass	Plant
Agrostis stolonifera	Creeping Bentgrass	Plant
Ranunculus repens	Creeping Buttercup	Plant
Polygonum caespitosum var. longisetum	Creeping Smartweed	Plant
Rumex crispus	Curly Dock	Plant
Potamogeton crispus	Curly-leaf Pondweed	Plant
Euphorbia cyparissias	Cypress Spurge	Plant
Hesperis matronalis	Dame's Rocket	Plant
Rosa canina	Dog Rose	Plant
Epipactis helleborin	Eastern Helleborine	Plant
Plantago lanceolata	English Plantain	Plant
Myriophyllum spicatum	Eurasian Water-milfoil	Plant
Alnus glutinosa	European Alder	Plant
Ligustrum vulgare	European Privet	Plant
Mentha x villosa	Foxtail Mint	Plant
Craspedacusta sowerbyi	Freshwater Jellyfish	Animal
Lotus corniculatus	Garden Bird's-foot-trefoil	Plant
Lysimachia vulgaris	Garden Loosestrife	Plant
Alliaria petiolata	Garlic Mustard	Plant

Prevalent Invasive Species (EDDMaps, 2021; iMapInvasives, 2021; PA DCNR, 2019)		
Scientific Name	**Common Name**	**Type**
Agrostis gigantea	Giant Bentgrass	Plant
Reynoutria sachalinensis	Giant Knotweed	Plant
Epilobium hirsutum	Great Hairy Willowherb	Plant
Chelidonium majus	Greater Celandine	Plant
Glechoma hederacea	Ground-ivy	Plant
Cardamine hirsuta	Hairy Bittercress	Plant
Adelges tsugae	Hemlock Woolly Adelgid	Insect
Lonicera spp (species unknown)	Honeysuckle (species unknown)	Plant
Berberis thunbergii	Japanese Barberry	Plant
Lonicera japonica	Japanese Honeysuckle	Plant
Spiraea japonica	Japanese Spiraea	Plant
Microstegium vimineum	Japanese Stiltgrass	Plant
Poa pratensis	Kentucky Bluegrass	Plant
Reynoutria spp. (species unknown)	Knotweed (species unknown)	Plant
Arctium minus	Lesser Burdock	Plant
Ranunculus ficaria	Lesser Celandine	Plant
Vinca minor	Lesser Periwinkle	Plant
(Persicaria hydropiper	Marshpepper Knotweed; Smartweed	Plant
Phleum pratense	Meadow Timothy	Plant
Persicaria perfoliata	Mile-a-minute-weed	Plant
Lonicera morrowii	Morrow's Honeysuckle	Plant
Artemisia vulgaris	Mugwort	Plant
Rosa multiflora	Multiflora Rose	Plant
Typha angustifolia	Narrowleaf Cattail	Plant
Catalpa speciosa	Northern Catalpa	Plant
Acer platanoides	Norway Maple	Plant
Hemerocallis fulva	Orange Daylily	Plant
Dactylis glomerata	Orchard Grass	Plant
Celastrus orbiculatus	Oriental Bittersweet	Plant
Leucanthemum vulgare	Oxeye Daisy	Plant
Mentha x piperita	Peppermint	Plant
Lathyrus latifolius	Perennial Pea	Plant
Conium maculatum	Poison-hemlock	Plant
Lythrum salicaria	Purple Loosestrife	Plant

Prevalent Invasive Species (EDDMaps, 2021; iMapInvasives, 2021; PA DCNR, 2019)		
Scientific Name	**Common Name**	**Type**
Daucus carota	Queen Anne's Lace	Plant
Trachemys scripta elegans	Red-eared Slider	Animal
Phalaris arundinacea	Reed Canary Grass	Plant
Pinus sylvestris	Scotch Pine	Plant
Poa trivialis	Scribner's Bluegrass	Plant
Rumex acetosella	Sheep Sorrel	Plant
Bromus inermis	Smooth Brome	Plant
Prunus avium	Sweet Cherry	Plant
Anthoxanthum odoratum	Sweet Vernal Grass	Plant
Melilotus officinalis	Sweetclover	Plant
Acorus calamus	Sweetflag, Calamus	Plant
Bidens aristosa	Tickseed Beggarticks	Plant
Cardamine impatiens	Touch-me-not Bittercress	Plant
Ailanthus altissima	Tree-of-Heaven	Plant
Anthriscus sylvestris	Wild Chervil	Plant
Pastinaca sativa	Wild Parsnip	Plant
Iris pseudacorus	Yellow Iris	Plant

4.3.4.4 Future Occurrence

According to the Pennsylvania Invasive Species Council (PISC), the probability of future occurrence for invasive species threats is growing due to the increasing volume of transported goods, increasing efficiency and speed of transportation, and expanding international trade agreements. Expanded global trade has created opportunities for many organisms to be transported to and establish themselves in new counties and regions. 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 Indiana County but have not yet been detected inside the county (see *Table X – 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 Indiana County.

Table 31 - Future Vulnerable Species

Future Vulnerable Species (EDDMaps, 2021; PA DCNR, 2019; iMapInvasives, 2021)		
Scientific Name	**Common Name**	**Type**
Puccinellia distans	Alkali Grass	Plant
Phellodendron amurense	Amur Corktree	Plant
Acer ginnala	Amur Maple	Plant
Lonicera x bella	Bell's Honeysuckle	Plant
Rhodotypos scandens	Black Jetbead	Plant
Brassica nigra	Black Mustard	Plant
Reynoutria x bohemica	Bohemian Knotweed	Plant
Parthenocissus tricuspidata	Boston-ivy	Plant
Najas minor	Brittle Naiad	Plant
Rhamnus cathartica	Buckthorn	Plant
Euonymus alatus	Burning Bush	Plant
Linaria vulgaris	Butter-and-eggs	Plant
Cirsium arvense	Canada Thistle	Plant
Ajuga reptans	Carpet-bugle	Plant
Bromus tectorum	Cheatgrass	Plant
Cichorium intybus	Chicory	Plant
Verbascum thapsus	Common Mullein	Plant
Ornithogalum umbellatum	Common Star-of-Bethlehem	Plant
Lysimachia nummularia	Creeping Jenny	Plant
Rorippa sylvestris	Creeping Yellowcress	Plant
Didymosphenia geminata	Didymo	Diatom
Agrilus planipennis	Emerald Ash Borer	Insect
Hedera helix	English Ivy	Plant
Allium vineale	Field Garlic	Plant
Sonchus arvensis	Field Sowthistle	Plant

Future Vulnerable Species (EDDMaps, 2021; PA DCNR, 2019; iMapInvasives, 2021)		
Scientific Name	**Common Name**	**Type**
Carassius auratus	Goldfish	Animal
Galium mollugo	Great Hedge Bedstraw	Plant
Humulus japonicus	Japanese Hop	Plant
Reynoutria japonica var. japonica	Japanese Knotweed	Plant
Viburnum plicatum	Japanese Snowball	Plant
Datura stramonium	Jimsonweed	Plant
Sorghum halepense	Johnson Grass	Plant
Pueraria montana var. lobata	Kudzu	Plant
Persicaria maculosa	Lady's Thumb	Plant
Viburnum dilatatum	Linden Arrow-wood	Plant
Tragopogon dubius	Meadow Goat's-beard	Plant
Carduus nutans	Musk Thistle	Plant
Chenopodium glaucum	Oakleaf Goosefoot	Plant
Bromus sterilis	Poverty Brome	Plant
Ligustrum spp. (species unknown)	Privet (species unknown)	Plant
Lamium purpureum	Purple Deadnettle	Plant
Hibiscus syriacus	Rose-of-Sharon	Plant
Trachemys scripta	Slider	Animal
Lonicera tatarica	Tatarian Honeysuckle	Plant
Myosotis scorpioides	True Forget-me-not	Plant
Abutilon theophrasti	Velvetleaf	Plant
Pyrrhalta viburni	Viburnum Leaf Beetle	Insect
Rorippa nasturtium-aquaticum	Watercress	Plant
Verbascum blattaria	White Moth Mullein	Plant
Morus alba	White Mulberry	Plant
Clinopodium vulgare	Wild Basil	Plant
Dipsacus fullonum	Wild Teasel	Plant
Rubus phoenicolasius	Wineberry	Plant
Dreissena polymorpha	Zebra Mussel	Animal

4.3.4.5 Vulnerability Assessment

Indiana 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 Indiana 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 Indiana County, there is a risk of future damage from invasive species that are present in the area. With about 834 square miles of total land in Indiana County, there is vulnerability to various land sites and waterways. If an invasive species were to invade the popular terrestrial areas or waterways in Indiana 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 Indiana 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 Indiana 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 X - Prevalent Invasive Species for priority species in Indiana County.*

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 Indiana County, but not yet present in the county (priority species in *Table X – 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.

4.3.5. Landslides

4.3.5.1 Location and Extent

Rock falls and other slope failures can occur in areas of Indiana 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 slides, 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 Indiana County as generally high to moderate in the western and northern sections of the county and high along lakes and bluffs and stream banks in the southern portion of the county. *Figure X – Landslide Hazard Areas* shows areas of landslide susceptibility in Indiana County. A majority of Indiana County is located in the Appalachian Plateaus physiographic province which is known for moderate to high vulnerability to all forms of landslide. Steep slopes are evenly spread throughout the county and there are locations that can be prone to landslides in almost every municipality.

4.3.5.2 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 or other slide along highways involve vehicles. 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 Indiana County.

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

4.3.5.3 Past Occurrence

No comprehensive list of landslide incidents in Indiana County is available, and 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. The United States Geological Survey attempts to compile past landslide events in the United States and currently, their system reports approximately 187 landslide events in Pennsylvania between the years of 2008 and 2019. This information can be found in *Figure X – USGS Reported Landslide Events in Pennsylvania*. This data reports only one prior landslide event occurring in Indiana County, and that event is listed as occurring in 1999. The Southwestern Pennsylvania Commission, a planning commission for the development of southwestern Pennsylvania, published and shared past observed landslide events with PASDA, the Pennsylvania Spatial Data Access, in 2017. The data illustrates that there were forty-seven previously observed landslide events in Indiana County, but the data does not provide dates of the events. The landslides reported by the Southwestern Pennsylvania Commission total an impacted acreage of approximately 46.81 acres in Indiana County.

4.3.5.4 Future Occurrence

Historically, significant landslide events are likely to occur on average once every four years in Indiana County. Mismanaged development in steeply sloped areas could increase the 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. The guidelines offered in this program are similar to landslides prevention practices.

4.3.5.5 Vulnerability Assessment

Landslides are often precipitated by other natural hazards such as earthquakes or floods. A significant landslide can cause millions of dollars in damages. Continued enforcement of floodplain management and proper road and building construction can mitigate the vulnerability to 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 those fractures could lead to unexpected flood events and landslide events.

A comprehensive database of land highly prone to erosion and landslides is difficult to produce. The potential for erosion and landslides should be considered when planning construction projects in Indiana County. There are several general factors that can be indicators of landslide prone areas including:

- 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 Indiana County are vulnerable to landslides. *Table X – Structure Vulnerability Data* illustrates the number of site structure address points per municipality and the number of structures in high slope areas. All of the structure locations that are in the vulnerable slope areas are not community lifeline locations or critical infrastructure facilities. From an aerial perspective, all of the locations are small buildings or residential houses. 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**
Armagh Borough	75	0
Armstrong Township	1688	2
Banks Township	558	0
Black Lick Township	671	0
Blairsville Borough	2193	0
Brush Valley Township	942	0

Structure Vulnerability Data		
Municipality	**Number of Addressable Structures Per Municipality**	**Number of Structures in Slope Area**
Buffington Township	661	0
Burrell Township	2256	0
Canoe Township	824	0
Center Township	2565	0
Cherryhill Township	1366	0
Cherry Tree Borough	186	0
Clymer Borough	837	0
Conemaugh Township	1251	2
Creekside Borough	184	0
East Mahoning Township	568	0
East Wheatfield Township	1283	0
Ernest Borough	230	0
Glen Campbell Borough	161	1
Grant Township	474	0
Green Township	2001	1
Homer City	943	0
Indiana Borough	5367	0
Marion Center Borough	237	0
Montgomery Township	884	0
North Mahoning Township	686	0
Pine Township	1084	0
Plumville Borough	156	0
Rayne Township	1555	0
Saltsburg Borough	456	0
Shelocta Borough	85	0
Smicksburg Borough	41	0
South Mahoning Township	859	0
Washington Township	837	2
West Mahoning Township	518	0
West Wheatfield Township	1181	0
White Township	8605	0
Young Township	1029	0
Totals:	**45,497**	**8**

Figure 18 - Landslide Hazard Areas

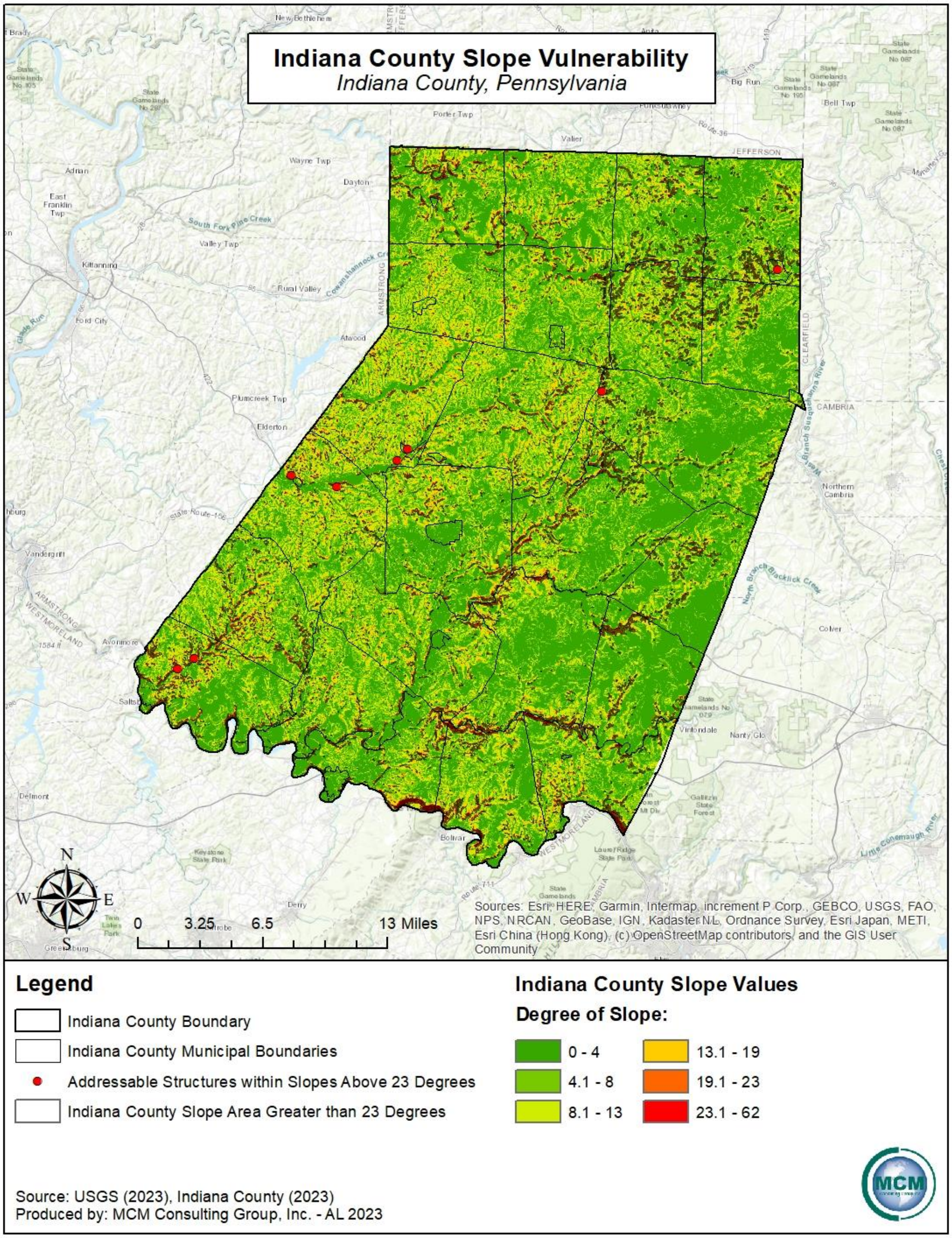
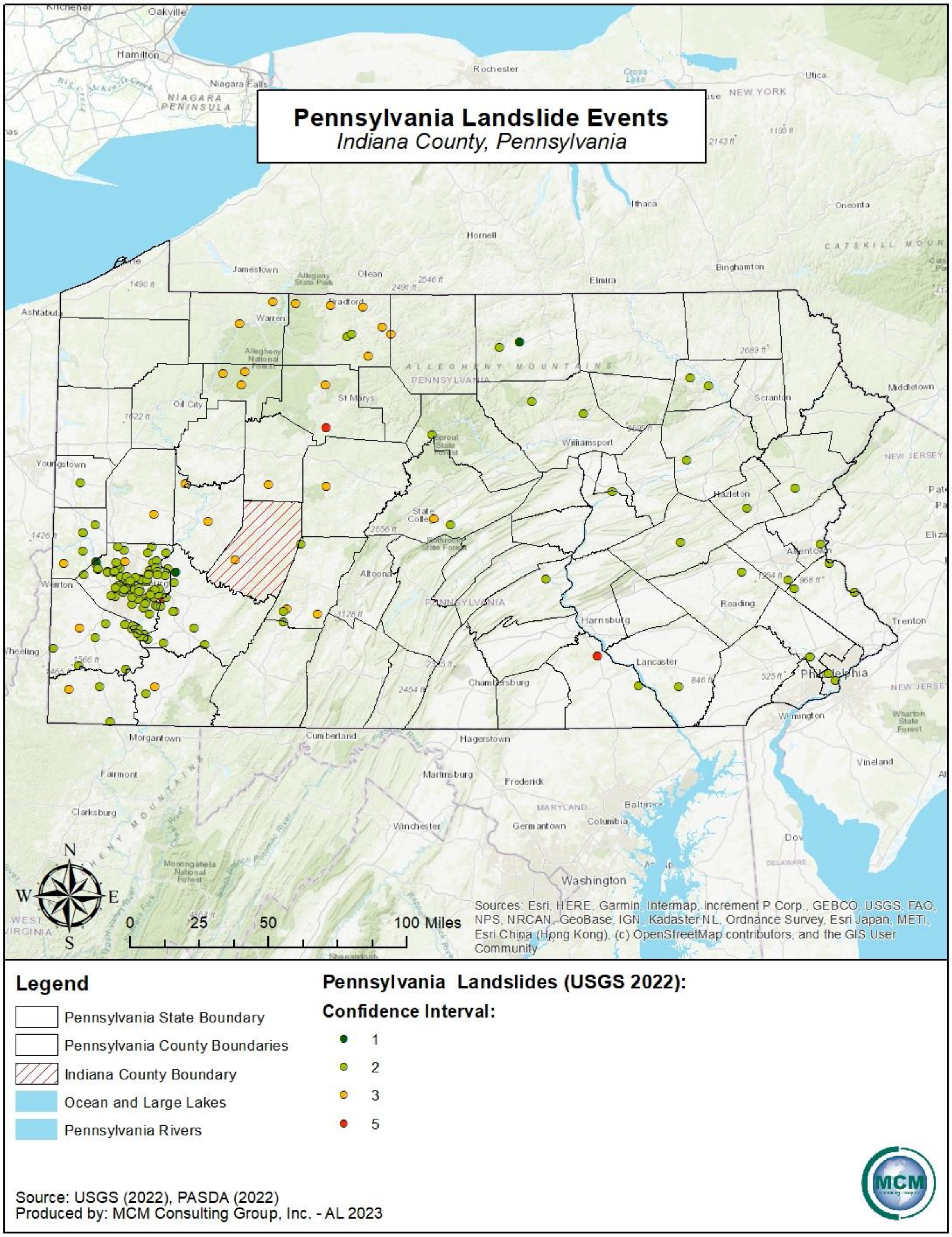


Figure 19 - USGS Reported Landslide Events in Pennsylvania



4.3.6. Pandemic and Infectious Disease

4.3.6.1 Location and Extent

Epidemic

An epidemic occurs when an infectious disease spreads more quickly than expected by medical and healthcare authorities. It is characterized by 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 a localized outbreak. Epidemics often include multiple countries, although not always spreading to different continents. In short, epidemics are regional.

Pandemic

A pandemic is a disease outbreak that spreads across countries or continents, which affects the population of a vast area. When a pandemic occurs, the event usually affects more people and takes more lives than an epidemic. Pandemics are 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 frequently affect the United States. A pandemic is measured and defined by the spreading of a disease rather than the fatalities with which it is associated. The characteristics of a pandemic outbreak include large and 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 efficiently than epidemics. In the event that a pandemic occurs in the eastern United States, the entirety of Indiana County would likely be impacted.

Endemic

An endemic is described as a disease that is present in a community at all times but occurs in a relatively low frequency and is not spreading at a rapid rate. An endemic can be a previous pandemic such as influenza, or coronavirus (COVID-19), or a more regionalized virus such as Ebola virus in Africa. An endemic can become a pandemic if the disease mutates into a more virulent strain.

Infectious Disease

Infectious diseases are illnesses caused by pathogenic organisms such bacteria, viruses, fungi, or parasites. Organisms become harmful and cause disease under certain conditions. The sources of infectious disease may originate from contaminated food or waterways, infected animals/livestock, or 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.

Pandemic and infectious disease events cover a wide geographical area and can affect large populations, potentially including the entire population of the Commonwealth of Pennsylvania. 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 more populated and urban 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 in, and contaminate, standing water.

4.3.6.2 Range of Magnitude

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 produces clinically asymptomatic cases less than 80% of the time. Therefore, approximately 20% of the cases result in mild infection, also known as West Nile fever. However, there is a small percentage of cases that could 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. Advances in medical technologies have greatly reduced the number of deaths caused by influenza over time. In the early 1900s, flu pandemics historically caused tens of millions of deaths, while the 2009 Novel H1N1, known as swine flu, caused fewer than 20,000 deaths world-wide. Many people infected with swine flu in 2009 recovered without needing medical treatment. Without recent medical inventions and technologies, modern influenza would be associated with higher morbidity rates. 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 were 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, humanity 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 rapidly advanced in 2020 and 2021. Of the six global outbreaks of viral infections, three were caused by coronaviruses (SARS, MERS, and COVID-19).

While there are limited secondary hazards related to public health emergencies, an outbreak can cause a variety of cascading hazards. Civil disorder due to supply shortages is the most common cascading hazard to result from pandemic, epidemic, or infectious disease. Additional potential 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 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. These phases are listed below in *Table X - Pandemic Influenza Phases*.

Table 33 - 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.
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.

Pandemic Influenza Phases	
Phase	**Characteristics**
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)	

4.3.6.3 Past Occurrence

Pandemic & Epidemic

Several pandemic influenza outbreaks have occurred over the past 100 years that not only affected Indiana County but the United States as a whole. *Table X - Past Pandemic Events in the United States* illustrates the various past pandemic events that have occurred since the late 1800's. Prior to COVID-19, 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 Indiana 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.

Spanish Flu

An estimated 1/3 of the world's population was infected and had clinically apparent illnesses during the 1918 - 1919 influenza pandemic. Pennsylvania experienced severe effects from the Spanish Flu. It claimed 500,000 lives in the United States, which included individuals in Indiana County. There is a lack of data which provides exact numbers of deaths that occurred in Indiana County from the Spanish Flu, however there were a total of 60,000 deaths in Pennsylvania. Deaths occurring in Indiana County are included in this number. 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 half a million cases and 16,000 deaths of the Spanish Flu in Philadelphia. The factors of high population density including crowded and unhygienic conditions contributed to higher numbers of cases and death rates across Pennsylvania.

Swine Flu/Avian Flu/H1N1

Each year, different strains of influenza are labeled as potential pandemic threats. 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.

Indiana County was impacted by the H1N1 virus during 2009. The Pennsylvania Department of Health (PA DOH) set up clinics throughout the county to administer vaccines to at-risk populations. A total 10,940 cases and seventy-eight deaths occurred in Pennsylvania from this pandemic but there is insufficient data to determine the exact number of cases and deaths from swine flu in Indiana County.

COVID-19

Indiana County was directly impacted by the COVID-19 pandemic. As of February 2023, Pennsylvania had an estimated 2.87 million total cases and 50,055 deaths related to the COVID-19 pandemic. The first cases in Pennsylvania were reported on March 6, 2020, in Delaware and Wayne counties. The first confirmed case of COVID-19 in Indiana County was on March 25, 2020. Beginning in December of 2020, there was a large-scale vaccination effort to combat COVID-19. Municipalities in Indiana County indicated an increase in the pandemic and infectious disease section of the risk factor assessment municipal comparison.

Table 34 - 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 Indiana County experienced pandemic events, but the county has also experienced infectious disease events. The two major infectious disease events experienced across Indiana County and Pennsylvania as a whole are the West Nile Virus and Lyme Disease. Due to the climatic traits of Pennsylvania these infectious diseases thrive in Indiana 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 Indiana County, 2018 had the most positive cases in Indiana County since 2016. Over the five-year period between 2016 and 2021, eight individuals tested positive for West Nile Virus in Indiana County. *Table X - West Nile Virus Control Program in Indiana County since 2016* outlines the West Nile Virus within Indiana County from 2016 to 2021, which was the most recent available data at the time of writing this plan.

Table 35 - West Nile Virus Control Program in Indiana County since 2016

West Nile Virus Control Program in Indiana County Since 2016				
Year	**Total Positives**	**Human Positives**	**Mosquito Positives**	**Bird Positives**
2016	2	1	0	1
2017	2	0	2	0
2018	4	0	3	1
2019	0	0	0	0
2020	0	0	0	0
2021	0	0	0	0
Source: (PA Department of Environmental Protection, 2023)				

Lyme Disease

Lyme Disease has been present in the United States and Indiana 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. Indiana County has an overall approximated 1,502 confirmed cases of Lyme disease from 2010 through 2020, although actual totals may be significantly higher due to under reporting. Indiana County as a whole has a high incidence total for Lyme Disease in the country, especially over the past several years. It is possible that numbers have risen dramatically due to lack of testing in previous years. Indiana County experienced the highest number of positive cases in 2016 at 227 cases. Lyme disease case counts have been 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 Indiana County. *Table X - Lyme Disease Data for Indiana County* outlines the total positive cases of Lyme Disease within Indiana County since 2010 through 2020. Data after 2020 was not available for this report.

Table 36 - Lyme Disease Data for Indiana County

Lyme Disease Data for Indiana County	
Year	**Total Positives**
2010	32
2011	82
2012	99
2013	208
2014	160
2015	188
2016	227
2017	183
2018	201
2019	89
2020	33
Source: (PA Department of Environmental Protection, 2023)	

Zika Virus

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.

4.3.6.4 Future Occurrence

Pandemic & Epidemic

The probability of a widespread public health emergency effecting Indiana County is approximately once every ten years. Minor outbreaks of less serious communicable disease, such as influenza, will occur much more frequently. The occurrence of pandemic influenza outbreaks is unpredictable, and complete avoidance of the events is unlikely. Therefore, future occurrences of pandemics and infectious disease events are very likely. Pandemics may also emerge from other diseases, especially invasive pathogens for which Indiana County and Pennsylvania as a whole lack natural immunity.

Influenza

It is estimated that 5% to 25% of Pennsylvanians get the flu each year, and 120 to 2,000 individuals 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.

Infectious Disease

Infectious diseases such as West Nile Virus and Lyme Disease have been present in Indiana County for many years and are expected to perpetuate. The best way to prevent infectious disease outbreaks, including West Nile Virus and Lyme Disease, is to actively address the causes of the diseases. West Nile Virus occurrence can be reduced by removing mosquito breeding locations in stagnant water sources and Lyme Disease occurrence can be reduced by utilizing insect repellant, removing ticks promptly, applying pesticides, and reducing tick habitats. Occurrence of Zika Virus can also be reduced by removing mosquito breeding areas and areas of stagnant water. Both West Nile Virus and Lyme Disease are expected to continue occurring in Indiana County in the future.

4.3.6.5 Vulnerability Assessment

Indiana County is considered to be a moderate vulnerability county in regard to the pandemic events. It is extremely difficult to predict the occurrence and the magnitude of a pandemic or epidemic event. The COVID-19 pandemic disproportionately affected populations over the age of sixty-five, especially those in nursing homes. It has had disparate effect on socially vulnerable populations, including unsheltered and homeless individuals.

Elderly individuals, children and immune deficient individuals are the most vulnerable to disease. Nursing facilities, personal care facilities, daycares, schools, and hospitals are considered more vulnerable since there are often groups of these socially vulnerable individuals present at these community lifelines. 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 reported high numbers of cases and deaths, and several county jails and state correctional institutions reported wide community spread.

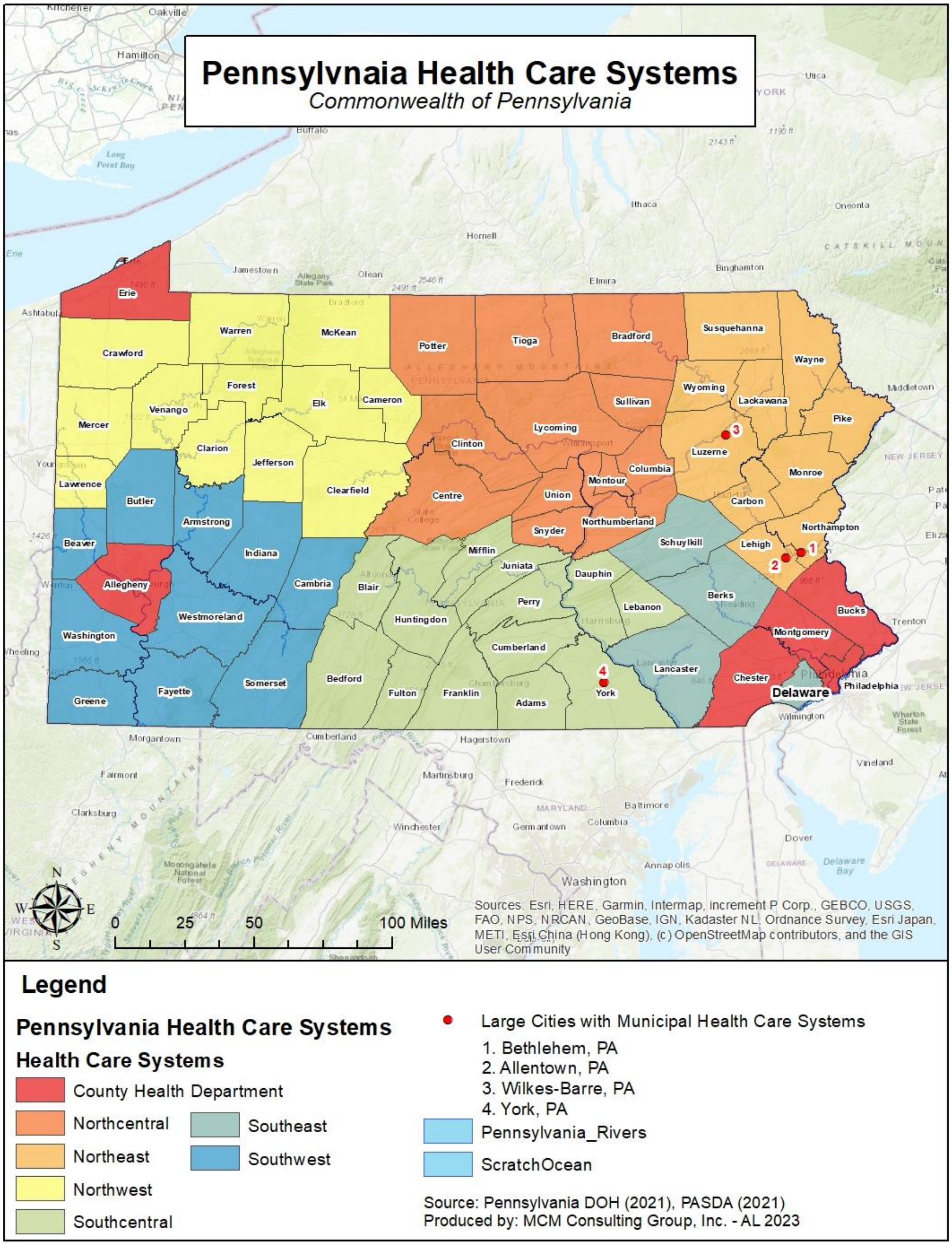
Health-care workers and those working in direct-care (such as correctional institutions or those who cannot social distance due to their jobs) are more likely to be exposed to a pandemic disease. Those who work outdoors for extended periods of time in warm months may be more vulnerable to West Nile Virus,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

The number of hospitals within the county, and availability of beds within the hospitals, determine the amount of care vulnerable and sick patients will receive. It is important for hospitals to review and exercise emergency response plans and continuity of operations plans (COOP) to ensure that there is an 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 X - Pennsylvania Department of Health Districts*). Indiana 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 20 - Pennsylvania Department of Health Districts



4.3.7. Radon Exposure

4.3.7.1 Location and Extent

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

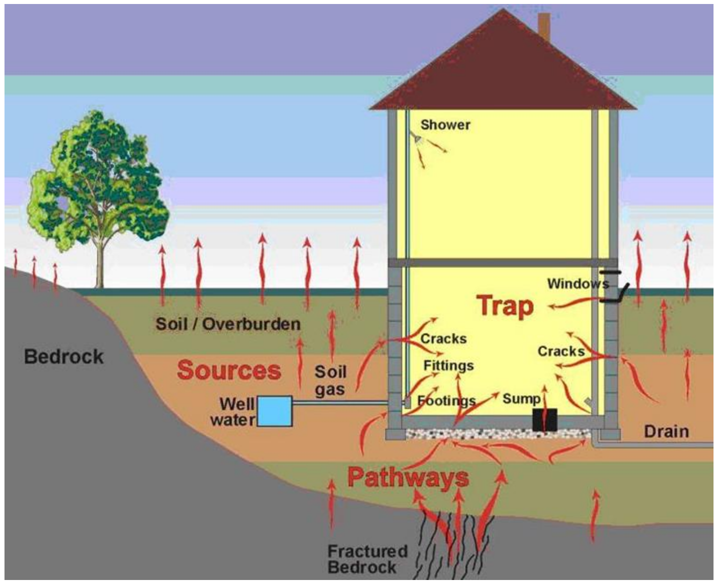
- Proximity to elevated uranium rich deposits (>50ppm). Areas within a few hundred feet of such deposits are most at risk. Such deposits are rare in Pennsylvania.
- Some more common rocks have higher than average uranium content (5 to 50 ppm), and proximity to such rocks also increases the risk of radon 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 21 - 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 Indiana 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.

4.3.7.2 Range of 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 X - 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 X - Radon Risk for Smokers and Nonsmokers* below, a smoker exposed to radon has a much higher risk of lung cancer.

Table 37 - Radon Risk for Smokers and Nonsmokers

<table>
<tr><th colspan="4">Radon Risk for Smokers and Nonsmokers</th></tr>
<tr><th>Radon Level (pCi/L)</th><th>If 1,000 People Were Exposed to this level over a lifetime…*</th><th>Risk of cancer from radon exposure compares to...***</th><th>Action Threshold</th></tr>
<tr><th colspan="4">SMOKERS</th></tr>
<tr><td>20</td><td>About 260 people could get lung cancer</td><td>250 times the risk of drowning</td><td rowspan="4">Fix Structure</td></tr>
<tr><td>10</td><td>About 150 people could get lung cancer</td><td>200 times the risk of dying in a home fire</td></tr>
<tr><td>8</td><td>About 120 people could get lung cancer</td><td>30 times the risk of dying in a fall</td></tr>
<tr><td>4</td><td>About 62 people could get lung cancer</td><td>5 times the risk of dying in a car crash</td></tr>
<tr><td>2</td><td>About 32 people could get lung cancer</td><td>6 times the risk of dying from poison</td><td>Consider fixing structure between 2 and 4 pCi/L</td></tr>
<tr><td>1.3</td><td>About 20 people could get lung cancer</td><td>(Average indoor radon level)</td><td rowspan="2">Reducing radon levels below 2pCi/L is difficult</td></tr>
<tr><td>0.4</td><td>About 3 people could get lung cancer</td><td>(Average outdoor radon level)</td></tr>
<tr><th colspan="4">NON-SMOKERS</th></tr>
<tr><td>20</td><td>About 36 people could get lung cancer</td><td>35 times the risk of drowning</td><td rowspan="2">Fix Structure</td></tr>
<tr><td>10</td><td>About 18 people could get lung cancer</td><td>20 times the risk of dying in a home fire</td></tr>
</table>

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**
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.*			

4.3.7.3 Past Occurrence

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

The Pennsylvania Department of Environmental Protection (PA DEP) provides information for homeowners about how to test for radon in their homes, and when they receive a test result over 4 pCi/L, the PA DEP Bureau of Radiation Protection works to help homeowners repair the home and mitigate the hazard. The DEP has estimated that the national average indoor radon concentration is 1.3 pCi/L and the level for action is 4.0 pCi/L; however, they have estimated that the average indoor concentration in Pennsylvania basements is about 7.1 pCi/L and 3.6 pCi/L on the first floor. The PA DEP records all the tests they receive and categorize them in a searchable database by zip code. There are currently 2,174 zip codes in Pennsylvania, but the zip code radon test data only covers for 986 zip codes. The missing zip codes that report in the data base as “N/A” for insufficient data either had fewer than thirty test results or no test results at all.

