LUZERNE COUNTY 2025

HAZARD MITIGATION PLAN UPDATE

PREPARED FOR:

Luzerne County
Department of Planning & Zoning
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Certification of Annual Review Meetings

The Luzerne County Hazard Mitigation Planning Team (HMPT) has reviewed this Hazard Mitigation Plan. See Section 8 for further details regarding this form. The director of the HMPT hereby certifies the review.

YEAR	DATE OF MEETING	PUBLIC OUTREACH ADDRESSED? *	SIGNATURE
2020	N/A	N/A	To the best knowledge of the Luzerne County HMSC no HMP meetings were held before the beginning of the HMP Update process. See Section 3 of the Luzerne County 2025 HMP Update for details regarding the meetings held during this process.
2021	N/A	N/A	
2022	N/A	N/A	
2023	N/A	N/A	
2024	N/A	N/A	
2025	See Section 3	See Section 3	

**Confirm yes here annually and describe on record of changes 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)
2020 - 2025	To the best knowledge of the Luzerne County HMSC no HMP progress reports were submitted from municipalities for the period from 2020 through 2025, although mitigation actions were accomplished in this period. Progress on actions is discussed in detail in Section 6.1 of this plan.	N/A	N/A

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

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Acronyms

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ACRONYM	FULL NAME	ACRONYM	FULL NAME
BRIC	Building Resilient Infrastructure and Communities	NDMC	National Drought Mitigation Center
CFR	Code of Federal Regulations	NFIP	National Flood Insurance Program
CKCOG	Central Keystone Council of Governments	NFPA	National Fire Protection Association
CRS	Community Ratings System	NHC	National Hurricane Center
DCED	Department of Community and Economic Development	NIDIS	National Integrated Drought Information System
DCNR	Department of Conservation and Natural Resources	NOAA	National Oceanic and Atmospheric Association
DCNR-BOF	Department of Conservation and Natural Resources-Bureau of Forestry	NWS	National Weather Service
DMA	Disaster Mitigation Act	PEIRS	Pennsylvania Emergency Incident Reporting System
EOP	Emergency Operations Plan	PA DEP	Pennsylvania Department of Environmental Protection
EOC	Emergency Operations Center	PASDA	Pennsylvania Spatial Data Access
EMC	Emergency Management Coordinator	PDSI	Palmer Drought Severity Index
EPA	Environmental Protection Agency	PEMA	Pennsylvania Emergency Management Agency
FEMA	Federal Emergency Management Agency	PennDOT	Pennsylvania Department of Transportation
FIRM	Flood Insurance Rate Map	RF	Risk Factor
FMA	Flood Mitigation Assistance Program	SALDO	Subdivision and Land Development Ordinance

Table of Acronyms			
ACRONYM	FULL NAME	ACRONYM	FULL NAME
HMGP	Hazard Mitigation Grant Program	SEDA-COG	Susquehanna Economic Development Association and Council of Governments
HMPT	Hazard Mitigation Planning Team	SFHA	Special Flood Hazard Area
HMPU	Hazard Mitigation Plan Update	SOG	Standard Operating Guide
HVA	Hazards Vulnerability Analysis	UCC	Universal Construction Code
ICC	International Code Council	US DOT	United States Department of Transportation
IBC	International Building Code	USACE	United States Army Corps of Engineers
LC/PZST	Luzerne County and/or Department of Planning and Zoning Staff Time	USDA	United States Department of Agriculture
NCDC	National Climatic Data Center	USGS	United States Geological Survey
NDIS	National Drought Information System	WYO	Write Your Own

1. INTRODUCTION

1.1. BACKGROUND

Across the United States, natural and human-made disasters have led to increasing levels of death, injury, property damage, and interruption of business and government services. The time, money, and effort needed to recover from these disasters exhausts resources, diverting attention from important public programs. This plan focuses on hazard mitigation in Luzerne County. Hazard Mitigation is defined by the Federal Emergency Management Agency (FEMA) as "any sustained action taken to reduce or eliminate long-term risk to people and property from hazards and their effects". The hazard mitigation planning process involves the coordination of actions taken to reduce injuries, deaths, property damage, economic losses, and degradation of natural resources caused by natural and man-made disasters. The emergency management community, citizens, elected officials and other stakeholders in Luzerne County recognize the impact of disasters on their community and support proactive efforts needed to reduce the impact of natural and human-made hazards.

Luzerne County Department of Planning & Zoning and Department of Emergency Services have taken an all-hazards approach to this Hazard Mitigation Plan Update.

Accordingly, the Luzerne County Hazard Mitigation Steering Committee (HMSC) have led the preparation of this Hazard Mitigation Plan (HMP) Update. Members of the HMSC are listed in table 3.2-1. The Plan is the result of work by local officials and citizens of the County to develop a pre-disaster multi-hazard mitigation plan that will not only guide the County towards greater disaster resistance but will also respect the character and needs of the community.

This plan is the fourth update to the Luzerne County HMP. The plan was initially drafted in 2009 for both Luzerne and Lackawanna Counties. In 2014 Luzerne County wanted a plan that was county specific and completed a countywide plan update. In 2020 the plan was further refined to the specifics of Luzerne County and identified more activities to keep the county and its citizens safe.

This 2025 Plan Update is intended to enable the County and its municipalities to effectively plan for and reduce the potential risks of identified hazards to the health, safety and property of the residents. The 2025 update will also allow Luzerne County municipalities to maintain their eligibility for a range of financial assistance following hazard events. The 2025 Plan Update consists of a thorough review and evaluation of the 2020 Plan. Each chapter in the 2025 HMP has been updated as necessary. A summary is included at the beginning of each chapter to indicate how this Plan was updated from the 2020 version.

1.2. PURPOSE

This plan was developed for the purpose of:

- Providing a blueprint for reducing damage and saving lives from the effects of future natural and human-made hazards in Luzerne County;
- Complying with state and federal legislative requirements related to eligibility for federal and technical assistance from state and federal hazard mitigation programs;
- Identifying and implementing cost-effective hazard mitigation measures in order to accomplish County goals and objectives and to raise awareness and acceptance of hazard mitigation; and
- Improving community resiliency following a disaster event.

Adoption of this plan supports Luzerne County and participating jurisdictions eligibility to apply for and receive certain federal grant funds that are administered by the Commonwealth of Pennsylvania for FEMA. This plan complies with the requirements of the Disaster Mitigation Act of 2000 and its implementing regulations published in Title 44 of the Code of Federal Regulations (CFR) Section 201.6.

1.3. SCOPE

The Luzerne County 2025 Hazard Mitigation Plan Update has been prepared to meet requirements set forth by FEMA and the Pennsylvania Emergency Management Agency (PEMA). The Plan Update is a multi-jurisdictional plan that covers Luzerne County and its 76 municipalities. It will be updated and maintained to continually address hazards determined to be of significant risk to the County and/or its local municipalities. Review will take place annually and following significant disasters, and a full Plan Update will occur, as required, every five years.

In accordance with the Disaster Mitigation Act (DMA) of 2000, the HMP Update documents the following topics:

- Planning Process;
- Hazard Identification;
- Risk Assessment;
- Mitigation Strategy: Goals, Objectives, and Actions;
- Formal Adoption by the Participating Jurisdictions; and
- PEMA and FEMA approval.

The report format is structured in accordance with the most current planning guidance from FEMA, Local Mitigation Planning Policy Guide (2022), and PEMA, Commonwealth of Pennsylvania's All-Hazard Mitigation Planning Standard Operating Guide (SOG) (2020). The overall format between the 2025 HMP Update and the 2020 HMP Update has remained largely unchanged.

It should be noted that future funding for mitigation projects will be contingent upon having each jurisdiction in Luzerne County adopt the plan. Any jurisdiction that does not adopt the 2025 HMP Update within one year of plan approval will become ineligible for pre- and post-disaster mitigation funds and must take additional steps before adopting the plan.

1.1. 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.
- 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*.
- Executive Order 12989 on Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. February 1994.
- Executive Order 13985 on Advancing Racial Equity and Support for Underserved Communities Through the Federal Government. January 2021.
- Executive Order 14008 on Tackling the Climate Crisis at Home and Abroad. January 2021.
- Executive Order 14030 on Climate-Related Financial Risk. May 2021.

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.
- Pennsylvania Floodplain Management Act of 1978. P.L. 851, No. 166.
- Pennsylvania Hazardous Material Emergency Planning and Response Act of 1990 (Act 165).

The following FEMA guides and reference documents were used to prepare this document:

- FEMA: *Integrating Hazard Mitigation into Local Planning: Case Studies and Tools for Community Officials*. March 2013
- FEMA: *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards*. January 2013.
- FEMA: *National Fire Incident Reporting System 5.0: Complete Reference Guide*. January 2015.
- FEMA: *Hazard Mitigation Assistance Unified Guidance*. February 2015.
- FEMA: *Local Mitigation Planning Handbook*. May 2023.
- FEMA: *Local Mitigation Planning Policy Guide*. April 2022.
- FEMA. *Region 3 High Hazard Potential Dams: Local and Tribal Mitigation Planning Tips*. July 2024.
- FEMA. Rehabilitation of High Hazard Potential Dams (HHPD) Grant Program.

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

- PEMA: *Hazard Mitigation Planning Made Easy!*
- PEMA Mitigation Ideas: *Potential Mitigation Measures by Hazard Type; A Mitigation Planning Tool for Communities*. March 2009.
- PEMA. *Administrative Processes*. December 20, 2019.

- PEMA: *Pennsylvania's Hazard Mitigation Planning Standard Operating Guide*. October 2020.

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

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

2. COMMUNITY PROFILE

This section profiles Luzerne County and its municipalities. It provides information on geography, population, demographics, equity, land use and development.

2.1. GEOGRAPHY AND ENVIRONMENT

Luzerne County is located in the northeastern region of Pennsylvania and consists of 76 municipalities (36 townships, 36 boroughs, and 4 cities), which are listed in Table 2.3-1. It is bordered by Wyoming County to the north, Lackawanna County to the northeast, a small portion of Monroe County to the east, Carbon County to the southeast, Schuylkill County to the south, Columbia County to the west, and Sullivan County to the northwest (see Figure 2.1-1: Luzerne County Base Map). Luzerne County is 906 square miles, or about 580,000 acres, and consists mostly of wooded and cultivated land. There are four state parks located fully or partially in Luzerne County: Frances Slocum, Lehigh Gorge, Nescopeck, and Ricketts Glen.

The majority of Luzerne County is in the Upper Susquehanna-Lackawanna portion of the Susquehanna River Watershed. Figure 2.1-2 shows the locations of watersheds throughout the county. Three major rivers flow through Luzerne County. The Susquehanna River runs for approximately 44 miles in a southwest direction through Luzerne County. The Lackawanna River runs for about 31 miles in a southwest direction through Lackawanna County and continues for approximately 2.5 miles through Luzerne County before its confluence with the Susquehanna River near the City of Pittston. The Lehigh River flows in a southwest direction for approximately 14 miles along the southern border of Lackawanna County and continues for about 22 miles along a portion of Luzerne County's eastern border. The mountains bordering this river valley are significant with elevations over 2,000 feet above sea level in some sections. The most notable mountains and ridgetops in Luzerne County are Penobscot Mountain and Wilkes-Barre Mountain east of the Susquehanna River, Shickshinny Mountain and Larksville Mountain west of the Susquehanna River, and North Mountain in the northern portion of the county.

US Route 11 runs through Luzerne County along the Susquehanna River. Interstate 81 runs near the Susquehanna River before veering South by Hanover Township. Interstate 80 runs across the Southern portion of Luzerne County by the City of Hazleton. Interstate 476 runs through the eastern part of the County, entering by the City of Pittston and exiting in Bear Creek Township. The locations of highways, boroughs, townships, and cities are provided in Figure 2.1-1.

Luzerne County experiences an average annual temperature of about 46.8 ° F and an average annual precipitation of approximately 43.74 inches. During the winter months (December through February), the average temperature is around 25.3° F, and the average precipitation is about 8.87 inches in which fluctuations during dry and wet years are not noticeably extreme. Spring months (March through May) bring moderate average temperatures of 45.3° F and precipitation levels of 11.08 inches. Average summer (June through August) temperatures are 67.3° F and average precipitation values are about 12.72 inches. In the fall (September through November), moderate temperatures and precipitation levels are prevalent. The average temperature is 49.3° F and the average precipitation is 11.04 inches (NOAA NCEI, 2024).

Figure 2.1-1 Base Map of Luzerne County

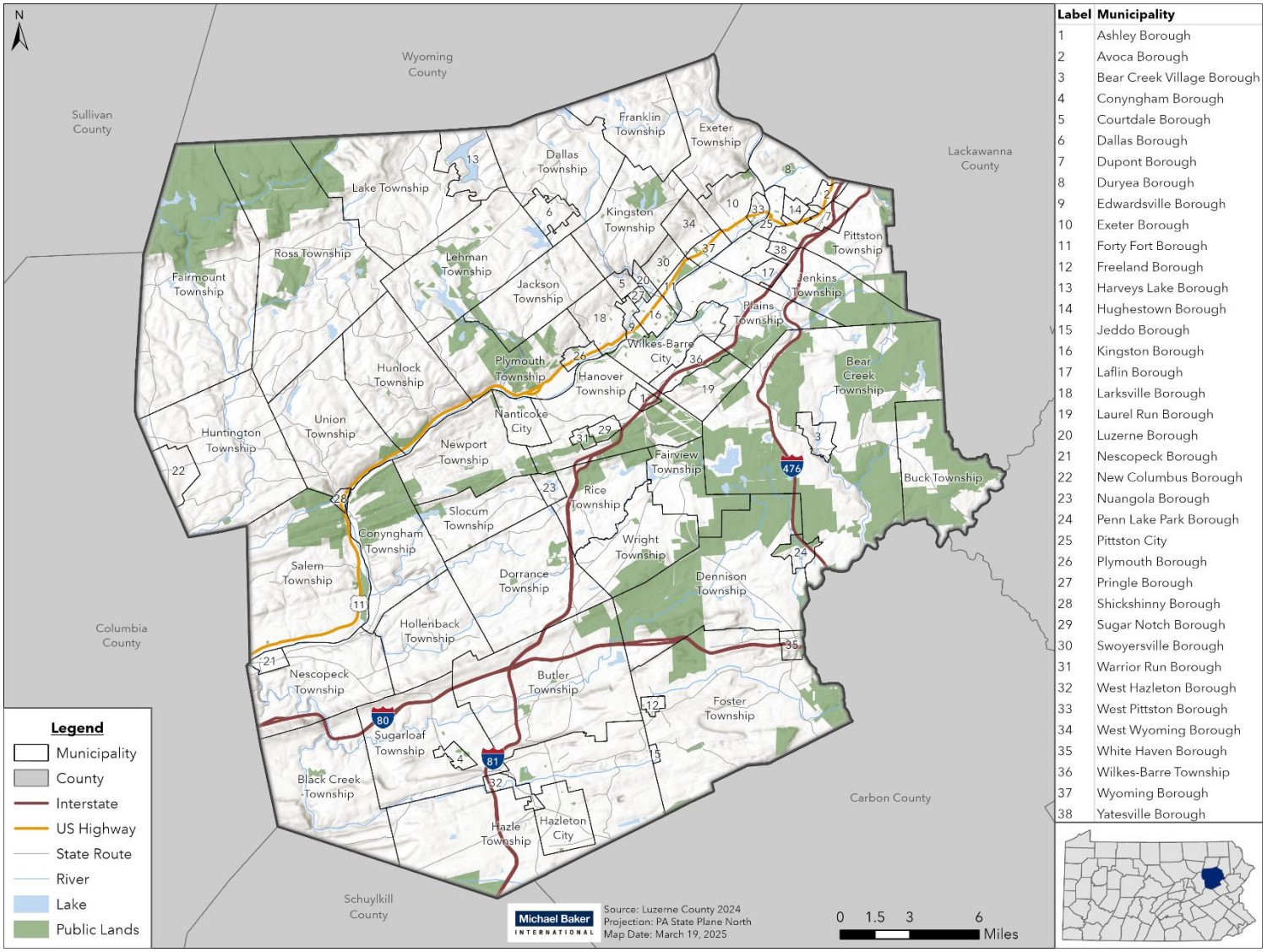
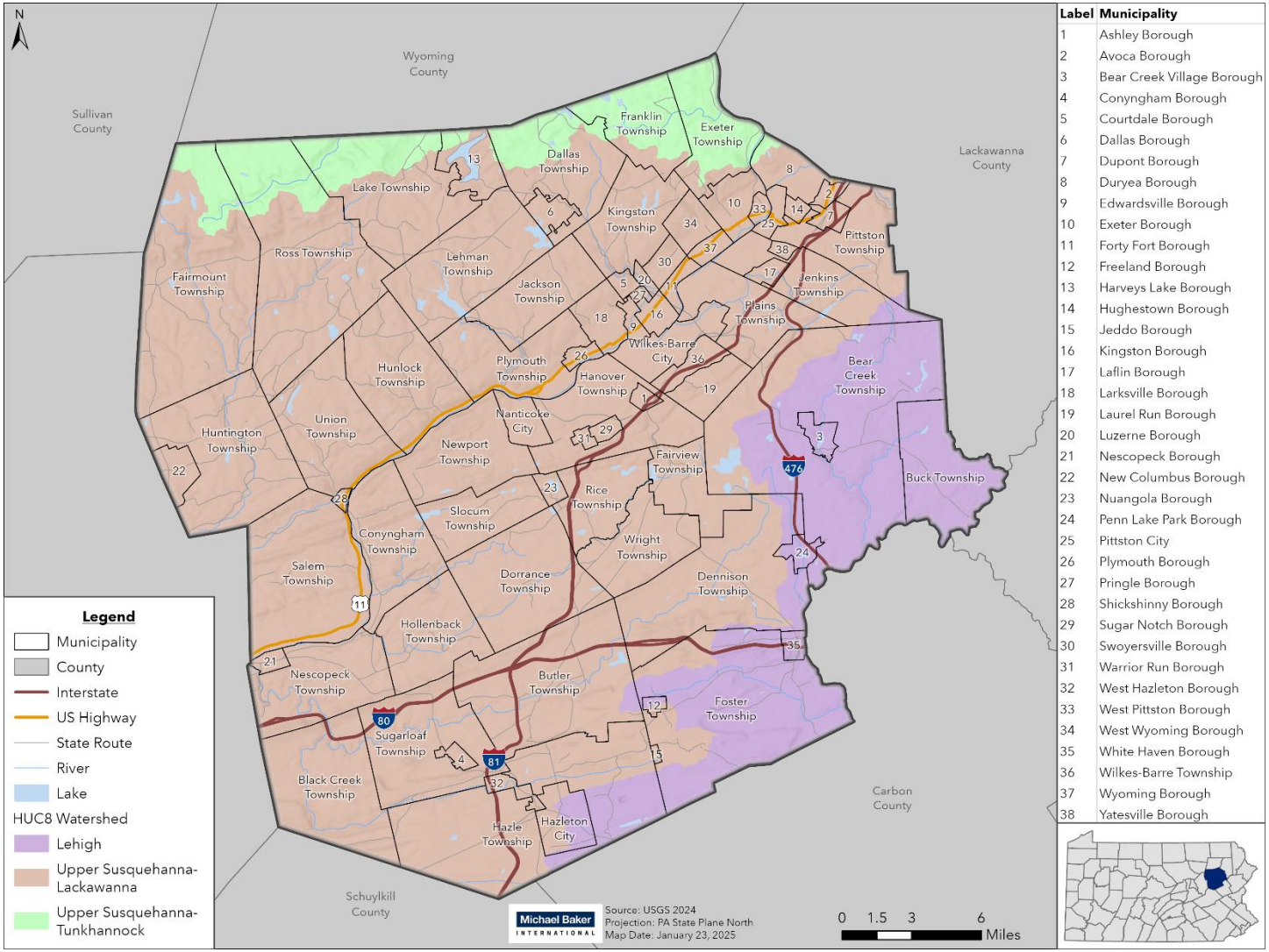


Figure 2.1-2 Luzerne County Watersheds



Label	Municipality
1	Ashley Borough
2	Avoca Borough
3	Bear Creek Village Borough
4	Conyngham Borough
5	Courtdale Borough
6	Dallas Borough
7	Dupont Borough
8	Duryea Borough
9	Edwardsville Borough
10	Exeter Borough
11	Forty Fort Borough
12	Freeland Borough
13	Harveys Lake Borough
14	Hughestown Borough
15	Jeddo Borough
16	Kingston Borough
17	Laflin Borough
18	Larksville Borough
19	Laurel Run Borough
20	Luzerne Borough
21	Nescopeck Borough
22	New Columbus Borough
23	Nuangola Borough
24	Penn Lake Park Borough
25	Pittston City
26	Plymouth Borough
27	Pringle Borough
28	Shickshinny Borough
29	Sugar Notch Borough
30	Swoyersville Borough
31	Warrior Run Borough
32	West Hazleton Borough
33	West Pittston Borough
34	West Wyoming Borough
35	White Haven Borough
36	Wilkes-Barre Township
37	Wyoming Borough
38	Yatesville Borough

2.2. COMMUNITY FACTS

Luzerne County was formed on September 25, 1786 from part of Northumberland County and named for the Chevalier de la Luzerne, French minister to the United States. Wilkes-Barre, the county seat, was laid out in 1772 and named for two members of the English Parliament, John Wilkes and Isaac Barré, both advocates of American rights. It was incorporated as a borough on March 17, 1806 and as a city on May 4, 1871 (PHMC, 2024). There are twelve public school districts throughout the County: Berwick Area, Crestwood, Dallas, Greater Nanticoke Area, Hanover Area, Hazleton Area, Lake-Lehman, Northwest Area, Pittston Area, Wilkes-Barre Area, Wyoming Area, and Wyoming Valley West School Districts. Further, there are two technical schools: West Side Area Vocational Technical School and Wilkes-Barre Area Vocational Technical School. The County is also home to seven colleges and universities: King's College Pennsylvania, Lackawanna College, Luzerne County Community College, Misericordia University, Penn State Hazleton, Penn State Wilkes-Barre, and Wilkes University (Luzerne County, 2024).

2.3. POPULATION AND DEMOGRAPHICS

The demographics of a community reflect how a community has evolved in the past and influences where a community wants to develop in the future. The past population trends and projections as well as the employment characteristics help us to better understand the socio-economic characteristics that have and will continue to shape the future of Luzerne County. Some of Luzerne County's demographic characteristics have been examined to provide an insight on how the community has changed over time.

The population of Luzerne County in 2023 is estimated at 325,978. The following table provides a distribution of County population by municipality obtained from the 2023 U.S. Census Bureau's American Community Survey (ACS) 5-year population estimate data. As shown in the table below, the population increased by 2.1% between 2010 and 2023. Six municipalities have decreases greater than 15%; Courtdale Borough, Hunlock Township, Newport Township, Nuangola Borough, Shickshinny Borough, and Warrior Run Borough. The population decrease in Newport Township was influenced by the closure of the State Correctional Institution (SCI) Retreat in 2020. This correctional facility housed up to 1,200 inmates at a time and employed about 400 people. Seven municipalities had population increases greater than 15%: Bear Creek Village Borough, Exeter Township, Hazleton City, Jeddo Borough, New Columbus Borough, Rice Township, and West Hazleton Borough. A comparison showed little change in the overall population estimates with a total of 324,825 in 2021, 325,396 in 2022 and 325,978 in 2023 (U.S. Census Bureau, ACS, 2023).

Table 2.3-1 Population in Luzerne County by municipality (U.S. Census Bureau, ACS, 2023)

MUNICIPALITY	2010 POPULATION	2023 POPULATION	PERCENT CHANGE (%)
Ashley Borough	2,792	2,599	-6.9%
Avoca Borough	2,677	2,523	-5.8%
Bear Creek Township	2,726	2,761	1.3%

Table 2.3-1 Population in Luzerne County by municipality (U.S. Census Bureau, ACS, 2023)

MUNICIPALITY	2010 POPULATION	2023 POPULATION	PERCENT CHANGE (%)
Bear Creek Village Borough	258	356	38.0%
Black Creek Township	1,947	1,699	-12.7%
Buck Township	302	284	-6.0%
Butler Township	8,806	9,694	10.1%
Conyngham Borough	1,811	1,639	-9.5%
Conyngham Township	1,325	1,328	0.2%
Courtdale Borough	741	596	-19.6%
Dallas Borough	2,765	2,702	-2.3%
Dallas Township	8,808	9,139	3.8%
Dennison Township	1,225	1,107	-9.6%
Dorrance Township	1,961	2,185	11.4%
Dupont Borough	2,704	2,545	-5.9%
Duryea Borough	4,844	5,054	4.3%
Edwardsville Borough	4,801	4,917	2.4%
Exeter Borough	5,686	5,514	-3.0%
Exeter Township	2,231	2,569	15.2%
Fairmount Township	1,356	1,285	-5.2%
Fairview Township	4,412	4,704	6.6%
Forty Fort Borough	4,255	4,235	-0.5%
Foster Township	3,423	3,434	0.3%
Franklin Township	1,847	1,748	-5.4%
Freeland Borough	3,535	3,830	8.3%
Hanover Township	11,105	11,449	3.1%
Harveys Lake Borough	2,769	2,800	1.1%
Hazle Township	9,380	10,184	8.6%
Hazleton City	24,877	29,886	20.1%
Hollenback Township	1,031	1,144	11.0%
Hughestown Borough	1,330	1,461	9.8%
Hunlock Township	2,860	2,154	-24.7%
Huntington Township	2,086	1,979	-5.1%
Jackson Township	4,581	4,413	-3.7%
Jeddo Borough	108	148	37.0%
Jenkins Township	4,447	4,353	-2.1%
Kingston Borough	13,244	13,333	0.7%
Kingston Township	6,999	7,113	1.6%
Laflin Borough	1,530	1,469	-4.0%
Lake Township	2,052	1,935	-5.7%
Larksville Borough	4,516	4,248	-5.9%
Laurel Run Borough	491	480	-2.2%
Lehman Township	3,472	3,374	-2.8%
Luzerne Borough	2,853	2,720	-4.7%

Table 2.3-1 Population in Luzerne County by municipality (U.S. Census Bureau, ACS, 2023)

MUNICIPALITY	2010 POPULATION	2023 POPULATION	PERCENT CHANGE (%)
Nanticoke City	10,492	10,610	1.1%
Nescopeck Borough	1,665	1,475	-11.4%
Nescopeck Township	1,120	1,082	-3.4%
New Columbus Borough	225	273	21.3%
Newport Township	5,287	4,460	-15.6%
Nuangola Borough	994	743	-25.3%
Penn Lake Park Borough	339	343	1.2%
Pittston City	7,774	7,618	-2.0%
Pittston Township	3,364	3,200	-4.9%
Plains Township	10,066	9,852	-2.1%
Plymouth Borough	6,012	5,761	-4.2%
Plymouth Township	1,738	1,622	-6.7%
Pringle Borough	938	920	-1.9%
Rice Township	3,158	3,675	16.4%
Ross Township	2,886	2,729	-5.4%
Salem Township	4,208	4,030	-4.2%
Shickshinny Borough	868	627	-27.8%
Slocum Township	925	1,035	11.9%
Sugarloaf Township	4,049	3,913	-3.4%
Sugar Notch Borough	1,089	977	-10.3%
Swoyersville Borough	5,061	5,014	-0.9%
Union Township	2,179	2,032	-6.7%
Warrior Run Borough	642	493	-23.2%
West Hazleton Borough	4,410	5,156	16.9%
West Pittston Borough	4,886	4,645	-4.9%
West Wyoming Borough	2,735	2,653	-3.0%
White Haven Borough	1,049	985	-6.1%
Wilkes-Barre City	41,595	44,217	6.3%
Wilkes-Barre Township	3,004	3,205	6.7%
Wright Township	5,617	5,716	1.8%
Wyoming Borough	3,082	3,111	0.9%
Yatesville Borough	694	716	3.2%
Total	**319,120**	**325,978**	**2.1%**

The population of Luzerne County is concentrated around the Susquehanna River and the surrounding municipalities. There are also greater concentrations around each of the four cities in Luzerne County. Luzerne County has historically experienced varying increases and decreases of persons per decade since 1920. The greatest increase was 54,000 people from 1920 to 1930. The greatest population decrease was 49,000 people from 1950 to 1960.

According to the 2023 ACS, the median income of households in Luzerne County is $62,321. This is approximately $18,289 less than the national median household income and $13,760 less than the median household income in Pennsylvania. This is exemplified by 15.4% of the Luzerne County population living in poverty compared to 11.8% of Pennsylvania's population. In Luzerne County 24.9% of children under 18 are below the poverty line, compared with 10.2% of people 65 years or older. The median age of the County population is 42.1 years with 20.3% of the population under 18 years of age and 19.9% of the population aged 65 years or older. Approximately 64.1% of housing units in the County are single-unit structures, 19.3% are multi-unit structures, and 3.1% are mobile homes. The median monthly housing costs are $1,407 for mortgaged homeowners and $602 for non-mortgaged owners and the median rent is $958 per month whereas Pennsylvania averages $1,722 and $630 respectively. In terms of race and ethnicity, 78.3% of the population is White, 15.9% is Hispanic, 5.2% of the population is African American, and 1.1% is Asian. The top five reported ancestries are Polish, Irish, Italian, German, and English (U.S. Census Bureau, ACS, 2023).

Countywide population is expected to increase in the future, despite the recent slight decrease. Population projections issued by the Center for Rural Pennsylvania in October 2023 show a trend in population gain for the County as a whole, as shown in Table 2.3-2. These are the most current population projections. They show smaller growth than the 2015 PA DEP report that was used in the previous plan, potentially due to the use of 2020 Census data that showed there was population decline, as opposed to growth like the 2015 estimates projected.

While these latest projections show smaller growth, they do still project that Luzerne County will be one of only a handful of counties in the state that are projected to grow between 2020 and 2050 with a 3.6% population increase. The report also states that urban areas will experience the most growth across the state while rural areas are projected to decline in population. This will likely result in increased development pressure on urbanized areas such as those near Wilkes-Barre, Nanticoke, and Hazleton. It is important to note that these population figures are projections only and are derived from birth rates, death rates, and migration information and may not fully capture population dynamics.

Table 2.3-2 Luzerne County Population Data and Projections (U.S. Census Bureau, 2023; Center for Rural Pennsylvania, 2023)

DATA	POPULATION	PERCENT CHANGE
2000 Census	318,842	<1%
2010 Census	319,120	
Percent Change 2000 – 2010		
2020 Census	325,396	1.9%
Percent Change 2010 – 2020		
2030 Projection	331,038	1.8%
Percent Change 2020 – 2030		
2040 Projection	334,017	2.7%
Percent Change 2020 – 2040		

Table 2.3-2 Luzerne County Population Data and Projections (U.S. Census Bureau, 2023; Center for Rural Pennsylvania, 2023)

DATA	POPULATION	PERCENT CHANGE
2050 Projection	336,757	3.6%
Percent Change 2020 – 2050		

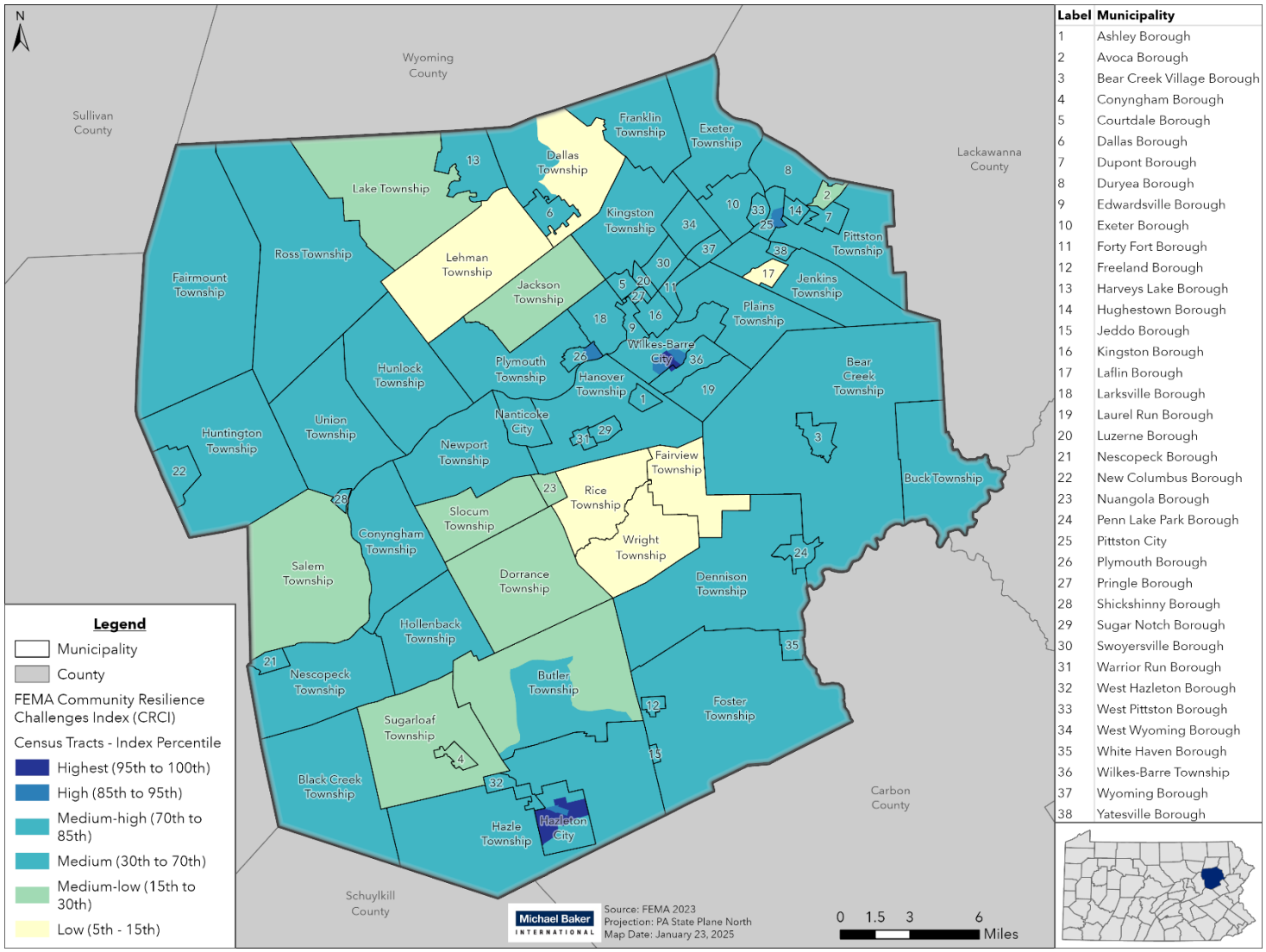
2.4. EQUITY IN HAZARD MITIGATION PLANNING

When planning for natural disasters or other hazardous events, accounting for underserved and socially vulnerable communities through an equitable approach is critical for minimizing negative impacts. Underserved communities refers to populations sharing a particular characteristic, as well as geographic communities that have historically been systematically denied a full opportunity to participate in aspects of economic, social and civic life. Social vulnerability is understood as the potential for loss within an individual or social group, recognizing that some characteristics influence an individual's or group's ability to prepare, respond, cope or recover from an event. These characteristics can overlap within populations to create heightened vulnerability, which may be compounded by infrastructure deficiencies within communities and historic or existing discriminatory government policies. Looking at these communities through an equitable approach consists of ensuring the fair and just distribution of resources, opportunities, and support tailored to meet the unique needs of different groups ensuring that everyone has the opportunity to thrive.

Luzerne County has census tracts that range from low to high in terms of challenges according to FEMA's Community Resilience Challenges Index (CRCI), as shown in Figure 2.4-1. Table 2.4-1 provides details on the challenges faced by census tracts within higher percentiles. The CRCI uses the following 22 indicators:

- Population
  - No High School Diploma
  - Age 65 or older
  - Disabilities
- Household
  - No vehicle
  - Limited English
  - Single Parent Households
  - No Smartphone
- Housing
  - Mobile Home Share
  - Owner-Occupied Housing
- Healthcare
  - Number of Hospitals
  - Medical Professionals per 1,000
  - Population without Insurance
- Economic
  - Unemployment
  - Income Inequality
  - Median Household Income
  - Unemployed Women
  - Population Below Poverty Level
  - Employment in Predominant Sector
- Connection to Community
  - Inactive Voters
  - Civic and Social Organizations
  - No Religious Affiliation
  - Population Change

Figure 2.4-1 FEMA Community Resilience Challenges Index (CRCI) Census Tracts in Luzerne County



Label	Municipality
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5	Courtdale Borough
6	Dallas Borough
7	Dupont Borough
8	Duryea Borough
9	Edwardsville Borough
10	Exeter Borough
11	Forty Fort Borough
12	Freeland Borough
13	Harveys Lake Borough
14	Hughestown Borough
15	Jeddo Borough
16	Kingston Borough
17	Laflin Borough
18	Larksville Borough
19	Laurel Run Borough
20	Luzerne Borough
21	Nescopeck Borough
22	New Columbus Borough
23	Nuangola Borough
24	Penn Lake Park Borough
25	Pittston City
26	Plymouth Borough
27	Pringle Borough
28	Shickshinny Borough
29	Sugar Notch Borough
30	Swoyersville Borough
31	Warrior Run Borough
32	West Hazleton Borough
33	West Pittston Borough
34	West Wyoming Borough
35	White Haven Borough
36	Wilkes-Barre Township
37	Wyoming Borough
38	Yatesville Borough

Table 2.4-1 Underserved and Socially Vulnerable Census Tracts in Luzerne County (FEMA, 2024)

CENSUS TRACT	MUNICIPALITY	CHALLENGE PERCENTILE	HIGH INDICATORS *(OUT OF 22 TOTAL INDICATORS)*
2127	Kingston Township	76.5	Single Parent, Low Owner-Occupied Housing,
2112.05	Dallas Township	77.6	Over 65, No Smartphone, Unemployment in a Predominant Sector, Income Inequality
2171	Hazleton City	77.9	No High School Diploma, Single Parent, Low Owner-Occupied Housing, Medical Professional Capacity, Uninsured
2177	Hazleton City	78.7	Limited English, No Smartphone, Uninsured
2001	Wilkes-Barre City	79.1	No Vehicle, No Smartphone, Low Owner-Occupied Housing, Medical Professional Capacity, Unemployment in a Predominant Sector
2118	Plains Township	79.3	Single Parent, Mobile Homes, Unemployed Women
2141	Nanticoke City	80.0	Disability, Single Parent, Low Owner-Occupied Housing, Medical Professional Capacity, Income Inequality
2132	Edwardsville Borough	80.6	Single Parent, Low Owner-Occupied Housing, Unemployment
2178	Hazleton City	81.5	No High School Diploma, Limited English, Single Parent, Low Owner-Occupied Housing
2011	Wilkes-Barre City	82.7	No High School Diploma, Low Owner-Occupied Housing, Unemployed Women
2170.02	Hazleton City	82.9	Over 65, No Smartphone, Poverty, Income Inequality
2151	Ashley Borough	83.8	Disability, Single Parent, Medical Professional Capacity, Poverty, Income Inequality
2108	Pittston Township, Hughestown Borough	86.4	Disability, No Vehicle, Single Parent, No Smartphone, Low Owner-Occupied Housing, Medical Professional Capacity
2136	Plymouth Borough	88.4	Single Parent, No Smartphone, Low Owner-Occupied Housing, Medical Professional Capacity, Unemployed Women
2008	Wilkes-Barre City	89.7	No Vehicle, Single Parent, No Smartphone, Low Owner-Occupied Housing, Medical Professional Capacity, Poverty
2175	Hazleton City	92.5	No High School Diploma, Limited English, Single Parent, Low Owner-Occupied Housing, Medical Professional Capacity

Table 2.4-1 Underserved and Socially Vulnerable Census Tracts in Luzerne County (FEMA, 2024)

CENSUS TRACT	MUNICIPALITY	CHALLENGE PERCENTILE	HIGH INDICATORS *(OUT OF 22 TOTAL INDICATORS)*
2010	Wilkes-Barre City	94.0	No Vehicle, Single Parent, Low Owner-Occupied Housing, Poverty, Unemployment, Income Inequality
2172	Hazleton City	95.2	No High School Diploma, No Vehicle, Limited English, Low Owner-Occupied Housing, Medical Professional Capacity, Uninsured, Unemployment in a Predominant Sector
2174	Hazleton City	97.7	No High School Diploma, Disability, No Vehicle, Limited English, Low Owner-Occupied Housing, Medical Professional Capacity, Poverty, Unemployed Women, Unemployment in a Predominant Sector
2009	Wilkes-Barre City	97.9	No Vehicle, Low Owner-Occupied Housing, Poverty, Unemployment, Unemployed Women, Income Inequality
2176	Hazleton City	97.9	No High School Diploma, Disability, Limited English, Single Parent, Low Owner-Occupied Housing, Medical Professional Capacity, Unemployed Women, Unemployment in a Predominant Sector, Income Inequality

The map and table show the most vulnerable census tracts, but each census tract in the county is impacted by many of the 22 indicators in the CRCI. In Luzerne County 21 out of 101 census tracts have a risk factor more over 75%. All census tracts in the county are impacted by at least 19 of the 22 factors. It is important for municipalities to be aware of and understand their vulnerable populations. In each hazard profile, municipalities with communities that may be particularly vulnerable to the hazard's impacts are identified.

Incorporating equity into mitigation plans ensures that these populations receive the attention and resources necessary to reduce their risk and enhance their resilience. This approach not only addresses existing social inequalities but also leads to more effective and sustainable disaster management outcomes, ensuring that all communities have the opportunity to thrive in the face of adversity.

To adequately target these underserved communities, targeted outreach was a fundamental part of the County's hazard mitigation plan. Appendix I – Outreach and Engagement Plan discusses the HMSC's work to identify underserved communities using local knowledge and tools. In addition to locating these communities, the HMSC met with organizations that represent and work with these communities to better understand the services they provide and

the populations that utilize them. Equity tools published by FEMA simultaneously helped to corroborate findings from the outreach plan.

2.5. LAND USE AND DEVELOPMENT

The Lackawanna-Luzerne Joint Comprehensive Plan lays out a Land Use Plan to guide development and redevelopment in the bi-county region through the year 2040 (Figure 2.5-1 shows the cover of the plan). Over the past decade, the region has seen an estimated 85,000 acres of development and the region is projected to continue to grow further. The Land Use Plan identifies urban centers, primary growth areas (PGAs), secondary growth areas (SGAs), preservation areas, and rural living areas (RLAs) for future County development.

Figure 2.5-1 Cover of the Lackawanna-Luzerne Counties Joint Comprehensive Plan & Long Range Transportation Plan (2021)

Urban Centers include the city and borough downtown areas, and the densely developed neighborhoods that surround them (such as Scranton or Wilkes-Barre). Future land use patterns in Urban Centers focus on pedestrian safety, accessibility, green infrastructure/renewable energy, arts/entertainment/leisure uses and events, and multi-modal opportunities. Urban Centers should not be less than 12 residential units per buildable acre. Zoning in Urban Centers is encouraged to allow higher-density multi-story, mixed use and/or apartment buildings.

In the overall land use framework, the majority of future growth will be within PGAs, while SGAs will have a much smaller proportion of total growth over the next 10 years. PGAs are areas where future growth and development is prioritized, which consists of mostly already developed land concentrated along the Susquehanna River and near Hazleton. Target densities in the PGAs should be 6 dwelling units per buildable acre or greater. Structures should consist of mixed-use buildings, multifamily units, shared parking on lots that permit multiple commercial uses and buildings with tight footprints. Further, there should be an emphasis on multimodal

transportation networks with infrastructure to safely accommodate pedestrians, bicyclists, transit, and vehicles and that builds strong connections between neighborhoods and other facilities/services. SGAs are identified in or around emerging employment centers in the region, such as the surrounding area of Dallas and Nescopeck. The locations of the SGAs correspond with growth in the transportation and warehousing industries and the expansion of new industrial parks. Target densities for new development in the SGAs should be 4 dwelling units per buildable acre or greater. Structures should incorporate mixed-use buildings, shared parking, and lots that permit multiple commercial uses and buildings on tight footprints. Additionally, there should be walkable, compact development supporting inclusive neighborhoods and may include regional recreation and park systems.

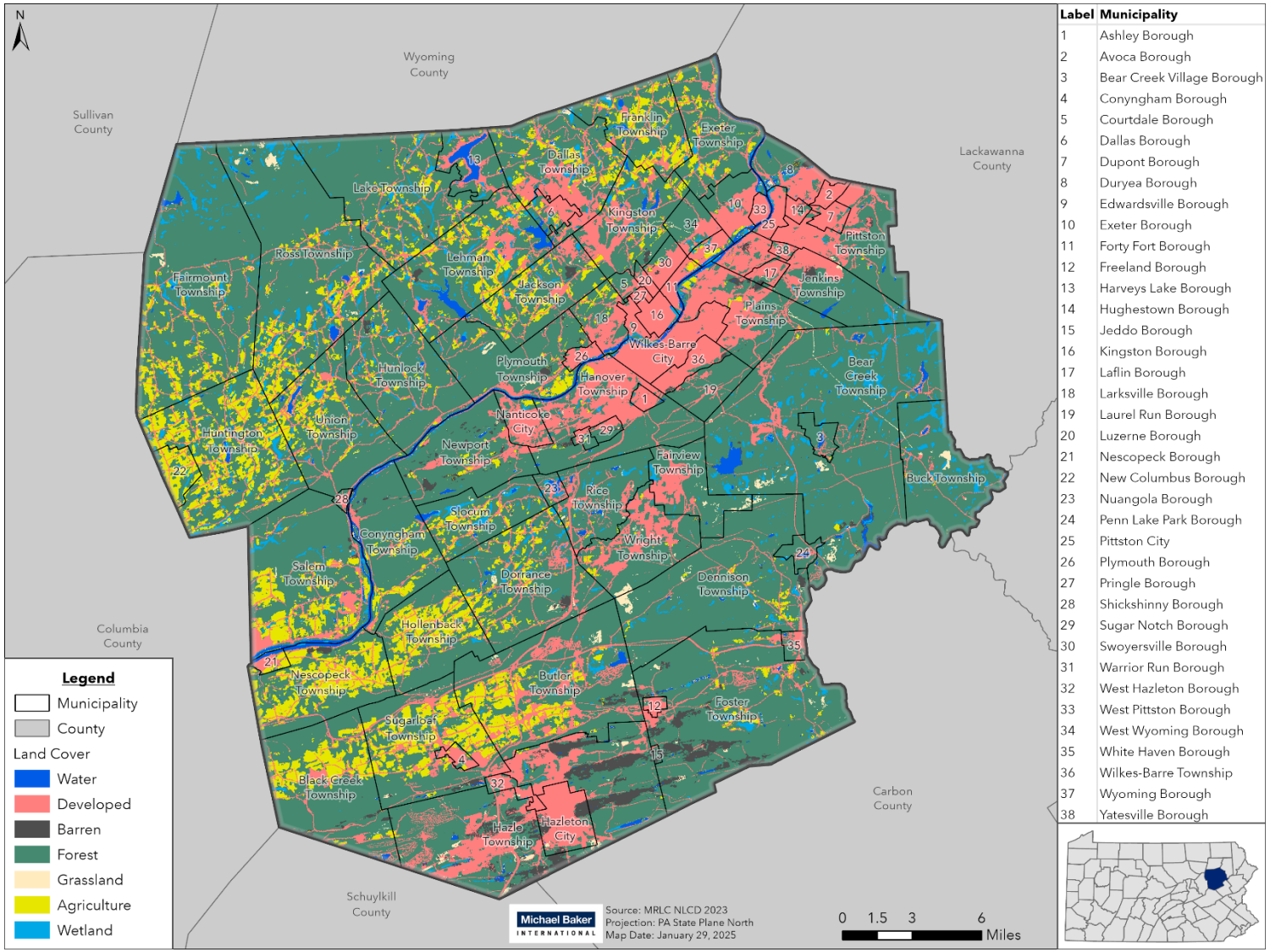
Preservation Areas include stream corridors, floodplain areas, state parks and game lands, preserved farms, active farm parcels containing prime agricultural soils, pending farm parcels seeking Agricultural Easement Purchase, and municipalities containing a large number of active farm operations. Future land use patterns in the Preservation Areas involve retention and maintenance of existing farmland. Additionally, municipal zoning and land use development codes should promote conservation of riparian corridors and floodplain areas to better retain and improve water quality.

RLAs accommodate existing large lot residential development as well as industrial, renewable energy land uses, large farm operations, farm homesteads, large and small farm businesses, farm markets, and other farm industry uses. Rural neighborhoods or hamlets, rural business centers, and "on-farm" development are typical in this landscape. Rural neighborhoods should be limited in scale and should incorporate conservation subdivision design principles and include a clear development edge. Rural business centers may exist in areas where agricultural support services, mineral extraction, or where existing industrial uses occur. Rural neighborhoods should maintain a separation distance from existing farms to limit negative impacts related to business operations. Municipalities are encouraged to refrain from permitting large-lot (1-3 acres) residential development. Various zoning techniques are encouraged to reduce suburban sprawl and other non-agricultural development.

The goals of this plan are to improve existing urban spaces, reduce urban vacancy rates, support growth in PGAs and SGAs, reduce/prevent suburban sprawl, and continue to preserve open/recreational/agricultural land from development. PGAs identify specific areas in Luzerne County that should be used for growth and development first. An additional discussion of future land development and how it interacts with hazards is provided in Section 4.4.4.

According to the 2021 Lackawanna-Luzerne Joint Comprehensive Plan, the general land use in in the County as of 2020 is classified 57.1% agricultural/open space/recreation, 17.2% rural residential, 14% suburban development, 6.2% urban development, 2.4% urban core, and 3.1% industrial. The majority of land in Luzerne County is agricultural or forested. Most development is concentrated along the Susquehanna River, which runs southwest through the County, entering near the City of Pittston. Figure 2.5-2 illustrates the existing general land use in the County.

Figure 2.5-2 Current Land Uses in Luzerne County



Label	Municipality
1	Ashley Borough
2	Avoca Borough
3	Bear Creek Village Borough
4	Conyngham Borough
5	Courtdale Borough
6	Dallas Borough
7	Dupont Borough
8	Duryea Borough
9	Edwardsville Borough
10	Exeter Borough
11	Forty Fort Borough
12	Freeland Borough
13	Harveys Lake Borough
14	Hughestown Borough
15	Jeddo Borough
16	Kingston Borough
17	Laflin Borough
18	Larksville Borough
19	Laurel Run Borough
20	Luzerne Borough
21	Nescopeck Borough
22	New Columbus Borough
23	Nuangola Borough
24	Penn Lake Park Borough
25	Pittston City
26	Plymouth Borough
27	Pringle Borough
28	Shickshinny Borough
29	Sugar Notch Borough
30	Swoyersville Borough
31	Warrior Run Borough
32	West Hazleton Borough
33	West Pittston Borough
34	West Wyoming Borough
35	White Haven Borough
36	Wilkes-Barre Township
37	Wyoming Borough
38	Yatesville Borough

2.6. DATA SOURCES AND LIMITATIONS

Gathering and analyzing new data about natural hazards and the community was critical to the process of updating the plan. The Luzerne County Geographic Information System (GIS)/Mapping Department provided many datasets to inform the plan: https://www.luzernecounty.org/234/GISMapping. These datasets include land use, building points, parcels with their assessed value and more.

Luzerne County's Effective Flood Insurance Rate Map (FIRM) (issued on June 20, 2024) was downloaded from FEMA's Flood Map Service Center: https://msc.fema.gov/portal/home. This data provides flood frequency and elevation information used in the flood hazard risk assessment.

Additional spatial data was provided by the Pennsylvania Department of Conservation and Natural Resources (DCNR), the Pennsylvania Department of Transportation (PennDOT) and other state agencies. Numerous GIS datasets were obtained from the Pennsylvania Spatial Data Access (PASDA) website: http://www.pasda.psu.edu/. PASDA is the official public access geospatial information clearinghouse for the Commonwealth of Pennsylvania. PASDA was developed by Penn State as a service to the citizens, governments, and businesses of the Commonwealth. PASDA is a cooperative project of the Governor's Office of Administration, Office for Information Technology, Geospatial Technologies Office and the Penn State Institutes of Energy and the Environment of the Pennsylvania State University.

Population and demographic data from the 2020 Decennial Census and 2019-2023 ACS five-year estimates were obtained from the U.S. Census Bureau. Additional information used to complete the risk assessment for this plan was taken from various government agency and non-government agency sources. Those sources are cited where appropriate throughout the plan and on each map with full references listed in Appendix A – Bibliography.

In order to assess the vulnerability of different jurisdictions to the hazards, hazard data from the National Centers for Environmental Information (NCEI) database was utilized. NCEI is a division of the US Department of Commerce's National Oceanic and Atmospheric Administration (NOAA). Information on hazard events is compiled by NCEI from data gathered by the National Weather Service (NWS), another division of NOAA. NCEI then presents it on its website in

Luzerne County considers twenty-one types of facilities critical: or essential to the health and welfare of the community:

- Airports
- Arenas/Event Venues
- Bridges
- Communication Facilities
- Dams
- Day Cares
- Electric Power Facilities
- Emergency Shelters
- Emergency Operation Centers
- Fire Stations
- Medical Facilities
- Miscellaneous Facilities
- Natural Gas Facilities
- Nuclear Power Plants
- Nursing Homes
- Oil Facilities
- Personal Care Facilities
- Police Stations
- Schools
- TRI Facilities
- Water Treatment Facilities

various formats. The data used for this plan came from the U.S. Storm Events database, which "documents the occurrence of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce" (NOAA, 2025). The database currently contains hazard event data from January 1950 to May 2025. Other federal datasets came from USGS, the National Hurricane Center, and NOAA's Storm Prediction Center. High Hazard Potential Dam (HHPD) data was collected from PA DEP and USACE's National Dam Inventory (NDI) and incorporated into the Dam Failure profile (Appendix H). PA DEP provides information on dams and the County provides information from Emergency Action Plans including risk and population vulnerability. Students at Bloomsburg University also provided information and analysis, which is incorporated throughout the plan.

Hazus is a powerful risk assessment methodology for analyzing potential losses from floods, hurricane winds, and earthquakes. In Hazus, current scientific and engineering knowledge is coupled with the latest GIS technology to produce estimates of hazard-related damage before or after a disaster occurs. Version 7.0 of this software was used to estimate losses for floods in Luzerne County. For more information about the methodology employed to prepare the Hazus model and estimate losses, see Appendix F.

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

The hazard mitigation plan takes assets into consideration. The plan describes the vulnerability of assets to the identified hazards and looks at the risk that makes them susceptible to damage from the identified hazards. Assets considered include:

- People (including underserved communities and socially vulnerable populations).
- Structures (including facilities, lifelines and critical infrastructure).
- Systems (including networks and capabilities).
- Natural, historic, and cultural resources.
- Activities that have value to the community.

Assets were identified using multiple methods. One of those methods was through reviewing FEMA's community lifelines. FEMA community lifelines are essential services that enable the continuous operation of critical government and business functions, which are crucial for human health, safety, and well-being. These lifelines, which are listed in Figure 2.6-1, form the backbone of a community's resilience to disasters. Additionally, Community lifelines will serve as a focal point for assessing vulnerabilities and implementing strategies to minimize disruptions.

Figure 2.6-1 Community Lifelines

Safety and Security Law Enforcement/ Security, Fire Service, Search and Rescue, Government Service, Community Safety	Food, Hydration, Shelter Food, Hydration, Shelter, Agriculture	Health and Medical Medical Care, Public Health, Patient Movement, Medical Supply Chain, Fatality Management	Energy (Power & Fuel) Power Grid, Fuel
Communications Infrastructure, Responder Communications, Alerts Warnings and Messages, Finance, 911 and Dispatch	Transportation Highway/Roadway/ Motor Vehicle, Mass Transit, Railway, Aviation, Maritime	Hazardous Materials Facilities, HAZMAT, Pollutants, Contaminants	Water Systems Potable Water Infrastructure, Wastewater Management

This 2025 HMP Update evaluates the vulnerability of the County's critical facilities. For the purposes of this plan, critical facilities are those entities that are essential to the health and welfare of the community. The list of critical facilities was developed in conjunction with Luzerne County Department of Planning and Zoning, Luzerne County Department of Emergency Services, and Luzerne County GIS/Mapping Department. Critical facilities have been identified in Luzerne County to include twenty-one types of facilities essential to the health and welfare of the community. Table 2.6-1 summarizes the critical facilities in Luzerne County by type and data source. Table 2.6-2 provides a list of critical facility types with definitions. Table 2.6-3 summarizes critical facilities by municipality and type. For a complete listing of critical facilities and their vulnerability to individual hazards, please see Appendix E.