Figure X – Radon Test Results in Indiana County shows a total of fifteen zip codes in Indiana 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 Marion Center-zip code, which is in the north of the county, with an average reading of 14.8 pCi/L within location of the basement. Most reporting zip codes in Indiana 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 9.5 pCi/L, and the average first floor reading is 5.3 pCi/L.

Table 38 - Radon Test Results in Indiana County

Radon Level Test Results (PA DEP, 2020)					
Zip Code	**Postal Community**	**Location**	**Number of Tests**	**Max Result pCi/L**	**Average Result pCi/L**
15681	Saltsburg	Basement	222	115.1	9.4
		First Floor	N/A	N/A	N/A
15701	Indiana	Basement	3707	636.0	7.2
		First Floor	352	47.7	3.8
15717	Blairsville	Basement	561	223.7	6.0
		First Floor	56	61.1	6.2
15724	Cherry Tree	Basement	66	160.0	13.8
		First Floor	N/A	N/A	N/A
15725	Clarksburg	Basement	77	107.0	11
		First Floor	N/A	N/A	N/A
15728	Clymer	Basement	71	34.8	5.8
		First Floor	N/A	N/A	N/A
15729	Commodore	Basement	34	48.5	8.5
		First Floor	N/A	N/A	N/A
15732	Creekside	Basement	100	55.7	6.0
		First Floor	N/A	N/A	N/A
15747	Home	Basement	132	294.0	10.8
		First Floor	N/A	N/A	N/A
15748	Graceton; Waterman; Homer City	Basement	328	104.9	7.2
		First Floor	36	43.7	6.0
15759	Marion Center	Basement	104	216.6	14.8
		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**
15765	Penn Run	Basement	107	187.0	10.5
		First Floor	N/A	N/A	N/A
15771	Rochester Mills	Basement	32	36.3	13.9
		First Floor	N/A	N/A	N/A
15772	Rossiter	Basement	39	39.7	9.3
		First Floor	N/A	N/A	N/A
15920	Armagh	Basement	33	41.1	8.6
		First Floor	N/A	N/A	N/A

4.3.7.4 Future Occurrence

Radon exposure is likely given the geologic and geomorphic conditions in Indiana 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 X – Pennsylvania Radon Levels*. Each zone reflects the average short-term measurement of radon that can be expected in a building without radon controls. Indiana County is located within Zone 1 with counties of high potential for radon which indicate an great 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 X - 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 39 - 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
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

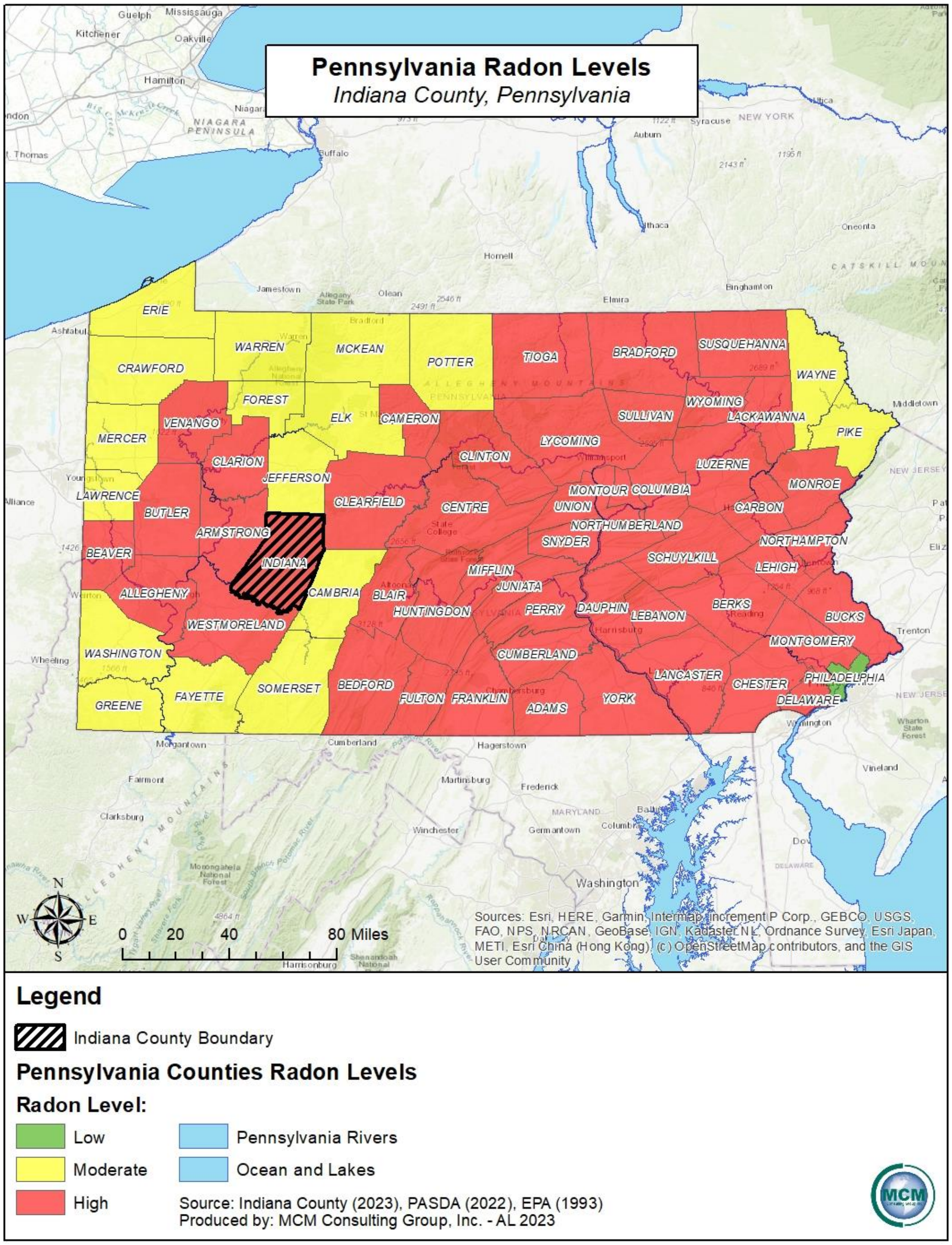
4.3.7.5 Vulnerability Assessment

Proper testing for radon levels should be conducted across Indiana 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.

Indiana County is in the EPA Radon Hazard Zone 1, meaning there is a high risk of radon exposure. Smokers can be up to ten times more vulnerable to lung cancer from high levels of radon depending on the level of radon they are exposed to. 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 X – 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 34,811 vulnerable buildings in

Indiana 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 6,962 buildings) would be $8,354,640.

Figure 22 - Pennsylvania Radon Levels



4.3.8. Subsidence and Sinkhole

4.3.8.1 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 Indiana County is not located in a karst vulnerable area. Subsidence in Indiana County is primarily due to mining activity. This plan will focus on mining activity. Indiana County has a history of subsidence due to 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.

4.3.8.2 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 Indiana County would be similar to an event in Allegheny 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 Indiana County local planning team assigned a risk factor assessment score of 2.5 to subsidence and sinkhole formation for the 2023 Hazard Mitigation Plan Update. This places the hazard at a high risk factor. This risk factor is the same as the risk factor assigned to the hazard in 2023. *Figure X – 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. Indiana County has a large portion of mining areas and is therefore one of these regions.

4.3.8.3 Past Occurrence

There is no comprehensive list of mine subsidence in Indiana 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 Indiana County. The fact that no sinkholes were identified does not necessarily mean there are no sinkholes in Indiana 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.

4.3.8.4 Future Occurrence

There is currently no reliable information regarding the probability of future occurrence of subsidence or sinkholes in 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 Indiana 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 Indiana County, the annual occurrence of subsidence and sinkholes near karst topography and where mining occurs is considered likely. Although precise locations of future occurrences is 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 Indiana 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 X – Unsuitable Areas 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 around Indiana County and in neighboring Cambria County and Clearfield County.

4.3.8.5 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 Indiana 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 Indiana County was superficial mining of natural resources. The mine sites that were abandoned after extraction can potentially become areas susceptible to subsidence events. These areas can be seen in *Figure X – Abandoned Mined Sites in Indiana County*. Subsidence cannot be ruled out as a potential hazard for Indiana County. There are not state or county critical infrastructure facilities or community lifeline locations at risk in the county due to sinkholes.

Figure 23 - Sinkhole Susceptibility in Pennsylvania

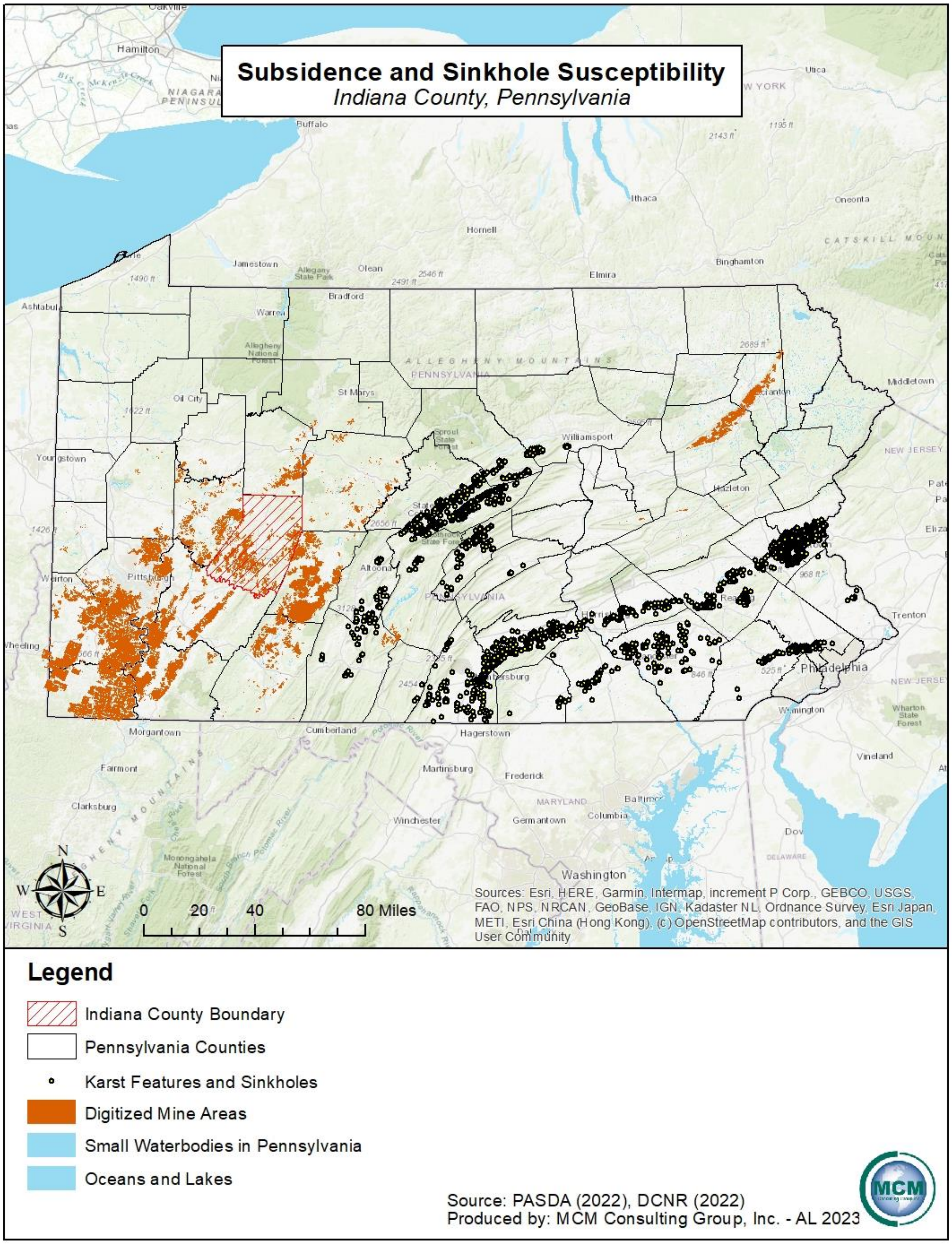


Figure 24 - Abandoned Mined Sites in Indiana County

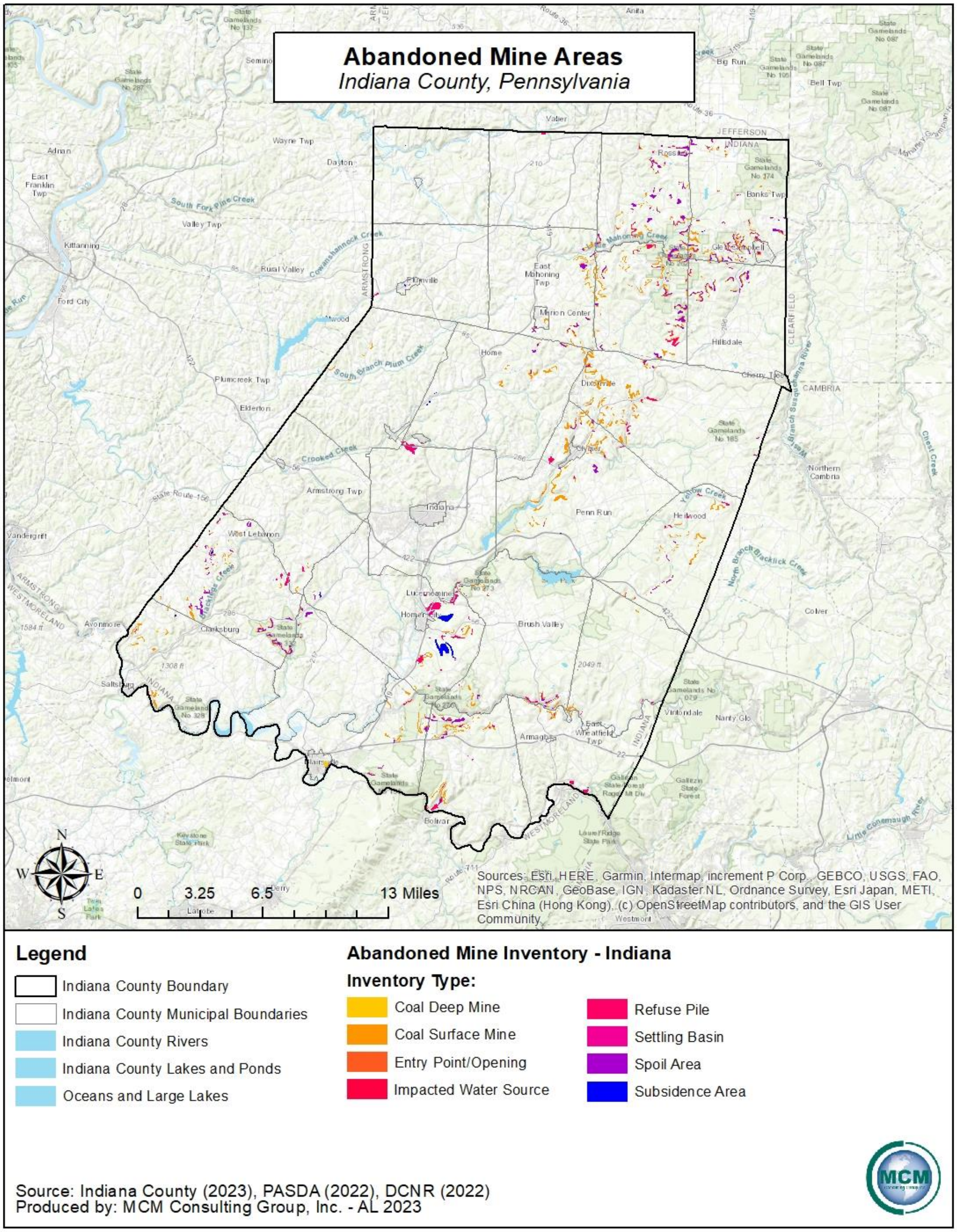
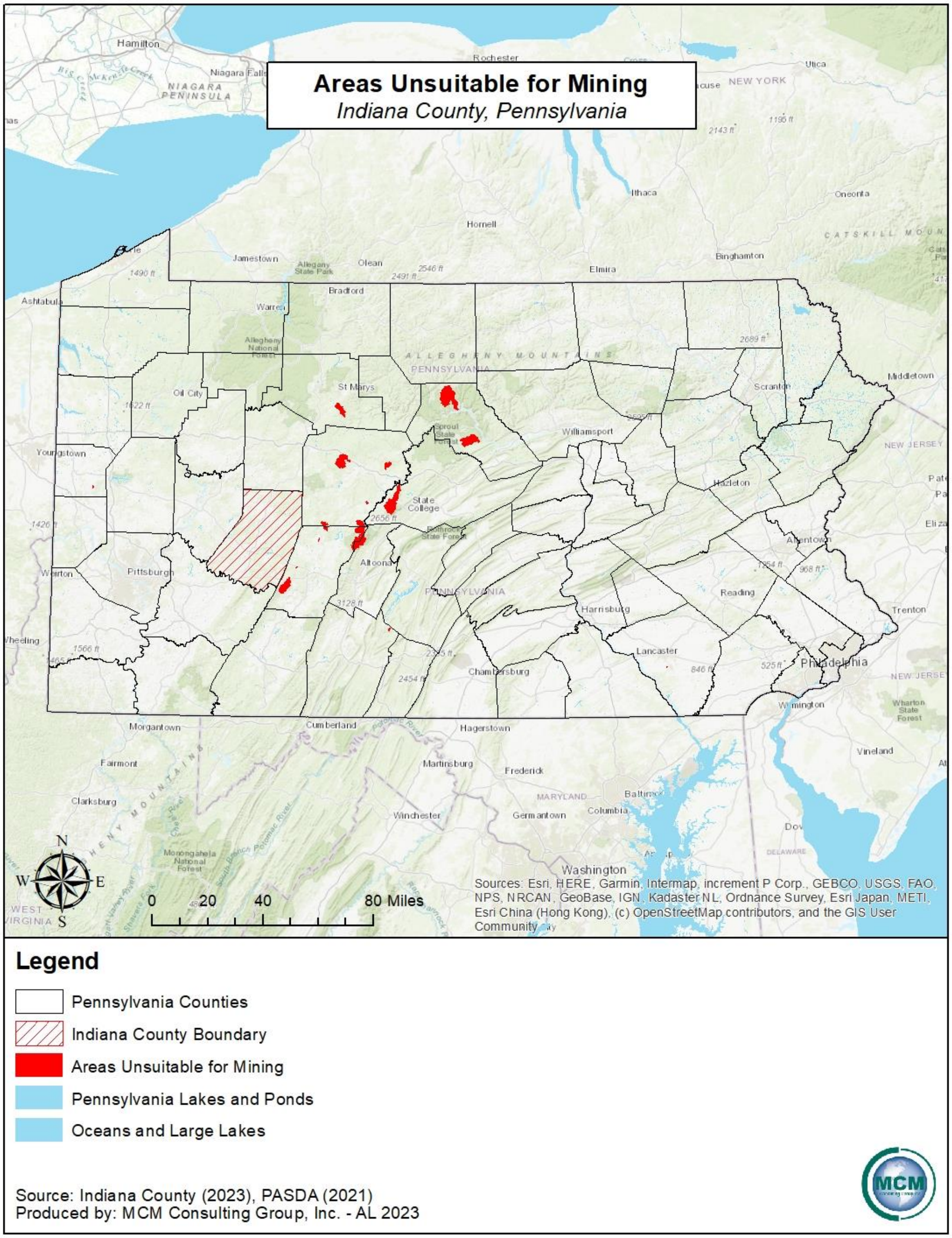


Figure 25 - Unsuitable Areas for Mining in Pennsylvania



4.3.9. Tornadoes/Windstorm

4.3.9.1 Location and Extent

Tornadoes and windstorms can occur throughout Indiana County and are usually localized in their location and extent. Severe thunderstorms may result in conditions favorable for the formation of windstorms, including 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 afternoon and early evening, which are typically the warmest hours of the day. Tornadoes are most likely to occur in the spring and summer.

Tornadoes

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 short-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 without a rotating updraft, which causes the spinning motion common with tornadoes to appear near the ground.

Windstorms

Windstorms are experienced on a region-wide scale. The most frequent cause of windstorms in Pennsylvania are thunderstorms, although they may also be caused by hurricanes and winter storms. 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 Indiana County.

4.3.9.2 Range of Magnitude

Tornadoes

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 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.

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 65 to more than 200 miles per hour (mph). The speed of forward motion can range from 0 mph to 50 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.

The destruction from tornadoes can range from minor to severe 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 X – Enhanced Fujita Scale*. The EF-Scale became effective on February 1, 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 X – Enhanced Fujita Scale* shows F-Scale categories with corresponding EF-Scale wind speeds.

Figure X – Pennsylvania Wind Zones identifies wind speeds that could occur across the state, which may 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 the design of 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.

Since Indiana 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. 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 Indiana County:

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

Table 40 - 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.

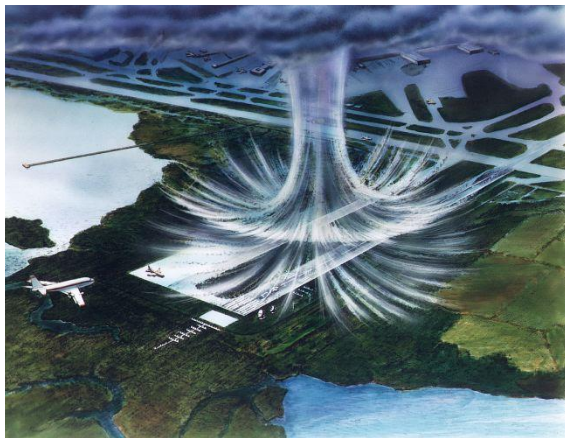
Enhanced Fujita Scale			
EF-Scale Number	**Wind Speed (MPH)**	**F-Scale Number**	**Description of Potential Damage**
EF4	166–200	F3	**Devastating damage**: Well-constructed houses and whole frame houses completely leveled; cars thrown, and small projectiles generated.
EF5	>200	F3-F6	**Extreme damage**: 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 Indiana County have occurred along the western and southern portions of the county. 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. Indiana County was not impacted by the 1985 outbreak.

Windstorms

Windstorms can be broken down into multiple categories. Straight-line winds are the most common wind event and are different from tornadic winds. It is a ground level, non-rotational, wind that comes out of a thunderstorm. Downdrafts are columns of air that rapidly sinks toward the ground and are classified as either a microburst or microburst. A macroburst is the outward burst of strong winds that are near or at the surface with horizontal dimensions greater than 2 ½ miles. Macrobursts winds may begin over a smaller area and then spread out to a 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 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.



4.3.9.3 Past Occurrence

Indiana County has experienced four tornado events since 2002, and eighteen wind incidents between 2002 and summer of 2023 as seen in *Table X – Indiana County Tornado History* and *Table X – Indiana County High Wind History*. Numerous sources provide information in regard to past occurrences and losses associated with tornadoes/windstorms in Indiana 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. Historically, the county has experienced both severe windstorms and tornadoes.

The most recent tornado impacted White Township on July 29th, 2021. There were three major tornados that impacted Indiana County during the previous plan period. No injuries or deaths were reported from those tornados and the property damage for those events totaled $50,000.00.

Table 41 - Indiana County Tornado History

Indiana County Tornado History					
Location	**Date**	**Magnitude (F/EF Scale)**	**Deaths**	**Injuries**	**Property Damage**
Young Township	04/28/2002	F0	0	0	$15,000.00*
Indiana Borough	04/28/2002	F2	0	1	$750,000.00*
Grant Township	04/28/2002	F1	0	1	$250,000.00*
Burrell Township	05/25/2019	EF1	0	0	$0.00*
Cherryhill Township	05/25/2019	EF0	0	0	$0.00*

Indiana County Tornado History					
Location	**Date**	**Magnitude (F/EF Scale)**	**Deaths**	**Injuries**	**Property Damage**
Green Township	06/16/2019	EF1	0	0	$0.00*
White Township	07/29/2021	EF0	0	0	$50,000.00*
Source: NOAA NCEI, 2023 Estimated Values are marked*					

Table 42 - Indiana County High Wind History

Indiana County High Wind History				
Location	**Date**	**Magnitude (knots)**	**Injuries**	**Property Damage**
Indiana County (Entire County)	02/01/2002	-	0	$20,000.00*
Indiana County (Entire County)	03/09/2002	-	0	$25,000.00*
Indiana County (Entire County)	02/04/2003	50	0	$0.00
Indiana County (Entire County)	03/08/2003	55	0	$0.00
Indiana County (Entire County)	07/21/2003	50	0	$1,000.00
Indiana County (Entire County)	09/19/2003	52	0	$2,000.00
Indiana County (Entire County)	11/13/2003	52	0	$8,000.00
Indiana County (Entire County)	12/01/2004	54	0	$6,000.00
Indiana County (Entire County)	12/23/2004	50	0	$5,000.00
Indiana County (Entire County)	02/17/2006	50	0	$5,000.00
Indiana County (Entire County)	12/01/2006	55	0	$30,000.00
Indiana County (Entire County)	01/30/2008	50	0	$50,000.00
Indiana County (Entire County)	02/12/2009	50	0	$200,000.00
Indiana County (Entire County)	12/09/2009	50	0	$0.00
Indiana County (Entire County)	04/16/2011	50	0	$50,000.00
Indiana County (Entire County)	02/12/2017	54	0	$50,000.00
Indiana County (Entire County)	02/24/2019	50	0	$0.00
Indiana County (Entire County)	12/23/2022	53	0	$0.00
Source: NOAA NCEI, 2023 Estimated Values are marked*				

4.3.9.4 Future Occurrence

In the United States, tornado activity has increased in variability, with a general decrease in the number of days a year on which activity occurs, but an increase in the number of tornadoes on those days. This indicates an increase in tornado outbreaks. The future probability of a disastrous tornado occurring in Indiana County is ranked as possible, but not highly likely. While the chance of being hit by a tornado in Indiana 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 in Pennsylvania. As jurisdictions within the county 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, such as the majority of Pennsylvania. 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, increasing the frequency and intensity of tornadoes and windstorms. There remains some uncertainty regarding the recurrence of tornadoes. Therefore, the number of future tornadoes and windstorm events could potentially increase due to known and unknown 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 Indiana County, as shown in *Figure X – Tornado Activity in Indiana County* below, are expected to have one tornado every three years as a future occurrence. The approximation of one to four tornadoes annually assists with determining the rate of future tornado occurrences within Indiana County. Future tornadoes will be similar to those that affected the county in past events. *Figure X – Pennsylvania Tornado Activity* illustrates the amount of tornados with a magnitude over EF2 impacting the Commonwealth of Pennsylvania.

Windstorm events occur on a more frequent basis compared to tornadoes. Indiana 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.

4.3.9.5 Vulnerability Assessment

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 include 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 cascading 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 during such events.

Additional dangers that accompany tornado-associated thunderstorms, and which increase the vulnerability of Indiana County, include:

- 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 Indiana County is moderately vulnerable to tornadoes. While there may be severe impact on financial and commercial systems of the economy, these storms, and the damage they cause, can disrupt business long-term. The local economy is vulnerable due to the possibility of being crippled by tornadoes and windstorms and their cascading effects when buildings and supporting infrastructure are destroyed in a 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.

Indiana 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 includes 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. Indiana 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 has the ability, potentially, to destroy structures, damage private and public property, and injure citizens and tourists to the area. People with disabilities, the elderly, functional needs, and non-English speaking residents are more vulnerable to tornadoes, windstorms, and their cascading effects. Without assistance to evacuate and/or seek shelter, and with potential difficulty understanding information, these at-risk populations may be unable to prepare themselves, or their homes and other possessions, to safely endure the storm.

Tornado, windstorm, and cascading events may affect a small portion, or the entirety, of the county. Therefore, it is important to identify specific critical facilities and assets that are most vulnerable to this hazard. Critical facilities are highly vulnerable to windstorms and tornado events. While many severe storms can cause exterior damage to structures, tornadoes can destroy structures, along with their surrounding infrastructure, immediately halting their 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 Pennsylvania Uniform Construction Code Act 45, trailers and mobile homes built before 2004, because of their lightweight construction and often unanchored design, are more vulnerable to high winds/tornadoes and will generally sustain more damage than will mobile homes built after 2004.

Figure 26 - Pennsylvania Wind Zones

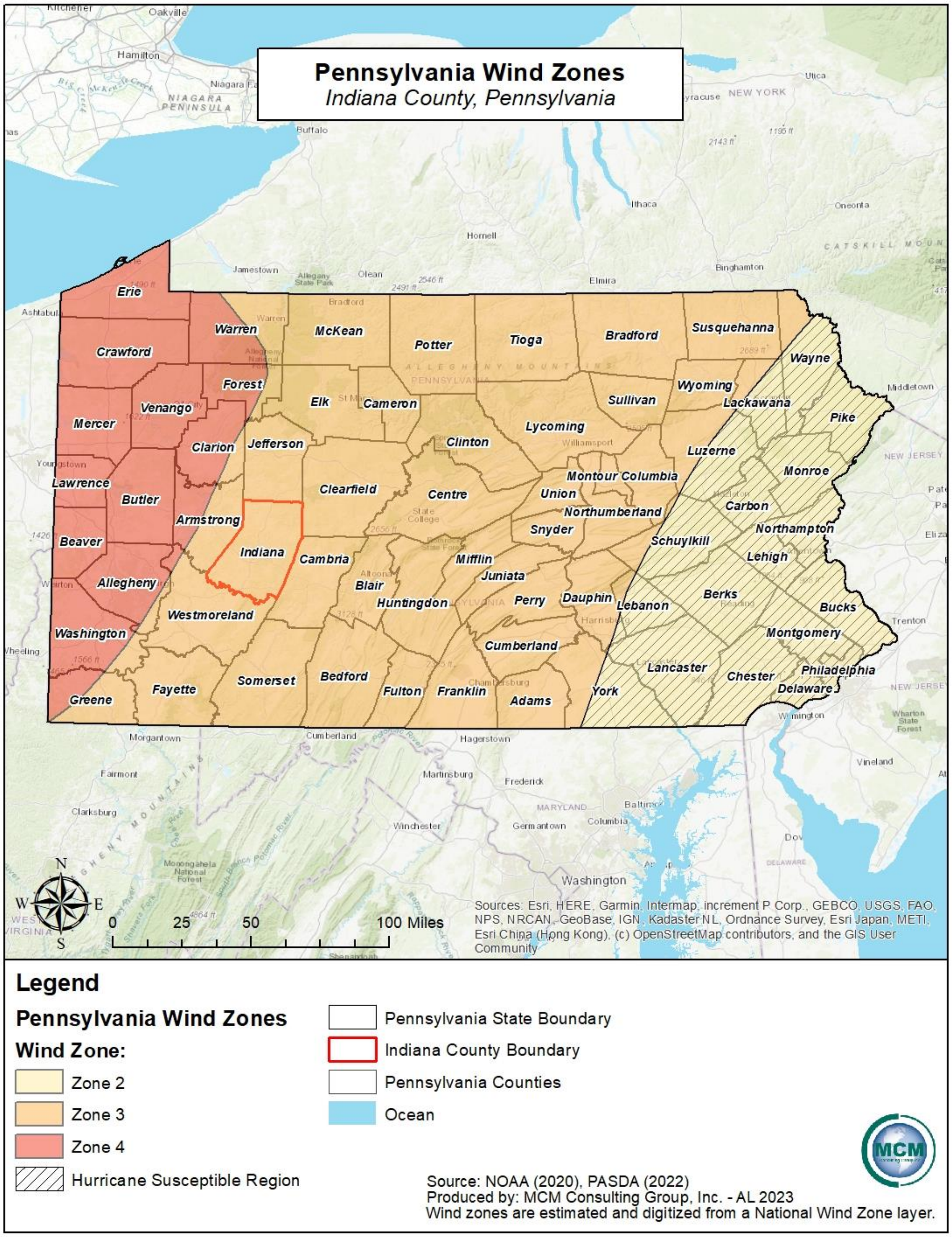


Figure 27 - Pennsylvania Tornado Activity

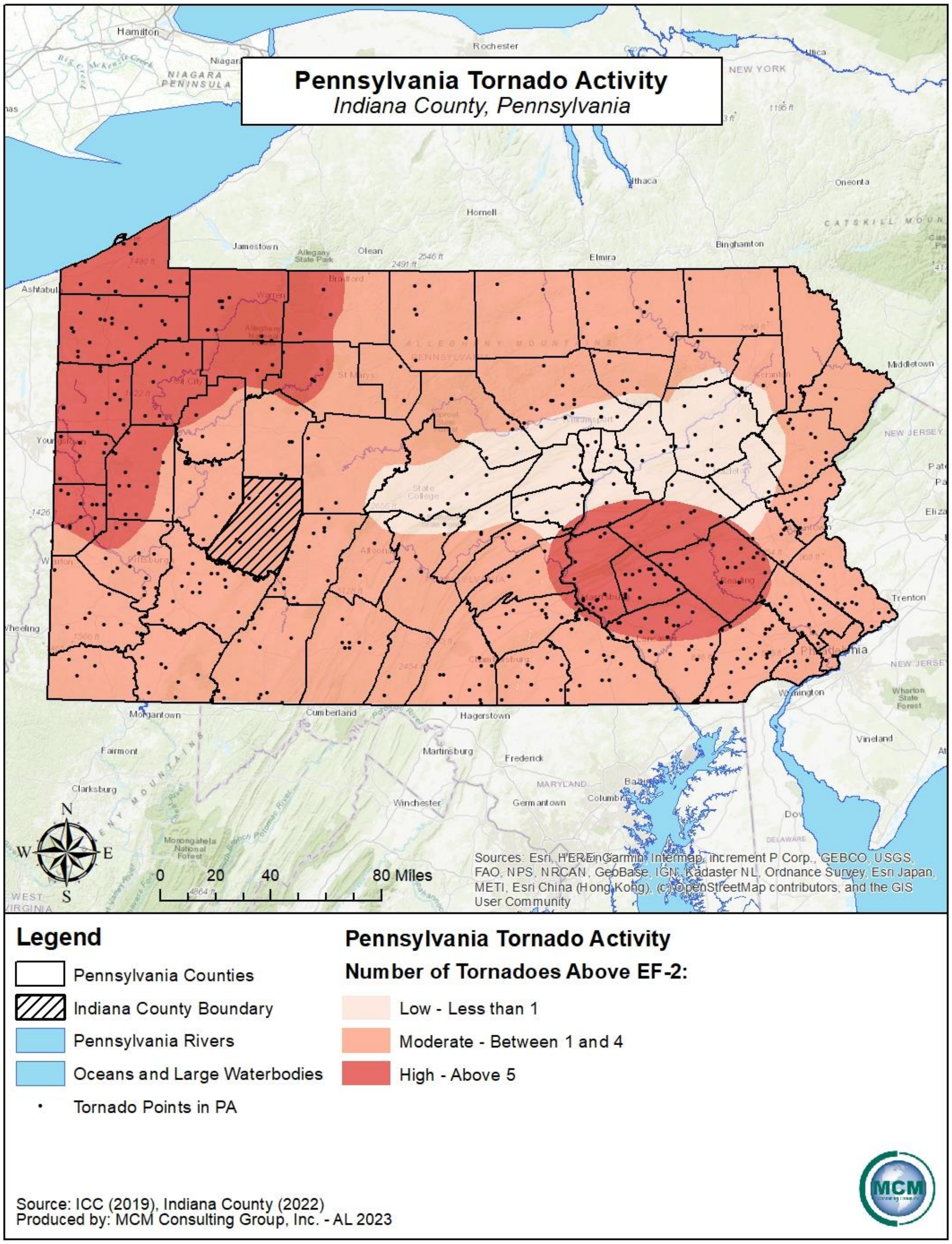
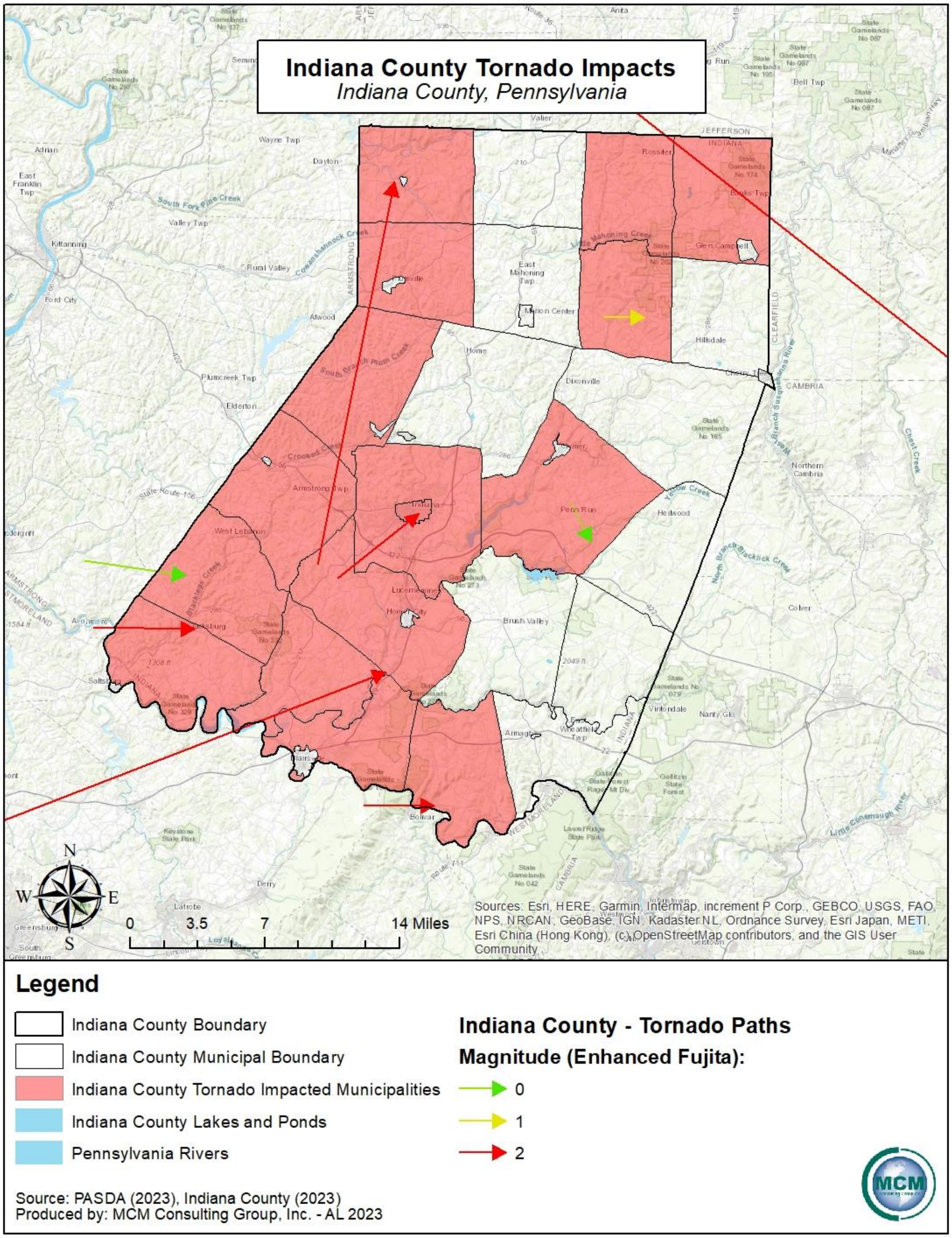


Figure 28 - Tornado Activity in Indiana County



4.3.10. Winter Storm

4.3.10.1 Location and Extent

Most severe winter storm hazards include heavy snow (snowstorms), blizzards, sleet, freezing rain, and ice storms. Since most extra-tropical cyclones (mid-Atlantic cyclones locally known as Northeasters or Nor'easters), generally take place during the winter weather months, these hazards have also been grouped as a type of severe winter weather storm. According to the Pennsylvania State Hazard Mitigation Plan (PA HMP), winter storms are frequent events for the Commonwealth and occur from late October until mid-April. These types of winter events or conditions are further defined below.

- **Heavy Snow:** According to the National Weather Service (NWS), heavy snow is generally snowfall accumulating to four inches or more in depth in twelve hours or less; or snowfall accumulating to six inches or more in depth in twenty-four hours or less. A snow squall is an intense but limited duration, period of moderate to heavy snowfall, also known as a snowstorm, accompanied by strong, gusty surface winds and possibly lightning.
- **Blizzard:** Blizzards are characterized by low temperatures, wind gusts of thirty-five miles per hour (mph) or more and falling and/or blowing snow that reduces visibility to 1/4-mile or less for an extended period of time (three or more hours).
- **Sleet of Freezing Rainstorm:** Sleet is defined as pellets of ice composed of frozen or mostly frozen raindrops or refrozen partially melted snowflakes. These pellets of ice usually bounce after hitting the ground and other hard surfaces. Freezing rain is rain that falls as a liquid but freezes into glaze upon contact with the ground.
- **Ice Storm:** An ice storm is used to describe occasions when damaging accumulations of ice are expected during freezing rain situations. Significant accumulations of ice pull down trees and utility lines resulting in loss of power and communication. These accumulations of ice make walking and driving extremely dangerous and can create extreme hazards to motorists and pedestrians.
- **Extra-Tropical Cyclone:** Sometimes called mid-latitude cyclones, are a group of cyclones defined as synoptic scale, low pressure, weather systems that occur in the middle latitudes of the Earth. These storms have neither tropical nor polar characteristics and are connected with fronts and horizontal gradients in temperature and dew point otherwise known as "baroclinic zones". Extra-tropical cyclones are everyday weather phenomena which, along with anticyclones, drive the weather over much of the Earth. These cyclones produce impacts ranging from cloudiness and mild showers to heavy gales and thunderstorms. Tropical cyclones often transform into extra-tropical cyclones at the end of their tropical existence, usually between 30˚ and 40˚ latitude, where there is insufficient force from upper-level shortwave troughs riding the westerlies (weather systems moving west to east) for the process of extra-tropical transition to begin. A

shortwave trough is a disturbance in the mid or upper part of the atmosphere which induces upward motion ahead of it. During an extra-tropical transition, a cyclone begins to tilt back into the colder air mass with height, and the cyclone's primary energy source converts from the release of latent heat from condensation to baroclinic processes.

4.3.10.2 Range and Magnitude

The magnitude or severity of a severe winter storm depends on several factors including a region's susceptibility to snowstorms, snowfall amounts, snowfall rates, wind speeds, temperatures, visibility, storm duration, topography, and time of occurrence during the day (e.g., weekday versus weekend), and time of season. The extent of a severe winter storm can be classified by meteorological measurements, such as those above, and by evaluating its societal impacts.

The Northeast Snowfall Impact Scale (NESIS) categorizes snowstorms in this manner. Unlike the Fujita Scale (tornado) and Saffir Simpson Scale (hurricanes), there is no widely used scale to classify snowstorms. NESIS was developed by Paul Kocin of The Weather Channel and Louis Uccellini of the National Weather Service and rank high impact, northeast snowstorms. These storms have large areas of ten-inch snowfall accumulations and greater. NESIS has five ranking categories: Notable (1), Significant (2), Major (3), Crippling (4), and Extreme (5). These ranking can be seen in *Table X – NESIS Winter Storm Rankings*. The index differs from other meteorological indices in that it uses population information in addition to meteorological measurements. Thus, NESIS gives an indication of a storm's societal impacts. This scale was developed because of the impact of northeast snowstorms can have on the rest of the country in terms of transportation and economic impact.

Table 43 - NESIS Winter Storm Rankings

NESIS Winter Storm Rankings			
Category	**Description**	**NESIS Range**	**Definition**
1	Notable	1.0 – 2.49	These storms are notable for their large areas of 4-inch accumulations and small areas of 10-inch snowfall.
2	Significant	2.5 – 3.99	Includes storms that produce significant areas of greater than 10-inch snows while some include small areas of 20-inch snowfalls. A few cases may even include relatively small areas of very heavy snowfall accumulations (greater than 30 inches).
3	Major	4.0 – 5.99	This category encompasses the typical major Northeast snowstorm, with large areas of 10-inch snows (generally between 50 and 150 x 103 mi^2 – roughly one to three times the size of New York State with significant areas of 20-inch accumulations.

NESIS Winter Storm Rankings			
Category	**Description**	**NESIS Range**	**Definition**
4	Crippling	6.0 – 9.99	These storms consist of some of the most widespread, heavy snows of the sample and can be best described as crippling to the northeast U.S, with the impact to transportation and the economy felt throughout the United States. These storms encompass huge areas of 10-inch snowfalls, and each case is marked by large areas of 20-inch and greater snowfall.
5	Extreme	10+	The storms represent those with the most extreme snowfall distributions, blanketing large areas and populations with snowfalls greater than 10, 20, and 30 inches. These are only storms in which the 10-inch accumulations exceed 200 X 103 mi^2 and affect more than 60 million people.
Source: Kocin and Uccellini, 2004			

The climate of Pennsylvania is marked by abundant snowfall. Winter weather can reach Pennsylvania as early as October and is usually in full force by late November with average winter temperatures between 20- and 40-degrees Fahrenheit. Indiana County receives an average of about 12.95 inches of snowfall a year. Most areas of Indiana County experience the effects of winter storms frequently. The general indication of the average annual snowfall map shows areas that are subject to a consistent risk for large quantities of snow. *Figure X - Pennsylvania Annual Snowfall 1981 – 2010* illustrates the long-term trends for snowfall accumulation in Pennsylvania over three decades.

4.3.10.3 Past Occurrence

Figure X – Winter Storm Events by County in Pennsylvania shows the number of winter storm events from 1950 – 2013 for the Commonwealth of Pennsylvania. Indiana County had between forty-two and fifty-eight such events. *Table X – Recent Annual Snowfall Estimates* shows recent annual snowfall measurements as stated by NOAA. Overall, Indiana County has experienced an decrease on the annual estimated average of snowfall. On average, the annual snowfall totals have decreased in the time periods from 2018-2023. A list of additional Indiana County winter storms, and other related events is outlined in *Table X – Indiana County Winter Strom History*.

Table 44 - Recent Annual Snowfall Estimates

Recent Annual Snowfall Estimates	
Time Span	**Snowfall Estimates (inches)**
1999-2000	21.8
2000-2001	41.7

Recent Annual Snowfall Estimates	
Time Span	**Snowfall Estimates (inches)**
2001-2002	24.1
2002-2003	62.9
2003-2004	65.3
2004-2005	26
2005-2006	45.6
2006-2007	40.5
2007-2008	39.4
2008-2009	42.3
2009-2010	74.2
2010-2011	35
2011-2012	21.3
2012-2013	13.3
2013-2014	24.4
2014-2015	52.8
2015-2016	0.6
2016-2017	38.3
2017-2018	43.2
2018-2019	27.1
2019-2020	24.3
2020-2021	44.1
2021-2022	32.3
2022-2023	8
Source: NOAA, 2023	

Table 45 - Indiana County Winter Weather History

Indiana County Winter Weather History		
Location	**Date**	**Event Type**
Indiana County	01/02/99	Winter Storm
Indiana County	01/08/99	Winter Storm
Indiana County	01/13/99	Winter Storm
Indiana County	03/03/99	Winter Storm
Indiana County	01/20/00	Winter Storm
Indiana County	03/04/01	Winter Storm
Indiana County	04/07/03	Ice Storm
Indiana County	02/03/04	Ice Storm
Indiana County	02/05/04	Ice Storm

Indiana County Winter Weather History		
Location	**Date**	**Event Type**
Indiana County	02/01/08	Winter Storm
Indiana County	02/12/08	Winter Storm
Indiana County	01/06/09	Winter Storm
Indiana County	01/27/09	Ice Storm
Indiana County	02/09/10	Winter Storm
Indiana County	01/31/11	Ice Storm
Indiana County	02/01/11	Ice Storm
Indiana County	02/04/14	Winter Storm
Indiana County	01/12/18	Winter Weather
Indiana County	02/07/18	Winter Weather
Indiana County	04/01/18	Winter Weather
Indiana County	01/18/19	Winter Storm
Indiana County	02/10/19	Winter Weather
Indiana County	02/20/19	Winter Weather
Indiana County	02/07/20	Winter Weather
Indiana County	02/01/21	Winter Weather
Indiana County	02/08/21	Winter Weather
Indiana County	02/10/21	Winter Weather
Indiana County	02/18/21	Winter Weather
Indiana County	01/16/22	Winter Storm
Indiana County	01/23/22	Winter Weather
Indiana County	02/03/22	Winter Weather
Indiana County	03/11/22	Winter Storm
Source: NOAA NCEI, 2021		

4.3.10.4 Future Occurrence

Winter storm hazards in Pennsylvania are guaranteed yearly since the state is located at a relatively high latitudes resulting in winter temperatures that range between 0- and 32-degrees Fahrenheit for a good deal of the fall through early spring season (later October until mid-April). In addition, the state is exposed to large quantities of moisture from both the Great Lakes and the Atlantic Ocean. While it is almost certain that a number of significant winter storms will occur during the winter and fall season, what is not easily determined is how many such storms will occur during that time frame. Based on historical snow related disaster declaration occurrences, the Commonwealth of Pennsylvania can expect a snowstorm of disaster declaration proportions, on average, once every three to five years. Similarly, for ice storms, based on historical disaster declarations, it is expected that on average, ice storms of disaster proportions will occur once every seven to ten years within the state.

4.3.10.5 Vulnerability Assessment

Severe winter storms are of significant concern to Indiana County because of their frequency and magnitude in the region. Additionally, they are of significant concern due to the direct and indirect costs associated with these events; delays caused by the storms and impacts on the people and facilities of the region related to snow and ice removal, health problems, cascade effects such as utility failure and traffic accidents, and stress on community resources.

Every year, winter weather indirectly and deceptively kills hundreds of people in the United States, primarily from automobile accidents, over exertion, and exposure. Winter storms are often accompanied by strong winds creating blizzard conditions with blinding win-drive snow, drifting snow, extreme cold temperatures, and dangerous wind chill. They are considered deceptive killers because most deaths and other impacts or losses are indirectly related to the storm. Heavy accumulations of ice can bring down trees and powerlines, disabling electrical power and communications for days or weeks. Heavy snow can immobilize a region and paralyze a city, shutting down all air and rail transportation and disrupting medical and emergency services. The economic impact of winter weather each year is quite large, with costs for snow removal, damage, and loss of business in the millions each year. Heavy snow can immobilize and strand commuters as well as stopping the flow of supplies through an area or transportation corridor. In rural areas, homes and farms may be isolated for days and unprotected livestock may be lost. Bridge and overpasses are particularly dangerous because they freeze before other transportation surfaces. For the purposes of this Hazard Mitigation Plan, the entire population of Indiana County (83,246) is exposed to severe winter storm events. The elderly are considered the most susceptible to this hazard due to their increased risk of injury and death from falls, overexertion, and or attempts to clear ice and snow. The elderly population is also more vulnerable to utility outages in winter, especially when they are paired with winter storm events. Vulnerable, or underserved, populations within Indiana County may not have access to housing or their housing may be less able to withstand cold temperatures (e.g., homes with poor insulation and heating supply). The unsheltered populations of an area are at most risk to winter storm events.

The entire general building stock inventory in Indiana County is exposed and vulnerable to the severe winter storm hazard. In general, structural impacts include damage to rood and building frames, rather than building content. There was no historic information available that identified property damages within Indiana County due to a single severe winter storm event. Current modeling tools are not available to estimate specific losses for this hazard. A specific area that is vulnerable to the severe winter storm hazard is the floodplain. At risk general building stock and infrastructure in floodplains are presented in the flood profile due to snow and ice melt.

Generally, losses from flooding associated with severe winter storms should be less than that associated with a 100-year or 500-year flood.

Full functionality of critical facilities such as police, fire, and medical facilities is essential for response during and after a severe winter storm event. These critical facility structures are largely constructed of concrete and masonry; therefore, they should only suffer minimal structural damage from severe winter storm events. Backup power is recommended critical infrastructure and facilities due to the potential for power interruption. Infrastructure at risk for this hazard includes roadways that could be damaged due to the application of salt and intermittent freezing and warming conditions that can damage roads over time. Severe snowfall requires infrastructure to clear roadways and alert citizens to dangerous conditions. In spring, this type of roadway damage must be repaired. Additionally, freezing rain and ice storms impact utilities (i.e., power lines and overhead utility wires) causing power outages for hundreds to thousands of residents.

The cost of snow and ice removal and repair of roads from the freeze/thaw process can drain local financial resources. However, because severe winter storms are a regular occurrence in this area, Indiana County is generally well-prepared for snow and ice removal each season.

The table below illustrates the number of citizens per municipality over the age of 65 years of age who are at increased vulnerability to winter storms, and cascading hazards from winter weather:

Population per Municipality 65 Years or Older		
Municipality	**Number of People 65 years or older**	**Percent of Population**
Armagh Borough	35	30%
Armstrong Township	658	23.4%
Banks Township	223	19.3%
Black Lick Township	286	25.1%
Blairsville Borough	697	21.4%
Brush Valley Township	367	19%
Buffington Township	188	13.4%
Burrell Township	938	26%
Canoe Township	271	18.2%
Center Township	924	20.7%
Cherryhill Township	604	22.3%
Cherry Tree Borough	76	25.2%

Population per Municipality 65 Years or Older		
Municipality	**Number of People 65 years or older**	**Percent of Population**
Clymer Borough	170	14.4%
Conemaugh Township	469	19.5%
Creekside Borough	33	24.1%
East Mahoning Township	136	13.3%
East Wheatfield Township	770	35.9%
Ernest Borough	74	18.1%
Glen Campbell Borough	43	26.6%
Grant Township	121	18.7%
Green Township	635	18.2%
Homer City Borough	321	19.7%
Indiana Borough	965	7.1%
Marion Center Borough	90	19%
Montgomery Township	461	28%
North Mahoning Township	257	22.2%
Pine Township	397	26.1%
Plumville Borough	51	21.3%
Rayne Township	574	20.4%
Saltsburg Borough	130	17.7%
Shelocta Borough	13	20%
Smicksburg Borough	17	25%
South Mahoning Township	209	11.3%
Washington Township	301	21.2%
West Mahoning Township	70	4.6%
West Wheatfield Township	475	27.2%
White Township	3872	25.4%
Young Township	300	16.7%
TOTAL	**16,221**	**-**
Source: American Community Survey, United States Census Bureau, 2021		

Figure 29 - Winter Storm Events by County in Pennsylvania

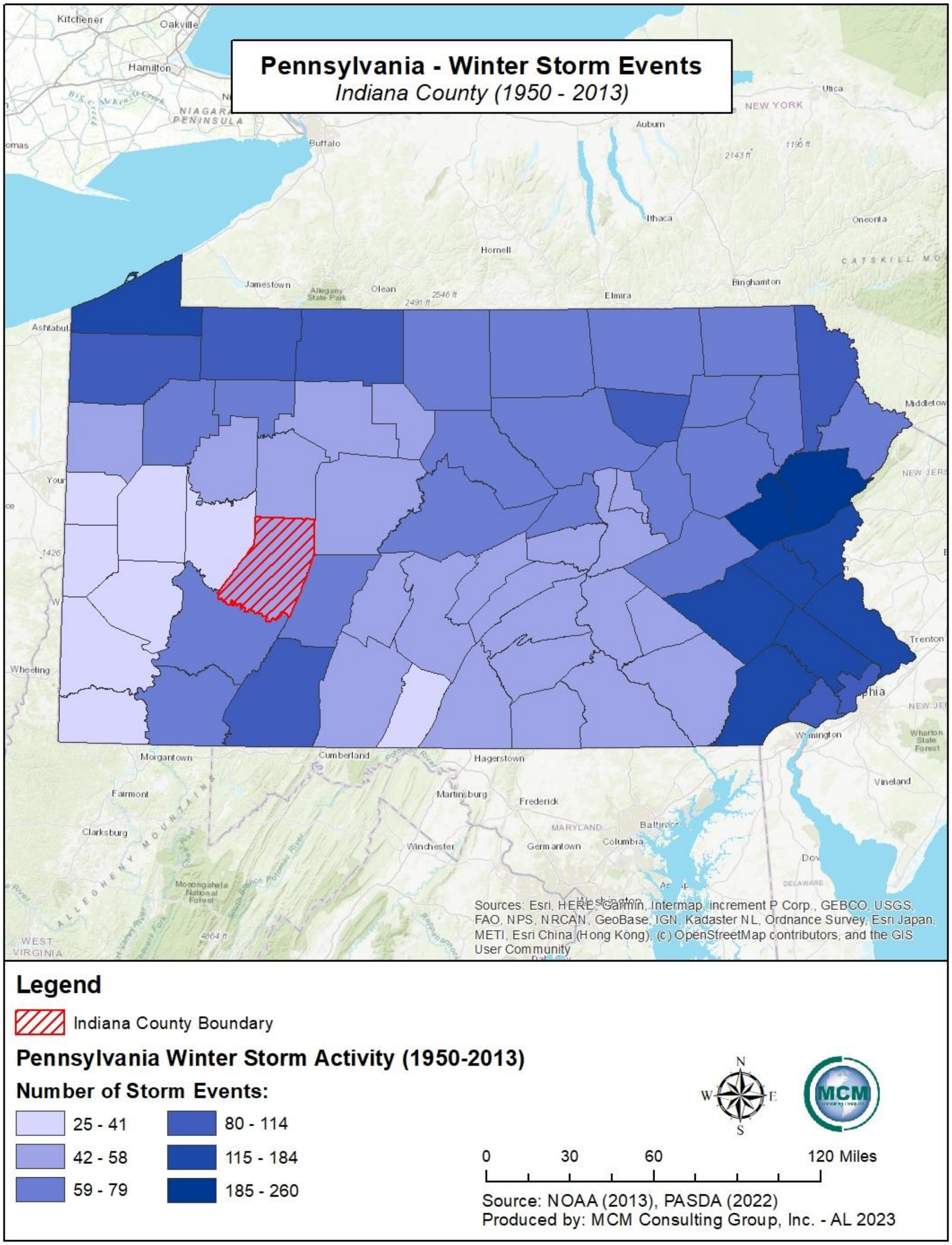
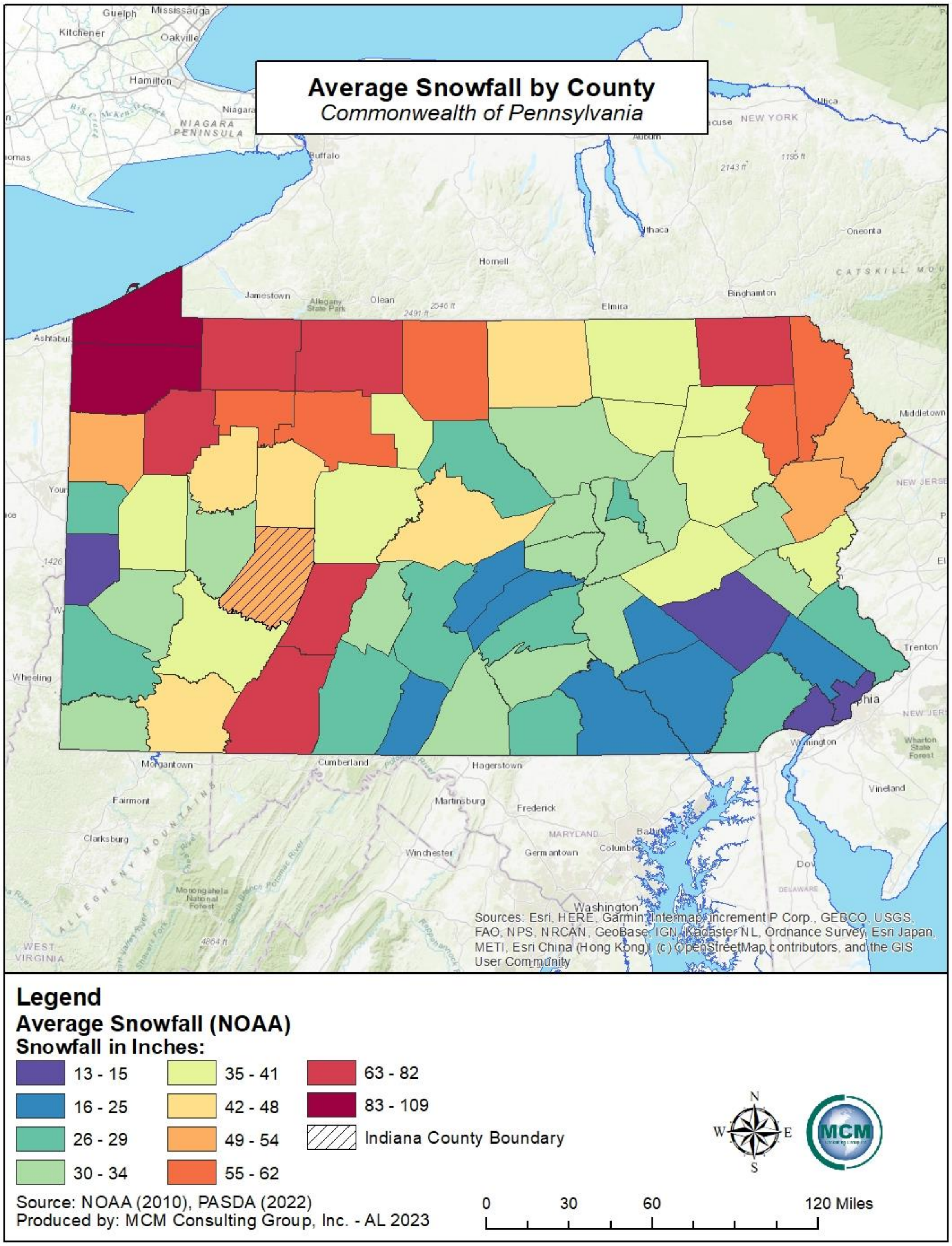


Figure 30 - Pennsylvania Annual Snowfall 1981-2010



4.3.11. Blighted Properties

4.3.11.1 Location and Extent

The presence of blighted properties in Indiana 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.

4.3.11.2 Range of Magnitude

Indiana County has a large number of blighted properties that are located in urban environments, including Indiana Borough, Blairsville Borough, and Clymer Borough. Most of the blighted properties in Indiana 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.

4.3.11.3 Past Occurrence

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

4.3.11.4 Future Occurrence

Blighted properties in Indiana 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 Indiana County is liable to decrease.

4.3.11.5 Vulnerability Assessment

Blighted properties are a significant concern when the health and safety of the citizens of Indiana 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 Indiana 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 Indiana County. If blighted properties flourish in the county, people who travel to Indiana County for pleasure, whether that be for summer vacations or seasonal hunting, might reconsider that travel due to the presence of blighted properties.

4.3.12. Civil Disturbance

4.3.12.1 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.

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

4.3.12.2 Range of Magnitude

Civil disturbances can take the form of small gatherings or large groups blocking or impeding access to a building or disrupting normal activities by generating noise and intimidating people. They can range from a peaceful sit-in to a full-scale riot, in which a mob 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: a crowd and a mob. A crowd may be defined as a casual, temporary collection of people without a strong, cohesive relationship. Crowds can be classified into four categories:

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

Cohesive Crowd: A cohesive crowd consists of members who are involved in some type of unified behavior. Members of this group are involved in some type of common activity, such as worshipping, dancing, or watching a sporting event. Although they may have intense internal discipline, they require substantial provocation to arouse to action.

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

Aggressive Crowd: An aggressive crowd is comprised of individuals who have assembled for a specific purpose. This crowd often has leaders who attempt to arouse the members or motivate them to action. Members are noisy and threatening and will taunt authorities.

They may be more impulsive and emotional and require only minimal stimulation to arouse violence. Examples of this type of crowd could include 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 are those groups which attempt to flee from something such as a fire, bomb, flood, or other catastrophe. Members of escape mobs are generally difficult to control and can be characterized by unreasonable terror.

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

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

In the event of 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.

Indiana County's greatest likelihood for civil disturbance is in Indiana Borough, the county seat. Citizens, property, and infrastructure could be affected if a large-scale disorder were to take place. Typically, government facilities, landmarks, prisons, and universities are common sites where crowds or mobs may gather. Indiana County is home to two universities and post-secondary education centers, including the Indiana University of Pennsylvania and outreach from Westmoreland County Community College.

4.3.12.3 Past Occurrences

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

Following the death of African-American George Floyd in Minneapolis, Minnesota in May 2020 at the hands of law enforcement, civil unrest erupted across the nation. Indiana County experienced some localized peaceful protesting over the death of George Floyd. This protest was located in Indiana Borough and surrounding Indiana University of Pennsylvania.

There have been no prison riot related events in connection with the Indiana County Jail.

4.3.12.4 Future Occurrence

While unlikely, civil disturbances may occur in Indiana County, and it is difficult to accurately predict the probability of future occurrence for civil disturbance events over the long-term. However, *Table X - 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 46 - 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 Indiana County are rare, the local planning team (LPT) decided civil disturbance should be regarded as a low-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 Indiana County and throughout the Commonwealth of Pennsylvania. According to the City-

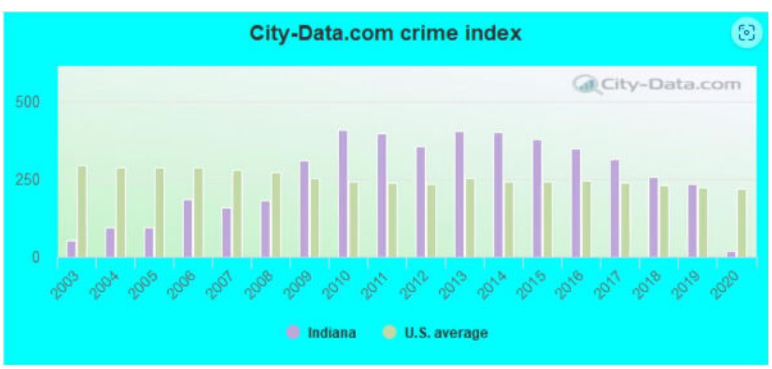
Data.com crime index, the 2020 crime rate in Indiana Borough (the county's highest population center) is 12.9 times lower than the U.S. average. It was higher than in 14% U.S. cities. The 2020 Indiana Borough crime rate fell by 92% compared to 2019. In the last five years, Indiana Borough has seen a drop in violent crime and decreasing property crime.

This data is limited to 2020 and is the last year that information was reported to City-Data.com Crime Index. As of the time of this writing, this is a data limitation with this data source. In order to fill this gap in information, see Table X – Reported Offenses for Indiana County. This information is reported by the Pennsylvania Attorney General in the Uniform Crime Reporting System from 2014-2018. No updated data was available from the Attorney General. As seen in the data, the number of reported offences in Indiana County have decreased over the past five reporting years.

Table 47 - Reported Offenses in Indiana County

Offenses Reported in Indiana County					
Offense Type	**2018**	**2017**	**2016**	**2015**	**2014**
Murder and Nonnegligent Manslaughter	1	2	1	1	4
Rape	28	47	30	35	23
Robbery	13	7	19	30	15
Aggravated Assault	169	168	182	193	218
Other Assaults – Simple	550	509	543	486	455
Burglary	134	187	166	217	209
Larceny – Theft	404	541	545	665	564
Motor Vehicle Theft	22	27	28	27	26
Arson	4	1	3	4	11
Total:	**1,325**	**1,489**	**1,517**	**1,658**	**1,525**
Source: PA Attorney General UCR System, Mar. 2023 Updated data not available during planning period.					

Table 48 - City-Data.com Crime Index



4.3.12.5 Vulnerability Assessment

All municipalities in Indiana 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 writing of this plan, the political temperature of the country as a whole continues to run high, making this hazard vulnerability one for consistent monitoring by public safety officials.

4.3.13. Dam and Levee Failure

4.3.13.1 Location and Extent

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 twelve high-hazard and low-hazard dams in Indiana County that are both publicly and privately owned and are registered with the USACE in the NID. There are also three dams with a hazard classification as significant. There are ten dams within the county that require an emergency action plan. *Table X – Indiana County Dam Inventory* illustrates the dams located in Indiana County. *Table X – High-Hazard Dams Municipal Summary* summarizes the high-hazard dams in Indiana County by municipality. The municipalities not listed do not have high-hazard dams. *Table X – Dam Name and Purpose* lists the dams located in Indiana County and their purpose code, and the description of purpose based on the Pennsylvania DEP codes.

Table 49 - High-Hazard Dams Municipality Summary

High-Hazard Dams – Municipal Summary (PA DEP)	
Municipality	**Number of High-Hazard Dams**
Armagh Borough	0
Armstrong Township	0
Banks Township	1
Black Lick Township	0
Blairsville Borough	0
Brush Valley Township	2
Buffington Township	0
Burrell Township	0
Canoe Township	1
Center Township	0
Cherryhill Township	1
Cherry Tree Borough	0
Clymer Borough	0
Conemaugh Township	0
Creekside Borough	0
East Mahoning Township	0
East Wheatfield Township	0
Ernest Borough	0
Glen Campbell Borough	0
Grant Township	0
Green Township	0
Homer City	0
Indiana Borough	0
Marion Center Borough	0
Montgomery Township	1
North Mahoning Township	0
Pine Township	0
Plumville Borough	0
Rayne Township	2
Saltsburg Borough	0
Shelocta Borough	0
Smicksburg Borough	0
South Mahoning Township	0
Washington Township	0
West Mahoning Township	0
West Wheatfield Township	0
White Township	1

High-Hazard Dams – Municipal Summary (PA DEP)	
Municipality	**Number of High-Hazard Dams**
Young Township	0
Total:	**9**

Table 50 - Indiana County Dam Inventory

Indiana County Dams (NID 2023)							
Dam Name	**River**	**Owner Name**	**Year Completed**	**Dam Height (feet)**	**Drainage Area (sq. miles)**	**Hazard**	**EAP**
Altemus	Tributary Brush Creek	Charles R. Altemus	1987	30	.14	S	N
Conemaugh Equalization Pond	Tributary Conemaugh River	Keystone Conemaugh Projects, LLC.	1987	31	.61	L	NR
Cummings	Tributary Crooked Creek	Indiana County Commissioners	1908	29	1.7	H	Y
Edwards	Tributary Two Lick Creek	Blair-Hirsch Interests	1917	30	.37	L	NR
Elroy Face	Tributary Yellow Creek	Eastern Orthodox Foundation	1954	25	.7	H	Y
Freshwater Impoundment	Tributary Brush Creek	Robindale Energy Services, Inc.	1974	50	.64	H	Y
Hemlock Lake	Straight Run	PA Fish and Boat Commission	1970	43	1.49	H	Y
Homer City Sed/Surge Pond	Tributary Cherry Run	Homer City Generation LP	1993	25	.18	L	NR
Musser Forests	McKee Run	Musser Forests, Inc.	1952	22	.35	H	Y
Pioneer Lake	Watershed Hazelet Run	Pioneer Lake Outdoor Club, Inc.	-	21	.22	H	Y
Rossiter	Tributary Canoe Creek	Indiana County Municipal Services Authority	1919	15	1.8	H	Y

Indiana County Dams (NID 2023)							
Dam Name	**River**	**Owner Name**	**Year Completed**	**Dam Height (feet)**	**Drainage Area (sq. miles)**	**Hazard**	**EAP**
Seph Mack	Tributary Yellow Creek	PA DCNR	1987	21	0.18	S	Y
Slurry Pond #2	-	Robindale Energy Services, Inc.	-	40	-	S	NR
Two Lick Creek	Two Lick Creek	Homer City Generation LP	1968	90	74	H	Y
Yellow Creek	Yellow Creek	PA DCNR	1969	62	52.5	H	Y

Table 51 - Dam Name and Purpose

Indiana County Dams and Purposes (PA DEP 2019 & NID 2023)		
Dam Name	**Purpose Code**	**Purpose Code Description**
Altemus	O	Other (Farm Irrigation)
Conemaugh Equalization Pond	O	Other
Cummings	R	Recreation
Edwards	R	Recreation
Elroy Face	R	Recreation
Freshwater Impoundment	S	Water Supply
Hemlock Lake	R	Recreation
Homer City Sed/Surge Pond	O	Other
Musser Forests	O	Other (Farm Irrigation)
Pioneer Lake	R	Recreation
Rossiter	S	Water Supply
Seph Mack	R	Recreation
Slurry Pond #2	O	Other (Tailings)
Two Lick Creek	O	Other (Grade Stabilization)
Yellow Creek	R	Recreation

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).

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. Indiana County is home to three levee sections, which are detailed in *Table X – Indiana County Levee Inventory*. One levee section, Vintondale – RB Blacklick Creek is located in both Indiana County and neighboring Cambria County.