Several critical facility GIS datasets were obtained from the Department of Homeland Security's (DHS) Homeland Infrastructure Foundation-Level Data (HIFLD) Open data portal, and FEMA's

Comprehensive Data Management System (CDMS). The HIFLD Open data portal aggregates data from hundreds of regional and local data providers to compile national datasets of essential assets and infrastructure. As of 2025, this data portal provided access to over 400 national geospatial data layers within the open public domain (DHS HIFLD, 2025). FEMA's CDMS was used to gather geospatial data for additional types of critical facilities not compiled through the HIFLD Open Data portal. A component of FEMA's Hazus software, the CDMS allows users to export the default geospatial data that Hazus uses to estimate potential losses. This default geospatial data includes national data for essential facilities, high potential loss facilities, selected transportation and lifeline systems, agriculture, vehicles, and demographics. More information on the sources for the Hazus default data can be found at https://www.fema.gov/summary-databases-hazus-multi-hazard.

Table 2.6-1 Number of Critical Facilities in Luzerne County by Type and Data Source

TYPE	NUMBER IN COUNTY	DATA SOURCE
Airports	4	CDMS
Arenas/Event Venues	2	County
Bridges	1,299	PennDOT
Communication Facilities	28	CDMS
Dams	103	PA DEP
Day Cares	99	HIFLD
Electric Power Facility	10	CDMS
Emergency Shelter	69	County
Emergency Operation Center	9	CDMS, County
Fire Stations	92	CDMS
Hospitals and Medical	10	CDMS
Miscellaneous	11	County
Natural Gas Facility	1	CDMS
Nuclear Power Plants	1	County
Nursing Homes	27	HIFLD
Oil Facility	2	County
Personal Care Facility	19	HIFLD
Police Stations	50	CDMS
Schools	100	CDMS
Toxic Release Inventory Facility	33	EPA
Water Treatment Facilities	17	CDMS

Table 2.6-2 Types of Critical Facilities in Luzerne County

TYPE	DEFINITION	WHY IT IS CRITICAL
Airports	A place from which aircraft operate that usually has paved runways and maintenance facilities and often serves as a terminal.	Important for the movement of people and goods and services.
Arenas/Sporting Venues	Multi-purpose spaces. Hosts a wide variety of events (i.e. music, sports, etc.).	Could be used for shelter in the case of a hazard event.
Bridges	A structure carrying a road, path, railroad, or canal across a river, ravine, road, railroad, or other obstacle.	Important infrastructure for providing access to areas that may otherwise be inaccessible, and for connecting communities. May be critical for evacuation.
Communication Facilities	A system that transmits, receives, or relays communications, such as data, voice, or intelligence.	Necessary for the transmission of information across a community. Important means of distributing key information during a hazard event.
Dams	A barrier that stops or restricts the flow of surface water or underground streams.	Important infrastructure, providing flood protection, water supply reservoirs, hydroelectric power, and irrigation. Their failure may result in significant damage and loss of life.
Day Cares	An institution that provides supervision and care of infants and young children during the daytime.	Necessary for a community's economy by providing employment and for the day-to- day life for many families by providing care for children while parents go to work.
Electric Power Facilities	Facilities that generate electricity from various primary energy sources.	Consistent electricity supply keeps communities running.
Emergency Shelters	A place giving temporary protection from bad weather or danger.	Provide physical safety from hazards, including place to sleep, meals, access to clean clothes, and/or medical care or counseling. A place where many people may gather during a hazard event.
Emergency Operations Centers	A facility where emergency medical service (EMS) personnel are stationed or based out of, or where equipment that such personnel use in carrying out their jobs is stored for ready use.	Important for the storage and maintenance of EMS equipment.
Fire Stations	A facility where fire engines and other equipment of a fire department are housed.	Important for the storage and maintenance of firefighting equipment.

Table 2.6-2 Types of Critical Facilities in Luzerne County

TYPE	DEFINITION	WHY IT IS CRITICAL
Medical Facilities	A place where sick or injured people are given care or treatment.	Buildings where people may be present 24/7, provide important care services, and may serve as a local shelter.
Miscellaneous	Facilities that do not fit within the other categories on this list, but are important to the communities in the county.	Communities may have assets that are vital to their community that do not fit cleanly into any of the other categories. It is important to assess their risk and consider them in this planning process.
Natural Gas Facilities	Encompass the infrastructure used to gather, process, transport, store, and distribute natural gas, including pipelines, processing plants, storage facilities, and terminals	Consistent eneregy supply keeps communities running.
Nuclear Power Plants	Energy resource producing electricity.	Provides electricity to surrounding communities. Produces radioactive waste, which is dangerous to human health.
Nursing Homes	Residential care facilities that provide assistance to seniors.	Provide safety and shelter for vulnerable populations, especially those that require 24/7 care and monitoring.
Oil Facilities	Infrastructure used for oil and gas extraction, processing, and transportation, including platforms, production plants, pipelines, refineries, and storage facilities	Consistent eneregy supply keeps communities running.
Personal Care Facilities	Provides non-medical care, whereas nursing homes provide medical care.	Provide safety and shelter for vulnerable populations, especially those that require 24/7 care and monitoring.
Police Stations	A building which serves to accommodate police officers, other members of police staff, and their equipment.	Important for the storage and maintenance of emergency response equipment.
Schools	An institution for educating children.	Buildings where many people and young vulnerable populations are present during the day, may also serve as a local shelter.
Toxic Release Inventory (TRI) Facilities	A facility that stores toxic chemicals listed on the publicly available TRI database that may pose a threat to human health and the environment.	Provide safe storage of chemicals that are harmful to the environment and public health.
Water Treatment Facilities	A facility that collects and treats water to make it appropriate for a specific end-use.	Provides water for safe drinking, industrial supply, irrigation, river flow maintenance, and other needs.

Figure 2.6-3 Luzerne County Critical Facilities by Municipality and Type

MUNICIPALITY	AIRPORTS	ARENAS/EVENT VENUES	BRIDGES	COMMUNICATION FACILITIES	DAMS	DAY CARES	ELECTRIC POWER FACILITIES	EMERGENCY SHELTER	EMERGENCY OPERATIONS CENTERS	FIRE STATIONS	MEDICAL FACILITIES	MISCELLANEOUS FACILITIES	NATURAL GAS FACILITIES	NUCLEAR POWER PLANTS	NURSING HOMES	OIL FACILITIES	PERSONAL CARE FACILITIES	POLICE STATIONS	SCHOOLS	TRI FACILITIES	WATER TREATMENT FACILITIES	TOTAL
Ashley Borough	0	0	20	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	22
Avoca Borough	0	0	17	0	0	2	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	21
Bear Creek Township	0	0	34	2	10	0	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0	50
Bear Creek Village Borough	0	0	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Black Creek Township	0	0	30	2	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	35
Buck Township	0	0	6	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	9
Butler Township	0	0	76	1	2	1	0	3	0	1	0	0	0	0	1	0	0	1	1	0	1	88
Conyngham Borough	0	0	5	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	8
Conyngham Township	0	0	17	0	1	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	21
Courtdale Borough	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	5
Dallas Borough	0	0	6	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	11
Dallas Township	0	0	35	0	7	3	0	3	0	2	0	0	0	0	2	0	0	1	6	0	1	60
Dennison Township	0	0	25	0	3	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	30
Dorrance Township	0	0	45	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	49
Dupont Borough	0	0	25	0	0	0	0	3	1	1	0	0	0	0	0	1	0	1	0	0	0	32
Duryea Borough	0	0	5	0	3	0	0	1	0	2	0	2	0	0	0	0	0	1	1	1	1	17

Figure 2.6-3 Luzerne County Critical Facilities by Municipality and Type

MUNICIPALITY	AIRPORTS	ARENAS/EVENT VENUES	BRIDGES	COMMUNICATION FACILITIES	DAMS	DAY CARES	ELECTRIC POWER FACILITIES	EMERGENCY SHELTER	EMERGENCY OPERATIONS CENTERS	FIRE STATIONS	MEDICAL FACILITIES	MISCELLANEOUS FACILITIES	NATURAL GAS FACILITIES	NUCLEAR POWER PLANTS	NURSING HOMES	OIL FACILITIES	PERSONAL CARE FACILITIES	POLICE STATIONS	SCHOOLS	TRI FACILITIES	WATER TREATMENT FACILITIES	TOTAL
Edwardsville Borough	0	0	1	1	0	3	0	0	0	1	1	2	0	0	0	0	0	1	0	0	0	10
Exeter Borough	0	0	6	0	0	3	0	1	0	1	0	0	0	0	1	0	0	0	2	0	0	14
Exeter Township	0	0	20	0	1	0	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	26
Fairmount Township	0	0	40	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	42
Fairview Township	0	0	14	0	1	5	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	24
Forty Fort Borough	0	0	5	0	0	7	0	2	1	1	0	0	0	0	0	0	1	1	1	0	0	19
Foster Township	0	0	21	0	3	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	3	30
Franklin Township	0	0	16	0	5	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	22
Freeland Borough	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	1	1	0	0	5
Hanover Township	0	0	58	11	3	4	0	5	0	3	0	0	0	0	1	0	0	1	5	3	1	95
Harveys Lake Borough	0	0	8	0	2	1	0	0	0	1	0	0	0	0	1	0	0	1	1	0	0	15
Hazle Township	1	0	25	2	7	6	3	3	0	2	0	0	0	0	1	0	1	0	6	4	0	61
Hazleton City	0	0	2	1	0	7	0	3	0	3	1	0	0	0	2	0	2	1	6	1	0	29
Hollenback Township	0	0	17	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	18
Hughestown Borough	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	2	0	0	4
Hunlock Township	0	0	27	0	2	0	2	2	0	1	0	0	0	0	0	0	0	0	1	1	0	36
Huntington Township	0	0	46	0	4	1	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	54

Figure 2.6-3 Luzerne County Critical Facilities by Municipality and Type

MUNICIPALITY	AIRPORTS	ARENAS/EVENT VENUES	BRIDGES	COMMUNICATION FACILITIES	DAMS	DAY CARES	ELECTRIC POWER FACILITIES	EMERGENCY SHELTER	EMERGENCY OPERATIONS CENTERS	FIRE STATIONS	MEDICAL FACILITIES	MISCELLANEOUS FACILITIES	NATURAL GAS FACILITIES	NUCLEAR POWER PLANTS	NURSING HOMES	OIL FACILITIES	PERSONAL CARE FACILITIES	POLICE STATIONS	SCHOOLS	TRI FACILITIES	WATER TREATMENT FACILITIES	TOTAL
Jackson Township	0	0	30	0	2	0	0	0	0	1	0	2	0	0	0	0	0	1	0	0	0	36
Jeddo Borough	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Jenkins Township	0	0	12	0	3	0	0	0	0	1	0	0	0	0	1	0	0	1	0	3	0	21
Kingston Borough	0	0	8	0	0	4	0	2	0	1	1	0	0	0	3	0	4	1	9	0	0	33
Kingston Township	0	0	32	0	3	3	0	1	0	2	0	0	0	0	0	0	1	1	2	0	0	45
Laflin Borough	0	0	10	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	13
Lake Township	0	0	28	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29
Larksville Borough	1	0	7	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	12
Laurel Run Borough	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	4
Lehman Township	0	0	27	0	3	1	0	2	0	2	0	0	0	0	0	0	0	2	3	0	0	40
Luzerne Borough	0	0	7	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	12
Nanticoke City	0	0	7	1	0	2	0	3	1	4	0	0	0	0	1	0	0	1	5	1	0	26
Nescopeck Borough	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2
Nescopeck Township	0	0	28	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	30
New Columbus Borough	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
Newport Township	0	0	10	0	2	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	15
Nuangola Borough	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1

Figure 2.6-3 Luzerne County Critical Facilities by Municipality and Type

MUNICIPALITY	AIRPORTS	ARENAS/EVENT VENUES	BRIDGES	COMMUNICATION FACILITIES	DAMS	DAY CARES	ELECTRIC POWER FACILITIES	EMERGENCY SHELTER	EMERGENCY OPERATIONS CENTERS	FIRE STATIONS	MEDICAL FACILITIES	MISCELLANEOUS FACILITIES	NATURAL GAS FACILITIES	NUCLEAR POWER PLANTS	NURSING HOMES	OIL FACILITIES	PERSONAL CARE FACILITIES	POLICE STATIONS	SCHOOLS	TRI FACILITIES	WATER TREATMENT FACILITIES	TOTAL
Penn Lake Park Borough	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Pittston City	0	0	2	0	0	4	0	2	0	1	1	0	0	0	0	0	1	1	2	0	0	14
Pittston Township	1	0	30	1	0	1	0	0	0	2	0	0	0	0	0	1	0	1	0	0	1	38
Plains Township	0	1	45	1	4	5	1	3	1	2	2	0	0	0	2	0	4	1	4	2	1	78
Plymouth Borough	0	0	8	0	3	0	0	1	0	3	0	0	0	0	0	0	0	1	1	0	0	17
Plymouth Township	0	0	17	2	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	24
Pringle Borough	0	0	3	0	1	1	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	9
Rice Township	0	0	30	0	5	1	0	1	0	0	0	0	0	0	0	0	0	1	2	0	0	40
Ross Township	0	0	44	1	4	2	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	53
Salem Township	0	0	36	0	2	1	1	1	0	3	0	0	0	1	1	0	0	2	2	4	1	55
Shickshinny Borough	0	0	5	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	7
Slocum Township	0	0	10	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	13
Sugarloaf Township	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	5
Sugar Notch Borough	0	0	32	0	0	2	0	3	0	1	0	0	0	0	0	0	1	2	3	0	1	45
Swoyersville Borough	0	0	11	0	0	2	0	0	0	2	0	3	0	0	0	0	0	1	0	1	0	20
Union Township	0	0	26	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	32
Warrior Run Borough	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2

Figure 2.6-3 Luzerne County Critical Facilities by Municipality and Type

MUNICIPALITY	AIRPORTS	ARENAS/EVENT VENUES	BRIDGES	COMMUNICATION FACILITIES	DAMS	DAY CARES	ELECTRIC POWER FACILITIES	EMERGENCY SHELTER	EMERGENCY OPERATIONS CENTERS	FIRE STATIONS	MEDICAL FACILITIES	MISCELLANEOUS FACILITIES	NATURAL GAS FACILITIES	NUCLEAR POWER PLANTS	NURSING HOMES	OIL FACILITIES	PERSONAL CARE FACILITIES	POLICE STATIONS	SCHOOLS	TRI FACILITIES	WATER TREATMENT FACILITIES	TOTAL
West Hazleton Borough	0	0	3	0	0	2	0	1	0	1	0	0	0	0	1	0	0	2	1	2	0	13
West Pittston Borough	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	5
West Wyoming Borough	0	0	5	0	0	1	0	0	0	2	0	0	0	0	0	0	0	1	0	1	0	10
White Haven Borough	0	0	6	0	0	0	0	2	1	1	1	1	0	0	0	0	0	1	0	0	2	15
Wilkes-Barre City	0	0	47	1	2	14	0	7	1	3	2	0	0	0	4	0	2	1	17	2	1	105
Wilkes-Barre Township	0	1	27	0	0	1	0	0	0	1	1	0	0	0	1	0	0	1	0	0	0	33
Wright Township	0	0	21	0	1	2	0	1	1	1	0	0	0	0	2	0	0	1	2	7	0	39
Wyoming Borough	1	0	3	0	0	1	0	0	0	2	0	0	0	0	0	0	1	1	2	0	0	11
Yatesville Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Total	**4**	**2**	**1,299**	**28**	**103**	**99**	**10**	**69**	**9**	**92**	**10**	**11**	**1**	**1**	**27**	**2**	**19**	**50**	**100**	**33**	**17**	**1,986**

3. PLANNING PROCESS

3.1. UPDATE PROCESS SUMMARY

The Luzerne County HMP was originally developed in 2009 and was then updated and adopted for implementation in 2014 and 2020. The 2009, 2014, 2020 Plans and this updated 2025 Luzerne County HMP represent the work of many collaborators in developing a blueprint for protecting community assets, preserving the economic viability of the community, and saving lives. The current update to the 2020 HMP was initiated in November 2024. Michael Baker International assisted the County and its municipalities throughout the update process.

This 2025 HMP update was funded by a FEMA grant. The Luzerne County HMSC, consisting of Luzerne County Department of Planning and Zoning staff and Luzerne County Department of Emergency services staff, was responsible for the development of 2025 HMP Update in partnership with the Hazard Mitigation Planning Team (HMPT) that included representatives from the Luzerne County municipalities and other local and regional stakeholders. Specifically, the 2025 HMPT included stakeholders from the groups listed in Figure 3.1-1. A full list of stakeholders invited to participate is included in Appendix C – Meeting and Other Participation Documentation on pages 1,533 to 1,537. The contact list in Appendix C specifies which stakeholder category (1 through 5 listed in Figure 3.1-1) each contact falls within.

Figure 3.1-1 Luzerne County HMP Stakeholder Types

All 76 municipalities in Luzerne County were considered in the vulnerability assessment and the development of the Mitigation Strategy to address vulnerabilities. Details on the members of the HMSC and HMPT are included in Section 3.2 – The Planning Team.

To begin this process, Luzerne County Department of Planning and Zoning and Department of Emergency Services hosted an internal kick-off meeting with the contract support to begin the update process on November 12, 2024. During this meeting, attendees reviewed the Hazard Mitigation Planning process, as well as changes to that process promoted by FEMA's updated Local Mitigation Planning Policy Guide. Additionally, the attendees discussed the scheduling of HMSC, HMPT and public meetings and participation for the 2025 update process. Details on this and other meetings are included in **Section 3.3 – Meetings and Documentation**.

Detailed information about stakeholder participation is included in **Section 3.4 – Public & Stakeholder Participation**. The municipal involvement in developing the 2025 HMP Update is detailed in **Section 3.5 – Multi-Jurisdictional Planning**.

The HMSC used a number of worksheets to gather information from each municipality and participant in the planning process. These worksheets were designed to gather information about the hazards that affected the entire County, and how those hazards affected each of the municipalities, as well as information about the Mitigation Strategy. The use of these forms is detailed in **Section 3.3 – Meetings and Documentation** and the submitted forms are included in **Appendix C – Meeting and Other Participation Documentation**.

To clearly identify and document an approach for the planning process, the Luzerne County 2025 HMP Update Stakeholder Outreach and Engagement Strategy was developed. This strategy established methods for ongoing opportunities for input, collaboration, and feedback during the HMP update. There are two main sections of the strategy. The Plan Participant Identification section focuses on target audiences, HMSC roles and responsibilities, building the HMPT, public involvement and identifying and including underserved communities. The Outreach and Engagement Methods section focuses on key meetings and touchpoints and leveraging different outreach tools. This strategy can be referenced in **Appendix I – Outreach and Engagement Plan**.

The Outreach and Engagement Plan is new to the 2025 planning process, and it significantly informed how outreach was approached. The planning team focused a considerable amount of time on implementing the Outreach and Engagement Plan throughout the planning process. Details on how the Outreach and Engagement Plan was implemented through the planning process is documented in Section 3.2 – The Planning Team, **Section 3.3 – Meetings and Documentation, Section 3.4 – Public & Stakeholder Participation, Section 3.5 – Multi-Jurisdictional Planning, and Appendix C – Meeting and Other Participation Documentation**.

3.2. THE PLANNING TEAM

The HMSC was assembled to guide the overall direction of the HMP Update and make day-to-day decisions pertaining to its completion. Table 3.2-1 details the members of the 2025 HMSC.

Table 3.2-1 Luzerne County Hazard Mitigation Plan Steering Committee	
PARTICIPANT	TITLE
LUZERNE COUNTY DEPARTMENT OF PLANNING AND ZONING	
Daniel Reese	Interim Director
Robert Manzella	Transportation Planner
LUZERNE COUNTY DEPARTMENT OF EMERGENCY SERVICES	
Lucy Morgan	Director
David Elmore	Deputy Director
Charles Krommes	Emergency Management Planner
MICHAEL BAKER INTERNATIONAL	
Devon Benne	Project Manager
Samantha McClean	Deputy Project Manager

The HMPT assembled for the 2025 HMP included representatives from Luzerne County, the Luzerne County municipalities, and additional stakeholders representing the groups identified in Figure 3.1-1. The stakeholders listed in Table 3.2-2 served on the HMPT and actively participated in the planning process through attendance at meetings, completion of assessment surveys, or submission of comments. Participants representing multiple jurisdictions are listed more than once. Stakeholder and other participation documentation is provided in **Appendix C – Meeting and Other Participation Documentation**.

All 76 municipalities fully participated the hazard mitigation planning process. The participants listed in Table 3.2-2 served on the 2025 HMPT and actively participated in the planning process.

Table 3.2-2 Hazard Mitigation Planning Process Participation	
MUNICIPALITY/ORGANIZATION	PARTICIPANT(S)
MUNICIPALITIES	
Ashley Borough	Wes Saltz, Emergency Management Coordinator; Lisa Wildes, Borough Council Vice President
Avoca Borough	Kevin J. O'Brien, EMA Coordinator
Bear Creek Township	Don Totino, Engineer; Paula Wihbrecht, Secretary and Treasurer
Bear Creek Village Borough	Joe Farrell, Supervisor; Walter Mitchell, Mayor
Black Creek Township	Stephen Motil, Deputy Emergency Management Coordinator
Buck Township	Walter Poplawski, Engneer; Frank Sipple, Secretary
Butler Township	Alan Kost, Township Manager/Emergency Management Coordinator
Conyngham Borough	Lynn Falatko, Borough Manager; Alan Kost, Emergency Management Coordinator
Conyngham Township	Ed Whitebread, Board of Supervisors Chair/Secretary
Courtdale Borough	Carl Hodorowski, Council President
Dallas Borough	Tracey M. Carr, Borough Manager and Zoning Officer; David Landmesser, Deputy Emergency Management Coordinator; Harry Vivian, Emergency Management Coordinator

Table 3.2-2 Hazard Mitigation Planning Process Participation

MUNICIPALITY/ORGANIZATION	PARTICIPANT(S)
Dallas Township	Martin Barry, Township Manager; Rusty Coolbaugh, Zoning and Code Enforcement
Dennison Township	Kathleen Stewartz, Secretary/Treasurer
Dorrance Township	Kindra Kowalski, Emergency Management Coordinator; Peter Sakowski, Fire and Emergency Services
Dupont Borough	Joseph Jones, Emergency Management Coordinator
Duryea Borough	Keith Moss, Emergency Management Coordinator; Carolyn Santee, Borough Manager; Stephanie Shupp, Borough Council
Edwardsville Borough	David Saraka, Emergency Management Coordinator
Exeter Borough	Dave Balent, Borough Council; Rudy Forlenza, Planning Commission; Amy Sorokin Huntington, Borough Manager
Exeter Township	Dan Fetch Jr., Emergency Management Coordinator
Fairmount Township	Lyle Harvey, Secretary/Treasurer
Fairview Township	Abby Wasiakowski, Secretary/Treasurer
Forty Fort Borough	Thomas Craig, Emergency Management Coordinator; Lee Hampton, Code Enforcement Officer
Foster Township	Tom Barna, Engineer; Wendy Zubick, Secretary
Franklin Township	Rick Melvin, Secretary and Zoning Officer
Freeland Borough	Heather Donish, Secretary/Treasurer
Hanover Township	David Lewis, Emergency Management Coordinator; Dwayne Taggart, Deputy Emergency Management Coordinator; Joe Temarantz, Fire District Department Chief
Harveys Lake Borough	Allyson Barcheski, Secretary; David A. Delaney, Council President; Frank Parsons, Fie Chief
Hazle Township	Chuck Krone, Fire Inspector and Zoning Officer
Hazleton City	Donald Leshko, Fire Chief; Dan Lynch, Director of Administration
Hollenback Township	Kindra Kowalski, Emergency Management Coordinator
Hughestown Borough	Marie Griglock, Secretary; Jamie Merlino, Emergency Management Coordinator, Fire Chief
Hunlock Township	Kimberly Piestrak, Manager
Huntington Township	Karen Hilley, Secretary
Jackson Township	Jim Floryshak, Zoning and Code Enforcement Officer
Jeddo Borough	John Loforte, Emergency Management Coordinator
Jenkins Township	Jack Lasky, Emergency Management Coordinator
Kingston Borough	Adam Gober, Director of Public Works; Angela Salleni, Secretary
Kingston Township	Brynn Kukosky, Township Clerk; Fred Rosencrans, Township Manager; Bob Sarley, Building Maintenance and Emergency Management Coordinator

Table 3.2-2 Hazard Mitigation Planning Process Participation

MUNICIPALITY/ORGANIZATION	PARTICIPANT(S)
Laflin Borough	Marc Malvizzi, Emergency Management Coordinator
Lake Township	Carlene Price, Secretary; Jerry Price, Supervisor
Larksville Borough	Irene Valataka, Borough Manager
Laurel Run Borough	Justin Correll, Mayor; Shandra Kisailus, Borough Council President
Lehman Township	Laura Elderkin, Secretary; Doug Ide, Floodplain Manager; James Welby, Emergency Management Coordinator
Luzerne Borough	Nicole Lord, Secretary
Nanticoke City	Chet Prymowicz, Emergency Management Coordinator
Nescopeck Borough	Sheri Custer, Borough Secretary
Nescopeck Township	Carolyn Superko, Secretary
New Columbus Borough	Debbie Fink, Secretary/Treasurer
Newport Township	Jason Kowalski, Fire Chief and Emergency Management Coordinator
Nuangola Borough	Liz Trolio, Secretary/Treasurer; Joseph Tucker, Emergency Management Coordinator, Borough Council President
Penn Lake Park Borough	Corey Beltz, Council President
Pittston City	John Ankenbrand, Emergency Management Coordinator
Pittston Township	Tony Ranielli, Emergency Management Coordinator; Kyle Rozitski, Financial Administrator
Plains Township	Karen Rubasky, Zoning Officer; Michael VanLuvender, Emergency Management Coordinator
Plymouth Borough	Earl Cunningham, Emergency Management Coordinator; Bill Dixon, Borough Council Vice President
Plymouth Township	Gale Conrad, Board of Supervisors Chair; Steve Grzymai, Secretary/Treasurer
Pringle Borough	Karen Butler, Secretary
Rice Township	Bryan Brown, Emergency Management Coordinator
Ross Township	Miralie Cappucci, Supervisor/Secretary/Treasurer; Mark Hummel, Supervisor; David Pall, Emergency Management Coordinator
Salem Township	Tim Belles, Emergency Management Coordinator; Brian Wieners, Assistant Emergency Management Coordinator
Shickshinny Borough	Melissa Johns, Secretary
Slocum Township	Charles Herring, Emergency Management Coordinator
Sugar Notch Borough	Gloria Kijek, Borough Manager
Sugarloaf Township	Brian DeFlor, Deputy Emergency Management Coordinator; Joe DiSabella, Board of Supervisors

Table 3.2-2 Hazard Mitigation Planning Process Participation	
MUNICIPALITY/ORGANIZATION	PARTICIPANT(S)
	Chair; Duan Hildebrand, Fire Chief; Wendy Hildebrand, Emergency Management Coordinator; Henry Mleczynski, Zoning Officer
Swoyersville Borough	John Baker, Emergency Management Coordinator; Ray Mackiewicz, Zoning and Code Enforcement Officer
Union Township	Lori Ragazzo, Township Manager; Alan Sorber, Board of Supervisors Chair
Warrior Run Borough	Donna Tudgay, Borough Secretary
West Hazleton Borough	Scott Herring, Emergency Management Coordinator; Jim Schweitzer, Borough Manager
West Pittston Borough	Angelo Alfano, Mayor; Jim Borzena, Engineer; Ellen Quinn, Council President
West Wyoming Borough	Lee Hampton, Fire Chief
White Haven Borough	Linda Szoke, Borough Manager
Wilkes Barre City	Jay Delaney, Emergency Management Coordinator; Bill Harris, Director of Planning and Zoning; Alan Klapat, Deputy Fire Chief
Wilkes Barre Township	James Greech, Emergency Management Coordinator
Wright Township	Pamela Heard, Secretary; Ivan Pettit, Emergency Management Coordinator
Wyoming Borough	Joe Kopko, Emergency Management Coordinator
Yatesville Borough	Lorraine Rodeghiero, Secretary
OTHER STAKEHOLDERS	
Commonwealth University - Bloomsburg	Jennifer Haney, Associate Professor
Greater Pittston Chamber of Commerce	Michelle Mikitish, President
Hanover Area School District	Joe Gorham, Compliance Officer; Michael McCree, Athletic Director
Hickory Run State Park	Stacie Hall, Park Operations Manager
Luzerne Conservation District	Keith George, Conservation Coordinator
Luzerne County Department of Emergency Services	Brian Black, Quality Assurance and Training Coordinator; Tim Chase, Emergency Management Planning Specialist; Dave Elmore, Deputy Director; Chris Halecki, Training and Protocol Supervisor; Charlie Krommes, Emergency Management Planner; Lucy Morgan, Director; Ron Smith, HAZMAT Coordinator
Luzerne County Flood Protection Authority	Laura Holbrook, Deputy Director
Luzerne County GIS	Patrick Sine, Senior GIS Analyst
Luzerne County Manager's Office	Romilda Crocamo, County Manager
Luzerne County Office of Human Services	Megan Stone, Divison Head

Table 3.2-2 Hazard Mitigation Planning Process Participation

MUNICIPALITY/ORGANIZATION	PARTICIPANT(S)
Luzerne County Planning and Zoning	Dane Cooper, Planning and Zoning Analyst; Rob Manzella, Transportation Planner; Mattie Round, Planning and Zoning Analyst; Dan Reese, Interim Director
NieghborWorks Northeastern Pennsylvania	Ellen Holden, Aging in Place Specialist
PA American Water Company	Jeremy Nelson, Project Manager
Susquehanna River Basin Commission	Ben Pratt, Water Resources Engineer
Talen Energy	Jessica Shoup, Emergency Preparedness Supervisor
Commission on Economic Opportunity	Jen Warabak, CEO
Volunteers of America	Bill Jones, Assistant Vice President; Crystal Kotlowski VP
Luzerne County Human Services	Megan Stone, Divison Head
Luzerne County Children, Youth and Families	Katrina Gownley, Administrator
Luzerne/Wyoming Counties Mental Healt/ Developmental Services	Tara Fox, Administrator
Luzerne/Wyoming Counties Drug and Alcohol	Ryan Hogan, Administrator
Luzerne County Veterans Affairs	Kevin Clocker, Director
Luzerne/Wyoming Counties Area Agency on Aging	Mary Roselle, Director
Luzerne County Budget and Finance	Marty Roselle, Division Head

3.3. MEETINGS AND DOCUMENTATION

The following meetings were held during the plan update process. Meetings with an asterisk (*) were open to the public. Invitations, agendas, sign-in sheets, and minutes for these meetings are included in **Appendix C – Meeting and Other Participation Documentation**.

November 12, 2024 – Steering Committee Kick-Off Meeting: This meeting was held virtually and was attended by County representatives and the consultant to go over the planning process and major milestones including the schedule for HMPT meetings and anticipated HMP submission dates. The group also discussed planning requirements, relevant stakeholders, and the availability of geospatial data and other plans and documents for integration.

December 10, 2024 – HMSC Meeting: This meeting was held virtually and was attended by County representatives and the consultant to discuss logistics for the Kick-Off Meetings, scheduling the Risk Assessment meetings, reviewing the list of hazards and the plan review timeline.

December 10, 2024 – Kick-Off Meeting with PEMA and FEMA: This meeting was held virtually and was attended by County representatives, a PEMA representative, a FEMA representative and the consultant to discuss plan requirements and expectations, the project timeline, and logistics for making sure the County, PEMA and FEMA are all on the same page from the start of the process.

December 16 and 19, 2024 – HMPT Kick-Off Meetings (one in-person, one virtual): The in-person meeting was held in the morning at the Luzerne County Emergency Management Agency, and the virtual meeting was held in the evening to accommodate schedules and provide additional opportunity for participation. The meetings included discussion of project scope, schedule, the planning process, participation and engagement, and next steps. Roles and responsibilities, the planning process and community engagement were discussed. Email invitations were sent to each Luzerne County municipality, as well as other stakeholders spanning the five different types of required stakeholders (see Figure 3.1-1). Meeting attendees were asked to begin completing project forms, check out the project website and provide contact information for other stakeholders that should be included in the planning process.

January 7, 2025 – HMSC Meeting: This meeting was held virtually and was attended by County representatives and the consultant to discuss logistics for the Risk Assessment Meetings, scheduling the Open House, scheduling the Capability Assessment and Mitigation Strategy Workshops, provide an update on participation and confirm the addition of Extreme Temperatures and Environmental Hazards – Coal Mining to the Risk Assessment.

January 27 and 31, 2025 – Risk Assessment Meetings (one in-person, one virtual): The in-person meeting was held in the morning at the Luzerne County Emergency Management Agency, and the virtual meeting was held in the evening to accommodate schedules and provide additional opportunity for participation. These meetings were an opportunity to discuss local hazard risk and vulnerability, and to look at critical facilities and assets. These meetings were leveraged to help jurisdictions meet plan participation requirements. Meeting attendees were asked to complete risk assessment and asset forms. The project team also conducted targeted outreach to each municipality following this meeting for feedback on local risk and assets.

January 28, 2025 – Quarterly Training: The Luzerne County Department of Emergency Services discussed the hazard mitigation plan as a key topic at this quarterly meeting. The county provided an overview of the hazard mitigation plan and reviewed the different meeting touchpoints with attendees. Attendees were encouraged to participate in the planning process. Fourteen municipalities were in attendance.

February 4, 2025 – HMSC Meeting: This meeting was held virtually and was attended by County representatives and the consultant to discuss follow-up from the Risk Assessment Meetings, logistics for the Capability Assessment and Mitigation Strategy Workshops, and to discuss plan writing and review. The Introduction and Plan Adoption sections of the plan were shared with the Steering Committee for review.

February through March 2025 – Targeted Asset Coordination with Communities: The Steering Committee worked with each community to gather feedback on assets. Working time was provided during the in-person Risk Assessment Meeting to gather asset information from stakeholders in attendance. For those not in attendance, the Steering Committee sent targeted email correspondence to each municipality. These emails were leveraged to help confirm key critical facilities and Community Lifelines in each community and across the county.

March 10, 2025 – HMSC Meeting: This meeting was held in-person and was attended by County representatives and the consultant to discuss the capability assessment and mitigation strategy. The team reviewed the 2020 goals, 2020 county actions and developed a timeline for review.

March 10, 2025 – Public Open House*: An Open House was held in person to provide an opportunity for the public to review information on the plan, ask questions, and provide feedback. Resources were provided that detailed the hazard mitigation planning process, information on the current update, the schedule for upcoming Draft Plan Review meetings, and more. A short looping presentation was available for attendees to review, which provided a general overview on the hazard mitigation plan and update process. Members of the HMSC were in attendance to field questions and engage in discussions. The Open House was advertised on the project website, and by conducting outreach to municipalities to post a flyer on their local websites and social media sites. Figure 3.3-1 shows one of the flyers used to advertise the open house.

March 10 and 13, 2025 – Capability Assessment and Mitigation Strategy Meeting (one in-person, one virtual): The in-person meeting was held in the morning at the Luzerne County Emergency Management Agency, and the virtual meeting was held in the evening to accommodate schedules and provide additional opportunity for participation. These meetings provided a collaborative space for the HMPT to develop the mitigation strategy and review capabilities. They were an opportunity to collectively identify and review relevant plans, policies, and programs already in place. These can be leveraged or built upon in the mitigation strategy. There was also the opportunity to discuss mitigation priorities and identify mitigation actions.

Figure 3.3-1 Public Open House Flyer

March through April 2025 – Calls to Municipalities Still Needing to Participate: The Steering Committee worked to encourage participation through targeted phone calls to municipalities that had not participated in the planning process up to this point. These phone calls were focused on discussing the HMP Update process with local officials and emphasizing the importance of participation. Through these phone calls the steering committee encouraged attendance at upcoming meetings and also offered opportunities to meet one-on-one. This effort significantly bolstered the number of participating municipalities.

March through April 2025 – Meetings with Organizations that Represent Socially Vulnerable Populations: An individual meeting was held with Luzerne County Office of Human Services on March 18, and a group meeting was held with multiple organizations on April 2. Organizations in attendance at the group meeting included the Commission on Economic Opportunity, Volunteers of America, Luzerne County Human Services, Luzerne County Children, Youth and Families, Luzerne/Wyoming Counties Mental Health/Developmental Services, Luzerne/Wyoming Counties Drug and Alcohol, Luzerne County Veterans Affairs and Luzerne/Wyoming Counties Area Agency on Aging. These meetings were an opportunity to discuss the populations and groups these organizations work with and the services that these organizations provide. Input gathered from these meetings will inform the Capability Assessment and Mitigation Strategy.

April 15, 2025 – HMSC Meeting: This meeting was held virtually and was attended by County representatives and the consultant to discuss preparation for the Draft Plan Review Meeting and the steps needed to finalize a draft of the plan.

April 22, 2025 – Quarterly Training: The Luzerne County Department of Emergency Services discussed participation in the Hazard Mitigation Planning process and attendance at the Draft Plan Review Meetings as key topics at this quarterly meeting.

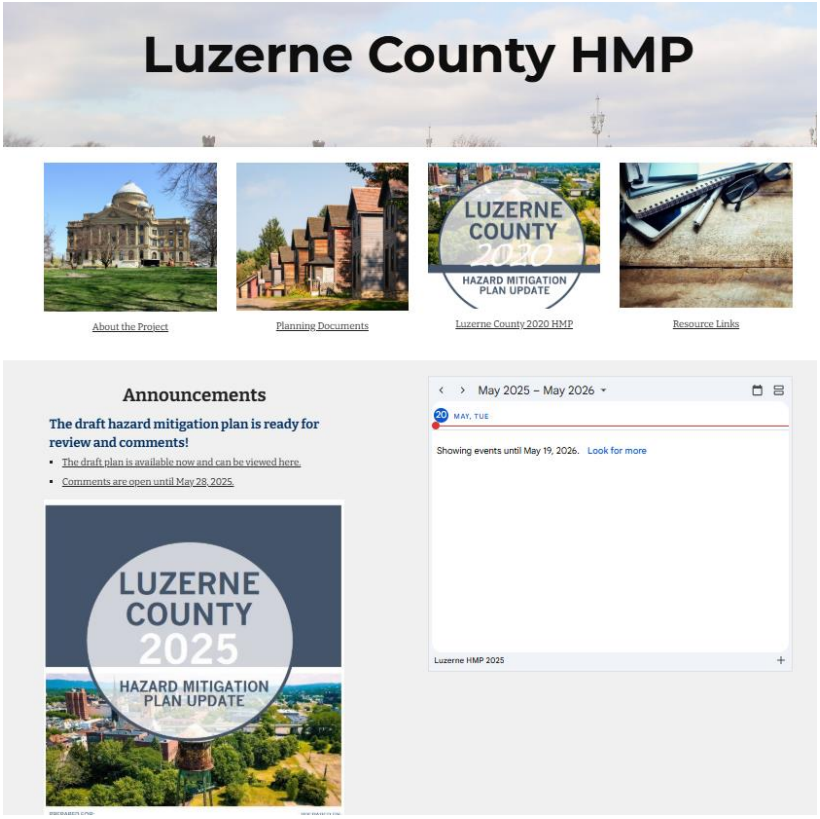
April 25, 2025 – School Districts Meeting: A general standing meeting was held with the school districts in Luzerne County. At this meeting, County representatives were allotted time to discuss plan participation, and the potential for adoption as a special district. It was mentioned that Hanover Area School is planning to adopt the plan as a special district, and the opportunity to learn more about how other school districts can meet requirements was discussed.

April 28 and May 1, 2025 – Draft Plan Review Meetings (one in-person, one virtual)*: The in-person meeting was held in the morning at the Luzerne County Emergency Management Agency, and the virtual meeting was held in the evening to accommodate schedules and provide additional opportunity for participation. The purpose of these final HMPT and public meetings was to provide information about the update process, evaluation, and general findings in the HMP. Additionally, instructions about when and how to review the draft HMP were covered as well as a final timeline for the review and submission to PEMA and FEMA. Invitations were emailed to each municipality and stakeholder on the HMPT, as well as to community members who completed the Public Survey. The meeting was noticed on the website, see Figure 3.3-2. Meeting attendees were asked to provide feedback via the provided digital question/comment form or by sharing via email.

May 27, 2025 – HMSC Meeting: This meeting was held virtually and was attended by County representatives and the consultant to discuss the plan appendices, as well as the process for submittal to PEMA and FEMA for review.

April 28 through May 28, 2025 – Public Review: The draft 2025 HMP Update was posted to the project website on April 28, 2025, so the public could obtain information about the draft, review the HMP, and ask questions or provide comments and feedback. The availability of planning materials and Draft HMP review were advertised on the project website. A question/comment form was available to provide feedback.

Figure 3.3-2 Draft Plan Review Meeting Website Advertisement



3.4. PUBLIC & STAKEHOLDER PARTICIPATION

Stakeholders and the public were given multiple opportunities to participate in the HMP Update process through invitation to the above outlined meetings (the public was invited to meetings with an asterisk (*)), review of risk assessment results and mitigation actions, and an opportunity to comment on a final draft of the 2025 HMP Update. Opportunities open to the public were advertised on the project website, on the county website and through municipal social media accounts. The tools listed below were available on the HMP Update website to solicit information, data, and comments from both local municipalities, other key stakeholders the public in Luzerne County. These forms were also distributed in-person at the HMPT meetings identified and by email correspondence at different touchpoints throughout the planning process. Responses to these worksheets and surveys are included in **Appendix C – Meeting and Other Participation Documentation**. Information provided in these forms was also thoroughly incorporated throughout the plan. The sections they informed are outlined in the descriptions below.

Evaluation of Identified Hazards and Risk Worksheet: Collects information from the Planning Team regarding whether there have been changes to the frequency of occurrence, magnitude of impact, or geographic extent of hazards identified in the 2020 Plan. In addition, the form asks

members of the Planning Team to identify any additional hazards they believe should be considered in the 2025 Plan. This form informed **Section 4 – Risk Assessment**.

Jurisdictional Hazard Risk Ranking Form: Collects information on the perceived risk of hazards in each municipality compared to the ranked hazards for the County. Communities list whether the jurisdictional risk is greater, equal to, or less than the County's risk. This form informed **Section 4 – Risk Assessment**.

Critical Facilities Review Worksheet: Provides an opportunity for municipalities to review the critical facilities identified in their community. Critical facilities were initially collected from state and national datasets. This worksheet allowed for more local and accurate input. This form informed **Section 4 – Risk Assessment, Section 6 – Mitigation Strategy**, and **Appendix E – Critical Facilities**.

Community Lifelines Form: Collects information on the FEMA Community Lifelines in the county. Communities list assets in their community that fall within the different lifeline categories. **Section 4 – Risk Assessment, Section 6 – Mitigation Strategy**, and **Appendix E – Critical Facilities**.

Capability Assessment Survey: Collects information on local planning, regulatory, administrative, technical, fiscal, political, and resiliency capabilities that can be included in the plan's Capability Assessment section. This form informed Section 5 – Capability Assessment.

NFIP Survey: Collects information related to community capabilities towards aspects of the NFIP. This form informed **Section 5 – Capability Assessment**.

Mitigation Action Progress Form: This form is specific to each jurisdiction and includes all actions for that jurisdiction in the 2020 HMP. Space is provided to note the current status of each action and to document any progress made. This form informed **Section 6 – Mitigation Strategy**.

New Mitigation Action Form: Allows communities to propose new mitigation actions for the HMP Update. This form collects details about the action, including priority, responsible parties, potential funding sources, implementation timeframe, and more. This form informed **Section 6 – Mitigation Strategy**.

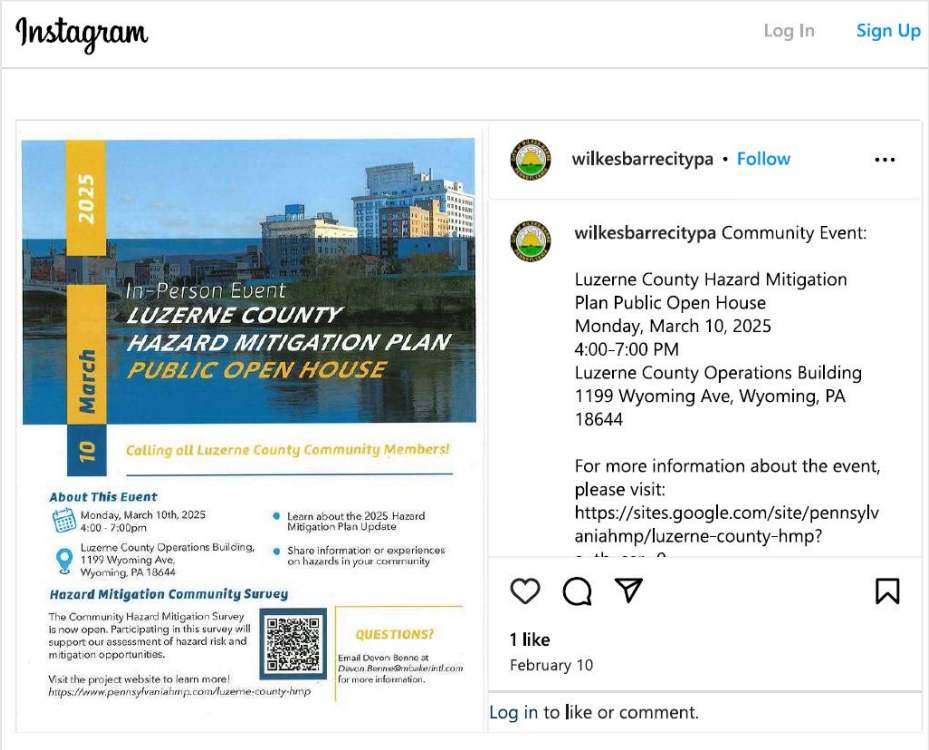
Plan Comment Form: Provides an opportunity for communities and the public to comment on the plan during the review period.

Community participation and comment was encouraged throughout the planning process, particularly through the project website: https://www.pennsylvaniahmp.com/luzerne-county-hmp. Figure 3.3-2 shows an image of the website's home page. This site was created and made publicly available at the beginning of the planning process and acted as a repository for the entire planning process. The website houses presentations, agendas, minutes, and worksheets from each meeting as well as promulgated meeting dates and important announcements. Since

the site was published in November 2024, it has received a total of 216 pageviews as of April 2025.

The HMSC also developed a Community Hazard Mitigation Survey intended to solicit public input regarding the understanding of hazard risk, which was posted to the website, and was also shared with communities to post to their social media accounts. See Figure 3.4-1 for an example Instagram post. The survey received 73 responses. Findings are analyzed in Section 4.4.5 Community Survey.

Figure 3.4-1 Example Post Advertising the Public Survey



Luzerne County posted the 2025 Draft Hazard Mitigation Plan Update on the plan update website (www.pennsylvaniahmp.com/luzerne-county-hmp) for review and comment on April 28, 2025 for a 30-day comment period. The invitation to the public to review and comment on the draft plan was posted on the project website and was emailed to local officials with a flyer to share with the public advertising the Draft Plan Review Meetings (Figure 3.4-2). An email was also sent to members of the public who completed the Public Survey and provided their email address in their response (about 70 people).

Figure 3.4-2 Draft Plan Review Meeting Flyer

Comments were to be submitted via the online comment form or to Devon Benne of Michael Baker International by email. Copies of all comments received are located in **Appendix C – Meeting and Other Participation Documentation**.

3.5. MULTI-JURISDICTIONAL PLANNING

This HMP was developed using a multi-jurisdictional approach. Although County level departments have resources such as technical expertise and data which local jurisdictions may lack, involvement from local municipalities is critical to the collection of local knowledge related to hazard events. Local municipalities also have the legal authority to enforce compliance with land use planning and development issues. The Steering Committee was committed to garnering municipal participation. Table 3.5-1 lists jurisdictional participation in this HMP update. All 76 municipalities participated in the HMP Update Process, achieving 100% participation.

HMPT meetings included the Kick-Off Meeting, the Risk Assessment Meeting, the Capability Assessment and Mitigation Strategy Workshop and the Draft Plan Review Meeting. These meetings were held over the course of two sessions, with both in-person and virtual opportunities. All HMPT meetings had afternoon and evening meeting sessions to maximize participation. Stakeholders were emailed invitations and reminders to all meetings. This included all neighboring counties – Wyoming County, Lackawanna County, Monroe County, Carbon County, Schuylkill County, Columbia County, and Sullivan County. Surveys and forms were provided at meetings, posted to the project website, emailed or mailed to jurisdictions. There was also targeted outreach to municipalities through email and phone calls. Forms and materials were shared with municipalities prior to and after each meeting.

Figure 3.5-1 2025 Luzerne County Stakeholder Participation

MUNICIPALITY/AGENCY/ ORGANIZATION	COUNTY HMP MEETINGS						WORKSHEETS AND EXERCISES								
	PLAN KICK-OFF MEETINGS	RISK ASSESSMENT MEETINGS	MITIGATION AND CAPABILITY WORKSHOPS	OPEN HOUSE	DRAFT PLAN REVIEW MEETINGS	OTHER MEETINGS/ENGAGEMENT	EVALUATION OF IDENTIFIED HAZARDS AND RISK WORKSHEET	RISK RANKING	CRITICAL FACILITIES FORM	COMMUNITY LIFELINES FORM	CAPABILITY ASSESSMENT SURVEY	NFIP COMPLIANCE AND CAPABILITIES SURVEY	MITIGATION ACTION PROGRESS FORM	NEW MITIGATION ACTION FORM	MISCELLANEOUS WRITTEN FEEDBACK
MUNICIPALITIES															
Ashley Borough						X	X								
Avoca Borough	X	X	X				X	X	X	X					X
Bear Creek Township			X			X	X	X		X					
Bear Creek Village Borough	X	X	X		X		X	X	X	X					X
Black Creek Township						X	X	X	X	X	X	X	X		
Buck Township						X	X								
Butler Township						X	X	X			X				
Conyngham Borough						X	X		X						
Conyngham Township			X		X	X	X								
Courtdale Borough						X	X								
Dallas Borough			X		X	X	X	X	X	X	X			X	
Dallas Township	X	X	X		X		X	X		X	X				X
Dennison Township						X	X								
Dorrance Township	X	X				X	X								X
Dupont Borough	X					X	X	X	X	X	X	X	X	X	X
Duryea Borough	X	X	X		X	X	X	X	X	X	X	X	X		X
Edwardsville Borough	X	X					X	X	X	X					X

Figure 3.5-1 2025 Luzerne County Stakeholder Participation

MUNICIPALITY/AGENCY/ ORGANIZATION	COUNTY HMP MEETINGS						WORKSHEETS AND EXERCISES								
	PLAN KICK-OFF MEETINGS	RISK ASSESSMENT MEETINGS	MITIGATION AND CAPABILITY WORKSHOPS	OPEN HOUSE	DRAFT PLAN REVIEW MEETINGS	OTHER MEETINGS/ENGAGEMENT	EVALUATION OF IDENTIFIED HAZARDS AND RISK WORKSHEET	RISK RANKING	CRITICAL FACILITIES FORM	COMMUNITY LIFELINES FORM	CAPABILITY ASSESSMENT SURVEY	NFIP COMPLIANCE AND CAPABILITIES SURVEY	MITIGATION ACTION PROGRESS FORM	NEW MITIGATION ACTION FORM	MISCELLANEOUS WRITTEN FEEDBACK
Exeter Borough	X	X	X		X		X	X	X	X					X
Exeter Township	X	X					X	X	X	X					X
Fairmount Township						X	X								
Fairview Township						X	X								
Forty Fort Borough	X	X	X		X	X	X	X	X	X					X
Foster Township						X	X								
Franklin Township			X		X		X				X	X	X		
Freeland Borough						X	X								
Hanover Township		X	X		X	X	X	X							
Harvey's Lake Borough					X	X	X				X	X	X		
Hazle Township	X	X					X	X	X	X					X
Hazleton City						X	X								
Hollenback Township	X	X				X	X								X
Hughestown Borough						X	X								
Hunlock Township					X	X							X		
Huntington Township	X					X							X		X
Jackson Township	X	X	X				X	X	X	X	X	X	X		X
Jeddo Borough						X	X						X		

Figure 3.5-1 2025 Luzerne County Stakeholder Participation

MUNICIPALITY/AGENCY/ ORGANIZATION	COUNTY HMP MEETINGS						WORKSHEETS AND EXERCISES								
	PLAN KICK-OFF MEETINGS	RISK ASSESSMENT MEETINGS	MITIGATION AND CAPABILITY WORKSHOPS	OPEN HOUSE	DRAFT PLAN REVIEW MEETINGS	OTHER MEETINGS/ENGAGEMENT	EVALUATION OF IDENTIFIED HAZARDS AND RISK WORKSHEET	RISK RANKING	CRITICAL FACILITIES FORM	COMMUNITY LIFELINES FORM	CAPABILITY ASSESSMENT SURVEY	NFIP COMPLIANCE AND CAPABILITIES SURVEY	MITIGATION ACTION PROGRESS FORM	NEW MITIGATION ACTION FORM	MISCELLANEOUS WRITTEN FEEDBACK
Jenkins Township	X	X			X		X	X	X	X					X
Kingston Borough						X	X								
Kingston Township	X	X	X		X	X	X	X	X	X	X	X	X	X	X
Laflin Borough			X			X	X								
Lake Township						X	X								
Larksville Borough						X	X								
Laurel Run Borough						X	X								
Lehman Township			X		X	X			X						
Luzerne Borough						X	X								
City of Nanticoke			X		X		X	X	X	X					
Nescopeck Borough						X	X	X	X	X	X				
Nescopeck Township						X	X	X		X					
New Columbus Borough						X	X								
Newport Township	X	X					X	X	X	X					X
Nuangola Borough						X	X								
Penn Lake Park Borough			X			X	X								
Pittston City	X	X	X		X	X	X	X	X	X					X
Pittston Township	X	X	X		X		X	X	X	X	X		X	X	X

Figure 3.5-1 2025 Luzerne County Stakeholder Participation

MUNICIPALITY/AGENCY/ ORGANIZATION	COUNTY HMP MEETINGS						WORKSHEETS AND EXERCISES								
	PLAN KICK-OFF MEETINGS	RISK ASSESSMENT MEETINGS	MITIGATION AND CAPABILITY WORKSHOPS	OPEN HOUSE	DRAFT PLAN REVIEW MEETINGS	OTHER MEETINGS/ENGAGEMENT	EVALUATION OF IDENTIFIED HAZARDS AND RISK WORKSHEET	RISK RANKING	CRITICAL FACILITIES FORM	COMMUNITY LIFELINES FORM	CAPABILITY ASSESSMENT SURVEY	NFIP COMPLIANCE AND CAPABILITIES SURVEY	MITIGATION ACTION PROGRESS FORM	NEW MITIGATION ACTION FORM	MISCELLANEOUS WRITTEN FEEDBACK
Plains Township		X	X		X	X			X	X	X				
Plymouth Borough	X	X	X		X		X	X	X	X					X
Plymouth Township						X	X								
Pringle Borough						X	X	X	X	X					
Rice Township	X	X	X		X	X	X	X	X	X	X		X		X
Ross Township					X	X	X								
Salem Township	X	X	X		X		X	X	X	X	X	X	X		X
Shickshinny Borough						X	X								
Slocum Township		X					X	X		X					
Sugar Notch Borough						X	X								
Sugarloaf Township	X					X	X						X		X
Swoyersville Borough		X	X		X	X	X	X	X	X	X				
Union Township					X	X	X	X			X			X	
Warrior Run Borough			X		X		X	X	X	X			X		
West Hazleton Borough	X		X			X	X	X	X	X			X		X
West Pittston Borough	X	X	X		X		X	X	X	X	X		X		X
West Wyoming Borough			X		X	X	X		X	X					
White Haven Borough			X		X		X	X	X	X	X	X			

Figure 3.5-1 2025 Luzerne County Stakeholder Participation

MUNICIPALITY/AGENCY/ ORGANIZATION	COUNTY HMP MEETINGS						WORKSHEETS AND EXERCISES								
	PLAN KICK-OFF MEETINGS	RISK ASSESSMENT MEETINGS	MITIGATION AND CAPABILITY WORKSHOPS	OPEN HOUSE	DRAFT PLAN REVIEW MEETINGS	OTHER MEETINGS/ENGAGEMENT	EVALUATION OF IDENTIFIED HAZARDS AND RISK WORKSHEET	RISK RANKING	CRITICAL FACILITIES FORM	COMMUNITY LIFELINES FORM	CAPABILITY ASSESSMENT SURVEY	NFIP COMPLIANCE AND CAPABILITIES SURVEY	MITIGATION ACTION PROGRESS FORM	NEW MITIGATION ACTION FORM	MISCELLANEOUS WRITTEN FEEDBACK
Wilkes-Barre City	X	X	X		X	X	X	X	X	X	X	X	X	X	X
Wilkes-Barre Township						X	X								
Wright Township		X	X			X	X	X	X	X	X		X		
Wyoming Borough	X	X	X		X	X	X	X	X	X					X
Yatesville Borough						X	X								
OTHER STAKEHOLDERS															
Commonwealth University - Bloomsburg	X	X					X								X
Greater Pittston Chamber of Commerce	X														X
Hanover Area School District		X	X			X	X	X		X					
Hickory Run State Park	X	X													X
Luzerne Conservation District	X	X	X				X	X							X
Luzerne County Department of Emergency Services	X	X	X	X	X										X
Luzerne County Flood Protection Authority	X	X					X	X	X	X					X
Luzerne County GIS	X						X								X

Figure 3.5-1 2025 Luzerne County Stakeholder Participation

MUNICIPALITY/AGENCY/ ORGANIZATION	COUNTY HMP MEETINGS						WORKSHEETS AND EXERCISES								
	PLAN KICK-OFF MEETINGS	RISK ASSESSMENT MEETINGS	MITIGATION AND CAPABILITY WORKSHOPS	OPEN HOUSE	DRAFT PLAN REVIEW MEETINGS	OTHER MEETINGS/ENGAGEMENT	EVALUATION OF IDENTIFIED HAZARDS AND RISK WORKSHEET	RISK RANKING	CRITICAL FACILITIES FORM	COMMUNITY LIFELINES FORM	CAPABILITY ASSESSMENT SURVEY	NFIP COMPLIANCE AND CAPABILITIES SURVEY	MITIGATION ACTION PROGRESS FORM	NEW MITIGATION ACTION FORM	MISCELLANEOUS WRITTEN FEEDBACK
Luzerne County Manager's Office			X	X											
Luzerne County Office of Human Services						X									
Luzerne County Planning and Zoning	X	X	X	X	X		X	X	X	X					X
NieghborWorks Northeastern Pennsylvania			X												
PA American Water Company		X					X	X	X	X					
Susquehanna River Basin Commission	X	X	X		X		X	X			X				X
Talen Energy	X														X
Commission on Economic Opportunity						X									
Volunteers of America						X									
Luzerne County Human Services						X									

Figure 3.5-1 2025 Luzerne County Stakeholder Participation

MUNICIPALITY/AGENCY/ ORGANIZATION	COUNTY HMP MEETINGS						WORKSHEETS AND EXERCISES								
	PLAN KICK-OFF MEETINGS	RISK ASSESSMENT MEETINGS	MITIGATION AND CAPABILITY WORKSHOPS	OPEN HOUSE	DRAFT PLAN REVIEW MEETINGS	OTHER MEETINGS/ENGAGEMENT	EVALUATION OF IDENTIFIED HAZARDS AND RISK WORKSHEET	RISK RANKING	CRITICAL FACILITIES FORM	COMMUNITY LIFELINES FORM	CAPABILITY ASSESSMENT SURVEY	NFIP COMPLIANCE AND CAPABILITIES SURVEY	MITIGATION ACTION PROGRESS FORM	NEW MITIGATION ACTION FORM	MISCELLANEOUS WRITTEN FEEDBACK
Luzerne County Children, Youth and Families						X									
Luzerne/Wyoming Counties Mental Healt/ Developmental Services						X									
Luzerne/Wyoming Counties Drug and Alcohol						X									
Luzerne County Veterans Affairs						X									
Luzerne/Wyoming Counties Area Agency on Aging						X									
Luzerne County Budget and Finance						X									

4. RISK ASSESSMENT

4.1. Update Process Summary

This risk assessment provides a factual basis for activities proposed by the County in its Mitigation Strategy. Hazards that may affect Luzerne County are identified and defined in terms of location and geographic extent, magnitude of impact, previous events and likelihood of future occurrence. All information from the previous plan has been included or updated in the 2025 Luzerne County HMP Update, unless otherwise indicated.