Table 52 - Indiana County Levee Inventory

Indiana County Levee Inventory (National Levee Database, 2023)				
Levee Name	**Flood Source**	**Levee Type**	**Levee Bank Side**	**Levee Length (miles)**
Cherry Tree – Cush Cushion	Cush Cushion Creek	Earthen	Left	0.36
Cherry Tree – West Branch	West Branch Susquehanna River	Earthen	Right	0.96
Vintondale – RB Blacklick Creek	Blacklick Creek	Earthen	Right	0.42

4.3.13.2 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 X – Indiana County Dams* shows the location of dams within Indiana County as well as their hazard designation.

Levees

Levee failure can be caused by a number of factors, and they can also cause catastrophic effects. Damage to the area beyond a levee, if it fails, could be more significant than if the levee was not present. 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 X – Indiana County Levee Locations* illustrates areas protected by the Indiana County levee systems. The figures following *Figure X – Indiana County Levee Locations* illustrate areas around Cherry Tree Borough and Buffington Township that are heavily protected by levees. They are *Figure X – Levee Locations – Cherry Tree – Cush Cushion*, *Figure X – Levee Locations – Cherry Tree – West Branch*, and *Figure X – Levee Locations – Vintondale – Blacklick Creek*.

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.

4.3.13.3 Past Occurrence

Dams

There have been no past occurrences of dam failure or major incidence occurring at the locations of dams within Indiana County. Smaller incidences have occurred but have not had significant impacts in the county.

There have been a few historically destructive dam failures in Pennsylvania over the course of the past two hundred years. The most destructive dam failure in United States history took place in Johnstown, Pennsylvania (Cambria County) in 1889, claiming 2,209 lives. Another significant dam failure took place in Austin, Pennsylvania (Potter County) in 1911, claiming seventy-eight lives. Similarly, a dam failure in West Taylor Township, Pennsylvania (Cambria County) claimed the lives of forty people when the Laurel Run Dam, No. 2 failed during the Johnstown Flood in the early morning hours of July 20th, 1977.

Levees

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

4.3.13.4 Future Occurrence

Dams

Although dam failures can occur at any time, given the right circumstances, the likelihood of a dam failure in Indiana 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.

Levees

Although levee failures can occur at any time, given the right circumstances, the future occurrence of levee failures in Indiana 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.

4.3.13.5 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 X – 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 53 - 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 fifteen dams in Indiana County vary greatly. The Two Lick Creek Dam, located in White Township, has the largest drainage area with a total of 74 square miles. The dam that was constructed the most recently is the Homer City Sed/Surge Pond Dam, located in Center Township, which was constructed in 1993. The dam that is the oldest in the county is Cummings Dam, which was constructed in 1908. The Two Lick Creek Dam is the tallest in the county with a height of 90 feet. Robindale Energy Services, Inc. owns the most dams in Indiana County with a total of two dams. These dams are the Freshwater Impoundment Dam and the

Slurry Pond #2 Dam. The dams in Indiana 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.

Levees

Each levee that is located in Indiana County is of different length and each protects areas from a different section of waterway and flood way. Cherry Tree – West Branch Levee is the largest in Indiana County with a length of 0.96 miles. The Cherry Tree – Cush Cushion Levee is the smallest in length in Indiana County with a length of 0.36 miles.

The entire leveed areas for Indiana County protect a total of 107 structures within the county. Also protected are three facility points with Indiana County that includes community lifeline facilities (municipal buildings, hospitals, police/fire/EMS, schools, childcare centers, and nursing/care homes) facilities. Each levee in Indiana County is a mainline levee and protects along a variety land features. A failure of levee in the urban areas in Indiana County would be catastrophic to life and property.

There are a few community lifeline facilities within the levee protection areas for the levees around Indiana County. *Table X – Number of Vulnerable Structures within Leveed Areas* shows the number of addressable structures and facility type points in the largest levee protection areas within Indiana County based on NLD information from 2023. 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. For the Cherry Tree – West Branch Levee, the community lifelines in the protection areas are a fire station, a police station, and a post office. According to information in the National Levee Database, the total property value protected by the levee systems in Indiana County is approximately $29.2 million.

Table 54 - Number of Vulnerable Structures within Leveed Areas

Number of Vulnerable Structures within Leveed Areas		
Leveed Area Name	**Addressable Structures in Leveed Area**	**Community Lifelines in Leveed Area**
Cherry Tree – Cush Cushion	23	0
Cherry Tree – West Branch	84	3
Vintondale – RB Blacklick Creek	0	0
Totals:	**107**	**3**

Figure 31 - Indiana County Dams

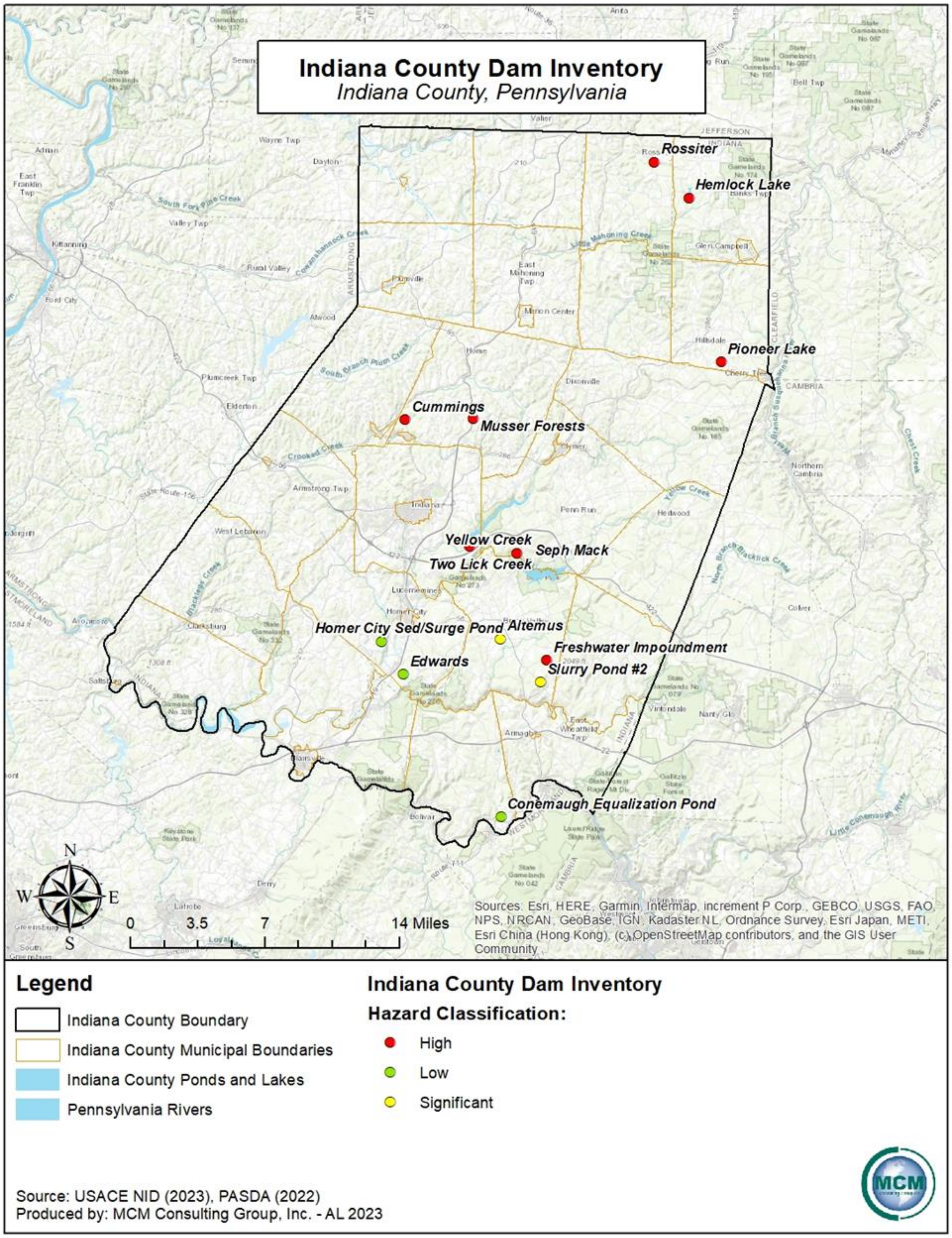


Figure 32 - Indiana County Levee Inventory

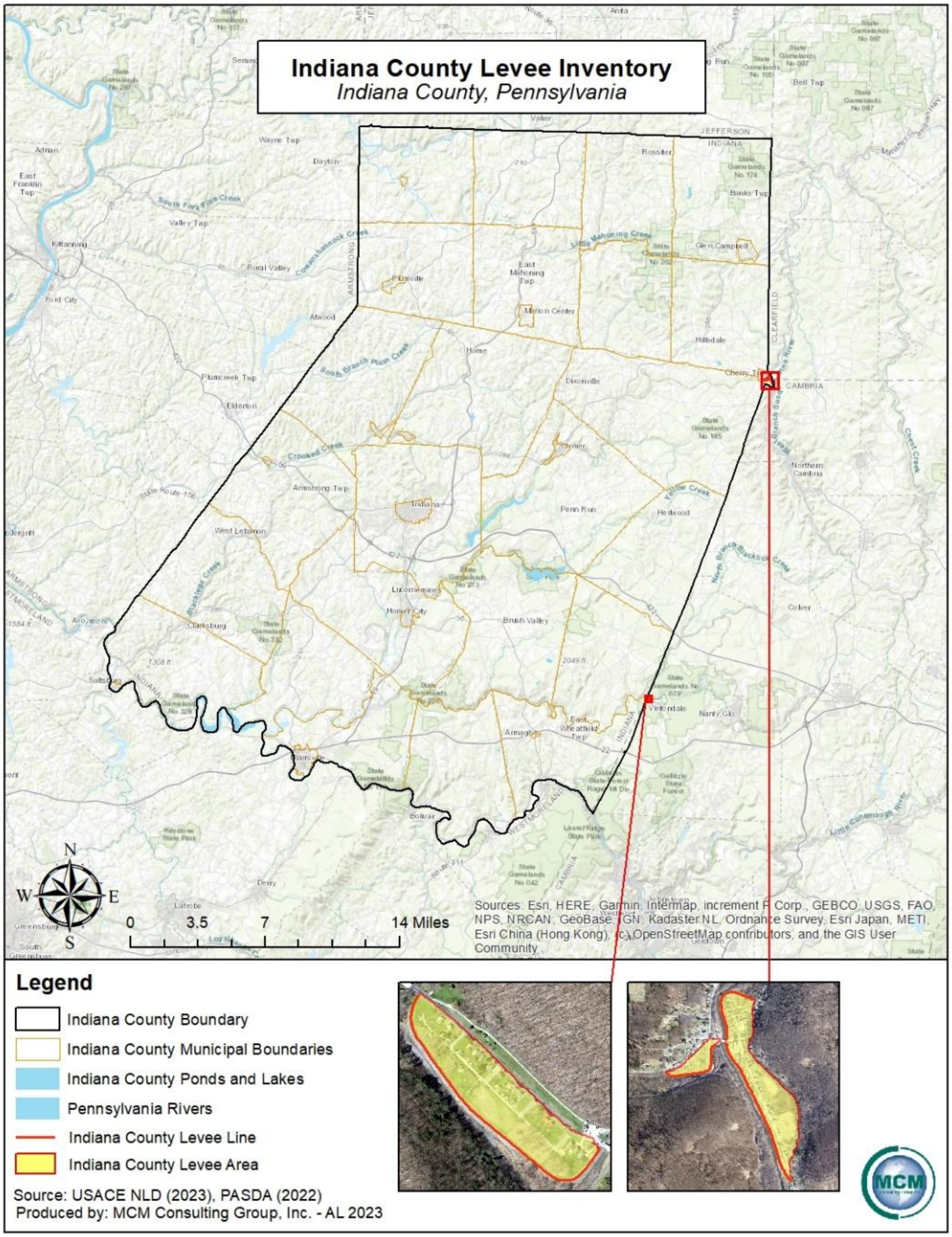


Figure 33 - Levee Locations - Cherry Tree - Cush Cushion

Figure 34 - Levee Locations - Cherry Tree - West Branch

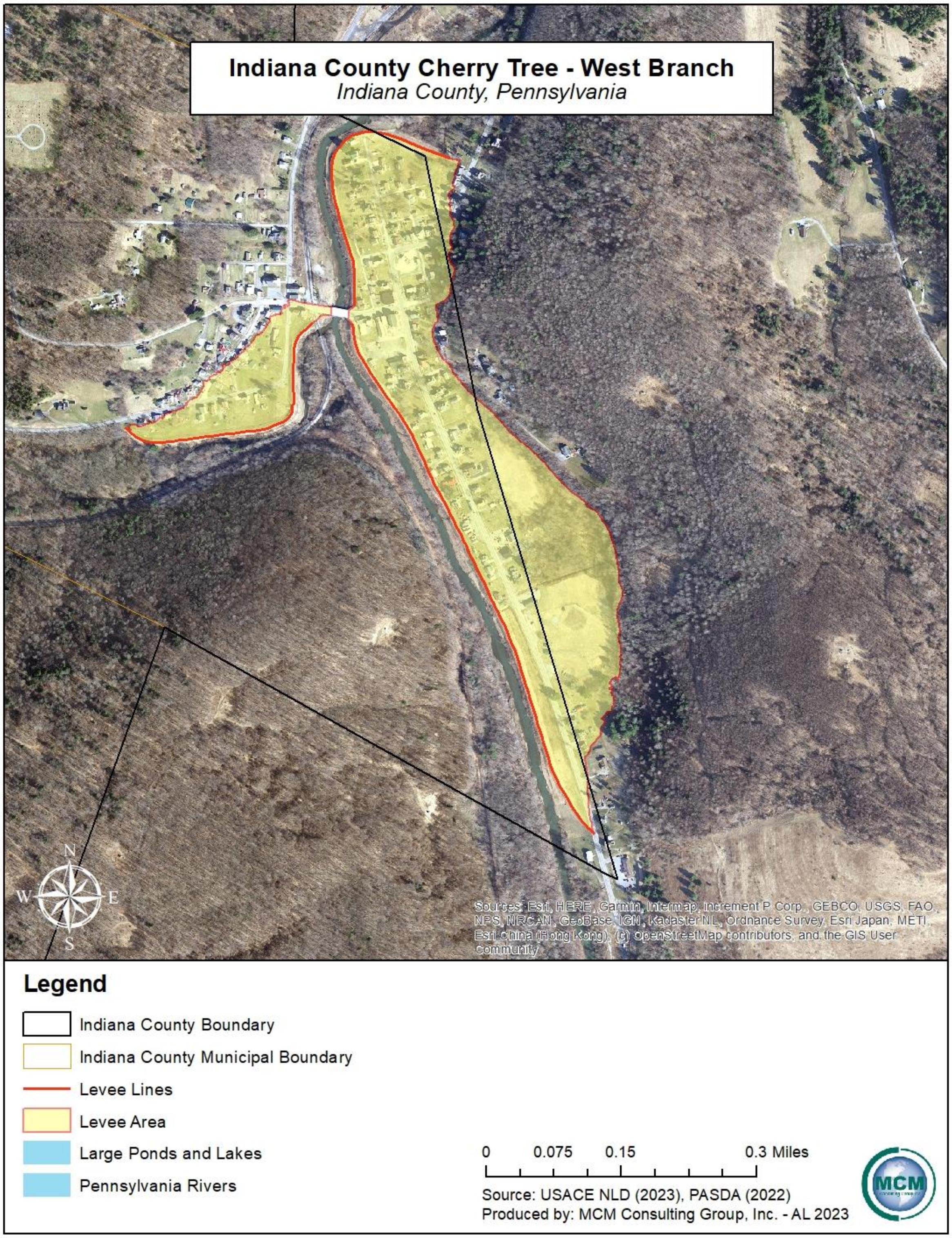


Figure 35 - Levee Locations - Vintondale - Blacklick Creek

4.3.14. Emergency Services

4.3.14.1 Location and Extent

Fire, emergency medical services (EMS), local emergency management coordinators (LEMC), and law enforcement service agencies are defined per municipality in Indiana County. In addition to the local services, the county hosts numerous special teams. 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 above separately 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.

4.3.14.2 Range of Magnitude

Finances, changing political climates, leadership, or a significant high-profile event can trigger a system to be declared as "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 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. The range of the issues related to emergency service shortages are felt across the entire United States of America and the Commonwealth of Pennsylvania. Indiana County has felt emergency shortages and these shortages have had adverse effects on emergency response in the county.

4.3.14.3 Past Occurrence

There have been no official records kept on shortages to emergency services. However, there has been a decrease in the number 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.

Indiana County has had multiple events that were caused by emergency service shortages, most significantly from 2020 to 2022, exacerbated by the COVID-19 pandemic. Indiana County has experienced shortages in both volunteerism and availability of equipment when it comes to emergency services. Fire companies in Indiana County are trying to maintain membership because all fire departments in Indiana County are volunteer based. Also, Indiana County has a major university in Indiana Borough, which requires the ability to respond to a large number of events if the university police need assistance with an event or incident. The Indiana County ambulance services are limited when compared to the number of fire stations in the county. Some of these ambulance services only have one or two ambulances available for transportation on any given day and time. This can result in increased response times if certain ambulance companies and departments are committed to a response call, and another emergency occurs in their response area. However, this shortage has not been caused exclusively by the COVID-19 pandemic and was occurring before the pandemic across Indiana County and the Commonwealth of Pennsylvania.

4.3.14.4 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.

The future occurrence of emergency service shortages is likely to continue in Indiana County and across the Commonwealth of Pennsylvania. With a lack of new recruits and officers for emergency services, response will continue to be hindered and response times will continue to be high. Institutional change is the most efficient way to decrease the likelihood of emergency service shortages in Indiana County, but that type of change is slow and often long-term.

4.3.14.5 Vulnerability Assessment

The possibility that EMS agencies and fire services could fail creates a vulnerability to all Indiana 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 make 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 Indiana 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 has 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 Indiana County are identified in the following tables, *Table X – Indiana County Fire Departments* identifies the municipalities served. All fire departments in Indiana County are volunteer. *Table X – Indiana County EMS Agencies* identifies each emergency medical service agency and the municipalities served. *Table X – Indiana 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 Indiana County Emergency Management and the Indiana County GIS Department.

Table 55 - Indiana County Fire Departments

Indiana County Fire Departments	
Name of Department	**Area Served**
Armagh Volunteer Fire Department	Armagh Township, Brush Valley Township, Buffington Township, East Wheatfield Township, West Wheatfield Township
Aultman Volunteer Fire Department	Armstrong Township, Blacklick Township, Center Township, White Township, Young Township
Big Run Volunteer Fire Department	Banks Township, Canoe Township
Black Lick Volunteer Fire Department	Black Lick Township, Brush Valley Township, Burrell Township, Center Township, West Wheatfield Township
Blairsville Volunteer Fire Department	Black Lick Township, Blairsville Borough, Burrell Township, Conemaugh Township, Young Township
Bolivar Volunteer Fire Department	Burrell Township, West Wheatfield Township
Brush Valley Volunteer Fire Department	Brush Valley Township, Buffington Township, Burrell Township, Center Township, Cherryhill Township, East Wheatfield Township, Pine Township, West Wheatfield Township, White Township
Cherry Tree Volunteer Fire Department	Cherry Tree Borough, Green Township, Montgomery Township

Indiana County Fire Departments	
Name of Department	**Area Served**
Cherryhill Volunteer Fire Department	Brush Valley Township, Buffington Township, Cherryhill Township, Green Township, Pine Township, White Township
Clyde Volunteer Fire Department	Brush Valley Township, Burrell Township, Center Township, East Wheatfield Township, West Wheatfield Township
Clymer Volunteer Fire Department	Cherryhill Township, Clymer Borough, East Mahoning Township, Green Township, Rayne Township, White Township
Coal Run Volunteer Fire Department	Armstrong Township, Black Lick Township, Center Township, Conemaugh Township, Young Township
Commodore Volunteer Fire Department	Banks Township, Canoe Township, Cherry Tree Borough, Cherryhill Township, East Mahoning Township, Grant Township, Green Township, Montgomery Township, Pine Township, Rayne Township
Coral Graceton Volunteer Fire Department	Black Lick Township, Brush Valley Township, Burrell Township, Center Township, West Wheatfield Township
Creekside Volunteer Fire Department	Armstrong Township, Creekside Borough, Ernest Borough, Rayne Township, Washington Township, White Township
Dalton Volunteer Fire Department	North Mahoning Township, Smicksburg Borough, South Mahoning Township, West Mahoning Township
Elderton Volunteer Fire Department	Armstrong Township, Shelocta Borough, Washington Township, Young Township
Glen Campbell Volunteer Fire Department	Banks Township, Canoe Township, Glen Campbell Borough, Grant Township, Montgomery Township
Homer City Volunteer Fire Department	Black Lick Township, Brush Valley Township, Center Township, Homer City Borough, White Township
Indiana Fire Association	Armstrong Township, Black Lick Township, Brush Valley Township, Center Township, Cherryhill Township, Indiana Borough, Rayne Township, Washington Township, White Township, Young Township
Iselin Volunteer Fire Department	Armstrong Township, Conemaugh Township, Young Township
Marion Center Volunteer Fire Department	Canoe Township, East Mahoning Township, Grant Township, Green Township, Marion Center Borough, North Mahoning Township, Rayne Township, South Mahoning
Perry Township Volunteer Fire Department	Canoe Township, North Mahoning Township, West Mahoning Township

Indiana County Fire Departments	
Name of Department	**Area Served**
Pine Township Volunteer Fire Department	Brush Valley Township, Buffington Township, Cherryhill Township, Green Township, Pine Township
Plumville Volunteer Fire Department	East Mahoning Township, North Mahoning Township, Plumville Borough, Rayne Township, South Mahoning Township, Washington Township, West Mahoning Township
Rossiter Volunteer Fire Department	Banks Township, Canoe Township, East Mahoning Township, Grant Township, Montgomery Township, North Mahoning Township
Saltsburg Volunteer Fire Department	Conemaugh Township, Saltsburg Borough, Young Township
Tunnelton Volunteer Fire Department	Black Lick Township, Conemaugh Township, Young Township
Vintondale Volunteer Fire Department	Brush Valley Township, Buffington Township, East Wheatfield Township, Pine Township

Table 56 - Indiana County EMS Agencies

Indiana County EMS Agencies	
Name of Services	**Area Served**
Blacklick Valley Ambulance	Buffington Township, East Wheatfield Township, Pine Township
Citizens Ambulance	All municipalities except Saltsburg Borough and Shelocta Borough
Elderton's Ambulance Service	Armstrong Township, Shelocta Borough, Washington Township, Young Township
Laurel Valley Ambulance Service	Burrell Township, East Wheatfield Township, West Wheatfield Township
LifeStat Ambulance	Conemaugh Township, Saltsburg Borough, Young Township
Punxsutawney Ambulance Service	Banks Township, Canoe Township, East Mahoning Township, Glen Campbell Borough, Grant Township, North Mahoning Township
Veterans Ambulance	Green Township, Pine Township

Table 57 - Indiana County Law Enforcement Agencies

Indiana County Police Departments / Law Enforcement	
Name of Department	**Area Served**
Blairsville Police Department	Blairsville Borough
Cherry Tree Police Department	Cherry Tree Borough
Clymer Borough Police Department	Clymer Borough
Homer City Police Department	Homer City Borough
Indiana Borough Police Department	Indiana Borough
Indiana Pennsylvania State Police	Armagh Township, Armstrong Township, Banks Township, Black Lick Township, Brush Valley Township, Buffington Township, Burrell

Indiana County Police Departments / Law Enforcement	
Name of Department	**Area Served**
	Township, Canoe Township, Center Township, Cherryhill Township, Conemaugh Township, Creekside Borough, East Mahoning Township, East Wheatfield Township, Ernest Borough, Grant Township, Green Township, Marion Center Borough, Montgomery Township, North Mahoning Township, Pine Township, Plumville Borough, Rayne Township, Shelocta Borough, South Mahoning Township, Washington Township, West Mahoning Township, West Wheatfield Township, White Township, Young Township
Indiana University of Pennsylvania Police Department	Indiana University of Pennsylvania
Punxsutawney Pennsylvania State Police	Banks Township, Canoe Township, Glen Campbell Borough, North Mahoning Township, Smicksburg Borough, West Mahoning Township
Saltsburg Police Department	Saltsburg Borough

4.3.15. Environmental Hazards/HazMat

4.3.15.1 Location and Extent

Transportation

Environmental hazards are most commonly due to hazardous materials incidents occurring when such materials are manufactured, used, stored, or transported. Most hazardous materials incidents are unintentional, however hazardous materials could also be released in a criminal or terrorist act. A release, whether it is intentional or accidental, can result in injury or death and may contaminate air, water and/or soils. Hazardous materials incidents can be generally broken down into the subcategories of transportation and fixed facility. This section will focus on environmental hazards and how they relate to transportation of hazardous materials.

Tanker trucks, tractor trailers, and rail cars often are used to transport hazardous materials. When there are transportation incidents involving these types of vehicles, hazardous materials can be released in significant quantities. *Figure X – Environmental Hazard Transportation Vulnerability* shows major transportation routes through Indiana County, including United States Route 22, United States Route 119, and United States Route 422. Also included in the figure are the Pennsylvania Routes for Indiana County.

Fixed Facility

Hazardous materials incidents can be broken down into the subcategories of transportation and fixed facility. This section of the report focuses on environmental hazardous materials at fixed facilities.

In Pennsylvania, facilities that use, manufacture, or store hazardous materials must comply with Title III of the federal Superfund Amendments and Reauthorization Act (SARA), and the Commonwealth's reporting requirements under the Hazardous Materials Emergency Planning and Response Act (1990-165), as amended. There are fourteen SARA Title III facilities in Indiana County. These facilities listed as SARA sites should not be considered an exhaustive and comprehensive list of all locations where hazardous materials reside in the county. *Figure X – Hazardous Waste Locations* identifies SARA Title III facilities as well as several other locations that consume, store, or release potentially hazardous materials and wastes.

Fixed facilities are also monitored by the Environmental Protection Agency (EPA). The EPA has identified hazardous materials sites, not regulated by SARA Title III, and are known as Toxic Releases Inventory (TRI) sites. Facilities which employ ten or more full time employees, and which manufacture or process more than 25,000 pounds (or use more than 10,000 pounds) of any SARA Section 313-listed toxic chemical in the course of a calendar year are required to report TRI information to the EPA. The EPA is the federal enforcement agency responsible for SARA

Title III and PEMA classifications. As of 2023, there are seven TRI facilities in Indiana County, all located around United States Route 22 corridor and the United Stated Route 119 corridor.

Oil and gas extraction facilities can also be sources of hazardous material release. Most wells in the county are active, but there are also many inactive and abandoned wells. *Figure X – Oil & Gas Well Locations* shows the location of all oil and gas wells in the county along with their proximity to surface waters.

4.3.15.2 Range of Magnitude

Transportation

While often accidental, releases can occur because of human carelessness, intentional acts, or natural hazards. When caused by natural hazards, environmental hazards are known as secondary events. Hazardous materials can include toxic chemicals, radioactive materials, infectious substances, or hazardous wastes. Such releases can affect nearby populations and contaminate critical or sensitive environmental areas.

Hazardous material release can contaminate air, water, and soil, and can possibly cause injuries, poisonings, or deaths. Hazardous materials fall into nine hazards classes. These hazard classes are as follows:

- Class #1: Explosives
- Class #2: Gases (flammable, non-flammable, non-toxic, and toxic)
- Class #3: Flammable and Combustible Liquids
- Class #4: Flammable Solids (spontaneously combustible and dangerous when wet materials/water reactive substances)
- Class #5: Oxidizing substances and organic peroxides
- Class #6: Toxic Substances and Infectious Substances
- Class #7: Radioactive Materials
- Class #8: Corrosive Substances
- Class #9: Miscellaneous Hazardous Materials / Substances

All nine hazard classes can be found in transportation incidences.

Fixed Facility

All nine hazard classes can be found at fixed facilities. Certain conditions can exacerbate release incidents and these events include fixed facilities:

- Micrometeorological effects of buildings and terrain which alters the dispersion of hazardous materials.
- Proximity to surface water and ground water resources.

- 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 type of material released, distance, and related response time of emergency responders also significantly impact severity and scope of hazardous material releases and clean-up efforts. Areas most proximal to the release are usually at the greatest level of risk, but depending on the material, a release can travel great distances or remain present in the environment for long periods of time (centuries or millennia for some radioactive materials) resulting in chronic and extensive impacts on people and the environment.

Oil and gas well drilling can have a variety of effects on the environment. Abandoned oil and gas wells, not properly plugged can contaminate groundwater and consequently 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. A pipeline breach or an accidental dispersal can spoil public drinking water supplies and can be particularly detrimental to vegetation and aquatic animals, making water safety an important factor in oil and gas extraction. In some cases, associated with hydraulic fracturing (fracking), methane has been found contaminating drinking water in surrounding areas.

Natural gas 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 to the intensity of the flame and the abundant fuel source.

4.3.15.3 Past Occurrence

Transportation

In the past, there have been approximately twelve transportation related environmental hazard events. These events include fuel spills and multiple vehicle crashes with no injuries, some injuries, and entrapment. More recent events are recorded in the records maintained by Indiana County and are summarized in *Table X – Hazardous Material Incidents*. Transportation accidents that involved hazardous materials were included in the table below.

Table 58 - Hazardous Material Incidents

Hazardous Material Incidents		
Municipality	**Date**	**Event**
Armstrong Township	01/25/2018	Fuel Spill
Cherryhill Township	07/31/2018	Fuel Spill

Hazardous Material Incidents		
Municipality	**Date**	**Event**
Burrell Township	04/24/2019	Fuel Spill
Cherryhill Township	06/08/2019	Fuel Spill
Washington Township	08/15/2019	HazMat Spill/Product Release
Pine Township	09/16/2019	Fuel Spill
White Township	12/22/2019	Fuel Spill
Conemaugh Township	02/19/2020	Structure Fire Residential
Center Township	09/16/2020	Special Detail/HazMat
Center Township	09/19/2020	Special Detail/HazMat
Montgomery Township	11/02/2020	MVC – No Injuries/HazMat
Center Township	05/05/2021	Special Detail/HazMat
Burrell Township	08/10/2021	Fuel Spill
West Wheatfield Township	08/21/2021	Bulk Tank Truck Leaking
Cherryhill Township	10/17/2021	MVC – W/Entrapment/HazMat
Indiana Borough	01/16/2022	IUP Chemical Leak
Burrell Township	03/20/2022	Fuel Spill
East Wheatfield Township	03/28/2022	MVC – No Injuries/HazMat
Green Township	09/20/2022	MVC – W/Entrapment/HazMat
Center Township	10/04/2022	MVC – W/Injuries/HazMat
Source: Indiana County Records, 2023		

Hazardous materials can be transported by air, sea, and land (over the road or through pipelines). Transportation accidents along roadways is a regular occurrence and a large number of hazardous materials are transported by roadway every day.

A past event for an environmental hazard incident involving transportation of hazardous materials that resulted in a large impact was a train derailment of a Norfolk Southern train transporting hazardous materials near East Palestine, Ohio, located in Columbiana County, Ohio on February 3rd, 2023. The train was carrying volatile organic compounds (VOCs) including vinyl chloride and butyl acrylate. Roads and areas around East Palestine were closed, and roads into Pennsylvania (Beaver County) were closed for travel. As a result if the derailment, state officials and emergency crews conducted a control burn of the chemicals to release them, so they did not explode and cause more damage.

This burn and release resulted in the evacuation of Ohio and Pennsylvania citizens within a 1-by-2 mile area of the site. The derailment resulted in a release of chemicals into the soil and Norfolk Sothern began clean-up efforts. The chemical spill killed an estimated 3,500 small fish and aquatic animals near the accident location and has raised concerns about exposure to the chemical involved. Ohio officials continue to work with the United States Environmental

Protection Agency (EPA), the Federal Emergency Management Agency (FEMA), and Norfolk Southern for continued cleanup, remediation, and analysis at the time of this writing. East Palestine is approximately 100 miles from Indiana County.

Fixed Facility

There have been a number of hazardous material incidents in Indiana County in the past but few of those events have been related to fixed facilities in the county. The major fixed facility event in Indiana County was a chemical leak at the Indiana University of Pennsylvania on January 16th, 2022. More recent events are recorded in records maintain at Indiana County and are summarized in *Table X – Hazardous Material Incidents*.

The EPA tracks the management of hazardous materials in facilities that handle significant amounts of hazardous materials. The seven TRI facilities in Indiana County as of 2023 are summarized in *Table X – TRI Facilities*. Production-related waste managed is a collective term to refer to how much of a chemical is recycled, combusted for energy recovery, treated for destruction, or disposed of, or otherwise released on and off site.

Table 59 - TRI Facilities

Toxic Release Inventory Facilities				
Name	**City**	**Industry Sector**	**Chemical(s)**	**Production-related Waste Managed (lbs)**
Conemaugh Generating Station	New Florence	Electric Utilities	Ammonia, Arsenic Compounds, Barium Compounds, Chromium Compounds, Cobalt Compounds, Copper Compounds, Hydrochloric acid, Hydrogen fluoride, Lead Compounds, Manganese Compounds, Mercury Compounds, Nickel Compounds, Selenium Compounds, Sulfuric acid, Vanadium Compounds, Zinc Compounds	5,328,881

Toxic Release Inventory Facilities				
Name	**City**	**Industry Sector**	**Chemical(s)**	**Production-related Waste Managed (lbs)**
Homer City Generation LP	Homer City	Electric Utilities	Ammonia, Arsenic Compounds, Barium Compounds, Chromium Compounds, Cobalt Compounds, Copper Compounds, Dioxin and dioxin-like Compounds, Hydrochloric acid, Hydrogen fluoride, Lead Compounds, Manganese Compounds, Mercury and Mercury Compounds, Naphthalene, Nickel Compounds, Polycyclic aromatic Compounds, Sulfuric Acid, Vanadium Compounds, Zinc Compounds.	9,421,600
Joy Global Underground Mining, LLC.	Homer City	Other	Manganese	12,774
Prime Metals Acquisitions, LLC.	Homer City	Primary Metals	Chromium and Chromium Compounds, Cobalt and Cobalt Compounds, Copper, Lead and Lead Compounds, Manganese and Manganese Compounds, Nickel and Nickel Compounds	289,895.6

Toxic Release Inventory Facilities				
Name	**City**	**Industry Sector**	**Chemical(s)**	**Production-related Waste Managed (lbs)**
Seward Power Plant	New Florence	Electric Utilities	Ammonia, Antimony Compounds, Arsenic Compounds, Barium Compounds, Beryllium Compounds, Chromium Compounds, Cobalt Compounds, Copper Compounds, Dioxin and dioxin-like compounds, Lead Compounds, Manganese Compounds, Mercury Compounds, Molybdenum trioxide, Nickel Compounds, Selenium Compounds, Sulfuric Acid, Thallium Compounds, Vanadium Compounds, Zinc Compounds	333,291.5
Specialty Bar Products Co.	Blairsville	Fabricated Metals	Nickel	2,784.728
Specialty Tires of America	Indiana	Plastics and Rubber	Zinc Compounds	0
Source: EPA, 2023				

As of 2023, Indiana County is home to 11,324 active oil and natural gas wells.

4.3.15.4 Future Occurrence

Transportation

While many incidents involving hazardous material releases have occurred in Indiana County in the past, they are generally difficult to predict. The nature of traffic accidents is that there is little to no warning for their occurrence, and they can have disastrous results. An occurrence is largely dependent upon the accidental or intentional actions of a person or group.

Fixed Facility

Hazardous material release incidents are generally difficult to predict, but the presence of such dangerous materials warrants preparation for accidental or intentional release events. Emergency response agencies in Indiana County should be prepared to handle the types of hazardous materials housed and used the SARA Title III facilities, TRI facilities, and oil and gas wells that are located within the county. The Federal Superfund Amendments and Reauthorization Act (SARA) is also known as the Emergency Planning and Community Right-to-Know Act (EPCRA), and the Local Emergency Planning Committees (LEPCs) are designed by EPCRA to ensure that state and local communities are prepared to respond to potential chemical accidents.

4.3.15.5 Vulnerability Assessment

Transportation

Quick response to transportation accidents involving hazardous materials minimizes the volume and concentration of hazardous materials that are transported and dispersed through the air, water, and soil. Every municipality within Indiana County is vulnerable to a hazardous materials incident caused along a transportation route. These incidents can occur along highways, railways, and pipelines. *Figure X – Environmental Hazard Transportation Vulnerability Map* identified the 2,000-foot hazard corridor for all major highways in Indiana County. *Figure X – Annual Truck Traffic Percentages* identifies the annual truck traffic percentages for all of the roadways in Indiana County.

Fixed Facility

Populations, critical infrastructure, and natural habitats within 1.5 miles of SARA Title III and Toxic Release Inventory sites are vulnerable to hazardous material incidents.