The Luzerne County HMSC reviewed the hazards profiled in the 2020 Luzerne County HMP Update during the December 10, 2024 Steering Committee Meeting. The HMSC determined that all the existing hazards should be carried over into the 2025 plan update and decided that two additional hazards should be profiled in the 2025 plan update: Extreme Temperatures and Environmental Hazards – Coal Mining. The HMSC also reviewed the 2023 State Hazard Mitigation Plan and, for consistency, updated "Opioid Addiction" to "Substance Use Disorder" and "Hazardous Materials Release" to "Environmental Hazard – Hazardous Materials Release". The hazards selected by the HMSC were then reviewed by the HMPT at the January 27 and January 30, 2025 Risk Assessment Workshops.

Hazard profiles were then developed in order to define the characteristics of each hazard as it applies to Luzerne County. Following hazard identification and profiling, a vulnerability assessment was performed to identify the impact of natural hazard events on people, buildings, infrastructure, and the community. Each natural hazard is discussed in terms of its potential impact on individual communities in Luzerne County, including the types of parcels and critical facilities that may be at risk. The assessment allows the County and its municipalities to focus mitigation efforts on areas most likely to be damaged or most likely to require early response to a hazard event. A vulnerability analysis was performed which identifies structures, critical facilities, or people that may be impacted by hazard events and describes what those events can do to physical, social, and economic assets. Depending upon data availability, assessment results consist of an inventory of vulnerable structures or populations.

Hazard profiles in the 2025 HMP include the following Natural and Human-Made Hazards:

- Drought
- Earthquake
- Extreme Temperatures
- Flood, Flash Flood, Ice Jam
- Hailstorm
- Hurricane, Tropical Storm, Nor'easter
- Landslide
- Pandemic
- Radon Exposure
- Subsidence, Sinkhole
- Tornado and Windstorm
- Wildfire
- Winter Storm
- Cyber-Terrorism
- Dam Failure
- Environmental Hazards – Coal Mining
- Environmental Hazards – Hazardous Materials Release
- Levee Failure
- Nuclear Release
- Substance Use Disorder

Each hazard profile has an "Equity in Vulnerable Communities" section, which expands on how certain socioeconomic factors can result in hazards having a disproportionate impact on certain populations or communities. This assessment allows the County and its municipalities to focus mitigation and preparedness efforts more adequately by allocating resources more fairly, improving emergency responses, and enhancing overall community resilience. Each hazard profiles also identifies community lifelines that may be affected by the associated natural hazards. The community lifelines are listed in Figure 2.6-1. Appendix E – Critical Facilities and Community Lifelines also includes insights from the Community Lifelines Forms that were completed by communities. The appendix includes a table for each lifeline listing the assets that were identified as being a part of each lifeline per municipality.

4.2. HAZARD IDENTIFICATION

4.2.1. TABLE OF PRESIDENTIAL DISASTER DECLARATIONS

Natural hazards have led to costly disasters in Luzerne County resulting in disaster declarations. There are a couple of types of disaster declarations.

First, Presidential Disaster and Emergency Declarations are issued when it has been determined that State and local governments need assistance in responding to a disaster event (McCarthy, 2011). Table 4.2-1 identifies Presidential Disaster and Emergency Declarations issued between 1955 through 2024 that have affected Luzerne County. Additional declarations beyond 2024 can be found on the FEMA website at: https://www.fema.gov/disaster/declarations.

Table 4.2-1 Presidential Disaster and Emergency Declarations affecting Luzerne County.

DECLARATION NUMBER	DATE	EVENT	EVENT TYPE
4618	9/10/2021	Remnants of Hurricane Ida	Major Disaster Declaration
4506	3/30/2020	Covid-19 Pandemic	Major Disaster Declaration
3356	10/29/2012	Hurricane Sandy	Emergency Declaration
4030	09/12/2011	Tropical Storm Lee	Major Disaster Declaration
3340	09/08/2011	Remnants of Tropical Storm Lee	Emergency Declaration
4025	09/03/2011	Hurricane Irene	Major Disaster Declaration
3339	08/29/2011	Hurricane Irene	Emergency Declaration
1684	02/23/2007	Severe storms and flooding	Major Disaster Declaration
1649	06/30/2006	Severe storms, flooding, and mudslides	Major Disaster Declaration
3235	09/10/2005	Hurricane Katrina	Emergency Declaration

Table 4.2-1 Presidential Disaster and Emergency Declarations affecting Luzerne County.

DECLARATION NUMBER	DATE	EVENT	EVENT TYPE
1587	04/14/2005	Severe storms and flooding	Major Disaster Declaration
1555	09/19/2004	Severe storms and flooding associated with Tropical Depression Frances	Major Disaster Declaration
1557	09/19/2004	Tropical Depression Ivan	Major Disaster Declaration
1093	01/21/1996	Severe storms and flooding	Major Disaster Declaration
1085	01/31/1996	Blizzard of '96	Major Disaster Declaration
1015	03/10/1994	Severe winter storms	Major Disaster Declaration
3105	03/16/1993	Severe snowfall and winter storm	Emergency Declaration
745	10/08/1985	Hurricane Gloria	Major Disaster Declaration
3026	01/29/1977	Snowstorms	Emergency Declaration
523	10/20/1976	Severe storms and flooding	Major Disaster Declaration
485	09/26/1975	Severe storms, heavy rains, and flooding	Major Disaster Declaration
340	06/23/1972	Tropical Storm Agnes	Major Disaster Declaration

The governor of Pennsylvania can also declare an emergency by issuing an Emergency Proclomation. These proclomations can range from weather impacts to health issues. Table 4.2-2 lists these Proclamations that have been issued for for the Commonwealth of Pennsylvania and that have impacted Luzerne County between 2018 and 2024 and can be found on the Pennsylvania website at: https://www.pa.gov/agencies/pema/resources/emergency-proclamations.html.

Table 4.2-2 Gubernatorial Disaster Declarations or Proclamations affecting Luzerne County.

DATE	EVENT	DESCRIPTION
February 1, 2021	Winter Weather.	A winter event including snow, ice, and high winds with potential for significant adverse impacts through Pennsylvania.

Table 4.2-2 Gubernatorial Disaster Declarations or Proclamations affecting Luzerne County.		
DATE	**EVENT**	**DESCRIPTION**
December 15, 2020	Winter Event.	Severe winter event expected to bring dangerous conditions including snow, ice, and flooding.
August 31, 2020	Hurricane Ida.	Hurricane Ida after-effects bring heavy rains and a serious threat of flash and riverine flooding to Pennsylvania.
May 30, 2020	Civil Disturbance.	George Floyd died in police custody in Minneapolis. Many protests remain peaceful, but some become dangerous.
March 6, 2020	Coronavirus (COVID-19).	Coronavirus (COVID-19) emerged in China and has spread to the U.S., creating a public health emergency.
January 18, 2019	Severe Winter Event.	A severe winter event is expected to cause dangerous winter weather conditions, including snow, ice, and flooding.
August, 2018	Severe Weather Event.	Slow-moving storms with record-breaking rainfall and flash flooding.
June 4, 2018	Severe Weather Event.	Nearly continuous storms for the first four months of 2018 caused a rapid buildup of water.
January 10, 2018	Opioid Crisis.	Declaring the opioid crisis a public health emergency in Pennsylvania contributing to addiction, overdose emergencies, and deaths.

Luzerne County has also received Small Business Administration (SBA) Assistance for a number of disaster events. A Small Business Administration Disaster Declaration qualifies communities for access to affordable, timely, and accessible financial assistance. The nine County events receiving Small Business Administration disaster-related loan assistance are listed below and can be found on the SBA website at: https://www.sba.gov/funding-programs/disaster-assistance.

Table 4.2-3 Small Business Administration Disaster Declarations affecting Luzerne County	
DATE	**EVENT**
January 2024	Severe Storms and Flooding.
October 2021	Tropical Storm Ida.
August, 2018	Flooding.
July 2018	Flooding.
October 2009	Fire.

Table 4.2-3 Small Business Administration Disaster Declarations affecting Luzerne County	
DATE	**EVENT**
August 2007	Hail.
December 2006	Severe Storms and Tornadoes.
November 2006	Severe Storms and Flooding.
July 1991	Drought.
January 1988	Fire.
September 1985	Flood.

4.2.2. SUMMARY OF HAZARDS

Following review of the hazards evaluated in 2020, the Pennsylvania Standard List of Hazards and completion of the *Evaluation of Hazards and Risk Form*, the HMSC along with input from the HMPT decided that the 2025 plan should identify, profile and analyze 20 hazards. These 20 hazards include all hazards profiled in the 2020 plan with the addition of two new hazards: Extreme Temperatures and Environmental Hazard – Coal Mining. Furthermore, the hazard profiles were informed by a study conducted from a student at Bloomsburg University.

Table 4.2-4 contains a complete list of the 20 hazards that have the potential to impact Luzerne County as identified through previous Risk Assessments, the County Hazards Vulnerability Analysis, and input from those that participated in the 2025 HMP Update. Hazard profiles are included in Section 4.3 for each of these hazards.

Table 4.2-4 List and description of natural and manmade hazards profiled in the 2020 Hazard Mitigation Plan Update. (PA 2020 Standard Operating Guide)	
HAZARD	HAZARD DESCRIPTION
NATURAL HAZARDS	
	Drought is defined as a deficiency of precipitation experienced over an extended period of time, usually a season or more. Droughts increase the risk of other hazards, like wildfires, flash floods, and landslides or debris flows. This hazard is of particular concern in Pennsylvania due to the prevalence of farms and other water-dependent industries, water-dependent recreation uses, and residents who depend on wells for drinking water. (National Drought Mitigation Center, 2025; Ready.gov 2025).
	An earthquake is the motion or trembling of the ground produced by sudden displacement of rock usually within the upper 10-20 miles of the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of underground caverns. Earthquakes can affect hundreds of thousands of square miles, cause damage to property measured in the tens of billions of dollars, result in loss of life and injury to hundreds of thousands of persons, and disrupt the social and economic functioning of the affected area. (Ready.gov, 2025).

Table 4.2-4 List and description of natural and manmade hazards profiled in the 2020 Hazard Mitigation Plan Update. (PA 2020 Standard Operating Guide)

HAZARD	HAZARD DESCRIPTION
	Extreme heat often results in the highest number of annual deaths of all weather-related hazards. In most of the United States, extreme heat is defined as a long period (2 to 3 days) of high heat and humidity with temperatures above 90 degrees. (Ready.gov, 2018). Extremely cold air comes every winter in at least part of the country and affects millions of people across the United States. The arctic air, together with brisk winds, can lead to dangerously cold wind chill values. People exposed to extreme cold are susceptible to frostbite and hypothermia in a matter of minutes (Ready.gov, 2025).
	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 (PEMA, 2020). 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. (NESEC, 2025).
	Hailstorms occur when ice crystals form within a low-pressure front due to the rapid rise of warm air into the upper atmosphere and the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until, having developed sufficient weight, they fall as precipitation in the form of balls or irregularly shaped masses of ice greater than 0.75 inches in diameter. Hailstorms can cause significant damage to homes, vehicles, livestock, and people. (NOAA, 2025).
	Hurricanes, tropical storms, and nor'easters are classified as cyclones and are any closed circulation developing around a low-pressure center in which the winds rotate counterclockwise (in the Northern Hemisphere) and whose diameter averages 10-30 miles across. Potential threats from hurricanes include powerful winds, heavy rainfall, storm surges, coastal and inland flooding, rip currents, tornadoes, and landslides. The Atlantic hurricane season runs from June 1 to November 30. (Ready.gov, 2025).
	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. (PA DCNR, 2025).

Table 4.2-4 List and description of natural and manmade hazards profiled in the 2020 Hazard Mitigation Plan Update. (PA 2020 Standard Operating Guide)

HAZARD	HAZARD DESCRIPTION
	A pandemic is a global outbreak of disease that occurs when a new virus emerges in the human population, spreading easily in a sustained manner, and causing serious illness. An epidemic describes a smaller-scale infectious outbreak, within a region or population, that emerges at a disproportional rate. Infectious disease outbreaks may be widely dispersed geographically, impact large numbers of the population, and could arrive in waves lasting several months at a time. (FEMA, 2025).
	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. (PA DEP, 2025c).
	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. (USGS, 2001 and PA DCNR, 2025).
	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 16 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. (NOAA, 2025).
	A wildfire is an unplanned fire that burns in a natural area. Wildfires can cause injuries or death and can ruin homes in their path. Wildfires can be caused by humans or lightning, and can happen anytime, though the risk increases in period of little rain. In Pennsylvania, 98% of wildfires are caused by people (Ready.gov, 2025 and PA DCNR, 2025).
	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. (NOAA, 2025).
HUMAN MADE HAZARDS	

Table 4.2-4 List and description of natural and manmade hazards profiled in the 2020 Hazard Mitigation Plan Update. (PA 2020 Standard Operating Guide)

HAZARD	HAZARD DESCRIPTION
	Cyber terrorism refers to acts of terrorism committed using computers, networks, and the Internet. The most widely cited definition comes from Denning's Testimony before the Special Oversight Panel on Terrorism: "Cyberterrorism…is generally understood to mean unlawful attacks and threats of attack against computers, networks, and the information stored therein when done to intimidate or coerce a government or its people in furtherance of political or social objectives. Further, to qualify as cyberterrorism, an attack should result in violence against persons or property, or at least cause enough harm to generate fear." (Denning, 2000).
	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. (ASDSO, 2025).
	Major impacts from coal mining include subsidence, landscape changes, and the chemical degradation of surface and subsurface waters. In addition, active and abandoned mines can result in injury and loss of human life. In active mines, workers can be injured or killed by mine collapse, entrapment, poisonous gases, inundation, explosions, fires, equipment malfunction, or improper ventilation. In abandoned mines, causes of injury or death include falling and drowning (PA DEP, 2025a).
	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 (PA DEP, 2025b).
	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. (USACE, 2025).

Table 4.2-4 List and description of natural and manmade hazards profiled in the 2020 Hazard Mitigation Plan Update. (PA 2020 Standard Operating Guide)

HAZARD	HAZARD DESCRIPTION
	Nuclear explosions can cause significant damage and casualties from blast, heat, and radiation. The primary concern following a nuclear accident or nuclear attack is the extent of radiation, inhalation, and ingestion of radioactive isotopes which can cause acute health effects (e.g. death, burns, severe impairment), chronic health effects (e.g. cancer), and psychological effects. (EPA, 2025; Ready.gov, 2025).
	Substance Use Disorder occurs when an individual becomes physically dependent on opioids, which include opiates and narcotics. Opioids are a synthetic substance found in certain prescription pain medications: morphine, codeine, methadone, oxycodone, hydrocodone, fentanyl, and hydromorphone, and street drugs like heroine. Opioids block the body's ability to feel pain and can create a sense of euphoria. Individuals often build a tolerance to opioid drugs, which leads them to take more of the medication than originally prescribed. (Pennsylvania Department of Drug and Alcohol Programs, 2025).

4.3. HAZARD PROFILES AND VULNERABILITY ANALYSIS

NATURAL HAZARDS

4.3.1. Drought

4.3.1.1. Location and Extent

Drought is defined as the consequence of a natural reduction in the amount of precipitation expected over an extended period, usually a season or more in length. Droughts are regional climatic events, so they typically impact all communities in a relatively uniform fashion with only minor localized variations in rainfall events. Droughts often occur across county boundaries, affecting large areas of Pennsylvania at the same time. Therefore, a drought would affect all of Luzerne County, with the largest impact being on areas of the County with extensive agriculture uses.

Locations of droughts nationwide are monitored continuously by USGS, and the PA DEP monitors conditions throughout the state. Maps showing locations currently experiencing drought conditions are posted on various websites (including http://waterwatch.usgs.gov) and show locations where stream flow is below normal and where drought conditions exist or are emerging. As this plan was being developed between December 2024 and April 2025, several locations in Pennsylvania were experiencing drought.

4.3.1.2. Range of Magnitude

Droughts can have varying effects, depending on the month in which they occur, as well as the severity, duration, and location of the event. Even short-term droughts can be devastating, especially in conjunction with extreme temperatures.

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

The Commonwealth uses five parameters to assess drought conditions:

1. Stream flows (compared to benchmark records)
2. Precipitation (measured as the departure from normal, 30-year average precipitation)
3. Reservoir storage levels in a variety of locations (especially three New York City reservoirs in upper Delaware River Basin)
4. Groundwater elevations in a number of counties (comparing to past month, past year and historic record)
5. The Palmer Drought Severity Index (PSDI)– a soil moisture algorithm calibrated for relatively homogeneous regions which measures dryness based on recent precipitation and temperature (see Table 4.3.1-1)

The Palmer Drought Severity Index (PDSI) is used to describe abnormally wet to abnormally dry conditions. Zero represents normal rainfall and temperature conditions; drought condition indices are described in the table below.

Table 4.3.1-1 Palmer Drought Severity Index (NOAA, 2020)

INDEX	DESCRIPTION OF CONDITIONS
4.0 or more	Extremely moist
3.0 to 3.9	Very moist spell
2.0 to 2.9	Unusual Moist Spell
-1.9 to 1.9	Near normal
-2.0 to -2.9	Moderate drought
-3.0 to -3.9	Severe drought
-4.0 or less	Extreme drought

Data provided by Cornell University shows that drought conditions in the Pocono Mountains region of Pennsylvania have resulted in Palmer Drought Severity Index level as low as -5.47. This was during a drought that lasted for twenty-one months from 1964 - 1966. In the Luzerne County area, the average Palmer Drought Severity Index level for droughts is -3.89 and the average duration of a drought is 4 months (NRCC, 2025).

In Pennsylvania, PEMA has primary responsibility for managing droughts with direct support from the DEP. According to Drought Management in Pennsylvania (2012), PEMA and DEP use the following three stages to describe and manage droughts. They are listed below in order of increasing severity:

- **Drought Watch**: A period to alert government agencies, public water suppliers, water users and the public regarding the potential for future drought-related problems. The focus is on increased monitoring, awareness and preparation for response if conditions worsen. A request for voluntary water conservation is made. The objective of voluntary water conservation measures during a drought watch is to reduce water uses by 5 percent in the affected areas. Due to varying conditions, individual water suppliers or municipalities may be asking for more stringent conservation actions.
- **Drought Warning**: This phase involves a coordinated response to imminent drought conditions and potential water supply shortages through concerted voluntary conservation measures to avoid or reduce shortages, relieve stressed sources, develop new sources, and if possible, forestall the need to impose mandatory water use restrictions. The objective of voluntary water conservation measures during a drought warning is to reduce overall water uses by 10-15 percent in the affected areas. Due to varying conditions, individual water suppliers or municipalities may be asking for more stringent conservation actions.
- **Drought Emergency**: This stage is a phase of concerted management operations to marshal all available resources to respond to actual emergency conditions, to avoid depletion of water sources, to assure at least minimum water supplies to protect public health and safety, to support essential and high priority water uses and to avoid unnecessary economic dislocations. It is possible during this phase to impose mandatory restrictions on non-essential water uses that are provided in the Pennsylvania Code (Chapter 119), if deemed necessary and if ordered by the Governor of Pennsylvania. The objective of water use restrictions (mandatory or voluntary) and other conservation measures during this phase is to reduce consumptive water use in the affected area by fifteen percent, and to reduce total use to the extent necessary to preserve public water system supplies, to avoid or mitigate local or area shortages and to assure equitable sharing of limited supplies.
- **Local Water Rationing**: Although not a drought phase, local municipalities may, with the approval of the PA Emergency Management Council, implement local water rationing to share a rapidly dwindling or severely depleted water supply in designated water supply service areas. These individual water rationing plans, authorized through provisions of the Pennsylvania Code (Chapter 120), will require specific limits on individual water consumption to achieve significant reductions in use. Under both mandatory restrictions imposed by the Commonwealth and local water rationing, procedures are provided for granting of variances to consider individual hardships and economic dislocations.

Environmental impacts of drought include:

- Hydrologic effects – lower water levels in reservoirs, lakes, and ponds; reduced streamflow; loss of wetlands; estuarine impacts; groundwater depletion and land

subsidence; effects on water quality such as increases in salt concentration and water temperature.

- Damage to animal species – lack of feed and drinking water; disease; loss of biodiversity; migration or concentration; and reduction and degradation of fish and wildlife habitat.
- Damage to plant communities – loss of biodiversity; loss of trees from urban landscapes and wooded conservation areas.
- Increased number and severity of fires.
- Reduced soil quality.
- Air quality effects – dust and pollutants.
- Loss of quality in landscape.
- Loss of water for navigation and recreation.
- Increase in nitrate levels which can have health impacts on pregnant women and children.

The potential impacts of drought on community lifelines are as follows:

Table 4.3.1-2 Most Likely Lifelines Impacted by Drought

LIFELINES	NOTES
Safety and Security	Drought will require significant personnel in response; some in recovery and mitigation.
Food, Hydration, Shelter	Crops may be lost and there are water regulation concerns.
Health and Medical	Food and water shortages could exacerbate health challenges, especially for food-vulnerable populations.

4.3.1.3. Past Occurrence

Table 4.3.1-3 lists periods of drought in the Luzerne County area showing a total of 9 droughts between 2000 and 2025.

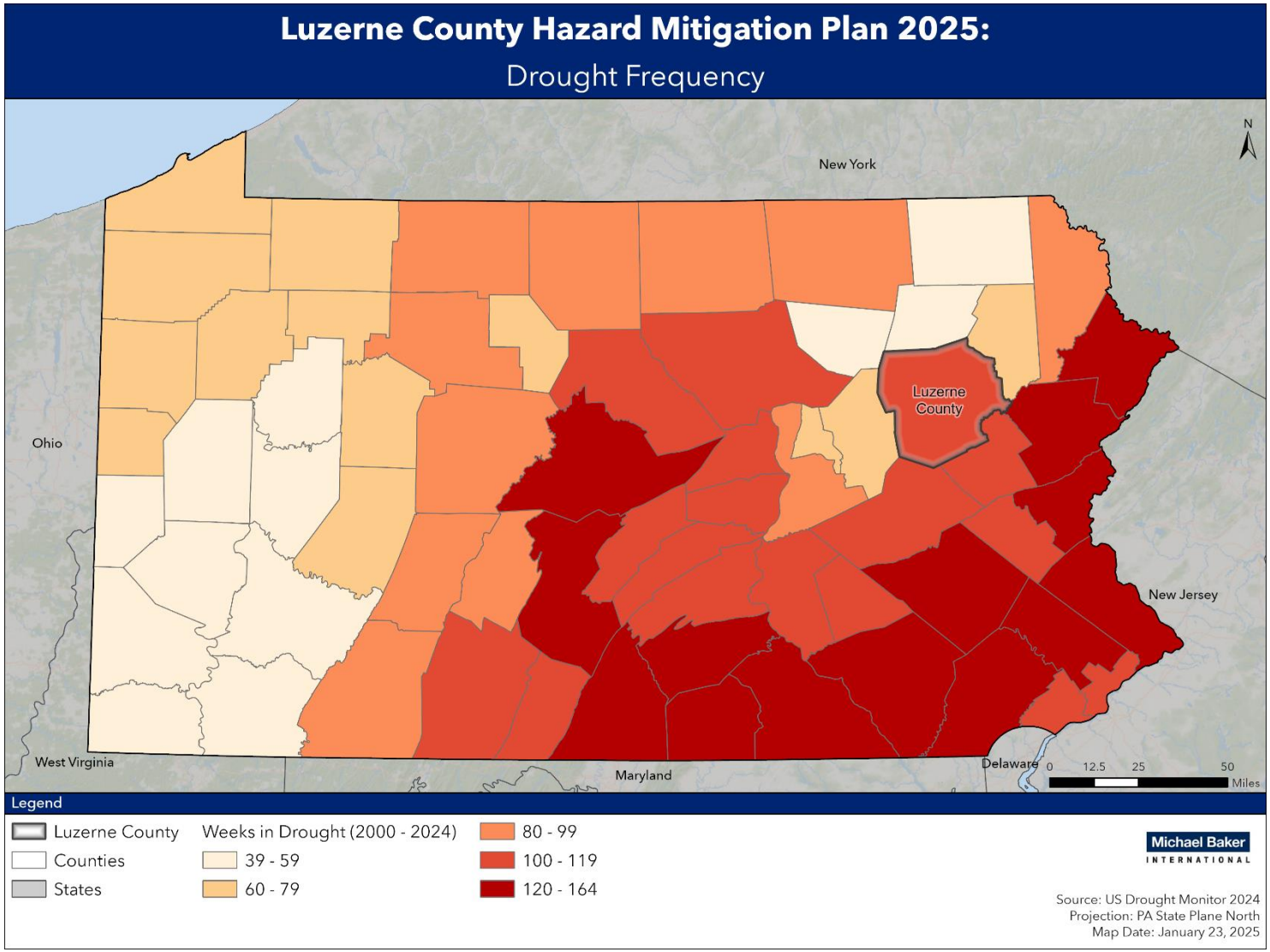
Table 4.3.1-3 Luzerne County Declared Drought Status from 1980 to 2025 (PADEP, 2025d).

DATE	DROUGHT STATUS
09/30/1999 – 05/05/2000	Watch
12/05/2001 – 11/07/2002	Watch
04/11/2006 – 06/30/2006	Watch

Table 4.3.1-3 Luzerne County Declared Drought Status from 1980 to 2025 (PADEP, 2025d).