Private water suppliers 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 and explosive hazard. Ideally, vulnerability of private drinking well owners would be established by comparing the distance of drinking water wells to known oil and gas well locations, but this extensive detailed data is not readily available. Private drinking water is largely unregulated and information on these wells is voluntarily submitted to the Pennsylvania Topographic and Geologic Survey by water well drillers, and the existing data is largely incomplete and/or not completely accurate. Young Township contains the most active oil and gas wells. West Wheatfield Township contains drinking water wells, meaning that West Wheatfield Township is most vulnerable to water contamination from oil and gas wells. *Table X – Oil and Gas Wells & Drinking Water Wells* illustrates the type of well and the local domestic drinking water wells for each municipality.

Table 60 - Oil and Gas Wells & Drinking Water Wells

Oil & Gas Wells in Indiana County (2023)					
Municipality	**Type of Well**				**Domestic Drinking Water Wells**
	Active	**Abandoned**	**Inactive**	**Proposed**	
Armagh Borough	0	0	0	0	1
Armstrong Township	629	23	3	29	121
Banks Township	373	7	0	12	56
Black Lick Township	493	3	2	39	63
Blairsville Borough	8	0	0	0	1
Brush Valley Township	239	9	1	70	131
Buffington Township	103	2	1	14	163
Burrell Township	310	2	0	50	106
Canoe Township	513	4	0	16	69
Center Township	697	1	0	19	84
Cherryhill Township	458	4	0	54	5
Cherry Tree Borough	0	0	0	0	112
Clymer Borough	7	0	0	0	1
Conemaugh Township	611	1	9	26	65
Creekside Borough	5	0	0	0	2
East Mahoning Township	619	71	1	23	37
East Wheatfield Township	39	5	0	8	188
Ernest Borough	3	0	0	0	1
Glen Campbell Borough	7	0	0	0	3
Grant Township	411	3	2	20	19
Green Township	641	1	0	46	154
Homer City Borough	5	0	0	0	1
Indiana Borough	7	0	0	3	1
Marion Center Borough	20	0	0	0	16
Montgomery Township	377	0	3	12	51
North Mahoning Township	659	89	1	19	73
Pine Township	58	0	0	3	144
Plumville Borough	12	0	0	0	11
Rayne Township	571	9	0	37	105

Oil & Gas Wells in Indiana County (2023)					
Municipality	Type of Well				Domestic Drinking Water Wells
	Active	Abandoned	Inactive	Proposed	
Saltsburg Borough	1	0	0	0	1
Shelocta Borough	2	0	0	0	0
Smicksburg Borough	1	0	0	0	4
South Mahoning Township	578	61	1	13	39
Washington Township	738	17	0	27	47
West Mahoning Township	543	34	1	29	16
West Wheatfield Township	166	5	1	24	290
White Township	675	3	1	14	165
Young Township	707	7	1	46	51
Total:	**11,286**	**361**	**28**	**656**	**2,397**
Source: PA DEP, 2023					

Figure 36 - Oil and Gas Well Locations

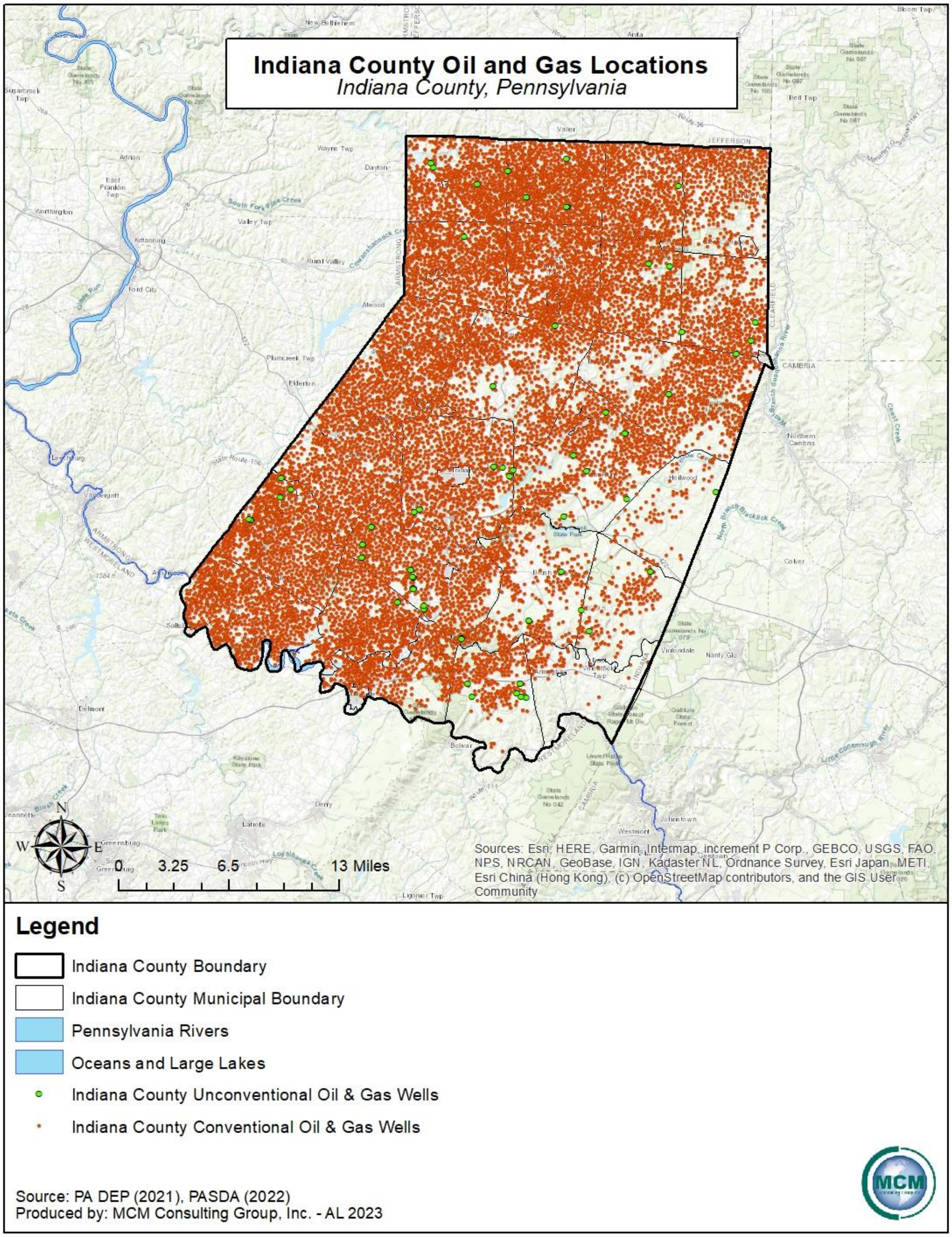


Figure 37 - Hazardous Water Locations

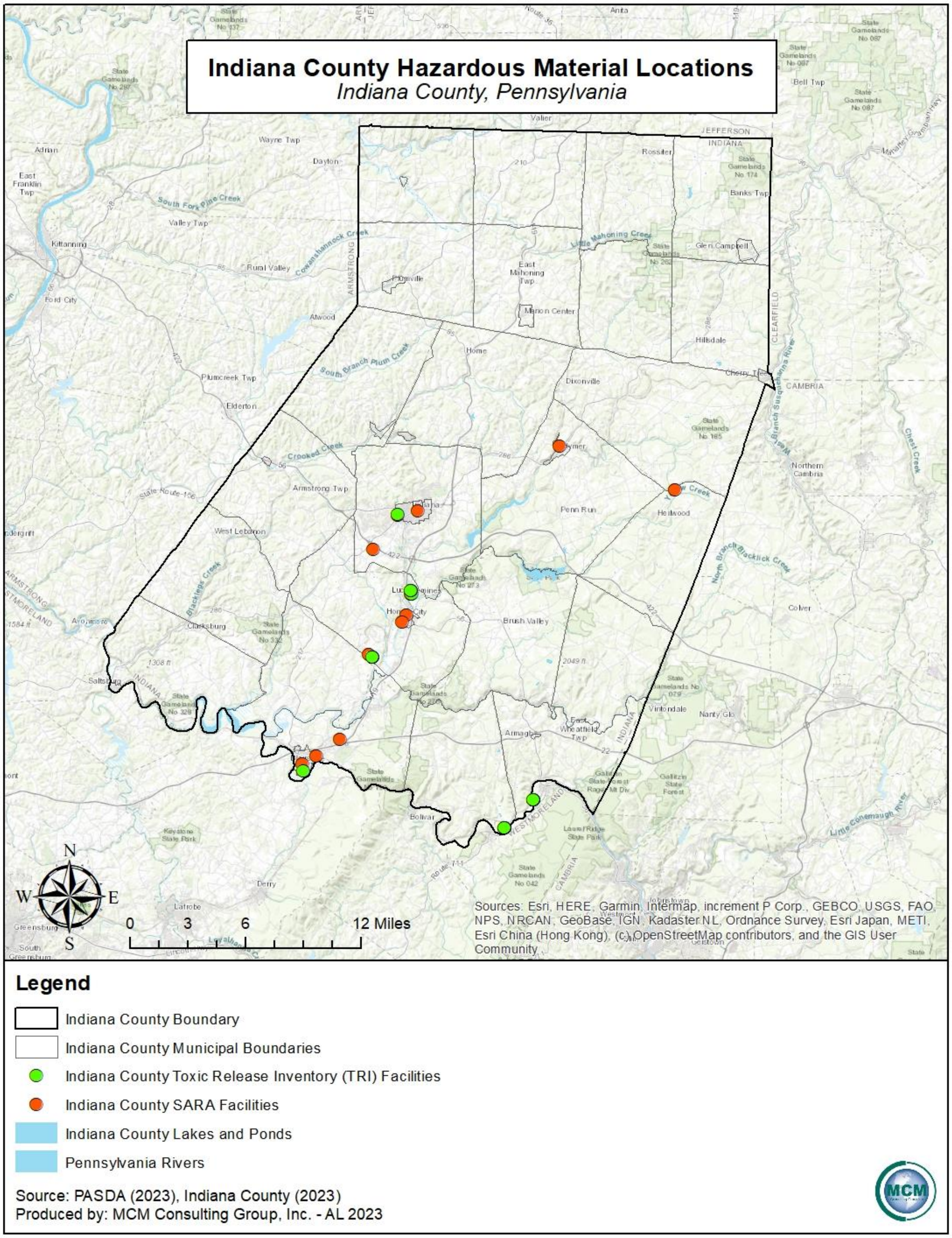


Figure 38 - Environmental Hazard Transportation Vulnerability

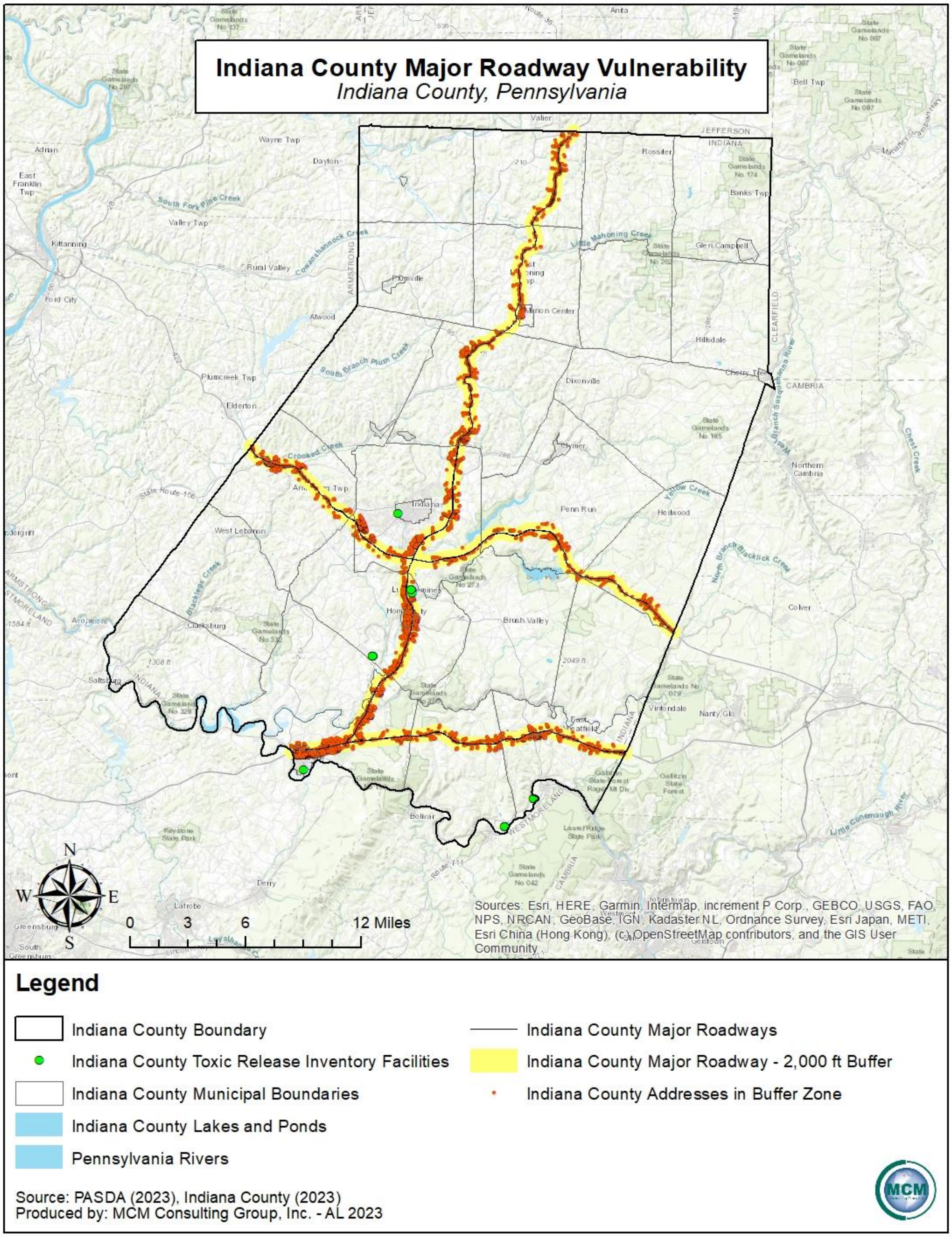
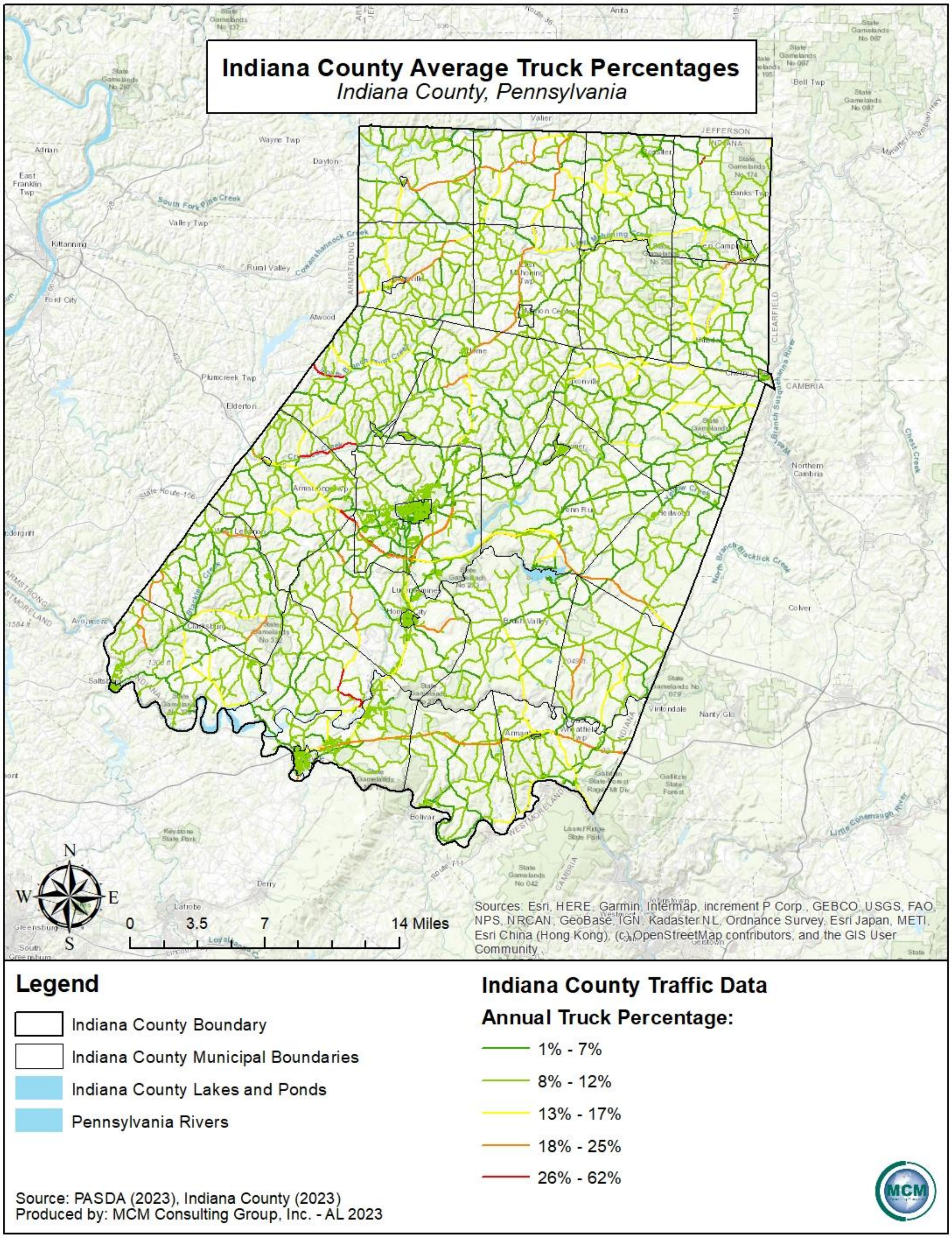


Figure 39 - Annual Truck Traffic Percentages



4.3.16. Opioid Epidemic

4.3.16.1 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 occur 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 Indiana 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.

4.3.16.2 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 Indiana 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 2021, a total of 5,343 deaths related to opioid use occurred in Pennsylvania. From February 2022 to February 2021, there was a 3.34% increase across the commonwealth of Pennsylvania. This could indicate a significant increase in opioid overdoses in Pennsylvania. 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.

4.3.16.3 Past Occurrence

In 2022, there was an estimated total of 3,018 drug-related overdose deaths in the Pennsylvania. Indiana County experienced a total of 190 drug related deaths from 2015 – 2020, with estimated deaths in 2021 equaling thirty-eight and estimate deaths in 2022 equaling twenty-three. There was a total of twenty-seven overdose deaths in 2015, forty-three deaths in 2016, thirty-six deaths in 2017, nineteen deaths in 2018, thirty-three deaths in 2019, and thirty-two in 2020. The most common age group for opioid abuse in Indiana County is the 35-44 years of age demographic. In Indiana County the overdose rate of males is greater than the overdose rate of females. Whites have the highest total rate of overdose deaths in Indiana County and the Pennsylvania Department of Health states that 74% of all drug overdoses were among whites. The most used opioid in Indiana 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%

4.3.16.4 Future Occurrence

Both Indiana 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 Indiana County, there are five drug take-back boxes located throughout the county. The drug take-back box locations include the Indiana County District Attorney’s Office, the Indiana Borough Police Department, CVS #4000, the State Police-Troop A/Indiana, and the Blairsville Borough Police Department. 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, previously 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 Indiana 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 Indiana 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.

4.3.16.5 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 wellbeing 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 Indiana 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 Indiana 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 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 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 Indiana 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 X – Opioid Overdose Deaths in Pennsylvania 2020* and *Figure X – Opioid Overdose Deaths in Pennsylvania 2021* illustrate the number of deaths per county in the state of Pennsylvania.

Figure 40 - Opioid Overdose Deaths in Pennsylvania 2020

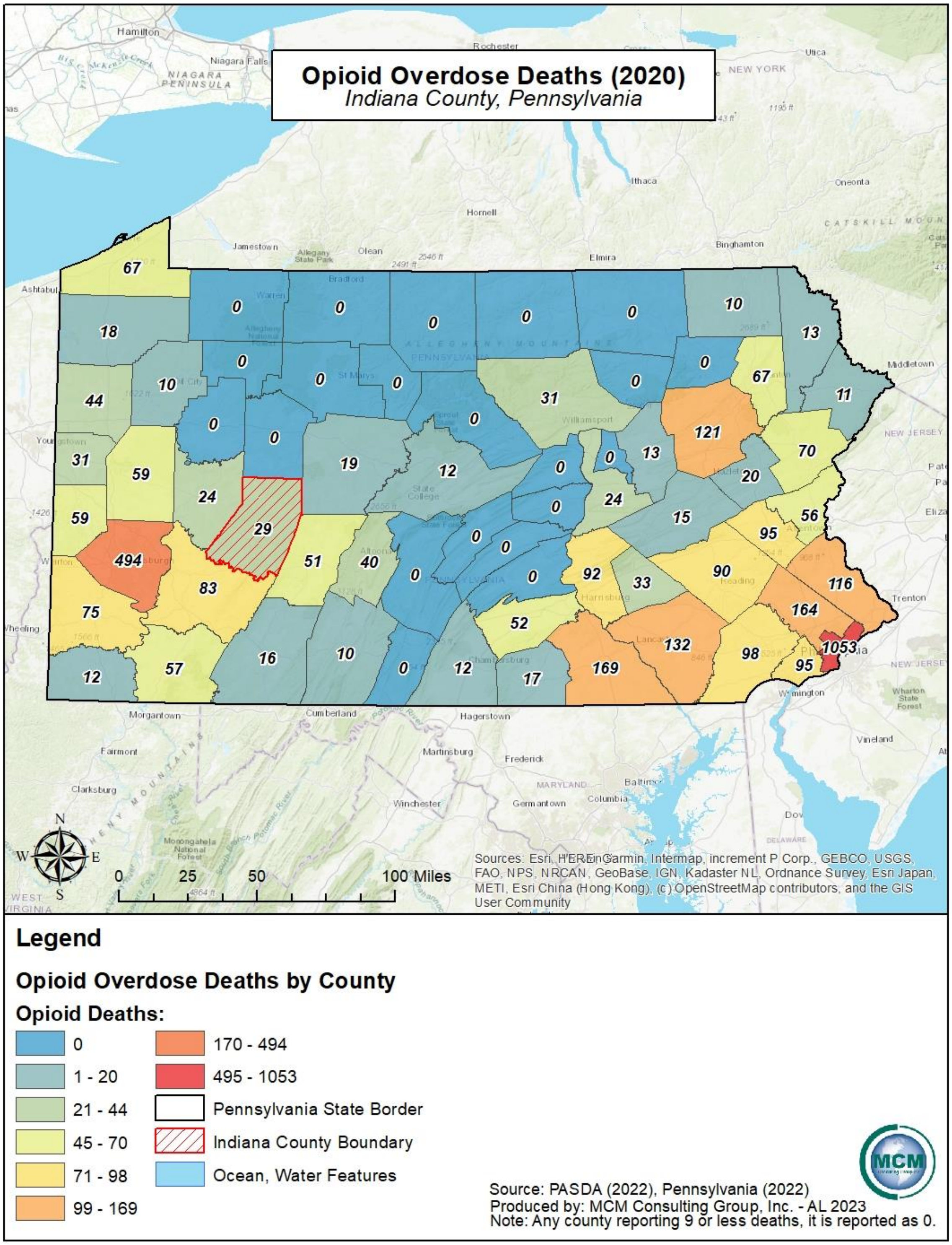
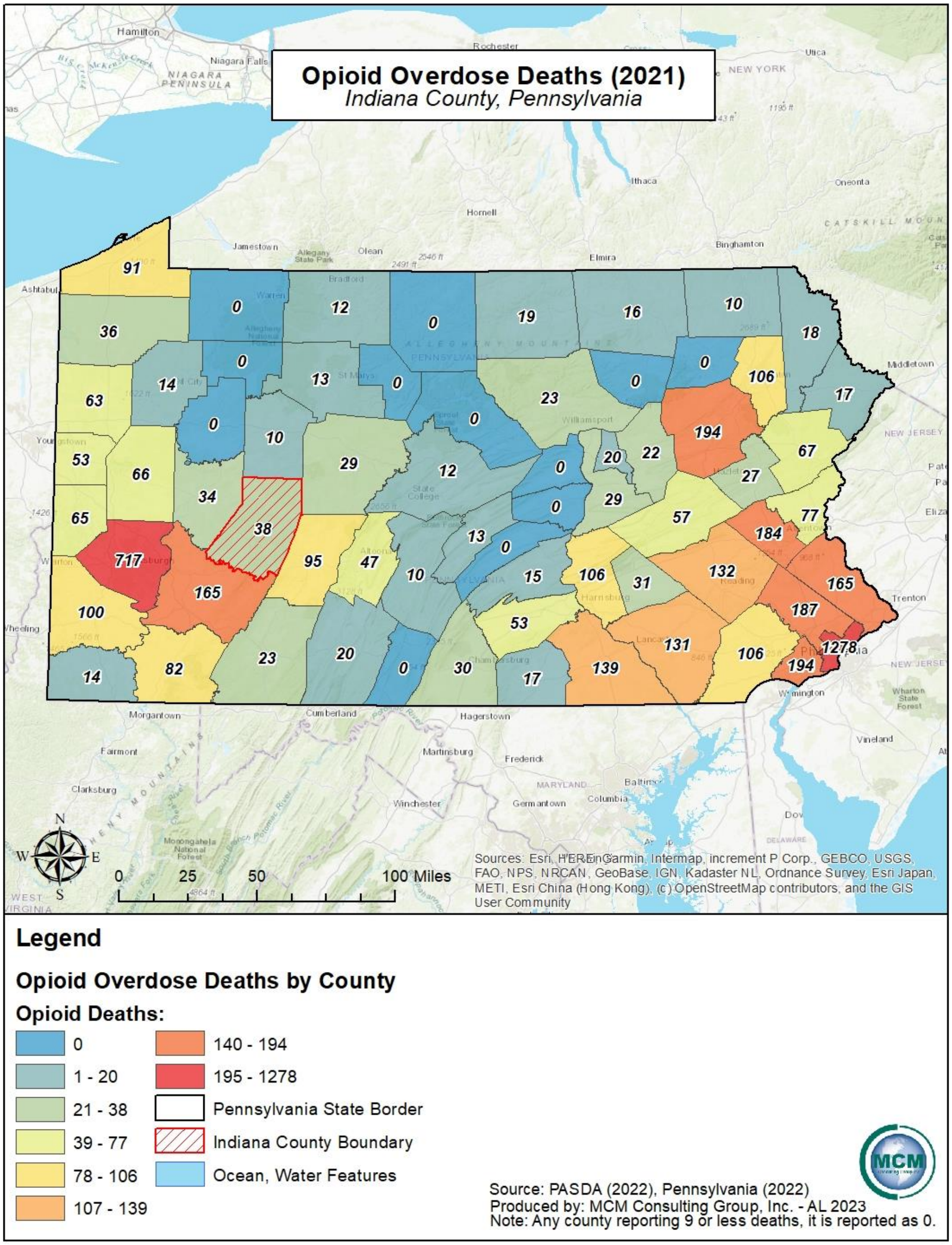


Figure 41 - Opioid Overdose Deaths in Pennsylvania 2021



4.3.17. Terrorism/Cyberterrorism

4.3.17.1 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."

Community lifeline facilities are either in the public or private sector that provide essential products and/or services to the general public. Community lifeline 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. Community lifeline 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

4.3.17.2 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. Indiana County has eleven public school districts (public schools K through 12th grade) that include Armstrong, Apollo-Ridge, Blairsville-Saltsburg, Harmony, Homer-Center, Indiana, Marion Center, Penns Manor, Punxsutawney, Purchase Line, and United school districts. Indiana University of Pennsylvania, Indiana County Technology Center, and the Rapha School, are the post-secondary institutions in Indiana 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 Indiana Borough, 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.

4.3.17.3 Past Occurrence

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, Antifa, Proud Boys, and 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.

Indiana County has not been directly impacted by any significant international or domestic terrorist incidents. However, terrorism cannot be predicted which necessitates the county profile and address the hazard, possible locations, and vulnerabilities of the county.

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 2021, there were a total of 61 active shooting incidents in the United States according to the FBI, which is an increase from 2020 and 2019 which saw 40 and 30 events, respectively. 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. 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. One of the most tragic recent active shooters occurred in Uvalde, Texas, where an armored and masked gunman entered the Robb Elementary School on May 24, 2022, and killed nineteen students and two teachers. Another active shooter event occurred on November 22, 2022, when an employee at a Walmart in Chesapeake, Virginia entered the breakroom of the Chesapeake Walmart and killed six individuals before taking his own life.

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 X – 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 X – Education Environments* shows two more summary pages from the report that detail active shooter statistics in educational environments.

Figure 42 - Active Shooter Incidents - 20 Year Active Shooter Summary

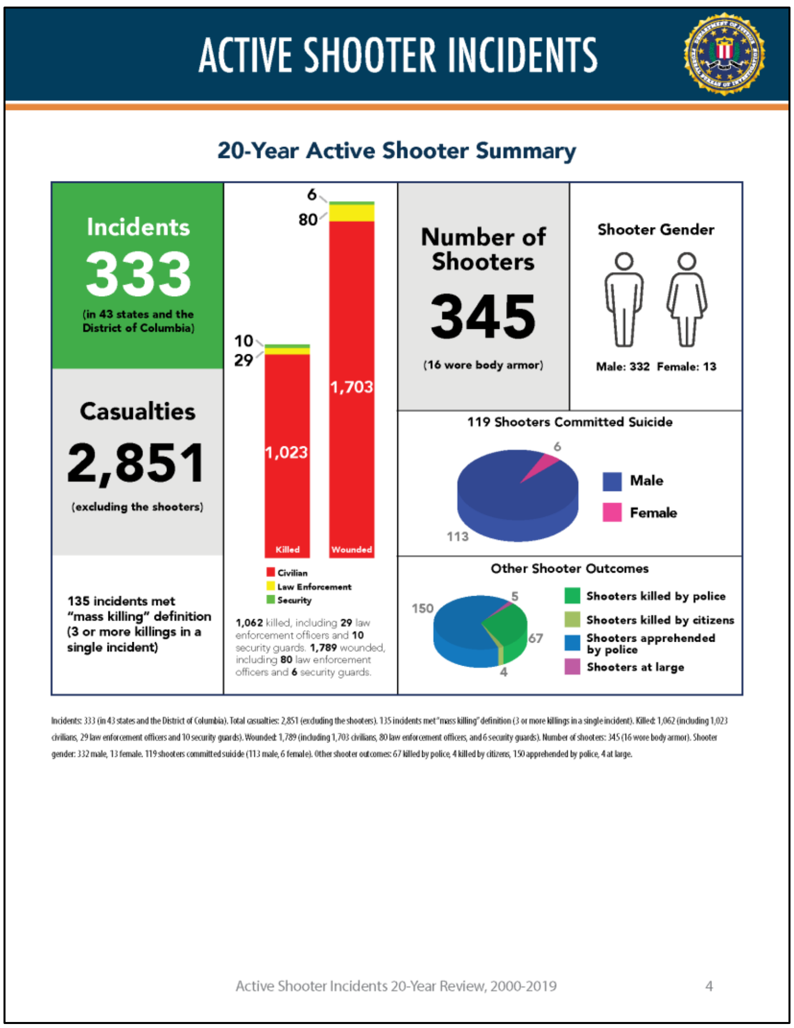


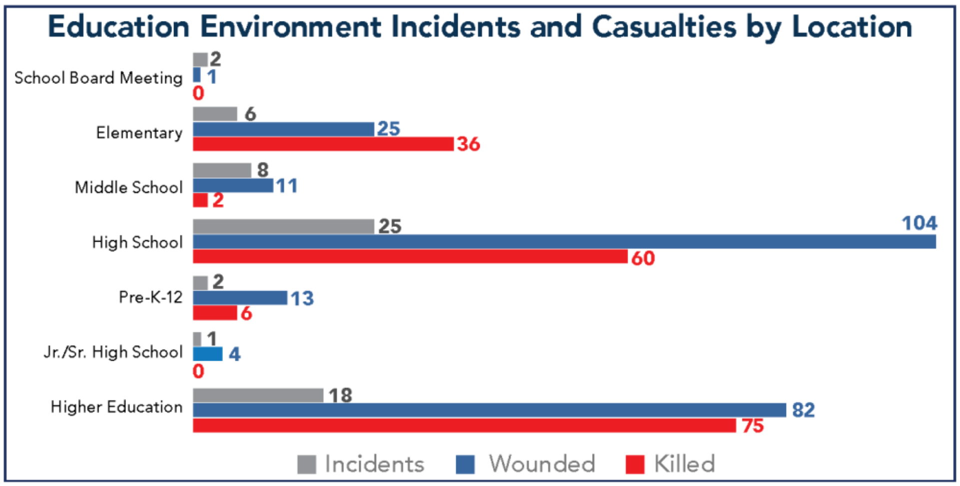
Figure 43 - Education Environments

ACTIVE SHOOTER INCIDENTS

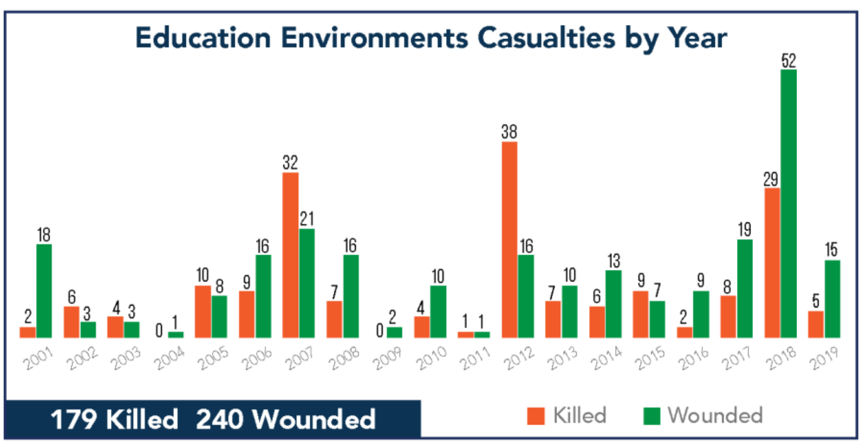
Education Environments

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)



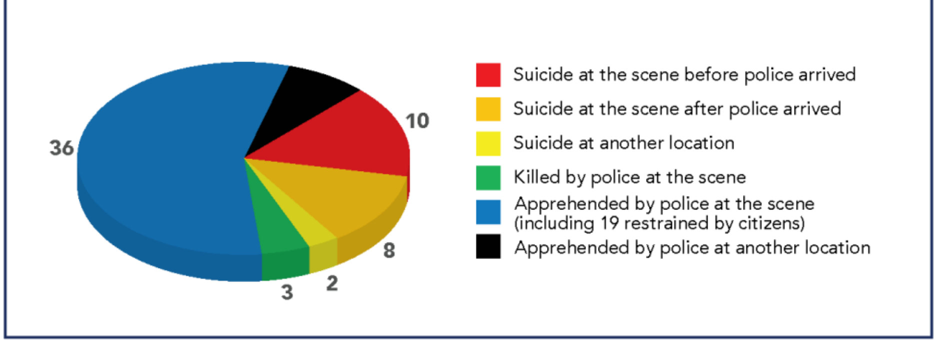
Education Environments Casualties by Year: 2001 (2 killed, 18 wounded); 2002 (6 killed, 3 wounded); 2003 (4 killed, 3 wounded); 2004 (0 killed, 1 wounded); 2005 (10 killed, 8 wounded); 2006 (9 killed, 16 wounded); 2007 (32 killed, 21 wounded); 2008 (7 killed, 16 wounded); 2009 (0 killed, 2 wounded); 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

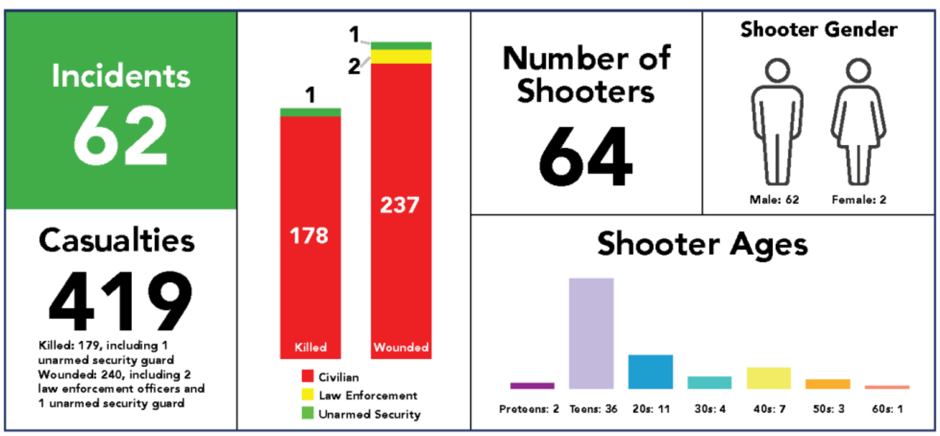
Education Environments

Education Environments Shooter Outcomes



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 (including 19 restrained by citizens) (36); Apprehended by police at another location (5)

.Key Findings:



Incidents: 62. Total casualties: 419. Killed: 179 (including 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

Indiana County has not been the target of any critical cyber terrorist events.

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.

4.3.17.4 Future Occurrence

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

4.3.17.5 Vulnerability Assessment

Indiana 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 aggressive cybercrime activities will continue as criminals pivot their attacks from data encryption to data exfiltration.

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 Indiana 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.

4.3.18. Transportation Accidents

4.3.18.1 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 Indiana County there are 298 state maintained and one federally maintained bridge, according to PennDOT. Major transportation routes in Indiana County include US routes 22, 119, 219, and 422. Other state routes are also present in the county including PA routes 36, 56, 85, 110, 156, 210, 217, 240, 259, 286, 403, 553, 580, 711, and 954. *Figure X – Major Transportation Routes* shows the major transportation systems in Indiana County.

Indiana County has one public airport which is the Indiana County–Jimmy Stewart Airport. There exists a potential extent for air transportation accidents to occur due to the number of commercial air traffic that flyovers 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 X – Airports and Vulnerability Zones*.

There are several freight lines in Indiana County. The railroad companies that operate within Indiana County, include Norfolk Southern and the R.J. Corman Railroad/Pennsylvania Lines. With the ability of these railroads for interchanging with other companies, goods can be transported virtually anywhere via rail from Indiana 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 Indiana County.

There are 11,286 active oil and gas wells located in Indiana County. Pipeline infrastructure is seen throughout the county. There are four major pipeline companies that transport hazardous materials in and through Indiana County. Of these major pipelines, all four are primarily for natural gas only. *Figure X – Utility Pipelines Vulnerability* shows the various pipelines that run through Indiana County

4.3.18.2 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.

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 or around the boroughs of Indiana or Blairsville, which are the most populous areas of the county. Such an event would constitute an immediate health hazard to the population and require evacuation.

4.3.18.3 Past Occurrence

Table X – PennDOT Crash Report for Indiana County shows crash statistics recorded by the Pennsylvania Department of Transportation between 2010 and 2021. Reports for 2023 were not available at the time of this report. The year 2010 had the most total crashes in Indiana County while 2020 had the least total crashes. The number of total crashes has declined over the span of eleven years between 2010 and 2021 in the county.

Table 62 - PennDOT Crash Report for Indiana County

PennDOT Crash Report for Indiana County								
Year	Vehicle accidents for Indiana County				Vehicle Accident Deaths for Indiana 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	845	22	439	384	22	8	3	0
2011	821	15	414	392	15	5	2	0
2012	786	8	379	399	8	4	1	0
2013	781	12	378	391	12	3	0	0
2014	779	9	371	399	9	3	0	0

PennDOT Crash Report for Indiana County								
Year	Vehicle accidents for Indiana County				Vehicle Accident Deaths for Indiana 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	
2015	750	15	312	423	15	9	2	0
2016	723	17	328	378	17	14	1	0
2017	709	7	295	407	7	1	0	0
2018	742	10	288	444	10	2	2	0
2019	723	11	290	422	11	3	0	0
2020	592	15	214	363	15	4	3	0
2021	666	10	248	408	10	3	0	0

While no major transportation accidents have occurred in Indiana County related to railroads and train transportation, train derailments are gaining greater attention on a national scale and have become the focus of increased awareness. As such, it is important to review those events in relation to transportation accidents. A major train derailment occurred in East Palestine, Ohio on February 3rd, 2023, releasing hazardous materials that were being transported for industrial use. This train derailment is still in the recovery phase of the disaster at the time of this writing. Another train derailment occurred in Raymond, Minnesota on March 30th, 2023 and a third major train derailment occurred near Paradise, Montana on April 2nd, 2023.

4.3.18.4 Future Occurrence

Indiana 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 and trucking 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 rail or aviation accidents. 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.

4.3.18.5 Vulnerability Assessment

A transportation accident can occur anywhere in Indiana 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 include natural hazards that affect the environment, such as winter storms or heavy rains that cause slippery roadways or mud slides, to windstorms or tornadoes that cause high-profile vehicles or train cars to topple 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. Sixty-four of Indiana County's 299 bridges are in poor condition, posing a vulnerability to transportation accidents, while 160 and seventy-five remain in fair and good condition, respectively.

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 X– Average Daily Traffic on Major Highway Vulnerability* identifies all major highways and railroads within Indiana County.

Figure 44 - Major Transportation Routes

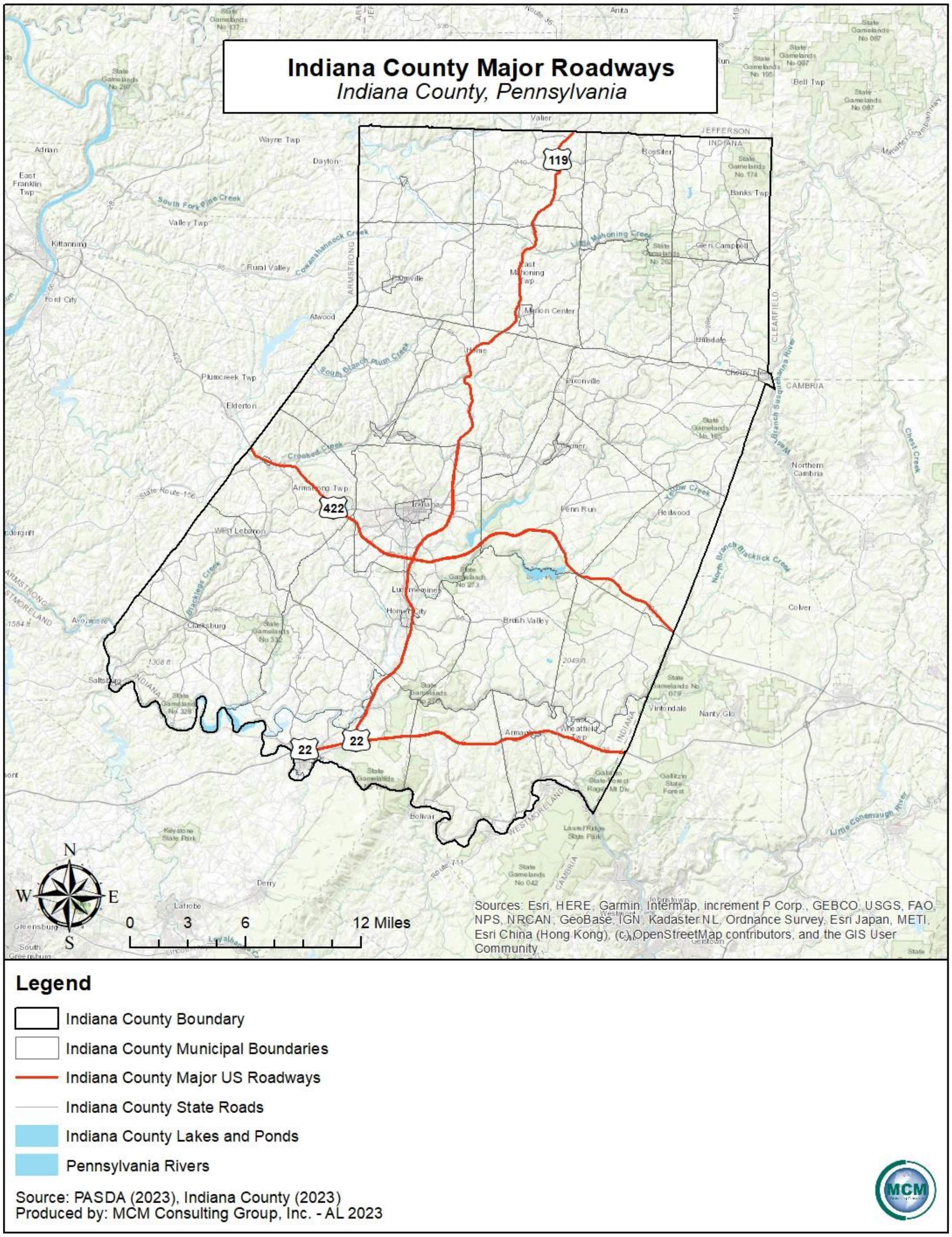


Figure 45 - Airports and Vulnerability Zones

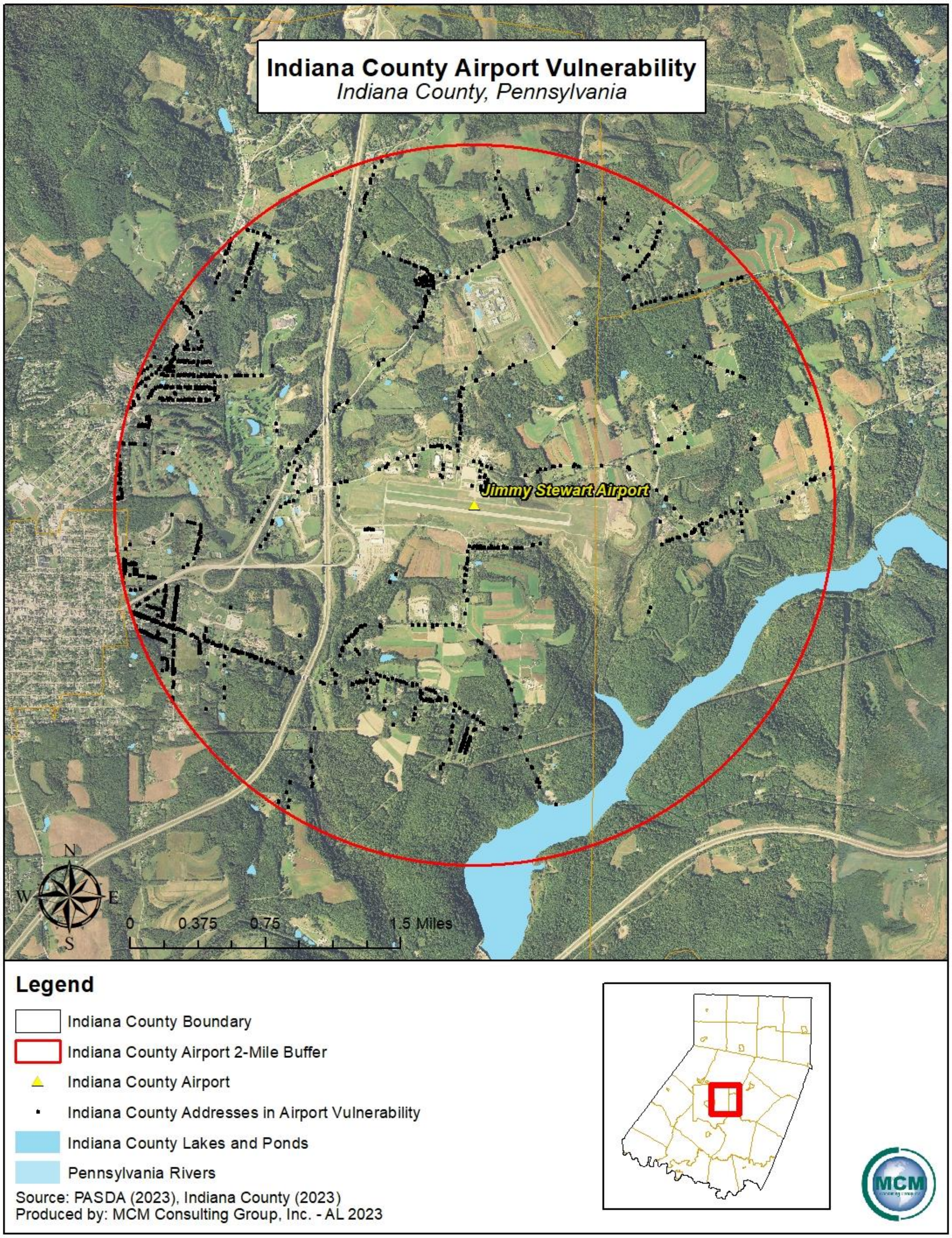


Figure 46 - Average Daily Traffic on Major Highway Vulnerability

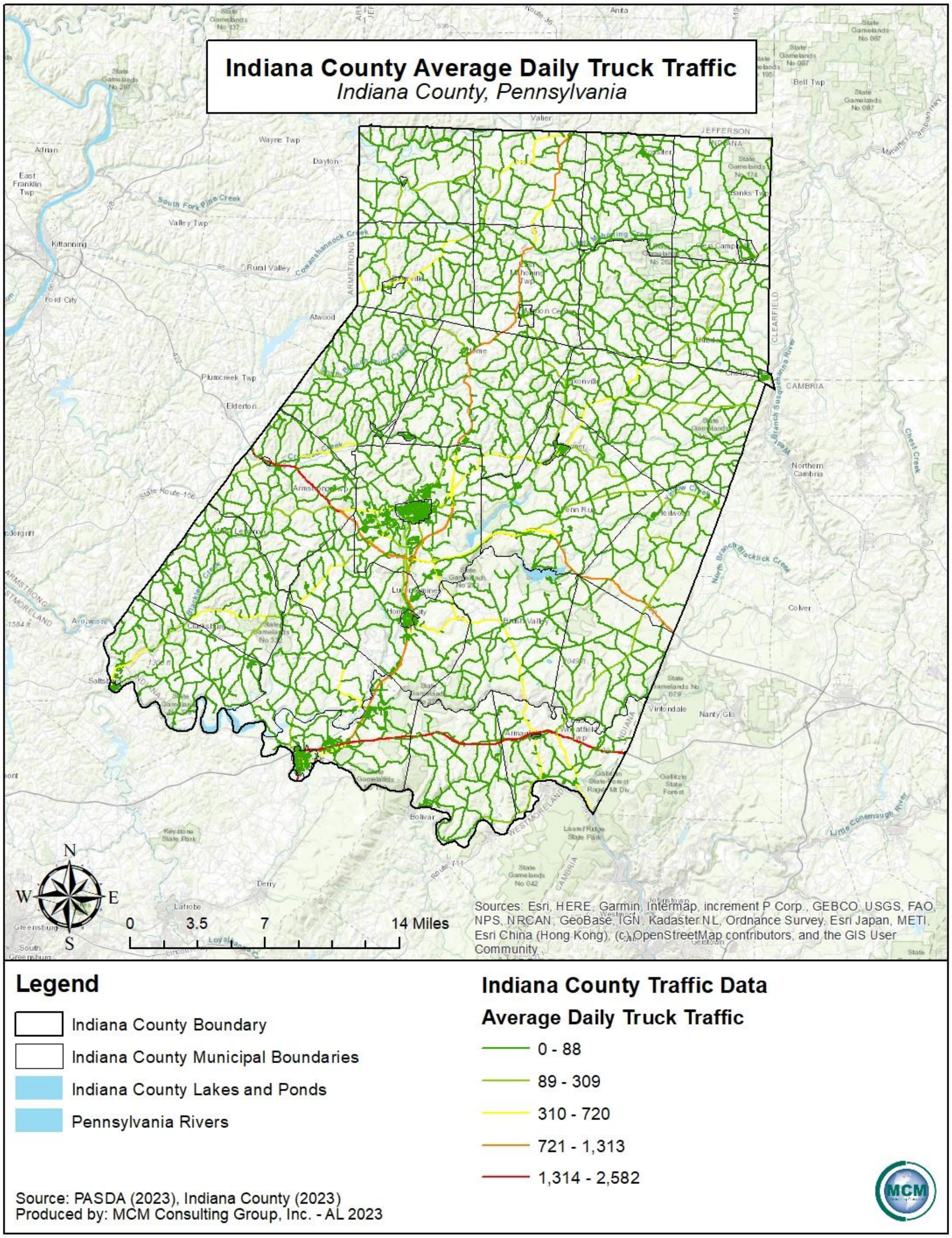
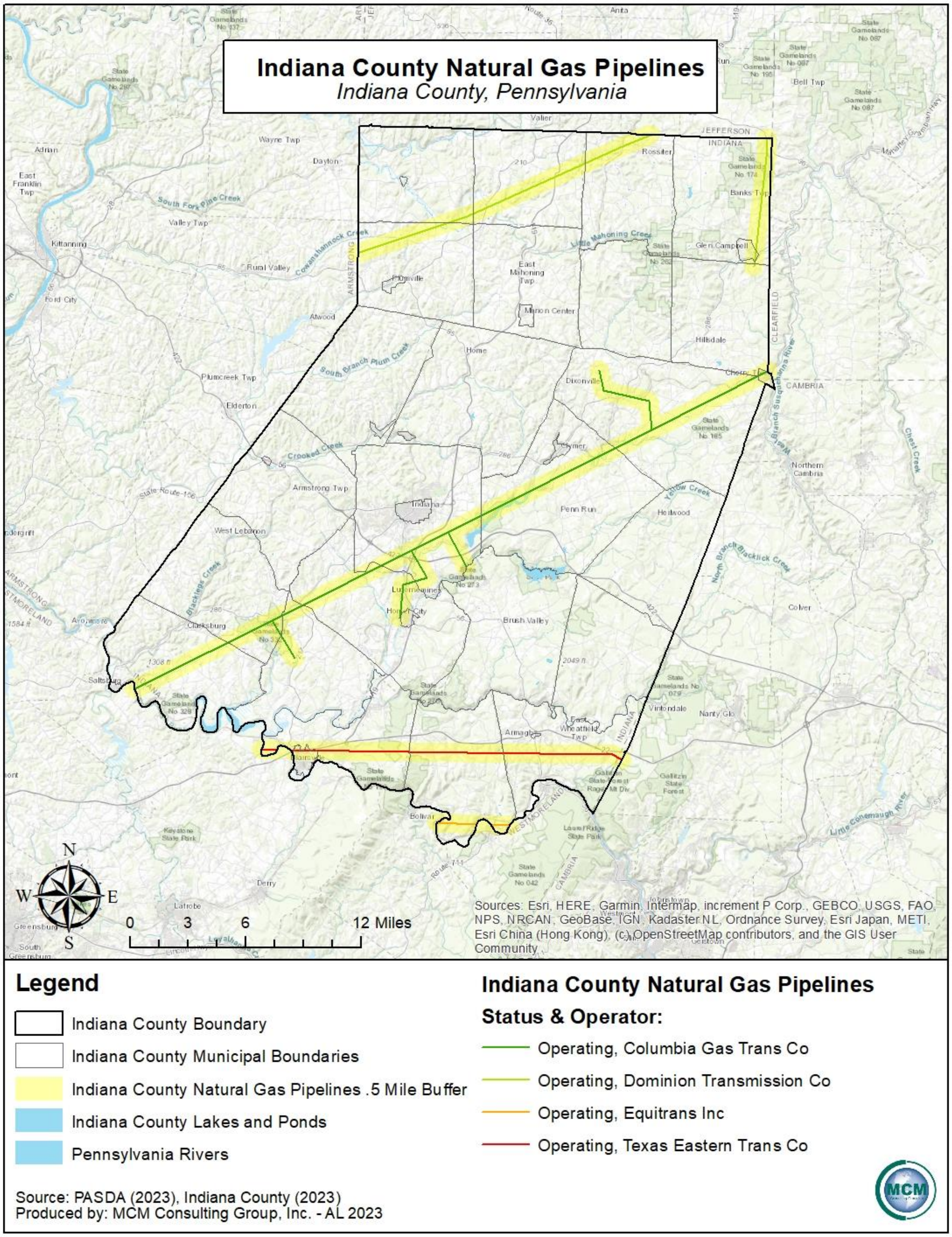


Figure 47 - Utility Pipelines Vulnerability



4.3.19. Utility Interruptions

4.3.19.1 Location and Extent

Utility interruptions can occur from an internal system failure or as a secondary impact of another hazard, such as windstorm, winter storm, extreme temperatures, or a traffic accident. Strong adverse weather conditions and storms can cause widespread disruptions in electric and telecommunications service due to power lines being brought down by falling tree branches across a region. Strong heat waves may result in rolling blackouts where power may not be available for an extended period, impacting air conditioning across a region. 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 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 Indiana County is shown in *Table X – Indiana County Utility Providers*.

Table 63 - Indiana County Utility Providers

Indiana County Utility Providers	
Utility Type	**Name of Utility Provider**
Electricity	Penelec REA Energy Cooperative, Inc.
Telephone/9-1-1/Wireless	AT&T Cricket Verizon Xfinity (Comcast)
Natural Gas	Critical Control Energy Services Energy Corporation of America Royal Oil and Gas Corporation William G Satterlee & Sons, Inc.
Water	Blairsville Municipal Authority Central Indiana County Water Authority

Indiana County Utility Providers	
Utility Type	**Name of Utility Provider**
	Clymer Borough Municipal Authority Crystal Waters, Inc. Ernest Borough Water Glen Campbell Municipal Waterworks Green Township Municipal Authority – Barr Slope Green Township Municipal Authority – Commodore Indiana County Municipal Services Authority PA American Water Company – Indiana Distribution
Source: PA Public Utility Commission, 2023	

4.3.19.2 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 can include a delay in emergency response and those services arriving in timely manner. A lack of potable drinking water can also become a major issue for areas impacted by utility interruptions.

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
- Stopped and stalled elevators
- Direct economic impact from retail settings

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 the increase in people working over wireless networks that occurred during the COVID-19 pandemic. These interruptions and issues can be detrimental for the Indiana County workforce.

4.3.19.3 Past Occurrence

Minor utility interruptions occur annually in Indiana County and occur most often in conjunction with winter weather and/or windstorms. Indiana County utilizes a database system called WebEOC to track incidents within the county. However, no such data was available for refence, from 2018 through 2023, during the development of this report. *Table X – Utility Interruptions in Indiana County* illustrates the number of interruptions to electric, natural gas, telecommunications, and water services between 2015 and 2022.

Table 64 - Utility Interruptions in Indiana County

Utility Interruptions in Indiana County		
Date	**Event Type**	**Municipality**
01/29/2015	Admin Phone Line Issue	Indiana Borough
05/18/2015	Power Outage	Marion Center Borough
06/14/2015	Power Outage – Tornado Warning	Pine Township
07/24/2015	9-1-1 Phone Outage	Indiana Borough
08/19/2015	Power Outage	Center Township

Utility Interruptions in Indiana County		
Date	**Event Type**	**Municipality**
10/27/2015	9-1-1 Phone Outage	Indiana Borough
12/10/2015	Water Main Break	Center Township
12/11/2015	Power Outage – Western Area	Indiana Borough
12/28/2015	Power Outage	Cherryhill Township
04/15/2016	Public Safety Phone Outage	Indiana Borough
03/08/2017	Power Outage	White Township
09/12/2017	Power Outage - IUP	White Township
08/13/2018	Water Main Break	Indiana Borough
11/25/2020	Water Main Break	White Township
01/24/2022	Water Main Break	Indiana Borough
Source: Indiana County, 2023		

The planning team identified some specific incidents and issues:

- Indiana Borough has experienced two water main breaks and four phone outages.
- White Township has experienced one water main break and two phone outages.

The Pennsylvania Public Utility Commission tracks the reliability of electric distribution companies (EDC) and outages. *Table X – 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 (Percentage of total customers)**	**Customers affected by Nika 2014 (Percentage of total customer)**	**Customers affected by Sandy 2012 (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			

Other past significant events of utility interruptions in the United States occur on a regional basis and can have varied effects related to number of impacted customers. A large water treatment plant failure occurred in Jackson, Mississippi in August of 2022 after flooding impacted the treatment facility. The city of Jackson was left without safe drinking water for close to two months until the water was deemed safe and potable in October of 2022. This event stood out as a large scale failure of community lifelines and utilities. This event also opened discussions related to equity in infrastructure repairs, as the repairs took a significant amount of time in a vulnerable socio-economic area. An attack on an electrical grid and power substations in North Carolina in December of 2022 left almost 45,000 people without power and reliant heat during the cold temperatures of January.

4.3.19.4 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 Indiana 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.

4.3.19.5 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 X – Indiana County Utilities* illustrates the approximate locations of service lines and pipelines throughout Indiana 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.

<u>Electricity:</u>

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. Community lifeline facilities are 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 Indiana County residents and visitors.

The occurrence of severe weather related utility interruptions will increase due to climate change in the Commonwealth of Pennsylvania and the United States as a whole. Climate change will cause weather to become more severe on a more frequent basis.

<u>Water:</u>

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. Drought events will continue to occur more frequently as climate change alters that available amount of ground water for consumption. This will result in greater well shortages and water utility interruptions for citizens that have well water.

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:

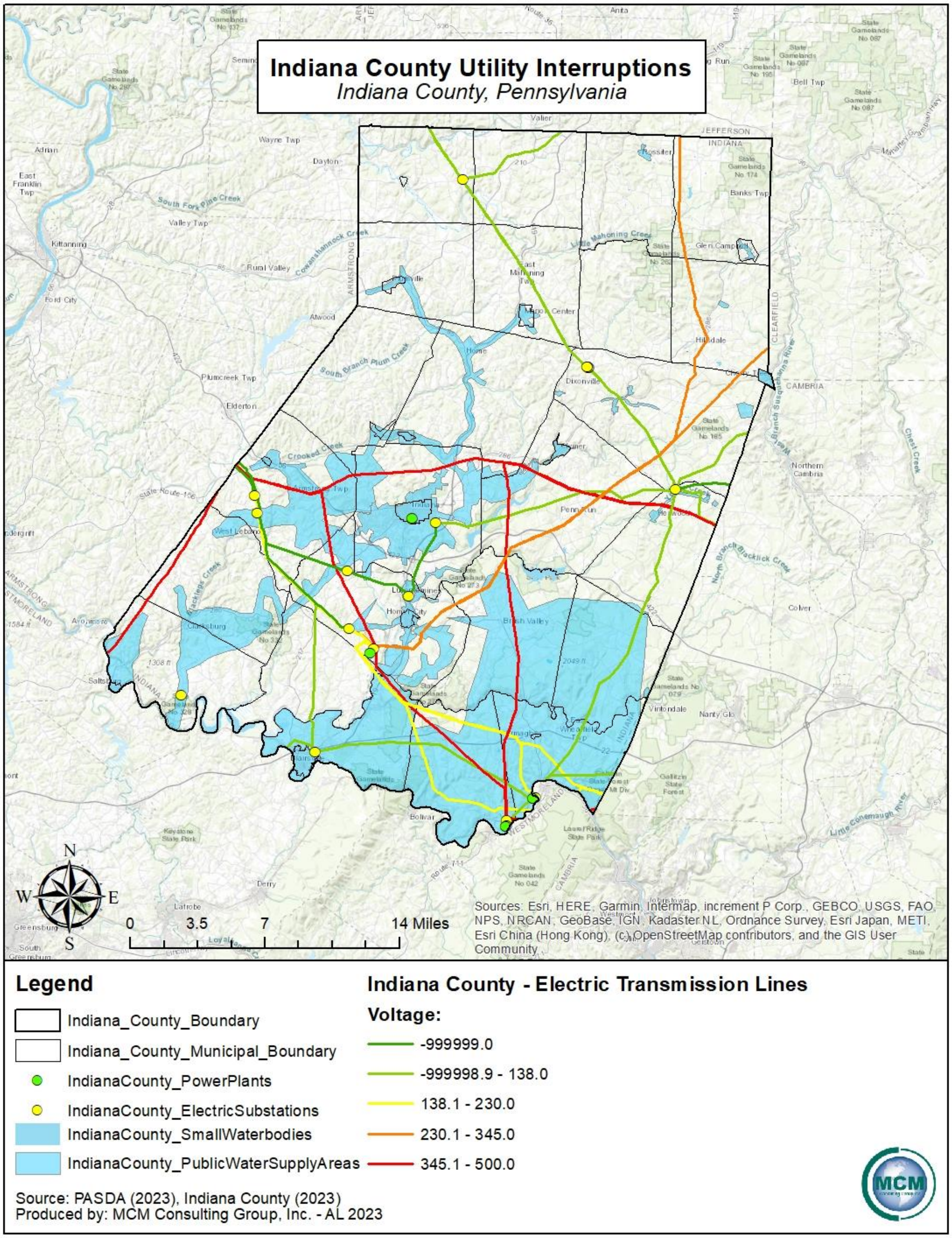
- Deterioration of line and facilities
- Puncturing the distribution lines by humans (either intentional or accidental)
- Coastal or winter storms
- Extreme heat or cold events
- Transportation accidents

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 Indiana 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 Indiana 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.

Table 66 - Indiana 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 X – 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:

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

Table X – 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 X – Risk Factor Assessment* lists the risk factor calculated for each of twenty-five potential hazards identified in the 2023 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

Indiana 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	Invasive Species	4	3	4	1	4	3.4
	Pandemic, Epidemic and Infectious Disease	4	3	4	1	4	3.4
	Emergency Services (Suggested 2023)	4	3	4	1	4	3.4
	Terrorism and Cyberterrorism	3	3	3	4	4	3.2
	Utility Interruption	4	3	2	4	3	3.2
	Drought	2	4	4	1	4	3.1
	Flash Flood	4	3	2	4	2	3.1
	Extreme Temperatures (Suggested 2023)	3	3	4	1	3	3
MODERATE	Environmental Hazards: Fixed Facility	4	2	3	4	1	2.9
	Windstorm	3	3	2	4	3	2.9
	Transportation Accidents	4	3	1	4	1	2.8
	Tornado	4	1	2	4	4	2.7
	Opioid Epidemic	4	2	2	1	4	2.7

Indiana 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	
	Environmental Hazards: Transportation	4	2	1	4	2	2.6
	Subsidence	3	2	1	4	4	2.5
	Radon Exposure	4	2	1	1	4	2.5
	Winter Storm	3	2	3	1	2	2.4
	Flood	3	2	2	1	4	2.4
	Blighted Properties (Suggested 2023)	3	1	3	1	4	2.3
	Civil Disturbance	3	2	1	4	1	2.2
	Dam Failure	1	3	2	4	2	2.2
LOW	Landslide	2	1	1	4	2	1.7
	Levee Failure	1	1	1	4	4	1.6
	Earthquake	1	1	2	4	1	1.5
	Ice Jam Flood	1	1	1	1	4	1.3

Based on these results, there are eight high risk hazards, thirteen moderate risk hazards, and four low risk hazards in Indiana 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 X – Countywide Risk Factor Assessment* shows the different municipalities in Indiana 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	Invasive Species	Pandemic, Epidemic, and Infectious Disease	Emergency Services	Terrorism and Cyberterrorism	Utility Interruption	Drought	Flash Flood	Extreme Temperatures	Environmental Hazards: Fixed Facility
	3.4	3.4	3.4	3.2	3.2	3.1	3.1	3	2.9
Armagh Borough	=	=	=	=	=	=	<	=	=
Armstrong Township	=	=	=	=	=	=	=	=	=
Banks Township	=	=	=	=	=	=	=	=	<
Blacklick Township	=	=	=	<	=	=	=	<	=
Blairsville Borough	=	=	=	=	=	=	=	=	=
Brush Valley Township	=	>	>	=	=	=	=	>	=
Buffington Township	=	=	=	=	=	=	=	=	=
Burrell Township	=	=	=	=	=	=	=	=	=
Canoe Township	=	=	=	=	=	=	=	=	=
Center Township	=	=	=	=	=	=	=	=	=
Cherryhill Township	<	<	=	<	=	=	=	=	=
Cherry Tree Borough	<	=	<	<	=	<	=	<	<
Clymer Borough	=	>	>	>	=	=	>	=	=
Conemaugh Township	=	=	=	=	=	=	=	=	=
Creekside Borough	>	=	=	<	=	=	=	=	=
East Mahoning Township	=	=	=	=	=	=	=	=	>
East Wheatfield Township	=	=	=	=	=	=	=	=	=
Ernest Borough	=	=	=	=	=	=	=	=	=
Glen Campbell Borough	=	=	=	=	=	=	=	=	=
Grant Township	=	=	=	=	=	=	=	=	=

Calculated Countywide Risk Factor by Hazard and Comparative Jurisdictional Risk									
IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR									
JURISDICTION	Invasive Species	Pandemic, Epidemic, and Infectious Disease	Emergency Services	Terrorism and Cyberterrorism	Utility Interruption	Drought	Flash Flood	Extreme Temperatures	Environmental Hazards: Fixed Facility
	3.4	3.4	3.4	3.2	3.2	3.1	3.1	3	2.9
Green Township	>	=	>	>	=	>	>	>	=
Homer City Borough	=	=	=	=	=	=	=	=	=
Indiana Borough	=	>	=	>	=	=	=	=	=
Indiana University of Pennsylvania (IUP)	>	=	=	=	=	=	=	=	=
Marion Center Borough	=	=	=	=	=	=	=	=	=
Montogmery Township	=	=	=	=	=	=	=	=	=
North Mahoning Township	=	=	=	=	=	=	=	=	=
Pine Township	=	<	<	=	>	=	=	=	<
Plumville Borough	=	=	=	=	=	=	=	=	=
Rayne Township	=	=	=	=	=	=	=	=	=
Saltsburg Borough	<	=	=	=	=	=	<	=	=
Shelocta Borough	=	=	=	=	=	=	=	=	=
Smicksburg Borough	=	=	=	=	=	=	=	=	=
South Mahoning Township	=	=	=	=	=	=	=	=	=
Washington Township	=	=	=	<	=	=	=	=	<
West Mahoning Township	=	=	=	=	=	=	=	=	=
West Wheatfield Township	=	=	=	<	=	<	=	<	<
White Township	=	=	>	>	=	=	>	=	=
Young Township	>	=	=	<	=	=	=	=	=

Calculated Countywide Risk Factor by Hazard and Comparative Jurisdictional Risk									
IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR									
JURISDICTION	Windstorm	Transportation Accidents	Tornado	Opioid Epidemic	Environmental Hazards: Transportation	Subsidence	Radon Expose	Winter Storm	Flood
	2.9	2.8	2.7	2.7	2.6	2.5	2.5	2.4	2.4
Armagh Borough	>	=	<	=	=	=	=	=	=
Armstrong Township	=	=	=	=	=	=	=	=	=
Banks Township	=	=	=	=	<	>	>	>	<
Blacklick Township	=	=	>	=	=	=	=	=	=
Blairsville Borough	=	=	=	=	=	=	=	=	=
Brush Valley Township	=	=	=	=	=	=	=	<	>
Buffington Township	=	=	=	=	=	=	=	=	=
Burrell Township	=	=	=	=	=	=	=	=	=
Canoe Township	=	=	=	=	=	=	=	=	=
Center Township	=	=	=	=	=	=	=	=	=
Cherryhill Township	=	=	<	=	=	=	=	=	=
Cherry Tree Borough	<	<	<	<	<	<	<	>	>
Clymer Borough	>	=	=	>	>	>	=	=	=
Conemaugh Township	=	=	=	=	=	=	=	=	=
Creekside Borough	=	=	=	=	=	=	=	=	>
East Mahoning Township	>	>	=	>	>	=	=	>	>
East Wheatfield Township	=	=	=	=	=	=	=	=	=
Ernest Borough	=	=	=	=	=	=	=	=	=
Glen Campbell Borough	=	=	=	=	=	=	=	=	=
Grant Township	=	=	=	=	=	=	=	=	=
Green Township	>	=	=	>	=	=	=	>	>

Calculated Countywide Risk Factor by Hazard and Comparative Jurisdictional Risk									
IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR									
JURISDICTION	Windstorm	Transportation Accidents	Tornado	Opioid Epidemic	Environmental Hazards: Transportation	Subsidence	Radon Expose	Winter Storm	Flood
	2.9	2.8	2.7	2.7	2.6	2.5	2.5	2.4	2.4
Homer City Borough	=	=	=	=	=	=	=	=	=
Indiana Borough	=	=	=	=	=	=	=	=	=
Indiana University of Pennsylvania (IUP)	=	=	=	<	=	=	=	=	=
Marion Center Borough	=	=	=	=	=	=	=	=	=
Montogmery Township	=	=	=	=	=	=	=	=	=
North Mahoning Township	=	<	=	=	=	=	=	=	=
Pine Township	=	>	=	>	>	=	=	=	=
Plumville Borough	=	=	=	=	=	=	=	=	=
Rayne Township	=	=	=	>	=	=	=	=	=
Saltsburg Borough	=	<	=	=	<	=	<	=	<
Shelocta Borough	=	=	=	=	=	=	=	=	=
Smicksburg Borough	=	=	=	=	=	=	=	=	=
South Mahoning Township	=	=	=	=	=	=	=	=	=
Washington Township	=	=	=	=	<	=	=	=	=
West Mahoning Township	=	=	=	=	=	=	=	=	=
West Wheatfield Township	=	>	=	=	>	=	<	=	=
White Township	=	=	=	=	>	=	=	>	>
Young Township	=	=	>	=	=	=	=	=	=

Calculated Countywide Risk Factor by Hazard and Comparative Jurisdictional Risk							
IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR							
JURISDICTION	Blighted Properties	Civil Disturbance	Dam Failure	Landslide	Levee Failure	Earthquake	Ice Jam Flood
	2.3	2.2	2.2	1.7	1.6	1.5	1.3
Armagh Borough	=	<	<	=	<	<	<
Armstrong Township	=	=	=	=	=	=	=
Banks Township	=	<	=	=	<	=	=
Blacklick Township	=	=	=	=	=	=	=
Blairsville Borough	=	=	=	=	=	=	=
Brush Valley Township	=	=	=	=	=	=	>
Buffington Township	=	=	=	=	=	=	=
Burrell Township	=	=	=	=	=	=	=
Canoe Township	=	=	=	=	=	=	=
Center Township	=	=	=	=	=	=	=
Cherryhill Township	=	=	=	=	=	=	=
Cherry Tree Borough	=	<	<	<	>	<	<
Clymer Borough	>	>	<	<	<	=	>
Conemaugh Township	=	=	=	=	=	=	=
Creekside Borough	=	=	=	=	=	=	=
East Mahoning Township	=	=	>	=	<	=	>
East Wheatfield Township	=	=	=	=	=	=	=
Ernest Borough	=	=	=	=	=	=	=
Glen Campbell Borough	=	=	=	=	=	=	=
Grant Township	=	=	=	=	=	=	=
Green Township	>	>	=	=	=	=	=

Calculated Countywide Risk Factor by Hazard and Comparative Jurisdictional Risk							
IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR							
JURISDICTION	Blighted Properties	Civil Disturbance	Dam Failure	Landslide	Levee Failure	Earthquake	Ice Jam Flood
	2.3	2.2	2.2	1.7	1.6	1.5	1.3
Homer City Borough	=	=	=	=	=	=	=
Indiana Borough	>	>	<	=	<	=	<
Indiana University of Pennsylvania (IUP)	=	<	=	=	=	=	=
Marion Center Borough	=	=	=	=	=	=	=
Montogmery Township	=	=	=	=	=	=	=
North Mahoning Township	=	=	=	=	=	=	=
Pine Township	>	=	<	=	=	=	=
Plumville Borough	=	=	=	=	=	=	=
Rayne Township	<	<	=	<	<	=	=
Saltsburg Borough	=	=	>	=	=	=	=
Shelocta Borough	=	=	=	=	=	=	=
Smicksburg Borough	=	=	=	=	=	=	=
South Mahoning Township	=	=	=	=	=	=	=
Washington Township	=	=	=	=	<	=	>
West Mahoning Township	=	=	=	=	=	=	=
West Wheatfield Township	=	<	>	=	=	=	=
White Township	>	>	=	=	=	=	=
Young Township	>	=	<	<	<	<	<

4.4.3. Potential Loss Estimates

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

Potential loss estimates have four basic components, including:

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

Flooding Loss Estimation:

Flooding is a high-risk natural hazard in Indiana 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 Indiana 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 Indiana County are estimated to equal $52.9 million with 71.4% 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 $268 million.