DATE	DROUGHT STATUS
08/06/2007 – 01/11/2008	Watch
09/16/2010 – 11/10/2010	Warning
03/24/2015 – 07/10/2015	Watch
11/03/2016 – 02/14/2017	Watch
08/31/2022 – 01/20/2023	Watch
05/15/2023 – 08/24/2023	Watch

Figure 4.3.1-1 Drought Frequency in Luzerne County from 2000-2024 (US Drought Monitor 2024).



4.3.1.4. Future Occurrence

It is difficult to forecast the severity and frequency of future drought events in Luzerne County. Luzerne County has been identified by the U.S. Drought Monitor as being abnormally dry (NIDIS, 2025). Also, over the past five years the declared drought status in Luzerne County has shifted between "Normal" and "Watch" indicating that conditions are fairly consistent over time (PA DEP, 2025d). While there hasn't been a declared drought status in the past five years, indicators show that local conditions make it possible for there to be a drought. Therefore, the probability of drought impacting Luzerne County is considered *likely* as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1).

According to the PEMA uncertainty regarding the future occurrence of droughts exists due to the potential impacts of climate change. The Pennsylvania Climate Impacts Assessment 2021 Update suggests that the likelihood for drought will *slightly increase* through the 21st century. While average and extreme precipitation are project to increase, higher temperatures and an increase in days without rain could reduce water availability (PA DEP, 2021).

The Climate Mapping for Resilience and Adaptation (CMRA) Tool provides county-level assessment reports for certain hazards, including drought. Figure 4.3.1-2 below shows the report for drought in Luzerne County. The future climate indicators that may contribute to drought include precipitation and temperature thresholds. According to CMRA, the number of days per year with no precipitation may increase depending on emission scenarios, even if the total annual precipitation is expected to increase. In addition, the annual number of days above 90 degrees Fahrenheit is expected to significantly increase in the future under all emission scenarios.

Figure 4.3.1-2 Luzerne County Drought Hazard Assessment Report (CMRA, 2025)

Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Average annual total precipitation	**44"** 42 - 45	**46"** 43 - 50	**46"** 43 - 50	**46"** 43 - 52	**47"** 43 - 52	**48"** 43 - 52	**49"** 44 - 54
Days per year with precipitation (wet days)	**203 days** 199 - 207	**202 days** 193 - 214	**202 days** 185 - 213	**201 days** 190 - 213	**200 days** 181 - 209	**201 days** 186 - 212	**199 days** 174 - 217
Days per year with no precipitation (dry days)	**162 days** 158 - 166	**163 days** 152 - 173	**163 days** 152 - 180	**164 days** 153 - 175	**165 days** 156 - 184	**164 days** 153 - 179	**166 days** 148 - 191
Maximum number of consecutive dry days	**10 days** 9 - 11	**10 days** 9 - 11	**10 days** 9 - 12	**10** days 9 - 12	**10 days** 9 - 13	**10 days** 9 - 12	**11 days** 9 - 13
Temperature thresholds:							
Annual days with maximum temperature > 90 °F	**3 days** 3 - 6	**14 days** 6 - 26	**16 days** 7 - 25	**20 days** 9 - 38	**26 days** 12 - 43	**26 days** 11 - 52	**54 days** 16 - 87
Annual days with maximum temperature > 100 °F	**0 days** 0 - 0	**0 days** 0 - 2	**1 days** 0 - 3	**1 days** 0 - 6	**2 days** 0 - 10	**2 days** 0 - 6	**10 days** 0 - 39

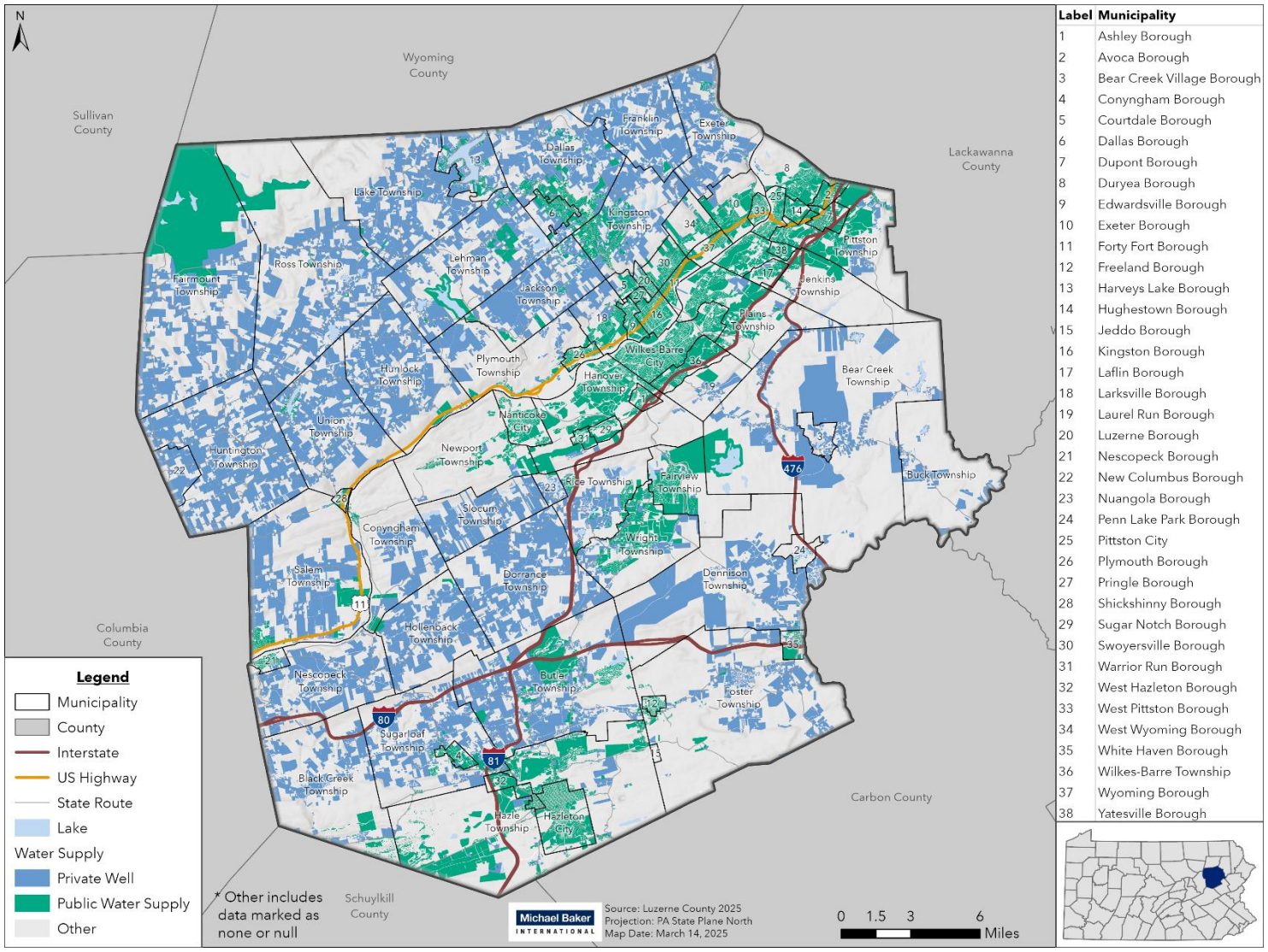
4.3.1.5. Vulnerability Assessment

A drought in Luzerne County can have significant detrimental effects on the domestic water supply, especially for well-water, agriculture, and water-dependent recreational activities. Economic effects in Luzerne County would include crop loss. No structural damage due to drought is anticipated in Luzerne County.

Negative impacts of drought would be experienced by agricultural interests, and the community would need to reduce its usage of water. Prolonged drought would affect the 376 farms located in Luzerne County, which sold approximately $30,268,000 in agricultural products in 2022 (USDA, 2022a). The major crops in Luzerne County are grains, oilseeds, dry beans, and dry peas, which totaled $11,139,000 in sales. According to the USDA 2022 Census of Agriculture, most sales to date have come from crop sales, totaling $25,773,000 (85%). Livestock sales made up the remaining 15% (USDA, 2022b). Figure 2.5-2 in the Community Profile shows land uses across Luzerne County. This map shows that most cultivated areas in the county are in the Western portion of the County. There are also some areas extending in Northern and Southern Areas of the County.

Luzerne County residents that use private domestic wells are also vulnerable to droughts because their wells can dry up. Map figure 4.3.1-1 shows county parcels that are known to have private water wells and parcels that are supplied by public infrastructure. Overall, there are 29,411 private domestic water wells in Luzerne County. Table 4.3.1-4 shows the number of domestic wells per municipality as provided by Luzerne County based on their assessment data. According to this dataset, one municipality has over 2,500 wells and ten municipalities have over 1,000 domestic wells. Residents in Butler Township have the highest reported number of wells in Luzerne County and therefore are the most vulnerable to water supply issues related to droughts.

Figure 4.3.1-3 Luzerne County Water Supply (Luzerne County 2025).



Label	Municipality
1	Ashley Borough
2	Avoca Borough
3	Bear Creek Village Borough
4	Conyngham Borough
5	Courtdale Borough
6	Dallas Borough
7	Dupont Borough
8	Duryea Borough
9	Edwardsville Borough
10	Exeter Borough
11	Forty Fort Borough
12	Freeland Borough
13	Harveys Lake Borough
14	Hughestown Borough
15	Jeddo Borough
16	Kingston Borough
17	Laflin Borough
18	Larksville Borough
19	Laurel Run Borough
20	Luzerne Borough
21	Nescopeck Borough
22	New Columbus Borough
23	Nuangola Borough
24	Penn Lake Park Borough
25	Pittston City
26	Plymouth Borough
27	Pringle Borough
28	Shickshinny Borough
29	Sugar Notch Borough
30	Swoyersville Borough
31	Warrior Run Borough
32	West Hazleton Borough
33	West Pittston Borough
34	West Wyoming Borough
35	White Haven Borough
36	Wilkes-Barre Township
37	Wyoming Borough
38	Yatesville Borough

Table 4.3.1-4 Number of reported domestic wells in Luzerne County (Luzerne County, 2025).

MUNICIPALITY	NUMBER OF REPORTED DOMESTIC WELLS	MUNICIPALITY	NUMBER OF REPORTED DOMESTIC WELLS
Ashley Borough	1	Lake Township	903
Avoca Borough	1	Larksville Borough	146
Bear Creek Village Borough	141	Laurel Run Borough	148
Bear Creek Township	1,480	Lehman Township	1,285
Black Creek Township	741	Luzerne Borough	19
Buck Township	265	City of Nanticoke	0
Butler Township	2,589	Nescopeck Borough	18
Conyngham Borough	17	Nescopeck Township	504
Conyngham Township	359	New Columbus Borough	106
Courtdale Borough	21	Newport Township	40
Dallas Borough	113	Nuangola Borough	489
Dallas Township	1,249	Penn Lake Park Borough	189
Dennison Township	540	City of Pittston	1
Dorrance Township	1,016	Pittston Township	260
Dupont Borough	0	Plains Township	59
Duryea Borough	20	Plymouth Borough	4
Edwardsville Borough	0	Plymouth Township	292
Exeter Borough	8	Pringle Township	0
Exeter Township	919	Rice Township	675
Fairmount Township	669	Ross Township	1,393
Fairview Township	83	Salem Township	902
Forty Fort Borough	0	Shickshinny Borough	38
Foster Township	1,181	Slocum Township	552
Franklin Township	671	Sugarloaf Township	1,316
Freeland Borough	10	Sugar Notch Borough	1
Hanover Township	96	Swoyersville Borough	2
Harveys Lake Borough	1,531	Union Township	913

Table 4.3.1-4 Number of reported domestic wells in Luzerne County (Luzerne County, 2025).

MUNICIPALITY	NUMBER OF REPORTED DOMESTIC WELLS	MUNICIPALITY	NUMBER OF REPORTED DOMESTIC WELLS
Hazle Township	636	Warrior Run Borough	0
City of Hazleton	24	West Hazleton Borough	1
Hollenback Township	519	West Pittston Borough	0
Hughestown Borough	0	West Wyoming Borough	21
Hunlock Township	1,079	White Haven Borough	19
Huntington Township	1,015	City of Wilkes-Barre	0
Jackson Township	854	Wilkes-Barre Township	2
Jeddo Borough	1	Wright Township	529
Jenkins Township	26	Wyoming Borough	1
Kingston Borough	0	Yatesville Borough	1
Kingston Township	699		
Laflin Borough	6	**Total**	**29,411**

FEMA's National Risk Index reports there are no Expected Annual Losses to Drought for all census tracts in Luzerne County.

4.3.1.6. Equity in Vulnerable Communities

Communities within Luzerne County with higher concentrations of low-income households could be more susceptible to drought. This includes Dallas Township, Ashley Borough, in addition to the cities of Hazleton, Nanticoke, and Wilkes-Barre as they have areas with the highest populations below the poverty level. These households are more likely to live in housing structures with lower-quality infrastructure and higher water bills relative to income.

4.3.2. EARTHQUAKE

4.3.2.1. Location and Extent

An earthquake is the motion or trembling of the ground produced by sudden displacement of rock usually within the upper 10-20 miles of the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of underground caverns. They can also result from human activity like mine blasts and nuclear experiments. The closest active fault line that might contribute to an earthquake in Luzerne County is the Mid-Atlantic Ridge, which is approximately 2,000 miles to the east of Pennsylvania (DCNR,2023). The Rampo Fault may also contribute to an earthquake in Luzerne County, although it is less likely. This is an ancient fault system that stretches about 185 miles from Pennsylvania, through New Jersey, and into New York. The Rampo Fault has very occasional seismic activity. While it does not run directly through Luzerne County, it runs nearby. As regional hazards, an earthquake would affect all of Luzerne County. Earthquakes can cause damage to buildings and other rigid superstructures, depending on factors like earthquake magnitude, distance of local areas to the earthquake epicenter, and local geologic conditions. It remains incredibly difficult to predict when and where an earthquake will occur in the northeast U.S. and Pennsylvania.

Earthquake events in Pennsylvania typically do not impact areas greater than 100 km (62 miles) from the epicenter, and earthquake epicenters in Luzerne County are rare. The area is generally not known for seismicity, and USGS downgraded the probabilistic seismic hazard for much of Pennsylvania in 2014. Figure 4.3.2-1 shows the earthquake hazard in Pennsylvania and Luzerne County, expressed as the two-percent probability of exceedance in 50 years of peak ground acceleration (g). The following map was digitized from the National Seismic Hazard report. Luzerne County is split between the 0.04 zone and the 0.06 zone, indicating that the hazard is slight to moderate. However, earthquakes originating outside Pennsylvania can affect Luzerne County, though they are not expected to cause significant damage. This was the most current data available when updating this plan.

4.3.2.2. Range of Magnitude

There are several different ways of describing the magnitude of an earthquake. One method measures peak ground acceleration. Peak ground acceleration is the maximum horizontal ground acceleration measured in centimeters per second per second (cm/sec^2) (USGS, 2019). Peak ground acceleration can range from zero for an earthquake that is noticed by very few people to 350, which would be categorized as a catastrophic event. A peak ground acceleration of 10 cm/sec^2 means that the shaking is equivalent to about one percent of the acceleration due to gravity. Generally, ground acceleration must exceed 15 cm/sec^2 for significant damage to occur.

Earthquake magnitude is also often measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake (DCNR, 2023). Table 4.3.2-1 below summarizes Richter Scale Magnitudes as they relate to the spatial extent of impacted areas. Pennsylvania has not experienced any earthquakes with a magnitude greater than 6.0.

Table 4.3.2-1 Richter scale magnitudes and associated earthquake size effects.

RICHTER MAGNITUDES	EARTHQUAKE EFFECTS
Less than 3.5	Generally, not 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.

The Richter Scale does not give any indication of the impact or damage of an earthquake, although it can be inferred that higher magnitude events cause more damage. Therefore, another way of measuring the intensity of an earthquake is the Modified Mercalli Intensity Scale (DCNR, 2023). Measures on this scale range from I, an earthquake that is not generally noticeable, to XII, an earthquake that causes complete destruction. The table below summarizes Modified Mercalli Intensity Scale impacts of earthquake events, measured in terms of earthquake intensity.

Table 4.3.2-2 Modified Mercalli Intensity Scale with associated impacts (ABAG)

SCALE	INTENSITY	DESCRIPTION OF EFFECTS	CORRESPONDING RICHTER SCALE MAGNITUDE
I	**Instrumental**	Detected only on seismographs	<4.2
II	**Feeble**	Some people feel it	<4.2
III	**Slight**	Felt by people resting; like a truck rumbling by	<4.2
IV	**Moderate**	Felt by people walking	<4.2
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	<6.9

Table 4.3.2-2 Modified Mercalli Intensity Scale with associated impacts (ABAG)			
SCALE	INTENSITY	DESCRIPTION OF EFFECTS	CORRESPONDING RICHTER SCALE MAGNITUDE
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

Recent earthquakes in Pennsylvania have been measured from IV to VI on the Modified Mercalli Intensity Scale. However, since the worst earthquake recorded in Pennsylvania was a magnitude 5.2, a worst-case scenario for this hazard would be if an earthquake of similar magnitude occurred in or around Luzerne County near a populated area.

The potential impacts of earthquakes on community lifelines are as follows:

Table 4.3.2-3 Most Likely Lifelines Impacted by Earthquakes	
LIFELINES	NOTES
	Shelters may be affected depending on severity. Higher earthquake building standards can aid in mitigation.
	Personnel will likely be overutilized in response and recovery, leading to potential gaps in capability.
	Pipelines may be affected. Mitigation includes requiring higher building standards.

4.3.2.3. Past Occurrence

According to records maintained by the Pennsylvania Department of Conservation and Natural Resources (DCNR), there has been one earthquake recorded with its epicenter in Luzerne County. This was a minor earthquake occurring in 1974, with a magnitude of 2-3 on the Richter Scale shown on Figure 4.3.2-1. However, parts of the county have likely experienced shock waves from some minor earthquakes that have occurred around the region shown on Figure 4.3.2-1.

Figure 4.3.2-1 Luzerne County and Pennsylvania Seismic Hazard Potential (USGS 2023).

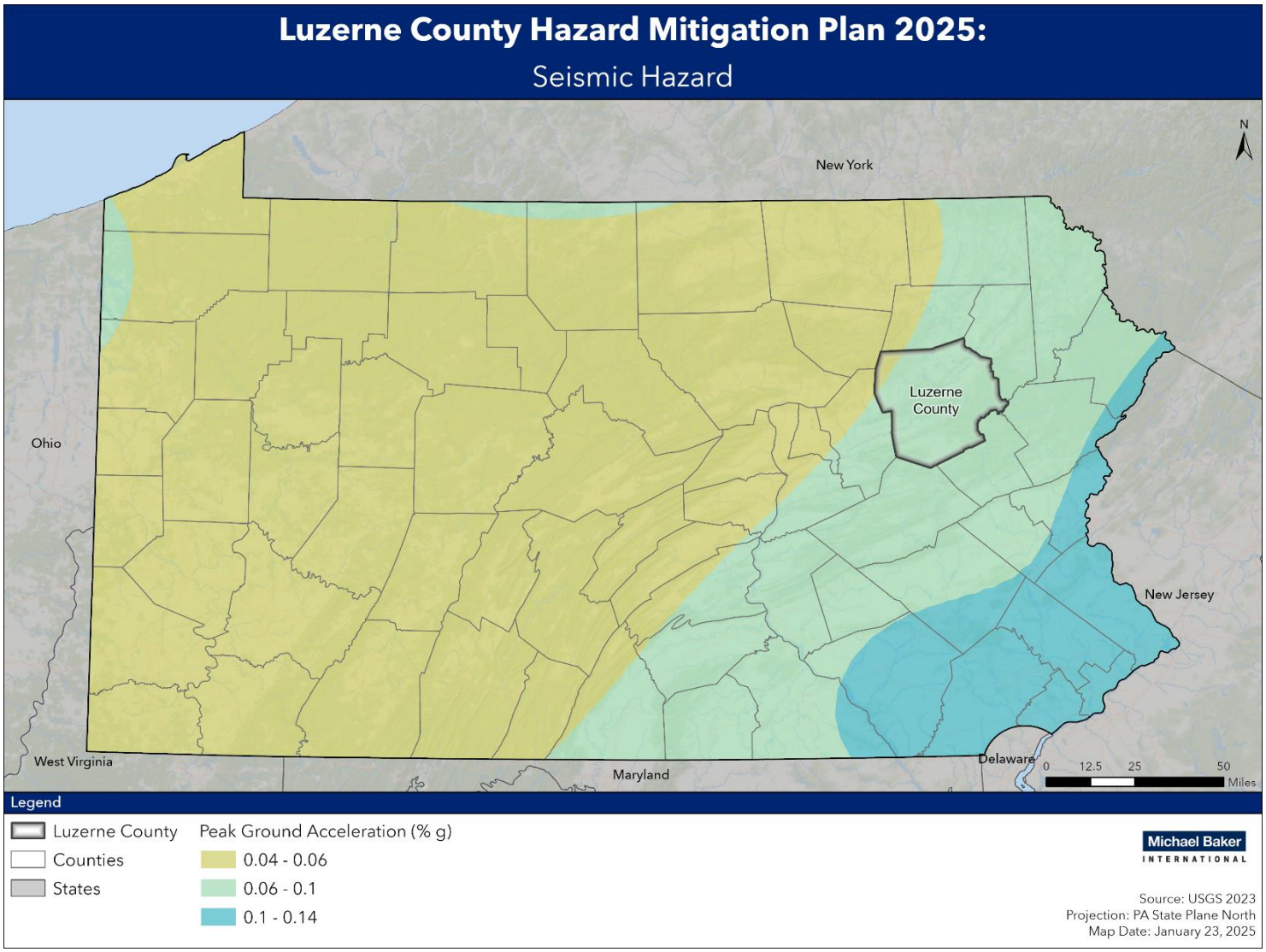
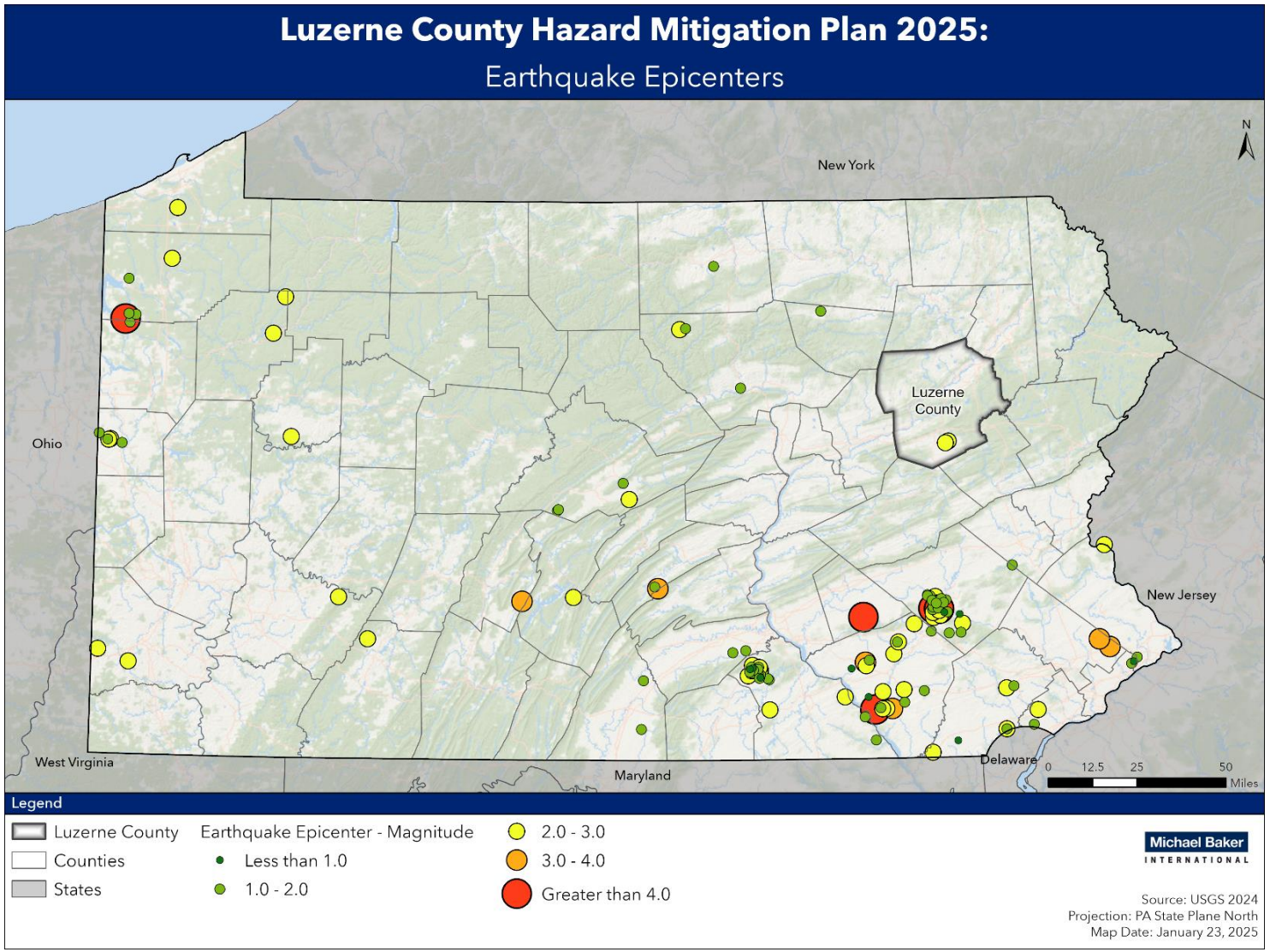


Figure 4.3.2-2 Luzerne County and Pennsylvania Seismic Epicenter History (USGS 2024).



4.3.2.4. Future Occurrence

The probability of an earthquake event occurring in Luzerne County is very low. Luzerne County does not sit on any fault lines; therefore, it is reasonable to believe that the County will not experience earthquake damage anytime soon. The future occurrence of earthquakes can be considered *unlikely* as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1).

4.3.2.5. Vulnerability Assessment

All structures and infrastructure in Luzerne County are equally at risk of experiencing an earthquake. However, in a mild earthquake of the magnitude typically experienced in Pennsylvania, no structural damage is anticipated. In other cases, damages are expected to be limited, and examples of anticipated damages are broken dishes and windows and toppled file cabinets.

However, for earthquakes, the available history covers a period of less than 300 years, which is a relatively short period of time for an examination of earthquakes. Large earthquakes may only affect a location every several centuries or millennia. Environmental impacts of earthquakes can be numerous, widespread and devastating, particularly if indirect impacts are considered. Some secondary hazards caused by earthquakes may include fire, hazardous material release, landslides, flash flooding, avalanches, tsunamis, and dam failure. These secondary events could also result in disruptions to natural ecosystems, poor water quality, damage to vegetation, and the release of toxic materials and sewage. Impacts to infrastructure could include train derailments, pipeline failures, and utility interruptions. A very large earthquake affecting Luzerne County might cause structural damage in dilapidated structures or structures that do not meet current building codes. Thus, the impact of an earthquake might range from negligible to catastrophic. Based on historical data for Luzerne County, damage is likely to be minimal.

Structures identified as potentially at risk of damage due to an earthquake are older structures. All existing buildings have the potential to experience an earthquake. Given no history of damage in Luzerne County due to earthquake, damages are estimated to be limited to the more dilapidated structures and structures with unreinforced masonry. The number of housing units that are at least 55 years old in Luzerne County is 90,138 (U.S. Census Bureau, 2023). This data point was chosen due to the census reporting of housing unit age being done in decades rather than individual years or ages. Table 4.3.2-4 below shows the number of these structures by municipality.