4.4.4. Future Development and Vulnerability

The 2020 census population for Indiana County is 83,246 which is 5,634 fewer than the 2010 census. There was an overall decrease of 6.3% in population based on the data. Smicksburg Borough was the only municipality that experienced population growth during that ten-year period, while South Mahoning Township did not have any population change. All of the remaining municipalities experienced population decreases in the period between 2010 and the 2020, as shown in *Table X – 2010 – 2020 Population Change.*

Table 70 - 2010-2020 Population Change

Population Change in Indiana County from 2010-2020			
Municipality	**2010 Census**	**2020 Census**	**Percent of Change 2010-2020**
Armagh Borough	122	103	-15.57%
Armstrong Township	2,998	2,786	-7.07%
Banks Township	1,018	914	-10.22%
Black Lick Township	1,237	1,133	-8.41%
Blairsville Borough	3,412	3,252	-4.69%
Brush Valley Township	1,858	1,695	-8.77%
Buffington Township	1,328	1,242	-6.48%
Burrell Township	4,393	3,525	-19.76%
Canoe Township	1,505	1,432	-4.85%
Center Township	4,764	4,443	-6.74%
Cherryhill Township	2,765	2,477	-10.42%
Cherry Tree Borough	364	276	-24.18%
Clymer Borough	1,357	1,336	-1.55%
Conemaugh Township	2,294	2,080	-9.33%
Creekside Borough	309	284	-8.09%
East Mahoning Township	1,077	975	-9.47%
East Wheatfield Township	2,366	2,161	-8.66%
Ernest Borough	462	422	-8.66%
Glen Campbell Borough	245	254	3.67%
Grant Township	741	639	-13.77%
Green Township	3,839	3,457	-9.95%
Homer City Borough	1,707	1,746	2.28%
Indiana Borough	13,975	13,564	-2.94%
Marion Center Borough	451	413	-8.43%
Montgomery Township	1,568	1,439	-8.23%
North Mahoning Township	1,428	1,349	-5.53%
Pine Township	2,033	1,881	-7.48%
Plumville Borough	307	257	-16.29%
Rayne Township	2,992	2,809	-6.12%

Population Change in Indiana County from 2010-2020			
Municipality	**2010 Census**	**2020 Census**	**Percent of Change 2010-2020**
Saltsburg Borough	873	780	-10.65%
Shelocta Borough	130	102	-21.54%
Smicksburg Borough	46	57	23.91%
South Mahoning Township	1,841	1,841	0.00%
Washington Township	1,808	1,670	-7.63%
West Mahoning Township	1,357	1,337	-1.47%
West Wheatfield Township	2,314	2,164	-6.48%
White Township	15,821	15.242	-3.66%
Young Township	1,775	1,709	-3.72%
TOTAL	**88,880**	**83,246**	**-6.34%**
Source: United States Census Bureau (2023), 2020 Census Data			

The 2019 census estimates indicates that there are approximately 37,626 housing units in Indiana County, Pennsylvania. Of those, 61.21% of the structures are occupied-housing units. The 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 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 Indiana 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 Indiana 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 Indiana 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 thirty-eight 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 Indiana County, and its municipalities have the capacity to do and provides an understanding of what must be changed to mitigate loss.

Indiana 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

Twenty-three of the thirty-eight municipalities in Indiana 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 Indiana 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 Indiana County adhere to the standards of the Pennsylvania Uniform Code (Act 45). Seventeen of the municipalities in Indiana County confirmed to 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, and 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, to assure adequate utilities and other improvements are provided in a manner that will not pollute streams, wells and/or soils, to reduce traffic congestions, and to 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 thirty-eight municipalities in Indiana County, some have subdivision/land use ordinances, some have zoning regulations – some have both and some have neither.

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 Indiana 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.

Indiana County last updated its comprehensive plan in 2012.

Article III of the MPC enables municipalities to prepare a comprehensive plan: however, development of a comprehensive plan is voluntary. Eleven municipalities in Indiana County confirmed having adopted their own comprehensive plan, or being in the process of adopting their own comprehensive plan.

Capital Improvements Plan

The capital improvements plan is a multi-year policy guide that identifies needed capital projects and is used to coordinate the financing and timing of public improvements. Capital improvements relate to streets, storm water systems, water distribution, sewage treatment, and other major public facilities. A capital improvements plan should be prepared by the respective county's planning department and should include a capital budget. This budget identifies the highest priority projects recommended for funding in the next annual budget. The capital improvements plan is dynamic and can be tailored to specific circumstances.

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.

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, twenty-one 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 fourteen boroughs, twenty-four townships, and no cities within Indiana 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 Indiana 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 Indiana 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 Indiana County GIS Department, which is available to assist all the county's municipalities. 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 Indiana County and its municipalities to have an emergency management coordinator.

The Indiana 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 total of fourteen Indiana County municipalities confirmed having 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 X – Indiana County Community Political Capability* summarizes the results of political capability.

Table 71 - Indiana County Community Political Capability

Indiana County Community Political Capability						
Municipality Name	**Capability Ranking**					
	0	**1**	**2**	**3**	**4**	**5**
Armagh Borough						
Armstrong Township				X		
Banks Township				X		
Blacklick Township	Not Reported					

Indiana County Community Political Capability						
Municipality Name	Capability Ranking					
	0	1	2	3	4	5
Blairsville Borough						
Brush Valley Township						
Buffington Township						
Burrell Township						
Canoe Township					X	
Center Township						
Cherryhill Township	Not Reported					
Cherry Tree Borough				X		
Clymer Borough				X		
Conemaugh Township						
Creekside Borough					X	
East Mahoning Township				X		
East Wheatfield Township			X			
Ernest Borough						X
Glen Campbell Borough						
Grant Township				X		
Green Township						
Homer City Borough						
Indiana Borough				X		
Indiana University of Pennsylvania (IUP)	Not Reported					
Marion Center Borough						
Montogmery Township				X		
North Mahoning Township	Not Reported					
Pine Township					X	
Plumville Borough						
Rayne Township				X		
Saltsburg Borough						
Shelocta Borough						
Smicksburg Borough				X		
South Mahoning Township						
Washington Township			X			

Indiana County Community Political Capability						
Municipality Name	**Capability Ranking**					
	0	**1**	**2**	**3**	**4**	**5**
West Mahoning Township						
West Wheatfield Township			X			
White Township					X	
Young Township					X	

Self-Assessment

In addition to the inventory and analysis of specific local capabilities, the capability assessment survey required each local jurisdiction to conduct its own self-assessment of its capability to effectively implement hazard mitigation activities. As part of this process, county and municipal officials were encouraged to consider the barriers to implementing proposed mitigation strategies in addition to 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 X – 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

Indiana County Capability Self-Assessment Matrix				
Municipality Name	**Capability Category**			
	Planning and Regulatory Capability	**Administrative and Technical Capability**	**Fiscal Capability**	**Community Political Capability**
Armagh Borough				
Armstrong Township	M	M	H	M
Banks Township	L	L	L	L
Blacklick Township	L	L	L	L
Blairsville Borough				
Brush Valley Township				
Buffington Township				
Burrell Township				

Indiana County Capability Self-Assessment Matrix				
Municipality Name	Capability Category			
	Planning and Regulatory Capability	Administrative and Technical Capability	Fiscal Capability	Community Political Capability
Canoe Township	L	M	M	L
Center Township				
Cherryhill Township	M	M	M	M
Cherry Tree Borough	L	M	L	M
Clymer Borough	M	M	M	M
Conemaugh Township				
Creekside Borough	L	L	L	L
East Mahoning Township	L	L	L	L
East Wheatfield Township	L	M	L	L
Ernest Borough	L	M	L	M
Glen Campbell Borough				
Grant Township	L	L	L	L
Green Township				
Homer City Borough				
Indiana Borough	M	M	H	M
Indiana University of Pennsylvania (IUP)	M	M	M	M
Marion Center Borough				
Montogmery Township	L	L	L	L
North Mahoning Township	L	L	L	L
Pine Township	L	L	L	M
Plumville Borough				
Rayne Township	L	L	L	L
Saltsburg Borough				
Shelocta Borough				
Smicksburg Borough	L	L	L	L
South Mahoning Township				
Washington Township	L	L	L	L
West Mahoning Township				
West Wheatfield Township	L	L	L	L

Indiana County Capability Self-Assessment Matrix				
Municipality Name	Capability Category			
	Planning and Regulatory Capability	Administrative and Technical Capability	Fiscal Capability	Community Political Capability
White Township	M	H	M	L
Young Township	L	L	L	L

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 Indiana 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 Indiana County Office of Planning and Development, and the Indiana County Conservation District**.**

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 with 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 low. 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

The Indiana County Emergency Management Agency conducts public outreach at public events to update the citizens and visitors of the county on natural and human-caused hazards. The county conservation district also conducts outreach on various activities and projects in the county.

Education activities that directly impact hazard mitigation in Indiana 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.

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:

- Indiana County Webpage: https://www.indianacountypa.gov/
- Indiana County Emergency Management Webpage: https://www.indianacountypa.gov/departments/emergency-management/

The Indiana 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 website of the Indiana County Office of Planning and Development also post information to educate residents, particularly in disaster preparedness, floodplain management, and zoning requirements. The Indiana County Office of Planning and Development currently provides access to planning documents and educational brochures about the benefits of planning and helpful guides. The EMA 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.

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 Indiana 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, EOPs, building codes, floodplain ordinances, subdivision, land development ordinances, stormwater management plans and ordinances, and zoning ordinances. All of these tools provide mechanisms for the implementation of adopted mitigation strategies.

Indiana County Comprehensive Plan

Overview

Article III of the Pennsylvania Municipalities Planning code (Act 247 of 1968, as reenacted and amended) requires all Pennsylvania counties (except Philadelphia) to adopt a comprehensive plan and update it at least every 10 years. The Indiana County Commissioners adopted the updated Indiana County Comprehensive Plan in 2012.

Comprehensive plans establish the overall vision, goals, and objectives for a community's growth. The Comprehensive Plan for Indiana County was adopted by the Indiana County Commissioners on September, 12, 2012. The plan is a collaborative effort between the municipalities in the county and contains both regional priorities and action plans for each local jurisdiction. 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.

Recommendations for Continued and Future Integration

The Indiana County Planning Commission is responsible for maintaining and updating the Comprehensive Plan for Indiana County and many other regulatory tools. Technical assistance on community planning matters is provided to the Indiana County Commissioners through the Indiana County Planning Commission. The planning commission administers the Indiana County Comprehensive Plan. The planning commission also performs technical reviews of municipal subdivision and land development plans, municipal floodplain ordinances and other community planning and development matters. An update to the Comprehensive Plan for Indiana County is due to be executed in the short term and should be updated as soon as possible. The Comprehensive Plan for Indiana County County provides an outline of goals and objectives that can be tied into hazard mitigation planning

Indiana County Emergency Operations Plan

Overview

The Pennsylvania Emergency Management Services Code, 35 PA C.S. Sections 7701- 7707, as amended, requires each county and municipality to prepare, maintain and keep current an Emergency Operations Plan (EOP). Indiana County Emergency Management Agency is responsible for preparing and maintaining the county's EOP, which applies to both the county and municipal emergency management operations and procedures. The EOP is reviewed annually. Whenever portions of the EOP are implemented in an emergency event or training exercise, a review is performed, and changes are made where necessary. These changes are then distributed to the county's municipalities. The complete risk assessment section, mitigation actions and mitigation project opportunities identified in the 2023 Indiana County Hazard Mitigation Plan will assist with decreasing hazard specific risk and vulnerability. Understanding the risks and vulnerability in the county and municipalities will allow for emergency management and other response agencies to better direct planning, response and recovery aspects.

Recommendations for Continued and Future Integration

The EMA will consider the 2023 Indiana County Hazard Mitigation Plan during its annual review of the county EOP. Recommended changes to the HMP will then be coordinated with the hazard mitigation local planning team. Each municipality has a municipal EOP as well. The Indiana County Emergency Management Agency will provide guidance and education to municipal elected and appointed officials on the integration of the specific sections of the 2023 HMP into the municipal EOP during the update period. Action 3.3.7 of the 2023 Indiana County HMP identifies that a review of the existing Indiana County Emergency Operations Plan (EOP) will be completed and the EOP will be updated where necessary based on any new information contained in the 2023 HMP. Action 3.3.8 states that a review of existing ordinances and other regulatory or planning mechanisms will be conducted for consistency with the 2023 HMP. Action 3.3.8 directly supports the updating of county and municipal EOPs.

Plan Interrelationships

Ensuring consistency between these planning mechanisms is critical. In fact, Section 301 (4.1) of the Pennsylvania Municipalities Planning Code requires that comprehensive plans include a discussion of the interrelationships among their various plan components, "which may include an estimate of the environmental, energy conservation, fiscal, economic development and social consequences on the environment." To that end, Indiana County and its municipalities must ensure that the components of the hazard mitigation plan are integrated into existing community planning mechanisms and are generally consistent with goals, policies and recommended actions. Indiana County and the hazard mitigation planning team will utilize the existing maintenance schedule of each plan to incorporate the goals, policies and recommended actions as each plan is updated.

6. Mitigation Strategy

6.1. Update Process Summary

Mitigation goals are general guidelines that explain what the county wants to achieve. Goals are usually expressed as broad policy statements representing desired long-term results. Mitigation objectives describe strategies or implementation steps to attain the identified goals. Objectives are more specific statements than goals; the described steps are usually measurable and can have a defined completion date. There were six goals and twenty objectives identified in the 2018 hazard mitigation plan. The 2023 Indiana County Hazard Mitigation Plan Update has five goals and twenty-one objectives. Objectives have been added and arranged in order to associate them with the most appropriate goal. These changes are noted in *Table X – 2018 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-nine actions identified in the 2018 mitigation strategy. A review of the 2018 mitigation actions was completed by the local planning team. The results of this review are identified in *Table X – 20XX 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 X – 2018 Mitigation Goals and Objectives Review

Indiana County 2018 Mitigation Goals and Objectives		
GOAL Objective	**Description**	**Comment**
GOAL 1	Attempt to reduce the current and future risk of flood damage in Indiana County.	**2023 Comment:**

Indiana County 2018 Mitigation Goals and Objectives		
GOAL Objective	**Description**	**Comment**
Objective 1.1	Direct new development away from high hazard areas by reviewing comprehensive plans, capital improvement plans, etc. and enforcing existing regulations to ensure adequacy in reducing the amount of future development proposed for identified flood hazard areas.	**2023 Comment:** **Verbiage updated.**
Objective 1.2	Encourage municipal participation in the National Flood Insurance Program (NFIP).	**2023 Comment:** **No comment.**
Objective 1.3	Evaluate and update existing floodplain ordinances to meet or exceed the NFIP standards.	**2023 Comment:** **No comment.**
Objective 1.4	Promote the use of flood insurance by property owners, recommending that flood insurance policies remain affordable through county and municipal government programs.	**2023 Comment:** **No comment.**
Objective 1.5	Identify and evaluate strategies for repetitive-loss properties.	**2023 Comment:** **No comment.**
Objective 1.6	Improve the enforcement of existing floodplain regulations.	**2023 Comment:** **No comment.**
GOAL 2	**Reduce the potential impact and losses stemming from natural and human-caused disasters on public and private property.**	**2023 Comment:** **Verbiage updated to include underserved populations.**
Objective 2.1	Identify by municipality the most vulnerable residents and critical existing structures and infrastructure due to the hazards identified in this plan.	**2023 Comment:** **No comment.**

Indiana County 2018 Mitigation Goals and Objectives		
GOAL Objective	**Description**	**Comment**
Objective 2.2	Encourage municipal enforcement of statewide Uniform Construction Code (UCC).	**2023 Comment:** **No comment.**
Objective 2.3	Protect Indiana County's most vulnerable populations, buildings, and critical facilities through the implementation of cost-effective and technically feasible mitigation projects.	**2023 Comment:** **Verbiage updated to include underserved communities.**
GOAL 3	**Improve upon the protection of the citizens of Indiana County from all natural and human-caused hazards before, during, and after events.**	**2023 Comment:** No comment.
Objective 3.1	Evaluate existing shelters to determine adequacy for current and future populations.	**2023 Comment:** **No comment.**
Objective 3.2	Ensure adequate training and resources for emergency organizations and personnel.	**2023 Comment:** **No comment.**
Objective 3.3	Improve emergency preparedness in Indiana County and its municipalities.	**2023 Comment:** **No comment.**
Objective 3.4	Improve coordination and communication among disaster response organizations, local, and county governments.	**2023 Comment:** **No comment.**
Objective 3.5	Evaluate cost-effective ways of augmenting existing broadcast and communication systems to enable better response, monitor warning information continuously and to disseminate the appropriate warnings.	**2023 Comment:** **No comment.**

Indiana County 2018 Mitigation Goals and Objectives		
GOAL Objective	**Description**	**Comment**
GOAL 4	**Reduce or redirect the impact of natural disasters away from at-risk population areas.**	**2023 Comment:** **No comment.**
Objective 4.1	Research and implement possible mitigation projects to reduce impacts of natural and human-caused disasters like generator installations, dead tree removals, reservoirs, levees, floodwalls, diversions, channel modification, and storm sewers.	**2023 Comment:** Objective 4.1 integrated into new objective 4.1 and 4.2.
GOAL 5	**Protect existing natural resources and open space, including parks and wetlands, to help prevent natural and human-caused disasters.**	**2023 Comment:** **Goals five and six integrated.**
Objective 5.1	Protect Indiana County's natural resources through the implementation of cost-effective and technically feasible mitigation projects.	**2023 Comment:** **Objective 5.1 became new objective 4.1.**
Objective 5.2	Protect Indiana County's natural resources through the implementation and, where appropriate, enforcement, of recreation planning and stormwater management planning.	**2023 Comment:** **Objective 5.2 became new objective 4.2.**
Objective 5.3	Protect and ensure survivability of the recreation areas and parks in Indiana County from encroachment by private industry development and the impact from the development areas.	**2023 Comment:** **Objective closed by LPT.**

Indiana County 2018 Mitigation Goals and Objectives		
GOAL Objective	**Description**	**Comment**
GOAL 6	**Protect existing natural resources and open space, including parks and wetlands, to help prevent natural and human-caused disasters. Protect public health, safety, and welfare by increasing the public awareness of existing hazards and by fostering both individual and public responsibility in mitigating risks due to those hazards.**	**2023 Comment:** **Goals five and six integrated.**
Objective 6.1	Distribute public awareness materials about natural hazard and human-caused risks, preparedness, and mitigation.	**2023 Comment:** **Objective 6.1 became new objective 4.3.**
Objective 6.2	Target owners of properties within identified hazard areas for additional outreach regarding mitigation and disaster preparedness.	**2023 Comment:** **Objective 6.2 became new objective 4.4.**

Table X – 2018 Mitigation Actions Review

Indiana County Mitigation Actions Review Worksheet						
Existing Mitigation Actions *(2018 HMP)*	***Status***					***Review Comments***
	No Progress/ Unknown	**In Progress/Not Yet Complete**	**Continuous**	**Completed**	**Discontinued**	
1.1.1 Encourage and assist municipal officials to steer new development from high hazard areas in their jurisdiction.						**2023 Comment:** **No comment.**
1.1.2 Provide model ordinances to municipalities that can be used to limit development in hazard-prone areas.						**2023 Comment:** **No comment.**
1.2.1 Arrange NFIP training sessions for municipalities and insurers.						**2023 Comment:** **No comment.**
1.3.1 Applicable municipalities to review and update their floodplain ordinances to be sure that they are in full compliance with the NFIP.						**2023 Comment:** **Action moved to new action 1.6.1.**
1.5.1 Hold public meetings with owners of repetitive loss properties in high-risk areas to consider and implement property protection or relocation projects.						**2023 Comment:** **Verbiage updated.**

Indiana County Mitigation Actions Review Worksheet						
	Status					
Existing Mitigation Actions (2018 HMP)	No Progress/ Unknown	In Progress/Not Yet Complete	Continuous	Completed	Discontinued	*Review Comments*
1.5.2 Continue to target, prioritize, and perform acquisitions, relocations, elevations, and demolition/reconstruction projects for at-risk structures countywide, completing Hazard Mitigation Opportunity Forms when applicable, and meet with homeowners on the benefits of mitigation.						**2023 Comment: Action moved to new action 1.4.2.**
2.1.1 Expand capabilities of GIS database of at-risk buildings and public infrastructure.						**2023 Comment: No comment.**
2.2.1 Municipal officials to continue review and enforcement of the Uniform Construction Code.						**2023 Comment: No comment.**
2.3.1 Evaluate alternative methods to minimize risk from breaches and spills of outdoor impoundment of liquid hazardous materials.						**2023 Comment: No comment.**
3.1.1 Conduct qualitative evaluation process to assess the ready state of existing shelters and needs for new shelters.						**2023 Comment: No comment.**
3.2.1 Conduct emergency planning exercises for high hazard dams in the County to simulate hazard response.						**2023 Comment: No comment.**

Indiana County Mitigation Actions Review Worksheet						
Existing Mitigation Actions (2018 HMP)	*Status*					*Review Comments*
	No Progress/ Unknown	In Progress/Not Yet Complete	Continuous	Completed	Discontinued	
3.2.2 Participate in winter storm exercises.						**2023 Comment: No comment.**
3.2.3 Coordinate access to training opportunities for, and thereby increasing the number of, citizens assisting first responders.						**2023 Comment: No comment.**
3.2.4 Conduct annual tabletop and functional disaster exercises with local law enforcement, emergency managers, county and local officials, and other disaster response agencies.						**2023 Comment: No comment.**
3.2.5 Provide continued training to first responders on the use and administration of Naloxone to suspected overdose patients.						**2023 Comment: No comment.**
3.3.1 Identify point of dispersing sites.						**2023 Comment: No comment.**
3.3.2 Improve accidents reporting to identify patterns for improvement of traffic markings, signals and identify educational efforts needed to reduce accidents.						**2023 Comment: No comment.**
3.3.3 Create local drought task force.						**2023 Comment: Verbiage updated to include a drought enforcement plan.**

Indiana County Mitigation Actions Review Worksheet						
Existing Mitigation Actions *(2018 HMP)*	*Status*					*Review Comments*
	No Progress/ Unknown	In Progress/Not Yet Complete	Continuous	Completed	Discontinued	
3.3.4 Purchase signs and temporary barricades to use in highway incident response or during flooding events on the highway.						**2023 Comment:** **No comment.**
3.3.5 Participate in the NOAA StormReady Program.						**2023 Comment:** **No comment.**
3.3.6 Distribution of NOAA Weather Radios to Indiana County municipalities, schools, hospitals, nursing homes, day care centers, and SARA facilities.						**2023 Comment:** **No comment.**
3.3.7 Review the existing Indiana County Emergency Operations Plan (EOP) and update where necessary based on any new information contained in the 2018 HMPU.						**2023 Comment:** **Action updated for applicability to 2023 plan.**
3.3.8 Review existing ordinances and other regulatory or planning mechanisms for consistency with the 2018 HMP.						**2023 Comment:** **Action updated for applicability to 2023 plan.**
3.3.9 Continue to solicit and review Hazard Mitigation Questionnaires and post-disaster reviews submitted by municipalities.						**2023 Comment:** **No comment.**

Indiana County Mitigation Actions Review Worksheet						
Existing Mitigation Actions *(2018 HMP)*	**Status**					***Review Comments***
	No Progress/ Unknown	**In Progress/Not Yet Complete**	**Continuous**	**Completed**	**Discontinued**	
3.3.10 Further integrate the 2015 Indiana University of Pennsylvania Hazard Mitigation Plan into the Indiana County Hazard Mitigation Plan.						**2023 Comment: No comment.**
3.4.1 Develop/update interface between dam owners' inundation mapping and the Indiana County's GIS tools.						**2023 Comment: No comment.**
3.4.2 Participate a County Task Force to coordinate issues on deep gas drilling, economics, and water quality.						**2023 Comment: No comment.**
3.4.3 Continue the mission and membership of the Indiana County Terrorism Task Force.						**2023 Comment: No comment.**
3.4.4 Convene regular meetings of the HMPSC to discuss issues and progress related to the implementation of the plan.						**2023 Comment: No comment.**
3.5.1 Continue maintain Indiana County's Emergency radio system.						**2023 Comment: No comment.**

Indiana County Mitigation Actions Review Worksheet						
Existing Mitigation Actions *(2018 HMP)*	*Status*					*Review Comments*
	No Progress/ Unknown	**In Progress/Not Yet Complete**	**Continuous**	**Completed**	**Discontinued**	
3.5.2 Research the possibility of installing Emergency Alert Warning Sirens and equipment to reach all populated areas throughout the County.						**2023 Comment:** **Action moved to new action 2.4.1.**
4.1.1 Ensure that all critical facilities in Indiana County have backup power and emergency operations plans to deal with power outages.						**2023 Comment:** **Action closed.**
4.1.2 Support the coordination of interagency debris removal.						**2023 Comment:** **Action moved to new action 4.4.2.**
4.1.3 Develop a county-wide stormwater management plan.						**2023 Comment:** **Action moved to new action to new action 4.2.1.**
4.1.4 Develop and implement programs to keep trees from threatening lives, property, and public infrastructure during wind and winter storm events.						**2023 Comment:** **Action moved to new action 4.4.4.**
4.1.5 Install, repair or replace culverts or storm sewers in areas of the municipality to address highway erosion.						**2023 Comment:** **Action closed.**
4.1.6 Explore opportunities and create stormwater infiltration areas in new developments.						**2023 Comment:** **Action closed.**

Indiana County Mitigation Actions Review Worksheet						
Existing Mitigation Actions *(2018 HMP)*	*Status*					*Review Comments*
	No Progress/ Unknown	In Progress/Not Yet Complete	Continuous	Completed	Discontinued	
4.1.7 Clean up debris in streams and along stream banks and bridges in municipality.						**2023 Comment: Action closed.**
4.1.8 Research avenues for restoring degraded natural resources and open space to improve their flood control functions.						**2023 Comment: Action closed.**
5.1.1 Collect information on the location, type, and threats to natural resource areas throughout the county.						**2023 Comment: Action moved to new action 4.1.1.**
5.1.2 Initiate a process to mitigate the impact of non-native plant and insect species.						**2023 Comment: Action moved to new action 4.1.2.**
5.2.1 Develop a county-wide storm water management plan.						**2023 Comment: Action moved to new action 4.2.1.**
6.1.1 Increase awareness of and participation in FEMA's Community Rating System (CRS) Program.						**2023 Comment: Action moved to new action 4.3.1.**
6.1.2 Increase awareness by residents of actions to take during an emergency, including sheltering and evacuation procedures.						**2023 Comment: Action moved to new action 4.3.2.**

Indiana County Mitigation Actions Review Worksheet						
Existing Mitigation Actions *(2018 HMP)*	***Status***					***Review Comments***
	No Progress/ Unknown	**In Progress/Not Yet Complete**	**Continuous**	**Completed**	**Discontinued**	
6.1.3 Develop a variety of displays for public events to provide information to citizens on preparedness, animal sheltering, business continuity, and children's awareness.						**2023 Comment: Action moved to new action 4.3.3.**
6.1.4 Partner with other local agencies to provide public education and outreach on the opioid epidemic and where addicts can find assistance.						**2023 Comment: Action moved to new action 4.3.4.**
6.1.5 Engage the school districts to develop or continue the reality tours of opioid overdose scenarios countywide.						**2023 Comment: Action moved to new action 4.3.5.**
6.2.1 Work with municipal officials to increase awareness among property owners with identified at-risk structures.						**2023 Comment: Action moved to new action 4.4.1.**

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 twenty-two corresponding objectives were developed. *Table X – 2023 Goals and Objectives* details the mitigation goals and objectives established for the 2023 Indiana County Hazard Mitigation Plan.

Table X – 2023 Goals and Objectives

Indiana County 2023 Goals and Objectives	
Goal Objective	**Description**
GOAL 1	**Attempt to reduce the current and future risk of flood damage in Indiana County.**
Objective 1.1	Review and enforce existing regulations, plans, ordinances, etc. to steer development away from flood hazard areas.
Objective 1.2	Encourage municipal participation in the National Flood Insurance Program (NFIP).
Objective 1.3	Evaluate and update existing floodplain ordinances to meet or exceed the NFIP standards.
Objective 1.4	Promote the use of flood insurance by property owners, recommending that flood insurance policies remain affordable through county and municipal government programs.
Objective 1.5	Identify and evaluate strategies for repetitive-loss properties.
Objective 1.6	Complete actions and projects to acquire, elevate, demolish or demolish/reconstruct properties, repetitive loss properties and severe repetitive loss properties
NEW Objective 1.7	Conduct or complete Act 167 planning, implementation, education, and outreach.
GOAL 2	**Reduce the potential impact and losses stemming from natural and human-caused disasters away from underserved populations and public and private property.**
Objective 2.1	Identify by municipality the most vulnerable public and private property and community lifeline facilities.
Objective 2.2	Encourage municipal enforcement of statewide Uniform Construction Code (UCC).
Objective 2.3	Protect Indiana County's most vulnerable populations, underserved communities, buildings, and critical facilities through the implementation of cost-effective and technically feasible mitigation projects.
NEW Objective 2.4	Research possible mitigation projects to reduce flooding, reduce/eliminate sewage leakage and inflow/infiltration problems. Some projects may include reservoirs, levees, floodwalls, diversions, channel modification, and storm sewers.
GOAL 3	**Improve upon the protection of the citizens of Indiana County from all natural and human-caused hazards before, during, and after events.**
Objective 3.1	Evaluate existing shelters to determine adequacy for current and future populations.
Objective 3.2	Ensure adequate training and resources for emergency organizations and personnel.
Objective 3.3	Improve emergency preparedness in Indiana County and its municipalities.
Objective 3.4	Improve coordination and communication among disaster response organizations, local, and county governments.
Objective 3.5	Evaluate cost-effective ways of augmenting existing broadcast and communication systems to enable better response, monitor warning information continuously and to disseminate the appropriate warnings.
GOAL 4	**Protect natural resources, including parks and wetlands, and increase awareness of public health, safety, and welfare measures to help mitigate natural and human-caused disasters.**

Indiana County 2023 Goals and Objectives	
Goal Objective	**Description**
Objective 4.1	Protect Indiana County's natural resources through the implementation of cost-effective and technically feasible mitigation projects.
Objective 4.2	Protect Indiana County's natural resources through the implementation and, where appropriate, enforcement, of recreation planning and stormwater management planning.
Objective 4.3	Distribute public awareness materials about natural hazard risks, preparedness, and mitigation.
Objective 4.4	Target owners of properties within identified hazard areas for additional outreach regarding mitigation and disaster preparedness.
New GOAL 5	**Participate in FEMA's High-Hazard Potential Dam Program (HHPD).**
New Objective 5.1	Educate Indiana County municipalities, property owners, and businesses about FEMA's HHPD program.
New Objective 5.2	Reduce long-term vulnerabilities from eligible high-hazard potential dams that pose an unacceptable risk to the public.
New Objective 5.3	Identify, by area, locations in Indiana County that could potentially be impacted by FEMA's HHPD program.

Goal 5 and Objective 5.1, 5.2, and 5.3 relate to multiple mitigation actions in *Table X – 2023 Mitigation Action Plan*. Action 5.1.1 relates to Objective 5.1, Action 5.2.1 relates to Objective 5.2, and 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 2023 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 X – 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 X – 2023 Mitigation Action Plan*.

Table X - Mitigation Strategy Technique Matrix

Indiana 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
Civil Disturbance	X	X		X
Dam Failure	X	X		X
Drought	X	X		X
Earthquake	X	X		X
Emergency Services	X	X		X
Environmental Hazards	X	X		X
Flood, Flash Flood, Ice Jam	X	X	X	X
Invasive Species	X	X		X
Levee Failure	X	X		X
Opioid Epidemic	X	X		X

Indiana County Mitigation Strategy Technique Matrix				
Hazard	MITIGATION TECHNIQUE			
	Local Plans and Regulations	Structural and Infrastructure	Natural Systems Protection	Education and Awareness
Pandemic, Epidemic	X	X		X
Radon Exposure	X	X		X
Subsidence and Sinkhole	X	X		X
Landslides	X	X		X
Terrorism	X	X		X
Tornado/Windstorm	X	X		X
Transportation Accidents	X	X		X
Utility Interruption	X	X		X
Winter Storm	X	X		X

6.4. Mitigation Action Plan

The Indiana County Hazard Mitigation Local Planning Team (LPT) immediately began work on the mitigation strategy section of the 2023 hazard mitigation plan (HMP) update after the risk assessment section was completed. The LPT started this section by reviewing the 2018 HMP mitigation strategy section. A review of the previous goals, objectives, actions, and project opportunities documented in the 2018 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 2023 Indiana County HMP are listed in the mitigation action plan. *Table X – 2023 Mitigation Action Plan* is the 2023 Indiana County Mitigation Action Plan. This plan outlines mitigation actions and projects that comprise a strategy for Indiana 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 X – 2023 Mitigation Action Plan* is a matrix that identifies the county and/or municipalities responsible for mitigation actions in the new mitigation action plan. *Table X – Municipal Hazard Mitigation Actions Checklist* shows which actions tie to specific municipalities for responsibilities. *Table X – Objective to Action Checklist* shows that each mitigation objective has a mitigation action item related to it. *Table X – 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 X – 2023 Mitigation Action Plan

Indiana County 2023 Mitigation Action Plan									
Action Number	**Mitigation Actions**		**Hazard Vulnerability**	**Prioritization**			**Implementation**		
	Category	**Description/ Action Items**		**High**	**Medium**	**Low**	**Schedule**	**Funding**	**Local Champion**
1.1.1	Local Plans and Regulations	Encourage and assist municipal officials to steer new development from high hazard areas in their jurisdiction.	All Hazards				2023 - 2027	Local	Indiana County and Municipalities
1.1.2	Local Plans and Regulations	Provide model ordinances to municipalities that can be used to limit development in hazard- prone areas.	All Hazards				2023 - 2027	Local, PDM, FMA	Indiana County and Municipalities
1.2.1	Education and Awareness	Arrange NFIP training sessions for municipalities and insurers.	Flooding, Flash Flooding and Ice Jam Flooding				2023 - 2027	Local, FMA	Indiana County and Municipalities
1.3.1	Local Plans and Regulations	Improve the enforcement of existing floodplain regulations.	Flooding, Flash Flooding and Ice Jam Flooding				2023 - 2027	Local	Indiana County and Municipalities
New 1.4.1	Education and Awareness	Hold public meetings with owners of repetitive loss properties in high- risk areas to consider and implement property protection or relocation projects.	Flooding, Flash Flooding and Ice Jam Flooding				2023 - 2027	Local	Indiana County and Municipalities
New 1.4.2	Structural and Infra-structure	Continue to target, prioritize, and perform acquisitions, relocations, elevations and demolition/reconstruction projects for at-risk structures countywide, completing Hazard Mitigation Opportunity Forms when applicable, and meet with homeowners on the benefits of mitigation.	All Hazards				2023 - 2027	Local	Indiana County and Municipalities
New 1.5.1	Education and Awareness	Educate residents with repetitive losses on the opportunity to participate in the property buy-out program. Assist in locating funding to pay for flood mitigation actions.	Flooding, Flash Flooding				2023 - 2027	Local	Indiana County and Municipalities

Indiana County 2023 Mitigation Action Plan									
Action Number	Mitigation Actions		Hazard Vulnerability	Prioritization			Implementation		
	Category	Description/ Action Items		High	Medium	Low	Schedule	Funding	Local Champion
New 1.6.1	Local Plans and Regulations	Applicable municipalities to review and update their floodplain ordinances to be sure that they are in full compliance with the NFIP.	Flooding, Flash Flooding and Ice Jam Flooding				2023 - 2027	Local, FMA	Indiana County and Municipalities
1.7.1	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				2023 - 2027	Local	Indiana County
2.1.1	Local Plans and Regulations	Expand capabilities of GIS database of at-risk buildings and public infrastructure.	All Hazards				2023 - 2027	Local	Indiana County and Municipalities
2.1.2	Local Plans and Regulations	Track and monitor truck traffic and commodity information to identify priority corridors to target truck safety measures.	Environmental Hazards				2023 - 2027	Local, Act 165, HMEP	Indiana County and Municipalities
2.1.3	Structural and Infrastructure	Complete a countywide inventory of blighted and abandoned properties that post a risk to the Community.	Blighted Properties				2023 - 2027	Local	Indiana County and Municipalities
2.2.1	Local Plans and Regulations	Municipal offices to continue review and enforcement of the Uniform Construction Code.	All Hazards				2023 - 2027	Local	Municipalities
2.3.1	Local Plans and Regulations	Evaluate alternative methods to minimize risk from breaches and spills of outdoor impoundment of liquid hazardous materials.	Environmental Hazards				2023 - 2027	Local, Act 165	Indiana County and Municipalities
2.3.2	Structural and Infrastructure	Research and identify additional funding sources for the demolishment and removal of blighted and abandoned properties.	Blighted Properties				2023 - 2027	Local	Indiana County and Municipalities

Indiana County 2023 Mitigation Action Plan									
Action Number	**Mitigation Actions**		**Hazard Vulnerability**	**Prioritization**			**Implementation**		
	Category	**Description/ Action Items**		**High**	**Medium**	**Low**	**Schedule**	**Funding**	**Local Champion**
2.4.1	Structural and Infrastructure	Research the possibility of installing emergency alert warning sirens and equipment to reach all populated areas throughout the county.	All Natural Hazards				2023 - 2027	Local	Indiana County
3.1.1	Local Plans and Regulations	Conduct qualitative evaluation process to assess the ready state of existing shelters and needs for new shelters.	All Hazards				2023 - 2027	Local	Red Cross, Indiana County and Municipalities
3.1.2	Local Plans and Regulations	Complete planning and coordination with the Red Cross for shelter social distancing.	All Natural Hazards				2023 - 2027	Local	Red Cross, Indiana County and Municipalities
3.2.1	Education and Awareness	Conduct emergency planning exercises for high hazard dams in the county to simulate hazard response.	Dam Failure				2023 - 2027	Local	Indiana County and Municipalities
3.2.2	Education and Awareness	Participate in winter storm exercises.	Winter Storms				2023 - 2027	Dam Owners	Indiana County and Municipalities
3.2.3	Education and Awareness	Coordinate access to training opportunities for, and thereby increase the number of, citizens assisting first responders.	All Hazards				2023 - 2027	Local, AFG, EMSOF	Indiana County and Municipalities
3.2.4	Education and Awareness	Conduct annual tabletop and functional disaster exercises with local law enforcement, emergency managers, county and local officials, and other disaster response agencies.	All Hazards				2023 - 2027	Local, EMPG	Indiana County and Municipalities

Indiana County 2023 Mitigation Action Plan									
Action Number	**Mitigation Actions**		**Hazard Vulnerability**	**Prioritization**			**Implementation**		
	Category	**Description/ Action Items**		**High**	**Medium**	**Low**	**Schedule**	**Funding**	**Local Champion**
3.2.5	Education and Awareness	Provide continued training to first responders on the use and administration of Naloxone to suspected overdose patients	Opioid Epidemic				2023 - 2027	Local and PCCD, U.S. Dept of Health and Human Services	Indiana County Coroner
3.3.1	Structural and Infrastructure	Identify point of dispensing sites.	Pandemic, Epidemic				2023 - 2027	Local, DOH	Indiana County and Municipalities
3.3.2	Structural and Infrastructure	Improve accident reporting to identify patterns for improvement of traffic markings, signals and identify educational efforts needed to reduce accidents.	Traffic Accidents				2023 - 2027	Local	Indiana County and Municipalities
3.3.3	Local Plans and Regulations	Develop a drought enforcement plan and capabilities for use in the event of mandatory water restrictions.	Drought				2023 - 2027	Local	Indiana County and Municipalities
3.3.4	Structural and Infrastructure	Purchase signs and temporary barricades to use in highway incident response or during flooding events on the highway.	Flooding, Flash Flooding and Ice Jam Flooding				2023 - 2027	Local	Indiana County and Municipalities
3.3.5	Local Plans and Regulations	Participate in the NOAA StormReady Program.	All Natural Hazards				2023 - 2027	Local	Indiana County and Municipalities

Indiana County 2023 Mitigation Action Plan									
Action Number	**Mitigation Actions**		**Hazard Vulnerability**	**Prioritization**			**Implementation**		
	Category	**Description/ Action Items**		**High**	**Medium**	**Low**	**Schedule**	**Funding**	**Local Champion**
3.3.6	Structural and Infra-structure	Distribution of NOAA Weather Radios to Indiana County municipalities, schools, hospitals, nursing homes, day care centers, and SARA facilities.	All Hazards				2023 - 2027	Local, Act 165	Indiana County and Municipalities
3.3.7	Local Plans and Regulations	Review the existing Indiana County Emergency Operations Plan (EOP) and update where necessary based on any new information contained in the 2023 HMP.	All Hazards				2023 - 2027	Local, EMPG	Indiana County and Municipalities
3.3.8	Local Plans and Regulations	Review existing ordinances and other regulatory or planning mechanisms for consistency with the 2023 HMP.	All Hazards				2023 - 2027	Local	Indiana County and Municipalities
3.3.9	Local Plans and Regulations	Continue to solicit and review hazard mitigation questionnaires and post- disaster reviews submitted by municipalities.	All Hazards				2023 - 2027	Local, PDM	Indiana County and Municipalities
3.3.10	Local Plans and Regulations	Further integrate the 2015 Indiana University of Pennsylvania Hazard Mitigation Plan into the Indiana County Hazard Mitigation Plan.	All Hazards				2023 - 2027	Local	Indiana County and Municipalities
3.3.11	Local Plans and Regulations	Complete a continuity of operations plan and disaster recovery plan for Indiana County taking into consideration the COVID	All Hazards				2023 - 2027	Local	Indiana County
3.3.12	Local Plans and Regulations	Update the place of distribution plan and mass distribution plan for Indiana County.	All Hazards				2023 - 2027	Local	Indiana County
3.4.1	Local Plans and Regulations	Develop/update interface between dam owners' inundation mapping and the Indiana County's GIS tools.	Dam Failure				2023 - 2027	Dam Owner	Indiana County and Municipalities

Indiana County 2023 Mitigation Action Plan									
Action Number	**Mitigation Actions**		**Hazard Vulnerability**	**Prioritization**			**Implementation**		
	Category	**Description/ Action Items**		**High**	**Medium**	**Low**	**Schedule**	**Funding**	**Local Champion**
3.4.2	Local Plans and Regulations	Participate in county task force to coordinate issues on deep gas drilling, economics, and water quality.	Environmental Hazards				2023 - 2027	Local	Indiana County and Municipalities
3.4.3	Local Plans and Regulations	Continue the mission and membership of the Indiana County Terrorism Task Force.	All Hazards				2023 - 2027	Local, HSGP	Indiana County and Municipalities
3.4.4	Local Plans and Regulations	Convene regular meetings of the HMPSC to discuss issues and progress related to the implementation of the plan.	All Hazards				2023 - 2027	Local	Indiana County and Municipalities
3.5.1	Structural and Infra-structure	Continue to maintain Indiana County's emergency radio system.	All Hazards				2023 - 2027	Local, Act 12	Indiana County and Municipalities
4.1.1	Local Plans and Regulations	Collect information on the location, type, and threats to natural resource areas throughout the county.	All Hazards				2023 - 2027	Local	Indiana County and Municipalities
4.1.2	Natural Resource Protection	Initiate a process to mitigate the impact of non-native plant and insect species.	Invasive Species				2023 - 2027	Local	Indiana County and Municipalities
4.2.1	Local Plans and Regulations	Develop a county-wide stormwater management plan.	Flooding, Flash Flooding and Ice Jam Flooding				2023 - 2027	Local	Indiana County and Municipalities

Indiana County 2023 Mitigation Action Plan									
Action Number	Mitigation Actions		Hazard Vulnerability	Prioritization			Implementation		
	Category	Description/ Action Items		High	Medium	Low	Schedule	Funding	Local Champion
4.3.1	Local Plans and Regulations	Increase awareness of and participation in FEMA's Community Rating System (CRS) Program.	Flooding, Flash Flooding and Ice Jam Flooding				2023 - 2027	Local, FMA, NFIP	Indiana County and Municipalities
4.3.2	Education and Awareness	Increase awareness by residents of actions to take during an emergency, including sheltering and evacuation procedures.	All Hazards				2023 - 2027	Local	Red Cross, Indiana County and Municipalities
4.3.3	Education and Awareness	Develop a variety of displays for public events to provide information to citizens on preparedness, animal sheltering, business continuity, and children's awareness.	All Hazards				2023 - 2027	Local	Indiana County and Municipalities
4.3.4	Education and Awareness	Partner with other local agencies to provide public education and outreach on the opioid epidemic and where addicts can find assistance.	Opioid Epidemic				2023 - 2027	Local	Indiana County, Law Enforcement and Municipalities
4.3.5	Education and Awareness	Engage the school districts to develop or continue the reality tours of opioid overdose scenarios countywide.	Opioid Epidemic				2023 - 2027	Local	Indiana County, Law Enforcement and School Districts

Indiana County 2023 Mitigation Action Plan									
Action Number	**Mitigation Actions**		**Hazard Vulnerability**	**Prioritization**			**Implementation**		
	Category	**Description/ Action Items**		**High**	**Medium**	**Low**	**Schedule**	**Funding**	**Local Champion**
4.3.6	Education and Awareness	Develop an outreach program in conjunction with the Pennsylvania Department of Forestry for education and reporting procedures in reference to the spotted lantern fly.	Invasive Species				2023 - 2027	Local	Indiana County Conser vation District and Munici palities
4.4.1	Local Plans and Regulations	Work with municipal officials to increase awareness among property owners with identified at-risk structures.	All Hazards				2023 - 2027	Local	Indiana County and Munici palities
4.4.2	Local Plans and Regulations	Support the coordination of interagency debris removal.	All Hazards				2023 - 2027	Local	Indiana County and Munici palities
4.4.3	Natural 1s Protections	Support a stream maintenance program.	Flooding, Flash Flooding				2023 - 2027	Local	Indiana County and Munici palities
4.4.4	Local Plans and Regulations	Develop and implement programs to keep trees from threatening lives, property, and public infrastructure during wind and winter storm events.	Utility Interruptio n, Transportat ion Accidents				2023 - 2027	Local	Indiana County and Munici palities
5.1.1	Education and Awareness	Distribute educational pamphlets about the HHPD program to municipalities and county residents.	Dam Failure				2023 - 2027	Local	Indiana County EMA
5.2.1	Planning and Regulations	Educate local mitigation policies and programs that address high-hazard potential dams.	Dam Failure				2023 - 2027	Local	Indiana County EMA
5.3.1	Planning and Regulations	Acquire or maintain digitized dam inundation GIS polygons to determine at risk populations for dams designated High-Hazard Potential Dams by FEMA.	Dam Failure				2023 - 2027	Local	Indiana County Dam Owners

Table X - Municipal Hazard Mitigation Actions Checklist

Municipal Hazard Mitigation Actions Checklist										
Municipality	**1.1.1**	**1.1.2**	**1.2.1**	**1.3.1**	**1.4.1**	**1.4.2**	**1.5.1**	**1.6.1**	**1.7.1**	**2.1.1**
Armagh Borough	X	X	X	X	X	X	X	X		X
Armstrong Township	X	X	X	X	X	X	X	X		X
Banks Township	X	X	X	X	X	X	X	X		X
Black Lick Township	X	X	X	X	X	X	X	X		X
Blairsville Borough	X	X	X	X	X	X	X	X		X
Brush Valley Township	X	X	X	X	X	X	X	X		X
Buffington Township	X	X	X	X	X	X	X	X		X
Burrell Township	X	X	X	X	X	X	X	X		X
Canoe Township	X	X	X	X	X	X	X	X		X
Center Township	X	X	X	X	X	X	X	X		X
Cherry Tree Borough	X	X	X	X	X	X	X	X		X
Cherryhill Township	X	X	X	X	X	X	X	X		X
Clymer Borough	X	X	X	X	X	X	X	X		X
Conemaugh Township	X	X	X	X	X	X	X	X		X
Creekside Borough	X	X	X	X	X	X	X	X		X
East Mahoning Township	X	X	X	X	X	X	X	X		X
Ernest Borough	X	X	X	X	X	X	X	X		X
Glen Campbell Borough	X	X	X	X	X	X	X	X		X
Grant Township	X	X	X	X	X	X	X	X		X
Green Township	X	X	X	X	X	X	X	X		X
Homer City Borough	X	X	X	X	X	X	X	X		X
Indiana Borough	X	X	X	X	X	X	X	X		X
Marion Center Borough	X	X	X	X	X	X	X	X		X
Montgomery Township	X	X	X	X	X	X	X	X		X
North Mahoning Township	X	X	X	X	X	X	X	X		X
Pine Township	X	X	X	X	X	X	X	X		X
Plumville Borough	X	X	X	X	X	X	X	X		X
Rayne Township	X	X	X	X	X	X	X	X		X
Saltsburg Borough	X	X	X	X	X	X	X	X		X
Shelocta Borough	X	X	X	X	X	X	X	X		X
Smicksburg Borough	X	X	X	X	X	X	X	X		X
South Mahoning Township	X	X	X	X	X	X	X	X		X
Washington Township	X	X	X	X	X	X	X	X		X
West Mahoning Township	X	X	X	X	X	X	X	X		X
West Wheatfield Township	X	X	X	X	X	X	X	X		X
White Township	X	X	X	X	X	X	X	X		X
Young Township	X	X	X	X	X	X	X	X		X
Indiana County	X	X	X	X	X	X	X	X	X	X

Municipal Hazard Mitigation Actions Checklist										
Municipality	**2.1.2**	**2.1.3**	**2.2.1**	**2.3.1**	**2.3.2**	**2.4.1**	**3.1.1**	**3.1.2**	**3.2.1**	**3.2.2**
Armagh Borough	X	X	X	X	X		X	X	X	X
Armstrong Township	X	X	X	X	X		X	X	X	X

Municipal Hazard Mitigation Actions Checklist										
Municipality	**2.1.2**	**2.1.3**	**2.2.1**	**2.3.1**	**2.3.2**	**2.4.1**	**3.1.1**	**3.1.2**	**3.2.1**	**3.2.2**
Banks Township	X	X	X	X	X		X	X	X	X
Black Lick Township	X	X	X	X	X		X	X	X	X
Blairsville Borough	X	X	X	X	X		X	X	X	X
Brush Valley Township	X	X	X	X	X		X	X	X	X
Buffington Township	X	X	X	X	X		X	X	X	X
Burrell Township	X	X	X	X	X		X	X	X	X
Canoe Township	X	X	X	X	X		X	X	X	X
Center Township	X	X	X	X	X		X	X	X	X
Cherry Tree Borough	X	X	X	X	X		X	X	X	X
Cherryhill Township	X	X	X	X	X		X	X	X	X
Clymer Borough	X	X	X	X	X		X	X	X	X
Conemaugh Township	X	X	X	X	X		X	X	X	X
Creekside Borough	X	X	X	X	X		X	X	X	X
East Mahoning Township	X	X	X	X	X		X	X	X	X
Ernest Borough	X	X	X	X	X		X	X	X	X
Glen Campbell Borough	X	X	X	X	X		X	X	X	X
Grant Township	X	X	X	X	X		X	X	X	X
Green Township	X	X	X	X	X		X	X	X	X
Homer City Borough	X	X	X	X	X		X	X	X	X
Indiana Borough	X	X	X	X	X		X	X	X	X
Marion Center Borough	X	X	X	X	X		X	X	X	X
Montgomery Township	X	X	X	X	X		X	X	X	X
North Mahoning Township	X	X	X	X	X		X	X	X	X
Pine Township	X	X	X	X	X		X	X	X	X
Plumville Borough	X	X	X	X	X		X	X	X	X
Rayne Township	X	X	X	X	X		X	X	X	X
Saltsburg Borough	X	X	X	X	X		X	X	X	X
Shelocta Borough	X	X	X	X	X		X	X	X	X
Smicksburg Borough	X	X	X	X	X		X	X	X	X
South Mahoning Township	X	X	X	X	X		X	X	X	X
Washington Township	X	X	X	X	X		X	X	X	X
West Mahoning Township	X	X	X	X	X		X	X	X	X
West Wheatfield Township	X	X	X	X	X		X	X	X	X
White Township	X	X	X	X	X		X	X	X	X
Young Township	X	X	X	X	X		X	X	X	X
Indiana County	X	X		X	X	X	X	X	X	X

Municipal Hazard Mitigation Actions Checklist										
Municipality	**3.2.3**	**3.2.4**	**3.2.5**	**3.3.1**	**3.3.2**	**3.3.3**	**3.3.4**	**3.3.5**	**3.3.6**	**3.3.7**
Armagh Borough	X	X		X	X	X	X	X	X	X
Armstrong Township	X	X		X	X	X	X	X	X	X
Banks Township	X	X		X	X	X	X	X	X	X
Black Lick Township	X	X		X	X	X	X	X	X	X
Blairsville Borough	X	X		X	X	X	X	X	X	X
Brush Valley Township	X	X		X	X	X	X	X	X	X
Buffington Township	X	X		X	X	X	X	X	X	X

Municipal Hazard Mitigation Actions Checklist										
Municipality	**3.2.3**	**3.2.4**	**3.2.5**	**3.3.1**	**3.3.2**	**3.3.3**	**3.3.4**	**3.3.5**	**3.3.6**	**3.3.7**
Burrell Township	X	X		X	X	X	X	X	X	X
Canoe Township	X	X		X	X	X	X	X	X	X
Center Township	X	X		X	X	X	X	X	X	X
Cherry Tree Borough	X	X		X	X	X	X	X	X	X
Cherryhill Township	X	X		X	X	X	X	X	X	X
Clymer Borough	X	X		X	X	X	X	X	X	X
Conemaugh Township	X	X		X	X	X	X	X	X	X
Creekside Borough	X	X		X	X	X	X	X	X	X
East Mahoning Township	X	X		X	X	X	X	X	X	X
Ernest Borough	X	X		X	X	X	X	X	X	X
Glen Campbell Borough	X	X		X	X	X	X	X	X	X
Grant Township	X	X		X	X	X	X	X	X	X
Green Township	X	X		X	X	X	X	X	X	X
Homer City Borough	X	X		X	X	X	X	X	X	X
Indiana Borough	X	X		X	X	X	X	X	X	X
Marion Center Borough	X	X		X	X	X	X	X	X	X
Montgomery Township	X	X		X	X	X	X	X	X	X
North Mahoning Township	X	X		X	X	X	X	X	X	X
Pine Township	X	X		X	X	X	X	X	X	X
Plumville Borough	X	X		X	X	X	X	X	X	X
Rayne Township	X	X		X	X	X	X	X	X	X
Saltsburg Borough	X	X		X	X	X	X	X	X	X
Shelocta Borough	X	X		X	X	X	X	X	X	X
Smicksburg Borough	X	X		X	X	X	X	X	X	X
South Mahoning Township	X	X		X	X	X	X	X	X	X
Washington Township	X	X		X	X	X	X	X	X	X
West Mahoning Township	X	X		X	X	X	X	X	X	X
West Wheatfield Township	X	X		X	X	X	X	X	X	X
White Township	X	X		X	X	X	X	X	X	X
Young Township	X	X		X	X	X	X	X	X	X
Indiana County	X	X	X	X	X	X	X	X	X	X

Municipal Hazard Mitigation Actions Checklist										
Municipality	**3.3.8**	**3.3.9**	**3.3.10**	**3.3.11**	**3.3.12**	**3.4.1**	**3.4.2**	**3.4.3**	**3.4.4**	**3.5.1**
Armagh Borough	X	X	X			X	X	X	X	X
Armstrong Township	X	X	X			X	X	X	X	X
Banks Township	X	X	X			X	X	X	X	X
Black Lick Township	X	X	X			X	X	X	X	X
Blairsville Borough	X	X	X			X	X	X	X	X
Brush Valley Township	X	X	X			X	X	X	X	X
Buffington Township	X	X	X			X	X	X	X	X
Burrell Township	X	X	X			X	X	X	X	X
Canoe Township	X	X	X			X	X	X	X	X
Center Township	X	X	X			X	X	X	X	X
Cherry Tree Borough	X	X	X			X	X	X	X	X
Cherryhill Township	X	X	X			X	X	X	X	X

Municipal Hazard Mitigation Actions Checklist										
Municipality	**3.3.8**	**3.3.9**	**3.3.10**	**3.3.11**	**3.3.12**	**3.4.1**	**3.4.2**	**3.4.3**	**3.4.4**	**3.5.1**
Clymer Borough	X	X	X			X	X	X	X	X
Conemaugh Township	X	X	X			X	X	X	X	X
Creekside Borough	X	X	X			X	X	X	X	X
East Mahoning Township	X	X	X			X	X	X	X	X
Ernest Borough	X	X	X			X	X	X	X	X
Glen Campbell Borough	X	X	X			X	X	X	X	X
Grant Township	X	X	X			X	X	X	X	X
Green Township	X	X	X			X	X	X	X	X
Homer City Borough	X	X	X			X	X	X	X	X
Indiana Borough	X	X	X			X	X	X	X	X
Marion Center Borough	X	X	X			X	X	X	X	X
Montgomery Township	X	X	X			X	X	X	X	X
North Mahoning Township	X	X	X			X	X	X	X	X
Pine Township	X	X	X			X	X	X	X	X
Plumville Borough	X	X	X			X	X	X	X	X
Rayne Township	X	X	X			X	X	X	X	X
Saltsburg Borough	X	X	X			X	X	X	X	X
Shelocta Borough	X	X	X			X	X	X	X	X
Smicksburg Borough	X	X	X			X	X	X	X	X
South Mahoning Township	X	X	X			X	X	X	X	X
Washington Township	X	X	X			X	X	X	X	X
West Mahoning Township	X	X	X			X	X	X	X	X
West Wheatfield Township	X	X	X			X	X	X	X	X
White Township	X	X	X			X	X	X	X	X
Young Township	X	X	X			X	X	X	X	X
Indiana County				X	X	X	X	X	X	X

Municipal Hazard Mitigation Actions Checklist										
Municipality	**4.1.1**	**4.1.2**	**4.2.1**	**4.3.1**	**4.3.2**	**4.3.3**	**4.3.4**	**4.3.5**	**4.3.6**	**4.4.1**
Armagh Borough	X	X	X	X	X	X	X		X	X
Armstrong Township	X	X	X	X	X	X	X		X	X
Banks Township	X	X	X	X	X	X	X		X	X
Black Lick Township	X	X	X	X	X	X	X		X	X
Blairsville Borough	X	X	X	X	X	X	X		X	X
Brush Valley Township	X	X	X	X	X	X	X		X	X
Buffington Township	X	X	X	X	X	X	X		X	X
Burrell Township	X	X	X	X	X	X	X		X	X
Canoe Township	X	X	X	X	X	X	X		X	X
Center Township	X	X	X	X	X	X	X		X	X
Cherry Tree Borough	X	X	X	X	X	X	X		X	X
Cherryhill Township	X	X	X	X	X	X	X		X	X
Clymer Borough	X	X	X	X	X	X	X		X	X
Conemaugh Township	X	X	X	X	X	X	X		X	X
Creekside Borough	X	X	X	X	X	X	X		X	X
East Mahoning Township	X	X	X	X	X	X	X		X	X
Ernest Borough	X	X	X	X	X	X	X		X	X

Municipal Hazard Mitigation Actions Checklist										
Municipality	**4.1.1**	**4.1.2**	**4.2.1**	**4.3.1**	**4.3.2**	**4.3.3**	**4.3.4**	**4.3.5**	**4.3.6**	**4.4.1**
Glen Campbell Borough	X	X	X	X	X	X	X		X	X
Grant Township	X	X	X	X	X	X	X		X	X
Green Township	X	X	X	X	X	X	X		X	X
Homer City Borough	X	X	X	X	X	X	X		X	X
Indiana Borough	X	X	X	X	X	X	X		X	X
Marion Center Borough	X	X	X	X	X	X	X		X	X
Montgomery Township	X	X	X	X	X	X	X		X	X
North Mahoning Township	X	X	X	X	X	X	X		X	X
Pine Township	X	X	X	X	X	X	X		X	X
Plumville Borough	X	X	X	X	X	X	X		X	X
Rayne Township	X	X	X	X	X	X	X		X	X
Saltsburg Borough	X	X	X	X	X	X	X		X	X
Shelocta Borough	X	X	X	X	X	X	X		X	X
Smicksburg Borough	X	X	X	X	X	X	X		X	X
South Mahoning Township	X	X	X	X	X	X	X		X	X
Washington Township	X	X	X	X	X	X	X		X	X
West Mahoning Township	X	X	X	X	X	X	X		X	X
West Wheatfield Township	X	X	X	X	X	X	X		X	X
White Township	X	X	X	X	X	X	X		X	X
Young Township	X	X	X	X	X	X	X		X	X
Indiana County	X	X	X	X	X	X		X	X	X

Municipal Hazard Mitigation Actions Checklist						
Municipality	**4.4.2**	**4.4.3**	**4.4.4**	**5.1.1**	**5.2.1**	**5.3.1**
Armagh Borough	X	X	X			
Armstrong Township	X	X	X			
Banks Township	X	X	X			
Black Lick Township	X	X	X			
Blairsville Borough	X	X	X			
Brush Valley Township	X	X	X			
Buffington Township	X	X	X			
Burrell Township	X	X	X			
Canoe Township	X	X	X			
Center Township	X	X	X			
Cherry Tree Borough	X	X	X			
Cherryhill Township	X	X	X			
Clymer Borough	X	X	X			
Conemaugh Township	X	X	X			
Creekside Borough	X	X	X			
East Mahoning Township	X	X	X			
Ernest Borough	X	X	X			
Glen Campbell Borough	X	X	X			
Grant Township	X	X	X			
Green Township	X	X	X			
Homer City Borough	X	X	X			
Indiana Borough	X	X	X			

Municipal Hazard Mitigation Actions Checklist						
Municipality	**4.4.2**	**4.4.3**	**4.4.4**	**5.1.1**	**5.2.1**	**5.3.1**
Marion Center Borough	X	X	X			
Montgomery Township	X	X	X			
North Mahoning Township	X	X	X			
Pine Township	X	X	X			
Plumville Borough	X	X	X			
Rayne Township	X	X	X			
Saltsburg Borough	X	X	X			
Shelocta Borough	X	X	X			
Smicksburg Borough	X	X	X			
South Mahoning Township	X	X	X			
Washington Township	X	X	X			
West Mahoning Township	X	X	X			
West Wheatfield Township	X	X	X			
White Township	X	X	X			
Young Township	X	X	X			
Indiana County	X	X	X	X	X	

Table X - Objective to Action Checklist

Objective	Number of Actions
Objective 1.1	**2**
Objective 1.2	**1**
Objective 1.3	**1**
Objective 1.4	**2**
Objective 1.5	**1**
Objective 1.6	**1**
Objective 1.7	**1**
Objective 2.1	**3**
Objective 2.2	**1**
Objective 2.3	**2**
Objective 2.4	**1**
Objective 3.1	**2**
Objective 3.2	**5**
Objective 3.3	**12**
Objective 3.4	**4**
Objective 3.5	**1**
Objective 4.1	**2**
Objective 4.2	**1**
Objective 4.3	**6**
Objective 4.4	**4**
Objective 5.1	**1**
Objective 5.2	**1**

Objective	Number of Actions
Objective 5.3	**1**

Table X - Actions Tied to Hazard

Actions Tied to Hazard	
Hazard	**Actions Related**
Building/Structural Collapse/Blighted Properties	1.1.1, 1.1.2, 1.4.2, 2.1.1, 2.1.3, 2.2.1, 2.3.2, 3.1.1, 3.2.3, 3.2.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.4.3, 3.4.4, 3.5.1, 4.1.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2
Civil Disturbance	1.1.1, 1.1.2, 1.4.2, 2.1.1, 2.2.1, 3.1.1, 3.2.3, 3.2.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.4.3, 3.4.4, 3.5.1, 4.1.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2
Dam Failure	1.1.1, 1.1.2, 1.4.2, 2.1.1, 2.2.1, 3.1.1, 3.2.1, 3.2.3, 3.2.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.4.1, 3.4.3, 3.4.4, 3.5.1, 4.1.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2, 5.1.1, 5.2.1, 5.3.1
Drought	1.1.1, 1.1.2, 1.4.2, 2.1.1, 2.2.1, 2.4.1, 3.1.1, 3.1.2, 3.2.3, 3.2.4, 3.3.3, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.4.3, 3.4.4, 3.5.1, 4.1.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2
Earthquake	1.1.1, 1.1.2, 1.4.2, 2.1.1, 2.2.1, 2.4.1, 3.1.1, 3.1.2, 3.2.3, 3.2.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.4.3, 3.4.4, 3.5.1, 4.1.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2
Emergency Services	1.1.1, 1.1.2, 1.4.2, 2.1.1, 2.2.1, 3.1.1, 3.2.3, 3.2.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.4.3, 3.4.4, 3.5.1, 4.1.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2
Environmental Hazards/Hazardous Materials	1.1.1, 1.1.2, 1.4.2, 2.1.1, 2.1.2, 2.2.1, 2.3.1, 3.1.1, 3.2.3, 3.2.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.4.2, 3.4.3, 3.4.4, 3.5.1, 4.1.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2
Flooding, Flash Flooding, and Ice Jam Flooding	1.1.1, 1.1.2, 1.2.1, 1.3.1, 1.4.1, 1.4.2, 1.5.1, 1.6.1, 1.7.1, 2.1.1, 2.2.1, 2.4.1, 3.1.1, 3.1.2, 3.2.3, 3.2.4, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.4.3, 3.4.4, 3.5.1, 4.1.1, 4.2.1, 4.3.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2, 4.4.3

Actions Tied to Hazard	
Hazard	**Actions Related**
Invasive Species	1.1.1, 1.1.2, 1.4.2, 2.1.1, 2.2.1, 3.1.1, 3.1.2, 3.2.3, 3.2.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.4.3, 3.4.4, 3.5.1, 4.1.1, 4.1.2, 4.3.2, 4.3.3, 4.3.6, 4.4.1, 4.4.2
Landslide	1.1.1, 1.1.2, 1.4.2, 2.1.1, 2.2.1, 2.4.1, 3.1.1, 3.1.2, 3.2.3, 3.2.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.4.3, 3.4.4, 3.5.1, 4.1.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2
Levee Failure	1.1.1, 1.1.2, 1.4.2, 2.1.1, 2.2.1, 3.1.1, 3.2.3, 3.2.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.4.3, 3.4.4, 3.5.1, 4.1.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2
Opioid Epidemic	1.1.1, 1.1.2, 1.4.2, 2.1.1, 2.2.1, 3.1.1, 3.2.3, 3.2.4, 3.2.5, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.4.3, 3.4.4, 3.5.1, 4.1.1, 4.3.2, 4.3.3, 4.3.5, 4.4.1, 4.4.2
Pandemic and Infectious Disease	1.1.1, 1.1.2, 1.4.2, 2.1.1, 2.2.1, 2.4.1, 3.1.1, 3.1.2, 3.2.3, 3.2.4, 3.3.13.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.4.3, 3.4.4, 3.5.1, 4.1.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2
Radon Exposure	1.1.1, 1.1.2, 1.4.2, 2.1.1, 2.2.1, 2.4.1, 3.1.1, 3.1.2, 3.2.3, 3.2.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.4.3, 3.4.4, 3.5.1, 4.1.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2
Subsidence/Sinkhole	1.1.1, 1.1.2, 1.4.2, 2.1.1, 2.2.1, 2.4.1, 3.1.1, 3.1.2, 3.2.3, 3.2.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.4.3, 3.4.4, 3.5.1, 4.1.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2
Terrorism/Cyber Terrorism Incidents	1.1.1, 1.1.2, 1.4.2, 2.1.1, 2.2.1, 3.1.1, 3.2.3, 3.2.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.4.3, 3.4.4, 3.5.1, 4.1.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2
Tornadoes/Windstorms	1.1.1, 1.1.2, 1.4.2, 2.1.1, 2.2.1, 2.4.1, 3.1.1, 3.1.2, 3.2.3, 3.2.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.4.3, 3.4.4, 3.5.1, 4.1.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2
Transportation Accidents	1.1.1, 1.1.2, 1.4.2, 2.1.1, 2.2.1, 3.1.1, 3.2.3, 3.2.4, 3.3.23.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.4.3, 3.4.4, 3.5.1, 4.1.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2, 4.4.4,

Actions Tied to Hazard	
Hazard	**Actions Related**
Utility Interruption	1.1.1, 1.1.2, 1.4.2, 2.1.1, 2.2.1, 3.1.1, 3.2.3, 3.2.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.4.3, 3.4.4, 3.5.1, 4.1.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2, 4.4.4
Winter Storm	1.1.1, 1.1.2, 1.4.2, 2.1.1, 2.2.1, 2.4.1, 3.1.1, 3.1.2, 3.2.2, 3.2.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.4.3, 3.4.4, 3.5.1, 4.1.1, 4.3.2, 4.3.3, 4.4.1, 4.4.2

7. Plan Maintenance

7.1. Update Process Summary

Monitoring, evaluating, and updating this plan is critical to maintaining its value and success in Indiana 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 2023 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 Indiana County is the responsibility of all levels of government (i.e., county, and local), as well as the citizens of the county. The Indiana 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 Indiana 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 2023 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 Indiana County Emergency Management Agency will maintain a copy of these records and place them in Appendix I of this plan. Indiana 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 Indiana County Emergency Management Agency will ensure that the 2023 Indiana County Hazard Mitigation Plan is posted and maintained on the Indiana County website and will continue to encourage public review and comment on the plan. The Indiana County website that the plan will be located at is as follows:
https://www.indianacountypa.gov/departments/emergency-management/

The public will have access to the 2023 Indiana County HMP through their local municipal office, the Indiana County Office of Planning and Development, or the Indiana County Emergency Management Agency. Information on upcoming events related to the HMP or solicitation for comments will be announced via newsletters, newspapers, mailings, and the county website.

The citizens of Indiana County are encouraged to submit their comments to elected officials and/or members of the Indiana County HMP Local Planning Team. To promote public participation, the Indiana 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 Indiana 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 2023 Indiana 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.

9. Appendices