Table 4.3.2-4 Housing Units At Least 55 Years Old by Municipality (U.S. Census Bureau, 2023)

MUNICIPALITY	NUMBER OF STRUCTURES
Ashley Borough	978
Avoca Borough	874
Bear Creek Township	531
Bear Creek Village Borough	66

Table 4.3.2-4 Housing Units At Least 55 Years Old by Municipality (U.S. Census Bureau, 2023)

MUNICIPALITY	NUMBER OF STRUCTURES
Black Creek Township	478
Buck Township	145
Butler Township	1,103
Conyngham Borough	537
Conyngham Township	394
Courtdale Borough	394
Dallas Borough	720
Dallas Township	1,455
Dennison Township	163
Dorrance Township	270
Dupont Borough	1,056
Duryea Borough	1,596
Edwardsville Borough	1,276
Exeter Borough	1,411
Exeter Township	489
Fairmount Township	149
Fairview Township	618
Forty Fort Borough	1,601
Foster Township	764
Franklin Township	251
Freeland Borough	1,586
Hanover Township	3,058
Harveys Lake Borough	816
Hazle Township	2,413
City of Hazleton	9,712
Hollenback Township	137
Hughestown Borough	432
Hunlock Township	356
Huntington Township	380
Jackson Township	300
Jeddo Borough	56
Jenkins Township	794
Kingston Borough	4,454
Kingston Township	1,472
Laflin Borough	168
Lake Township	238
Larksville Borough	1,195
Laurel Run Borough	56
Lehman Township	621
Luzerne Borough	1,390

Table 4.3.2-4 Housing Units At Least 55 Years Old by Municipality (U.S. Census Bureau, 2023)

MUNICIPALITY	NUMBER OF STRUCTURES
City of Nanticoke	3,873
Nescopeck Borough	623
Nescopeck Township	148
New Columbus Borough	62
Newport Township	1,522
Nuangola Borough	228
Penn Lake Park Borough	129
City of Pittston	2,730
Pittston Township	621
Plains Township	2,857
Plymouth Borough	2,261
Plymouth Township	479
Pringle Borough	357
Rice Township	184
Ross Township	615
Salem Township	1,385
Shickshinny Borough	288
Slocum Township	271
Sugarloaf Township	349
Sugar Notch Borough	352
Swoyersville Borough	1,489
Union Township	388
Warrior Run Borough	185
West Hazleton Borough	1,524
West Pittston Borough	1,784
West Wyoming Borough	1,035
White Haven Borough	349
City of Wilkes-Barre	14,228
Wilkes-Barre Township	1,012
Wright Township	634
Wyoming Borough	1,317
Yatesville Borough	131
TOTAL	**90,138**

All future structures will also have the potential to experience an earthquake. However, given that new structures must meet current building codes and given the expected magnitude of earthquakes in the County, no property damages are anticipated.

Table 4.3.2-5 below shows the Expected Annual Losses for each census tract in the county according to FEMA's National Risk Index.

Table 4.3.2-5 Expected Annual Losses to Earthquake by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2001.00	Wilkes-Barre City	$20,132.47	Relatively Low
2002.00	Wilkes-Barre City	$4,720.82	Very Low
2003.00	Wilkes-Barre City	$3,913.70	Very Low
2004.00	Wilkes-Barre City	$4,385.58	Very Low
2005.00	Wilkes-Barre City	$7,135.63	Very Low
2006.00	Wilkes-Barre City	$2,401.49	Very Low
2007.00	Wilkes-Barre City	$6,503.43	Very Low
2008.00	Wilkes-Barre City	$5,767.85	Very Low
2009.00	Wilkes-Barre City	$3,507.07	Very Low
2010.00	Wilkes-Barre City	$929.14	Very Low
2011.00	Wilkes-Barre City	$462.06	Very Low
2012.00	Wilkes-Barre City	$2,629.40	Very Low
2013.00	Wilkes-Barre City	$1,082.76	Very Low
2014.00	Wilkes-Barre City	$989.97	Very Low
2015.00	Wilkes-Barre City	$1,302.68	Very Low
2016.00	Wilkes-Barre City	$1,280.49	Very Low
2101.00	Pittston Township	$4,006.94	Very Low
2102.00	Dupont Borough	$1,841.55	Very Low
2103.00	Avoca Borough	$2,980.35	Very Low
2104.00	Hughestown Borough	$1,325.43	Very Low
2105.00	Duryea Borough	$3,912.76	Very Low
2106.00	Pittston City	$1,092.66	Very Low
2107.00	Pittston City	$969.99	Very Low
2108.00	Pittston City	$1,228.34	Very Low
2110.00	West Pittston Borough	$2,167.64	Very Low
2111.01	Exeter Borough	$3,437.91	Very Low
2111.02	Exeter Township	$874.29	Very Low
2112.01	Dallas Borough	$2,540.33	Very Low
2112.03	Franklin Township	$928.27	Very Low
2112.04	Dallas Township	$8,200.57	Very Low
2112.05	Dallas Township	$1,275.98	Very Low
2113.01	Jackson Township	$1,889.80	Very Low
2113.02	Lehman Township	$4,737.87	Very Low
2113.03	Harveys Lake Borough	$1,700.25	Very Low
2113.04	Lake Township	$904.04	Very Low
2114.00	Kingston Township	$3,194.77	Very Low

Table 4.3.2-5 Expected Annual Losses to Earthquake by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2115.00	West Wyoming Borough	$3,935.05	Very Low
2116.00	Wyoming Borough	$7,943.52	Very Low
2117.01	Jenkins Township	$5,048.58	Very Low
2117.02	Laflin Borough	$1,308.98	Very Low
2118.00	Plains Township	$2,537.40	Very Low
2119.00	Plains Township	$8,811.55	Very Low
2120.00	Plains Township	$1,111.61	Very Low
2121.00	Forty Fort Borough	$6,761.47	Very Low
2122.00	Swoyersville Borough	$3,344.36	Very Low
2123.00	Luzerne Borough	$1,299.09	Very Low
2127.00	Kingston Borough	$9,757.25	Very Low
2128.00	Kingston Borough	$5,897.02	Very Low
2129.00	Kingston Borough	$3,689.07	Very Low
2130.00	Kingston Borough	$2,899.64	Very Low
2131.00	Kingston Borough	$4,568.47	Very Low
2132.00	Edwardsville Borough	$8,696.94	Very Low
2133.00	Courtdale Borough	$882.85	Very Low
2134.00	Larksville Borough	$2,764.66	Very Low
2136.00	Plymouth Borough	$851.61	Very Low
2137.00	Plymouth Borough	$1,007.78	Very Low
2138.00	Plymouth Borough	$473.21	Very Low
2139.00	Plymouth Township	$1,435.32	Very Low
2141.00	Nanticoke City	$1,894.24	Very Low
2142.00	Nanticoke City	$1,572.44	Very Low
2143.00	Nanticoke City	$2,071.95	Very Low
2144.00	Nanticoke City	$972.83	Very Low
2145.00	Hanover Township	$878.27	Very Low
2146.00	Hanover Township	$5,599.66	Very Low
2149.00	Hanover Township	$855.15	Very Low
2150.00	Sugar Notch Borough	$1,156.04	Very Low
2151.00	Ashley Borough	$1,040.85	Very Low
2152.00	Wilkes-Barre Township	$3,479.22	Very Low
2153.00	Bear Creek Township	$3,213.31	Very Low
2154.00	Dennison Township	$1,708.77	Very Low
2155.01	Fairview Township	$2,753.28	Very Low
2155.02	Wright Township	$5,988.59	Very Low
2155.03	Rice Township	$3,646.84	Very Low
2155.04	Dorrance Township	$2,169.51	Very Low
2156.00	Newport Township	$2,925.08	Very Low
2157.01	Hunlock Township	$1,124.19	Very Low

Table 4.3.2-5 Expected Annual Losses to Earthquake by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2157.02	Union Township	$1,555.87	Very Low
2158.00	Ross Township	$1,748.12	Very Low
2159.00	Fairmount Township	$1,908.18	Very Low
2161.00	Salem Township	$2,549.92	Very Low
2162.00	Conyngham Township	$2,872.63	Very Low
2164.00	Black Creek Township	$1,290.54	Very Low
2165.01	Conyngham Borough	$1,729.39	Very Low
2165.02	Sugarloaf Township	$3,475.50	Very Low
2166.01	Butler Township	$2,068.37	Very Low
2166.02	Butler Township	$2,717.23	Very Low
2167.00	Freeland Borough	$1,891.05	Very Low
2168.00	Foster Township	$2,449.22	Very Low
2169.00	Hazle Township	$2,185.85	Very Low
2170.01	Hazle Township	$9,770.34	Very Low
2170.02	Hazle Township	$3,504.20	Very Low
2171.00	Hazleton City	$1,208.38	Very Low
2172.00	Hazleton City	$1,576.92	Very Low
2173.00	Hazleton City	$3,234.76	Very Low
2174.00	Hazleton City	$3,562.85	Very Low
2175.00	Hazleton City	$3,250.91	Very Low
2176.00	Hazleton City	$1,670.01	Very Low
2177.00	Hazleton City	$5,001.75	Very Low
2178.00	Hazleton City	$3,335.91	Very Low
2179.00	Hazle Township	$7,060.07	Very Low
2180.00	Hanover Township	$4,067.16	Very Low
TOTAL		**$320,115.05**	

4.3.2.6. Equity in Vulnerable Communities

Communities within Luzerne County with a large renter population may be more at risk during an earthquake due to a lack of control over the seismic safety of their buildings. This includes Edwardsville Borough, Pittston City, Plymouth Borough, Hazleton City, and Wilkes-Barre City. Renter protections may also be affected due to a lack of renter protections or access to temporary housing after an earthquake. Low-income communities may also be at greater risk as these households often live in older or poorly constructed housing, which is more likely to sustain damage during an earthquake. People with disabilities or limited mobility also face greater challenges in evacuating during an earthquake and accessing post-disaster services. In terms of emergency notification, households without smartphones and lack of access to the internet will affect how people get emergency communications. Ensuring equitable access to such technologies and providing information in multiple languages and formats is critical.

4.3.3. EXTREME TEMPERATURES

Extreme temperature includes both hot and cold temperatures. Extreme cold temperatures drop well below what is considered normal for an area during the winter months and often accompany winter storm events. Combined with increases in wind speed, such temperatures in Pennsylvania can be life threatening to those exposed for extended periods of time. Extreme heat can be described as temperatures that are above the average high temperature for a region during the summer months.

4.3.3.1. Location and Extent

All of Luzerne County may be subject to extreme temperatures in the summer and winter seasons. Luzerne has a moderate risk to extreme heat. Any day that feels above a temperature of 94°F is considered a hot day in Luzerne County. According to the Binghampton NWS Station, Avoca was 7 degrees warmer in 2024 compared to previous years (NOAA NWS, 2024a) In 2025 it is expected that there will be seven hot days. In 30 years it is expected that there will be 16 hot days a year due to climate change (First Street, 2025). Areas most susceptible to extreme heat include urban environments, as buildings and pavement absorb and retain heat, causing an Urban Heat Island Effect.

The county is also moderately at risk to extreme cold. Luzerne County is susceptible to freezing temperatures (below 32° F), especially during the winter. Avoca tied with the previous record low of -2°F in 2024, which was set in 1960 (NOAA NWS, 2024a). However, as climate changes, the number of extreme cold days are expected to decrease (NOAA, 2025). Areas most susceptible to extreme cold include higher elevations. Different populations and industries may experience extreme temperatures differently. For both extreme heat and extreme cold demographics must also be considered, as large populations of elderly or poor represent those most vulnerable to temperature extremes.

Figure 4.3.3-1 and Figure 4.3.3-2 show annual mean maximum and minimum temperatures throughout Pennsylvania and highlight Luzerne County. These maps present the year-round average minimum temperature and average maximum temperature. Elevation and topography account for local differences seen on the maps. However, during the summer, the average high temperature is 82.3°F and the average low is 60.6°F in Luzerne County. In winter, the average high in Luzerne County is 38.2°F and the average low is 22.8°F (NOAA-NCEI, 2025).

Figure 4.3.3-1 Average Minimum Temperature in Luzerne County, 2021

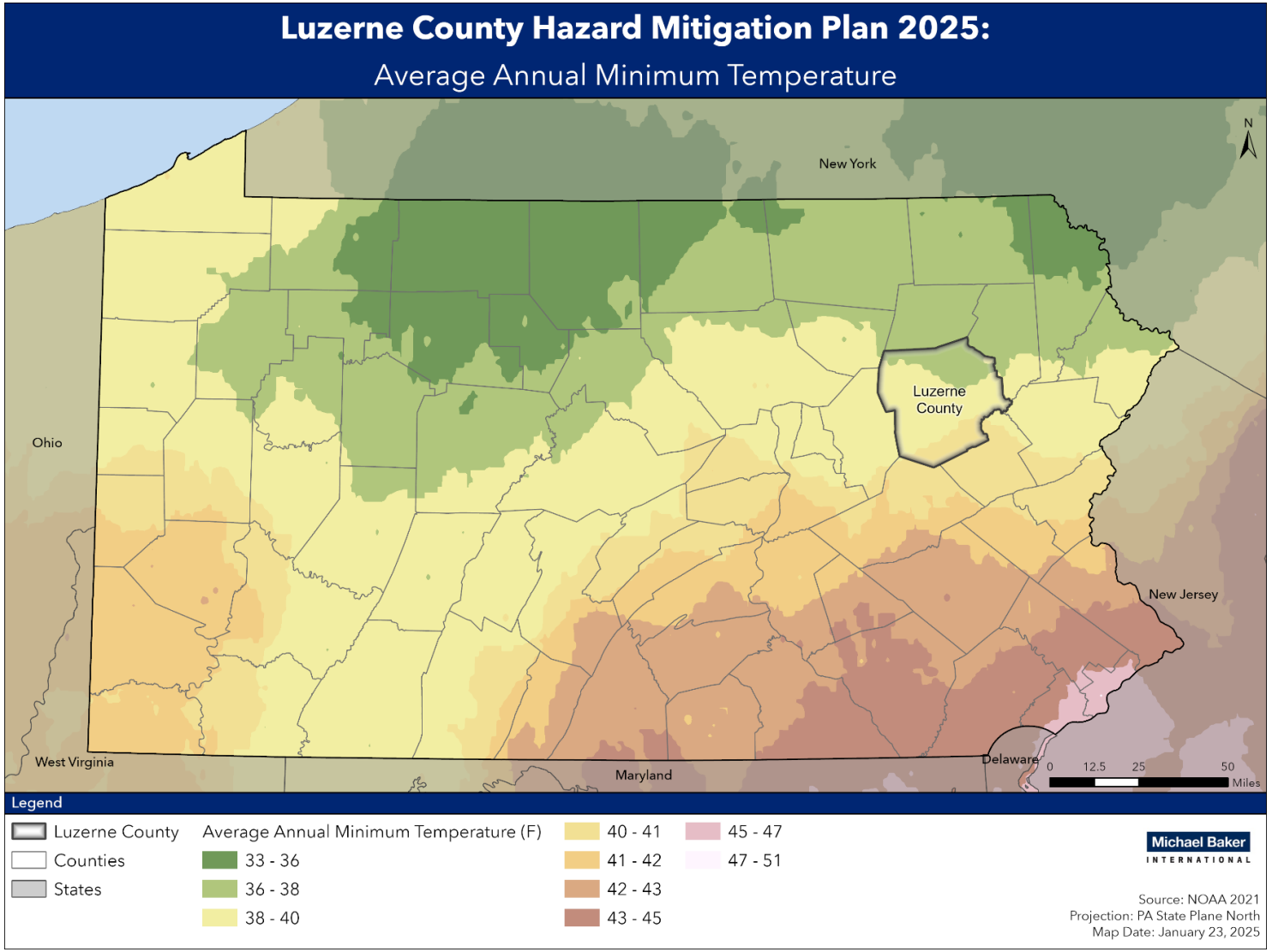
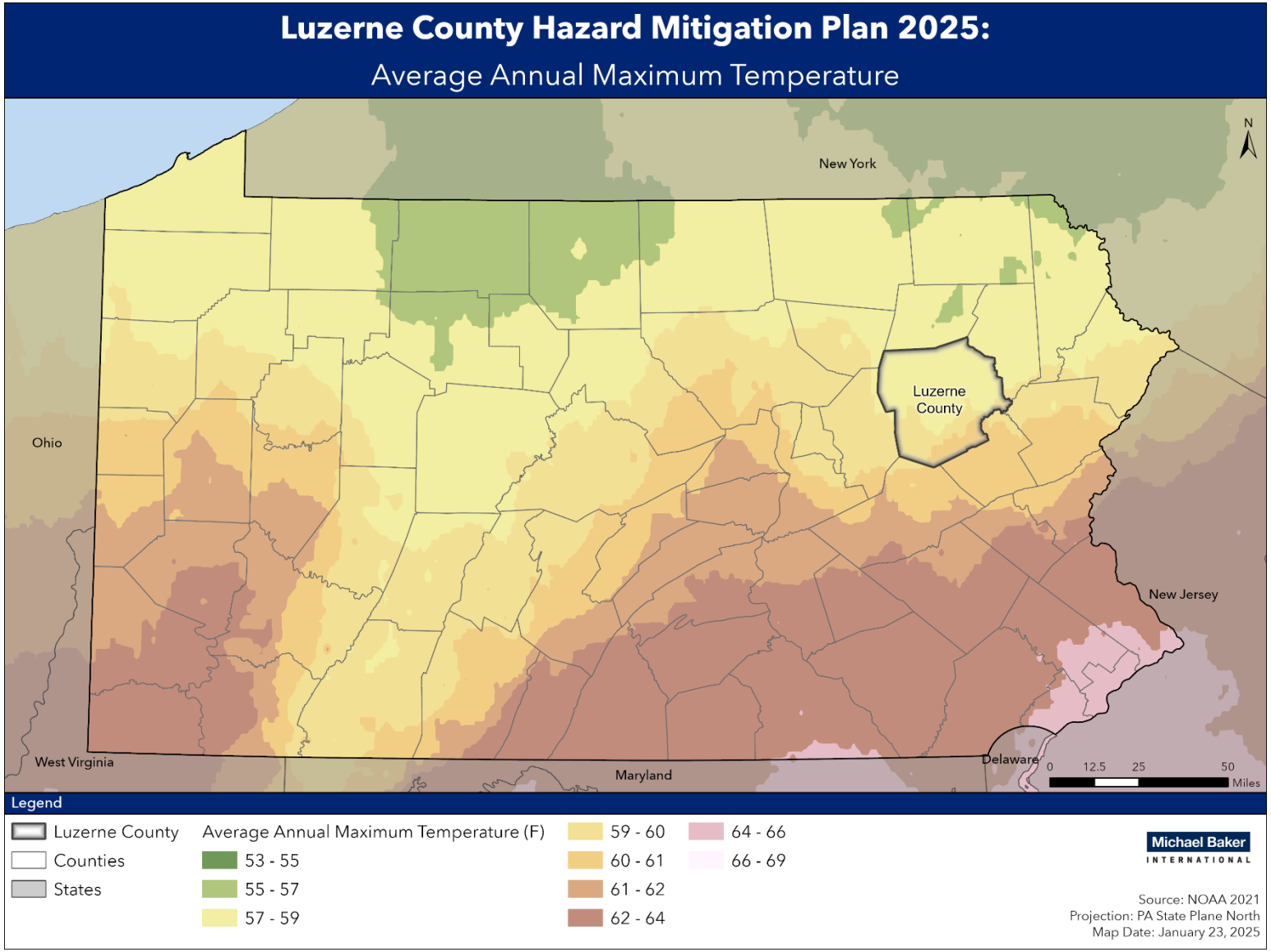


Figure 4.3.3-2 Average Maximum Temperature in Luzerne County, 2021



4.3.3.2. Range of Magnitude

Extreme temperatures can be disruptive and/or dangerous, especially for the elderly, disabled, poor, and otherwise disadvantaged members of communities. Extreme heat and cold can also impact transportation, agriculture, and energy supplies.

The following impacts can be observed in conjunction with extreme temperature events:

- **Health Impacts:** Both extreme cold and extreme heat can cause severe health impacts. The impacts of severe cold include hypothermia and frostbite from prolonged exposure. Cold weather also raises the risk of injuries from falls, traffic incidents, carbon monoxide poisoning, and house fires. Health impacts of extreme heat include heat stroke and dehydration. The health impacts of extreme cold are greater in terms of mortality in humans, but often after more prolonged exposure vs. a cold snap. Extreme heat waves, however, can prove more deadly over a shorter duration. Both extreme heat and extreme cold are most likely to impact the elderly, low-income individuals, residents with disabilities and pre-existing medical conditions, and laborers and farm workers.
- **Transportation:** Cold weather can impact automotive engines, possibly stranding motorists; limit or prevent travel by pedestrians, bicyclists, and users of public transportation; and stress metal bridge structures. Highways and railroad tracks can become distorted in high heat. Disruptions to the transportation network and accidents due to extreme temperatures represent an additional risk.
- **Agriculture:** Absolute temperature and duration of extreme cold can have devastating effects on trees and winter crops. Livestock is especially vulnerable to heat. Crop yields can be impacted by heat waves or cold snaps that occur during key development stages, even at levels that do not impact most of the population.
- **Energy:** Energy consumption rises significantly during extreme cold weather, and any fuel shortages or utility failures that prevent the heating of a dwelling place residents in extreme danger. Extreme heat also can result in utility interruptions, and sagging transmission lines due to the heat can lead to shorting out.

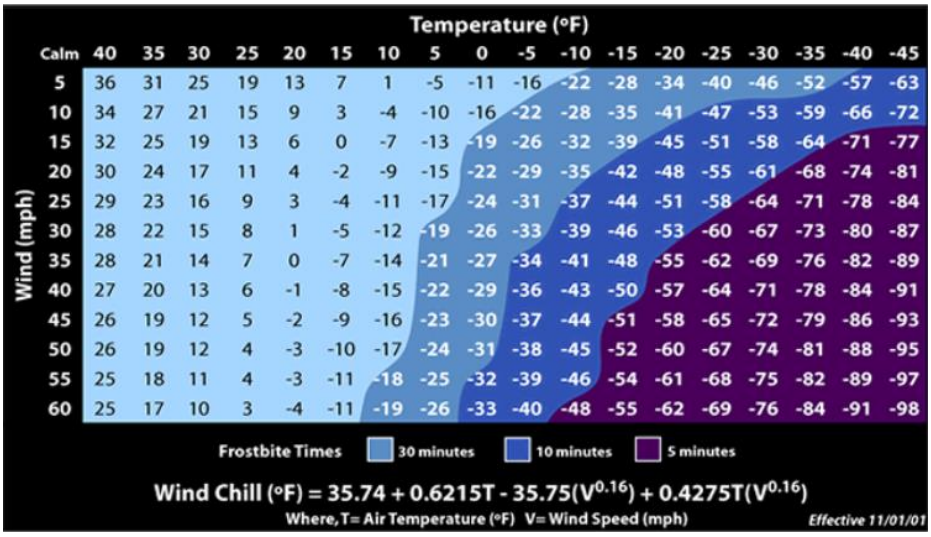
The range of these impacts, especially health effects, can be mitigated through improved forecasts, warnings, community preparedness, and appropriate community response. A worst-case extreme cold event for Luzerne County would include extreme cold temperatures combined with an interruption in energy supplies and loss of access to medical care from snow or ice impacting travel. Medical afflictions could result from direct influence on the coronary circulation system and the respiratory system. A worst-case extreme heat event for Luzerne County with include extreme heat temperatures combined with drought, impacting food and water supply.

The experience of extreme heat and extreme cold varies considerably depending on humidity and wind conditions, respectively. Figure 4.3.3-3 shows the effects of wind speed on extreme cold events and humidity on extreme heat events. These compounding factors can increase the

risk experienced by vulnerable populations and the general public. While the temperatures in Figures 4.3.3-3 and 4.3.3-4 serve as a guide for various danger categories, the impacts of high temperatures will vary from person to person based on individual age, health, and other factors.

NWS issues temperature advisories, watches, and warnings. Exact thresholds vary across the Commonwealth, but in general heat advisories are issued when the heat index will be equal to or greater than 100°F, but less than 105°F, excessive heat warnings are issued when heat indices will attain or exceed 105°F, and excessive heat watches are issued when there is a possibility that excessive heat warning criteria may be experienced within twelve to forty-eight hours. Similarly, NWS issues wind chill warnings, watches, and advisories. A wind chill warning is issued when extremely cold wind chill values are occurring; a watch when extremely cold wind chill values are possible; and an advisory when seasonably cold wind chill values are occurring (NOAA NWS, 2025).

Figure 4.3.3-3 Effects of Wind Speed on Extreme Cold Events (Wind Chill) (NOAA NWS, 2025)



Temperature (°F)

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

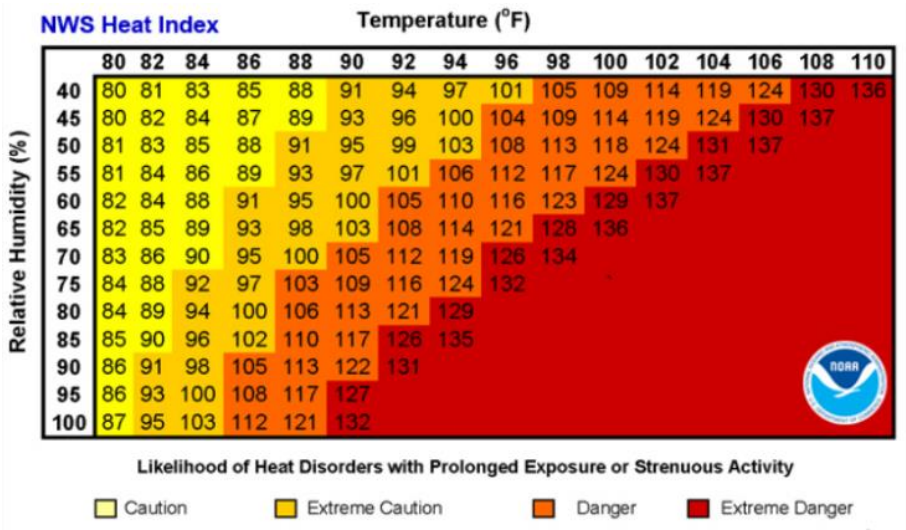
Frostbite Times: 30 minutes, 10 minutes, 5 minutes

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

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

Effective 11/01/01

Figure 4.3.3-4 Effects of Wind Speed on Humidity on Extreme Heat Events (Heat Index) (NOAA NWS, 2025)



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

Major human risks to extremely high temperatures include heat cramps, heat syncope, heat exhaustion, heatstroke, and death. The elderly, the very young, and those with low or no income are most vulnerable to health-related impacts of extreme temperatures. Cold temperatures can be extremely dangerous to humans and animals exposed to the elements. Without heat and shelter, cold temperatures can cause hypothermia, frost bite, and death. Wind chill temperatures are often used in place of raw temperature values due to the effect of wind can have in drawing heat from the body under cold temperatures.

The potential impacts of extreme temperature on community lifelines are as follows:

Table 4.3.3-1 Most Likely Lifelines Affected by Extreme Temperature

LIFELINES	NOTES
Safety and Security	Government operations and facilities, including police and fire, will be needed for response and recovery. Landlords and utility companies will need to respond to infrastructure issues for residents.
Health and Medical	Medical care will be needed in extreme events, and the facilities themselves will need effective heating and cooling infrastructure.
Energy (Power & Fuel)	Extreme temperatures will lead to a larger strain on the power grid due to an increased usage of heating and cooling utilities in response.

4.3.3.3. Past Occurrence

Historically, the highest and lowest recorded temperatures in central Pennsylvania, as observed by NWS in Wilkes-Barre, Pennsylvania were 101°F on July 16, 1988 and -21°F degrees on January 21, 1994. Table 4.3.3-2 shows extereme weather events from 2000 to 2025. Since 2000 there have been four cold weather events and five hot weather events.

Table 4.3.3-2 Previous Temperature Extremes Impacting Luzerne County, 2005-2025 (NOAA NCEI, 2025)

DATE	EVENT	DEATHS	INJURIES	PROPERTY DAMAGE RECORDED	CROP DAMAGE RECORDED
8/1/2001	Heat	0	0	$0.00	$0.00
1/10/2004	Cold/Wind Chill	0	0	$5K	$0.00
1/15/2005	Cold/Wind Chill	0	0	$10K	$0.00
12/14/2005	Cold/Wind Chill	0	0	$0.00	$0.00
1/1/2006	Heat	0	0	$0.00	$0.00
10/4/2007	Excessive Heat	0	0	$0.00	$0.00
7/21/2011	Excessive Heat	0	0	$0.00	$0.00
3/17/2012	Heat	0	0	$0.00	$0.00
11/23/2018	Extreme Cold/Wind Chill	0	0	$0.00	$0.00

4.3.3.4. Future Occurrence

Due to its location and geography, the County is more likely to encounter extreme cold weather than excessive heat. Topography and vegetation can impact temperature differentials across the County. The probability of an extreme temperature event in Luzerne County is considered *possible* as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1).

The Climate Mapping for Resilience and Adaptation (CMRA) Tool provides a county-level assessment report for extreme heat, shown in Figure 4.3.3-5 below. The future climate indicators that may contribute to extreme heat are temperature thresholds and annual temperature. According to CMRA, the number of days per year above both 90- and 95-degrees Fahrenheit are expected to increase in the future under all emission scenarios. The annual single highest maximum temperature is projected to be nearly 100 degrees Fahrenheit by midcentury. These changes may intensify the impacts from extreme heat. CMRA does not provide insights for extreme cold.

Figure 4.3.3-5 Luzerne County Extreme Heat Hazard Assessment Report (CMRA, 2025)

Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Temperature thresholds:							
Annual days with maximum temperature > 90°F	**3 days** 3 - 6	**14 days** 6 - 26	**16 days** 7 - 25	**20 days** 9 - 38	**26 days** 12 - 43	**26 days** 11 - 52	**54 days** 16 - 87
Annual days with maximum temperature > 95°F	**0 days** 0 - 1	**3 days** 1 - 10	**4 days** 1 - 9	**5 days** 1 - 18	**8 days** 2 - 20	**8 days** 2 - 26	**25 days** 3 - 60
Annual days with maximum temperature > 100°F	**0 days** 0 - 0	**0 days** 0 - 2	**1 days** 0 - 3	**1 days** 0 - 6	**2 days** 0 - 10	**2 days** 0 - 6	**10 days** 0 - 39
Annual days with maximum temperature > 105°F	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 1	**0 days** 0 - 3	**0 days** 0 - 3	**3 days** 0 - 22
Annual temperature:							
Annual single highest maximum temperature °F	**93 °F** 92 - 94	**97 °F** 94 - 100	**97 °F** 95 - 101	**98 °F** 95 - 103	**99 °F** 95 - 106	**100 °F** 96 - 106	**104 °F** 96 - 114
Annual highest maximum temperature averaged over a 5-day period °F	**88 °F** 87 - 88	**91 °F** 88 - 95	**92 °F** 89 - 95	**93 °F** 90 - 98	**94 °F** 90 - 100	**94 °F** 91 - 101	**99 °F** 91 - 109
Cooling degree days (CDD)	**507 degree-days** 456 - 540	**807 degree-days** 623 - 1,024	**843 degree-days** 647 - 1,077	**954 degree-days** 698 - 1,287	**1,089 degree-days** 776 - 1,421	**1,106 degree-days** 772 - 1,547	**1,683 degree-days** 1,036 - 2,423

N/A = Data Not Available for the selected area

4.3.3.5. Vulnerability Assessment

The potential for extreme heat and cold always exists in and around the summer and winter months. Meteorologists and weather forecasters can normally predict the temperature with excellent accuracy. Adhering to extreme temperature warnings can significantly reduce the risk of temperature related illness or death. Those hardest hit by both heat and cold waves include the elderly, disabled, and those who are socio-economically disadvantaged. Excessive heat exposure also affects people with certain pre-existing medical conditions, including cardiovascular disease, respiratory illnesses, and obesity. The two tables below showcase the elderly and disabled populations for each municipality. All 76 jurisdictions are considered vulnerable to the effects of extreme temperatures, but these vulnerabilities can vary across the general population. Efforts to mitigate the impacts should focus on those groups most vulnerable.

Table 4.3.3-3 Population Aged 65 or Older by Municipality (U.S. Census Bureau, 2023)

MUNICIPALITY	NUMBER OF INDIVIDUALS
Ashley Borough	415
Avoca Borough	564
Bear Creek Township	616
Bear Creek Village Borough	82
Black Creek Township	529
Buck Township	78
Butler Township	2,047
Conyngham Borough	542
Conyngham Township	281
Courtdale Borough	122
Dallas Borough	524
Dallas Township	2,178
Dennison Township	194
Dorrance Township	388
Dupont Borough	481
Duryea Borough	991
Edwardsville Borough	703
Exeter Borough	1,436
Exeter Township	546
Fairmount Township	315
Fairview Township	606
Forty Fort Borough	748
Foster Township	932
Franklin Township	358
Freeland Borough	672
Hanover Township	2,290
Harveys Lake Borough	801

Table 4.3.3-3 Population Aged 65 or Older by Municipality (U.S. Census Bureau, 2023)

MUNICIPALITY	NUMBER OF INDIVIDUALS
Hazle Township	2,745
City of Hazleton	4,500
Hollenback Township	218
Hughestown Borough	261
Hunlock Township	520
Huntington Township	480
Jackson Township	668
Jeddo Borough	32
Jenkins Township	1,013
Kingston Borough	2,492
Kingston Township	1,813
Laflin Borough	366
Lake Township	345
Larksville Borough	1,025
Laurel Run Borough	128
Lehman Township	740
Luzerne Borough	707
City of Nanticoke	1,928
Nescopeck Borough	374
Nescopeck Township	208
New Columbus Borough	88
Newport Township	873
Nuangola Borough	199
Penn Lake Park Borough	110
City of Pittston	1,458
Pittston Township	633
Plains Township	2,433
Plymouth Borough	917
Plymouth Township	324
Pringle Borough	205
Rice Township	473
Ross Township	651
Salem Township	1,268
Shickshinny Borough	171
Slocum Township	278
Sugarloaf Township	849
Sugar Notch Borough	132
Swoyersville Borough	1,439
Union Township	505
Warrior Run Borough	61

Table 4.3.3-3 Population Aged 65 or Older by Municipality (U.S. Census Bureau, 2023)	
MUNICIPALITY	**NUMBER OF INDIVIDUALS**
West Hazleton Borough	649
West Pittston Borough	886
West Wyoming Borough	642
White Haven Borough	203
City of Wilkes-Barre	6,854
Wilkes-Barre Township	609
Wright Township	1,359
Wyoming Borough	628
Yatesville Borough	108
Total	**65,007**

Table 4.3.3-4 Disabled Population by Municipality (U.S. Census Bureau, 2023)	
MUNICIPALITY	**NUMBER OF INDIVIDUALS**
Ashley Borough	678
Avoca Borough	377
Bear Creek Township	14
Bear Creek Village Borough	356
Black Creek Township	321
Buck Township	51
Butler Township	1,542
Conyngham Borough	247
Conyngham Township	286
Courtdale Borough	39
Dallas Borough	237
Dallas Township	999
Dennison Township	189
Dorrance Township	324
Dupont Borough	395
Duryea Borough	516
Edwardsville Borough	691
Exeter Borough	1,250
Exeter Township	305
Fairmount Township	150
Fairview Township	447
Forty Fort Borough	497
Foster Township	548
Franklin Township	236
Freeland Borough	659

Table 4.3.3-4 Disabled Population by Municipality (U.S. Census Bureau, 2023)

MUNICIPALITY	NUMBER OF INDIVIDUALS
Hanover Township	2,218
Harveys Lake Borough	416
Hazle Township	1,899
City of Hazleton	5,098
Hollenback Township	169
Hughestown Borough	150
Hunlock Township	339
Huntington Township	293
Jackson Township	218
Jeddo Borough	62
Jenkins Township	940
Kingston Borough	1,827
Kingston Township	847
Laflin Borough	156
Lake Township	185
Larksville Borough	682
Laurel Run Borough	135
Lehman Township	453
Luzerne Borough	619
City of Nanticoke	2,069
Nescopeck Borough	309
Nescopeck Township	112
New Columbus Borough	44
Newport Township	580
Nuangola Borough	61
Penn Lake Park Borough	44
City of Pittston	1,368
Pittston Township	687
Plains Township	1,757
Plymouth Borough	1,257
Plymouth Township	276
Pringle Borough	164
Rice Township	378
Ross Township	469
Salem Township	574
Shickshinny Borough	109
Slocum Township	124
Sugarloaf Township	540
Sugar Notch Borough	202
Swoyersville Borough	947

Table 4.3.3-4 Disabled Population by Municipality (U.S. Census Bureau, 2023)

MUNICIPALITY	NUMBER OF INDIVIDUALS
Union Township	413
Warrior Run Borough	80
West Hazleton Borough	895
West Pittston Borough	418
West Wyoming Borough	418
White Haven Borough	161
City of Wilkes-Barre	6,441
Wilkes-Barre Township	606
Wright Township	673
Wyoming Borough	660
Yatesville Borough	103
Total	**56,738**

Table 4.3.3-5 below shows the Expected Annual Losses to cold waves for each census tract in the county according to FEMA's National Risk Index.

Table 4.3.3-5 Expected Annual Losses to Cold Wave by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2001.00	Wilkes-Barre City	$18,639.93	Relatively Moderate
2002.00	Wilkes-Barre City	$17,289.07	Relatively Moderate
2003.00	Wilkes-Barre City	$8,770.70	Relatively Moderate
2004.00	Wilkes-Barre City	$12,358.42	Relatively Moderate
2005.00	Wilkes-Barre City	$12,509.44	Relatively Moderate
2006.00	Wilkes-Barre City	$10,576.98	Relatively Moderate
2007.00	Wilkes-Barre City	$17,473.18	Relatively Moderate
2008.00	Wilkes-Barre City	$17,557.75	Relatively Moderate
2009.00	Wilkes-Barre City	$15,267.70	Relatively Moderate
2010.00	Wilkes-Barre City	$13,413.53	Relatively Moderate
2011.00	Wilkes-Barre City	$6,300.48	Relatively Moderate
2012.00	Wilkes-Barre City	$12,620.82	Relatively Moderate
2013.00	Wilkes-Barre City	$10,584.09	Relatively Moderate
2014.00	Wilkes-Barre City	$11,223.28	Relatively Moderate
2015.00	Wilkes-Barre City	$10,900.72	Relatively Moderate
2016.00	Wilkes-Barre City	$12,868.42	Relatively Moderate
2101.00	Pittston Township	$14,969.52	Relatively Moderate
2102.00	Dupont Borough	$11,925.77	Relatively Moderate
2103.00	Avoca Borough	$11,774.46	Relatively Moderate

Table 4.3.3-5 Expected Annual Losses to Cold Wave by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2104.00	Hughestown Borough	$6,256.23	Relatively Moderate
2105.00	Duryea Borough	$23,714.35	Relatively Moderate
2106.00	Pittston City	$12,697.68	Relatively Moderate
2107.00	Pittston City	$8,185.33	Relatively Moderate
2108.00	Pittston City	$14,767.21	Relatively Moderate
2110.00	West Pittston Borough	$21,853.87	Relatively Moderate
2111.01	Exeter Borough	$25,937.13	Relatively Moderate
2111.02	Exeter Township	$9,806.45	Relatively Moderate
2112.01	Dallas Borough	$12,676.90	Relatively Moderate
2112.03	Franklin Township	$8,276.71	Relatively Moderate
2112.04	Dallas Township	$31,196.17	Relatively High
2112.05	Dallas Township	$11,654.06	Relatively Moderate
2113.01	Jackson Township	$21,883.26	Relatively Moderate
2113.02	Lehman Township	$15,964.61	Relatively Moderate
2113.03	Harveys Lake Borough	$13,067.89	Relatively Moderate
2113.04	Lake Township	$9,488.52	Relatively Moderate
2114.00	Kingston Township	$33,481.85	Relatively High
2115.00	West Wyoming Borough	$12,405.33	Relatively Moderate
2116.00	Wyoming Borough	$14,658.60	Relatively Moderate
2117.01	Jenkins Township	$23,160.63	Relatively Moderate
2117.02	Laflin Borough	$6,828.39	Relatively Moderate
2118.00	Plains Township	$9,077.22	Relatively Moderate
2119.00	Plains Township	$28,299.02	Relatively High
2120.00	Plains Township	$8,605.35	Relatively Moderate
2121.00	Forty Fort Borough	$19,920.20	Relatively Moderate
2122.00	Swoyersville Borough	$23,593.82	Relatively Moderate
2123.00	Luzerne Borough	$12,736.03	Relatively Moderate
2127.00	Kingston Borough	$24,507.84	Relatively Moderate
2128.00	Kingston Borough	$16,167.48	Relatively Moderate
2129.00	Kingston Borough	$6,818.15	Relatively Moderate
2130.00	Kingston Borough	$6,946.65	Relatively Moderate
2131.00	Kingston Borough	$8,273.99	Relatively Moderate
2132.00	Edwardsville Borough	$23,136.59	Relatively Moderate
2133.00	Courtdale Borough	$7,438.45	Relatively Moderate
2134.00	Larksville Borough	$19,867.62	Relatively Moderate
2136.00	Plymouth Borough	$10,110.31	Relatively Moderate
2137.00	Plymouth Borough	$9,424.08	Relatively Moderate
2138.00	Plymouth Borough	$7,543.45	Relatively Moderate
2139.00	Plymouth Township	$8,426.67	Relatively Moderate
2141.00	Nanticoke City	$16,495.85	Relatively Moderate

Table 4.3.3-5 Expected Annual Losses to Cold Wave by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2142.00	Nanticoke City	$13,856.53	Relatively Moderate
2143.00	Nanticoke City	$9,977.38	Relatively Moderate
2144.00	Nanticoke City	$9,660.80	Relatively Moderate
2145.00	Hanover Township	$8,278.20	Relatively Moderate
2146.00	Hanover Township	$19,275.15	Relatively Moderate
2149.00	Hanover Township	$6,852.85	Relatively Moderate
2150.00	Sugar Notch Borough	$7,179.68	Relatively Moderate
2151.00	Ashley Borough	$12,190.88	Relatively Moderate
2152.00	Wilkes-Barre Township	$14,984.21	Relatively Moderate
2153.00	Bear Creek Township	$18,732.65	Relatively Moderate
2154.00	Dennison Township	$11,728.55	Relatively Moderate
2155.01	Fairview Township	$22,096.05	Relatively Moderate
2155.02	Wright Township	$26,896.25	Relatively Moderate
2155.03	Rice Township	$17,076.81	Relatively Moderate
2155.04	Dorrance Township	$18,157.13	Relatively Moderate
2156.00	Newport Township	$20,869.36	Relatively Moderate
2157.01	Hunlock Township	$10,529.68	Relatively Moderate
2157.02	Union Township	$12,845.58	Relatively Moderate
2158.00	Ross Township	$13,163.15	Relatively Moderate
2159.00	Fairmount Township	$18,823.46	Relatively Moderate
2161.00	Salem Township	$20,555.32	Relatively Moderate
2162.00	Conyngham Township	$27,201.51	Relatively Moderate
2164.00	Black Creek Township	$10,385.30	Relatively Moderate
2165.01	Conyngham Borough	$8,600.32	Relatively Moderate
2165.02	Sugarloaf Township	$19,772.99	Relatively Moderate
2166.01	Butler Township	$15,542.61	Relatively Moderate
2166.02	Butler Township	$30,161.98	Relatively High
2167.00	Freeland Borough	$18,003.96	Relatively Moderate
2168.00	Foster Township	$16,603.49	Relatively Moderate
2169.00	Hazle Township	$22,052.92	Relatively Moderate
2170.01	Hazle Township	$11,118.32	Relatively Moderate
2170.02	Hazle Township	$14,682.77	Relatively Moderate
2171.00	Hazleton City	$18,343.76	Relatively Moderate
2172.00	Hazleton City	$18,341.02	Relatively Moderate
2173.00	Hazleton City	$17,253.28	Relatively Moderate
2174.00	Hazleton City	$8,229.66	Relatively Moderate
2175.00	Hazleton City	$15,874.66	Relatively Moderate
2176.00	Hazleton City	$17,463.14	Relatively Moderate
2177.00	Hazleton City	$25,773.87	Relatively Moderate
2178.00	Hazleton City	$19,410.18	Relatively Moderate

Table 4.3.3-5 Expected Annual Losses to Cold Wave by Census Tract (FEMA NRI, 2025)			
CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2179.00	Hazle Township	$24,239.36	Relatively Moderate
2180.00	Hanover Township	$19,558.69	Relatively Moderate
TOTAL		**$1,544,717.66**	

Table 4.3.3-6 below shows the Expected Annual Losses to heat waves for each census tract in the county according to FEMA's National Risk Index.

Table 4.3.3-6 Expected Annual Losses to Heat Wave by Census Tract (FEMA NRI, 2025)			
CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2001.00	Wilkes-Barre City	$3,069.35	Relatively Low
2002.00	Wilkes-Barre City	$2,854.61	Relatively Low
2003.00	Wilkes-Barre City	$1,447.08	Relatively Low
2004.00	Wilkes-Barre City	$2,040.00	Relatively Low
2005.00	Wilkes-Barre City	$2,063.25	Relatively Low
2006.00	Wilkes-Barre City	$1,746.25	Relatively Low
2007.00	Wilkes-Barre City	$2,884.06	Relatively Low
2008.00	Wilkes-Barre City	$2,898.79	Relatively Low
2009.00	Wilkes-Barre City	$2,520.55	Relatively Low
2010.00	Wilkes-Barre City	$2,215.17	Relatively Low
2011.00	Wilkes-Barre City	$1,040.15	Relatively Low
2012.00	Wilkes-Barre City	$2,081.86	Relatively Low
2013.00	Wilkes-Barre City	$1,746.25	Relatively Low
2014.00	Wilkes-Barre City	$1,852.43	Relatively Low
2015.00	Wilkes-Barre City	$1,798.18	Relatively Low
2016.00	Wilkes-Barre City	$2,122.94	Relatively Low
2101.00	Pittston Township	$2,461.06	Relatively Low
2102.00	Dupont Borough	$1,967.93	Relatively Low
2103.00	Avoca Borough	$1,943.12	Relatively Low
2104.00	Hughestown Borough	$1,030.41	Relatively Low
2105.00	Duryea Borough	$3,904.92	Relatively Low
2106.00	Pittston City	$2,095.81	Relatively Low
2107.00	Pittston City	$1,350.20	Relatively Low
2108.00	Pittston City	$2,437.62	Relatively Low
2110.00	West Pittston Borough	$3,605.66	Relatively Low
2111.01	Exeter Borough	$4,273.95	Relatively Low
2111.02	Exeter Township	$1,594.64	Relatively Low
2112.01	Dallas Borough	$2,088.42	Relatively Low

Table 4.3.3-6 Expected Annual Losses to Heat Wave by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2112.03	Franklin Township	$1,336.25	Relatively Low
2112.04	Dallas Township	$5,131.47	Relatively Low
2112.05	Dallas Township	$1,915.23	Relatively Low
2113.01	Jackson Township	$3,593.53	Relatively Low
2113.02	Lehman Township	$2,599.97	Relatively Low
2113.03	Harveys Lake Borough	$2,153.48	Relatively Low
2113.04	Lake Township	$1,547.73	Relatively Low
2114.00	Kingston Township	$5,511.95	Relatively Low
2115.00	West Wyoming Borough	$2,044.87	Relatively Low
2116.00	Wyoming Borough	$2,406.66	Relatively Low
2117.01	Jenkins Township	$3,812.16	Relatively Low
2117.02	Laflin Borough	$1,124.64	Relatively Low
2118.00	Plains Township	$1,492.13	Relatively Low
2119.00	Plains Township	$4,650.15	Relatively Low
2120.00	Plains Township	$1,419.94	Relatively Low
2121.00	Forty Fort Borough	$3,285.63	Relatively Low
2122.00	Swoyersville Borough	$3,892.12	Relatively Low
2123.00	Luzerne Borough	$2,101.24	Relatively Low
2127.00	Kingston Borough	$4,043.58	Relatively Low
2128.00	Kingston Borough	$2,667.05	Relatively Low
2129.00	Kingston Borough	$1,124.64	Relatively Low
2130.00	Kingston Borough	$1,146.34	Relatively Low
2131.00	Kingston Borough	$1,364.91	Relatively Low
2132.00	Edwardsville Borough	$3,817.51	Relatively Low
2133.00	Courtdale Borough	$1,226.32	Relatively Low
2134.00	Larksville Borough	$3,275.37	Relatively Low
2136.00	Plymouth Borough	$1,668.74	Relatively Low
2137.00	Plymouth Borough	$1,554.14	Relatively Low
2138.00	Plymouth Borough	$1,244.26	Relatively Low
2139.00	Plymouth Township	$1,341.20	Relatively Low
2141.00	Nanticoke City	$2,714.44	Relatively Low
2142.00	Nanticoke City	$2,286.49	Relatively Low
2143.00	Nanticoke City	$1,644.13	Relatively Low
2144.00	Nanticoke City	$1,594.33	Relatively Low
2145.00	Hanover Township	$1,352.96	Relatively Low
2146.00	Hanover Township	$3,174.02	Relatively Low
2149.00	Hanover Township	$1,130.15	Relatively Low
2150.00	Sugar Notch Borough	$1,184.34	Relatively Low
2151.00	Ashley Borough	$2,012.10	Relatively Low
2152.00	Wilkes-Barre Township	$2,467.08	Relatively Low

Table 4.3.3-6 Expected Annual Losses to Heat Wave by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2153.00	Bear Creek Township	$3,086.86	Relatively Low
2154.00	Dennison Township	$1,930.09	Relatively Low
2155.01	Fairview Township	$3,645.21	Relatively Low
2155.02	Wright Township	$4,424.00	Relatively Low
2155.03	Rice Township	$2,815.38	Relatively Low
2155.04	Dorrance Township	$2,951.39	Relatively Low
2156.00	Newport Township	$3,437.26	Relatively Low
2157.01	Hunlock Township	$1,725.54	Relatively Low
2157.02	Union Township	$2,076.19	Relatively Low
2158.00	Ross Township	$2,123.12	Relatively Low
2159.00	Fairmount Township	$2,772.03	Relatively Low
2161.00	Salem Township	$3,165.57	Relatively Low
2162.00	Conyngham Township	$4,004.78	Relatively Low
2164.00	Black Creek Township	$1,520.44	Relatively Low
2165.01	Conyngham Borough	$1,415.27	Relatively Low
2165.02	Sugarloaf Township	$3,029.62	Relatively Low
2166.01	Butler Township	$2,519.66	Relatively Low
2166.02	Butler Township	$4,864.80	Relatively Low
2167.00	Freeland Borough	$2,970.88	Relatively Low
2168.00	Foster Township	$2,727.46	Relatively Low
2169.00	Hazle Township	$3,637.70	Relatively Low
2170.01	Hazle Township	$1,813.18	Relatively Low
2170.02	Hazle Township	$2,417.71	Relatively Low
2171.00	Hazleton City	$3,029.00	Relatively Low
2172.00	Hazleton City	$3,027.45	Relatively Low
2173.00	Hazleton City	$2,845.31	Relatively Low
2174.00	Hazleton City	$1,357.16	Relatively Low
2175.00	Hazleton City	$2,619.76	Relatively Low
2176.00	Hazleton City	$2,884.06	Relatively Low
2177.00	Hazleton City	$4,255.17	Relatively Low
2178.00	Hazleton City	$3,205.71	Relatively Low
2179.00	Hazle Township	$3,997.10	Relatively Low
2180.00	Hanover Township	$3,217.97	Relatively Low
TOTAL		**$252,700.76**	

4.3.3.6. Equity In Vulnerable Communities

Low-income households and renter households may be at greater risk during extreme weather risks. Energy bills may be disproportionately expensive regarding income in these households and in the event of heating and cooling system malfunctions, renters may be unable to make key decisions. Elderly populations (those 65+ and older) will need extra consideration as they are more susceptible to negative health effects related to extreme temperatures. According to FEMA's CRCI indicator data, this means areas of Wilkes-Barre City are susceptible due to there being a high percentage of renters. Dallas Township, Plains Township, Hazle Township, Black Creek Township and Swoyersville Borough may be particularly vulnerable due to a high older population.

4.3.4. FLOOD, FLASH FLOOD, ICE JAM

4.3.4.1. 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 natural hazards in Pennsylvania. Flooding occurs when excess water from snowmelt or rainfall fills a stream, causing it to overflow onto the stream banks and adjacent floodplains. Floodplains are lowlands adjacent to rivers, streams, and creeks that are subject to recurring floods.

Flash flood conditions can result from a large amount of rainfall over a short time span. Though, a small amount of rain can also result in floods in locations where the soil is frozen or saturated from a previous wet period or if the rain is concentrated in an area of impervious surfaces such as large parking lots, paved roadways, or other densely developed areas.

Snow melt combined with heavy rains can cause frozen rivers to swell, which can break the ice layer on top of a river. If this occurs, large chunks can float downstream, piling up in narrow passages and near other obstructions such as bridges and dams causing an ice jam. One record of a flood event caused by ice jams along the Susquehanna River in Luzerne County occurred in January 2018.

Luzerne County lies within the drainage basin of the Susquehanna River, which is the largest basin on the Atlantic Seaboard of the United States (PACD, 2019). The Susquehanna River drains directly into the Chesapeake Bay. Most of the County is in the Upper Susquehanna-Lackawanna portion of the Watershed as illustrated in the Watersheds Map in Section 2, Figure 2.1-2. The County seat, the City of Wilkes-Barre, is located along the East Branch of the Susquehanna River in the northern central part of Luzerne County. According to the Pennsylvania Association of Conservation Districts, the Susquehanna River Watershed is one of the most flood prone areas in the United States, covering over half of Pennsylvania, and regions in New York and Maryland (PACD, 2019).

The various tributary streams and creeks generally flow towards the central valley in Luzerne County, towards the Susquehanna River. Large tributaries in the County include Mill Creek, Nescopeck Creek, Solomon Creek, and Toby Creek (PACD, 2019).

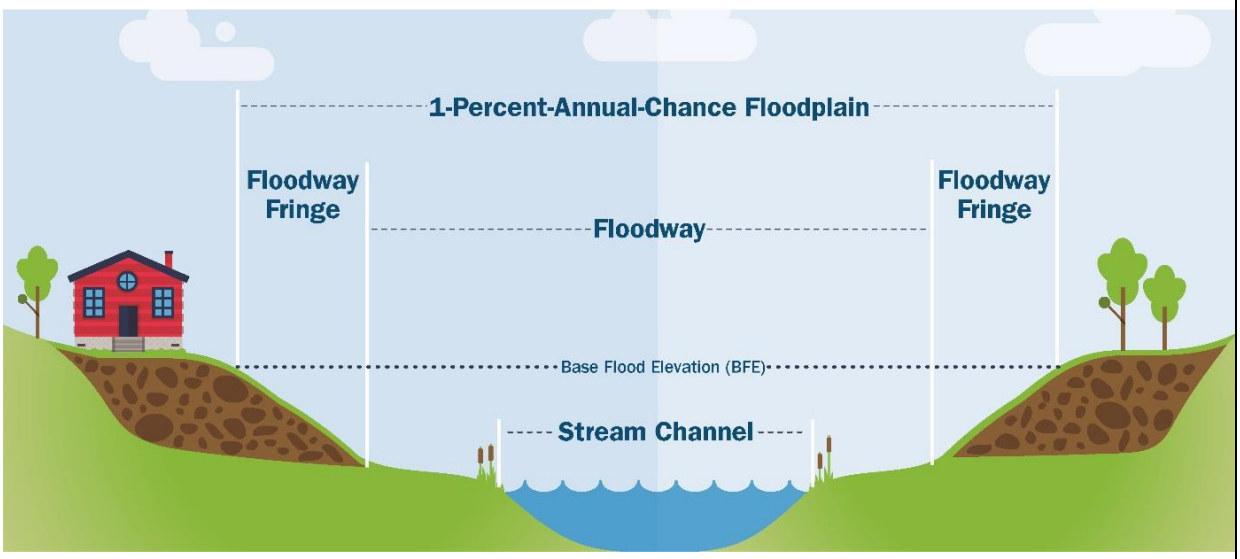
Of the 76 municipalities within Luzerne County, those located along the Susquehanna River are at greatest risk to flooding. For example, Forty Fort Borough, Plymouth Township, and the City of Wilkes-Barre have all suffered severe damage from flooding due to extensive development within the floodplain and its proximity to the Susquehanna River and its tributaries.

Luzerne County's Act 167 Stormwater Management Plan identifies and prioritizes "general" and "detailed" flooding problem areas (LCDPZ, 2010). The Problem Area Inventory identifies 254 problem area in Luzerne County. While stormwater problems exist throughout the entire County, the highest concentrations of problem areas were identified in areas with more urbanization. Types of problems include flooding, deficient bridge/culvert, erosion,

sedimentation, water/groundwater pollution, and other. Each problem areas includes a photograph of the location of concern, a description of the problem including probable causes if identified, and suggested solutions. Several problems require further investigation to determine optimal solutions and associated costs; these areas are noted accordingly in the plan.

The size of the floodplain is described by the recurrence interval of a given flood. Flood recurrence intervals are explained in more detail in Section 4.3.3.4. However, in assessing the potential spatial extent of flooding it is important to know that a floodplain associated with a 10-percent-annual chance of occurring in a given year is smaller than the floodplain associated with a flood that has a 0.2-percent-annual chance of occurring. The National Flood Insurance Program (NFIP), for which Flood Insurance Rate Maps (FIRM) are published, identifies the risk associated with the 1-percent-annual chance flood. This 1-percent-annual chance flood event is used to delineate the *Special Flood Hazard Area* (SFHA) and to identify *Base Flood Elevations* (BFE). Figure 4.3.3-1 illustrates these terms. The SFHA serves as the primary regulatory boundary used by FEMA, the Commonwealth of Pennsylvania, and Luzerne County when determining risk associated with flooding.

Figure 4.3.4-1 Diagram identifying Special Flood Hazard Area, 1% annual chance (100-Year) floodplain, floodway and flood fringe.

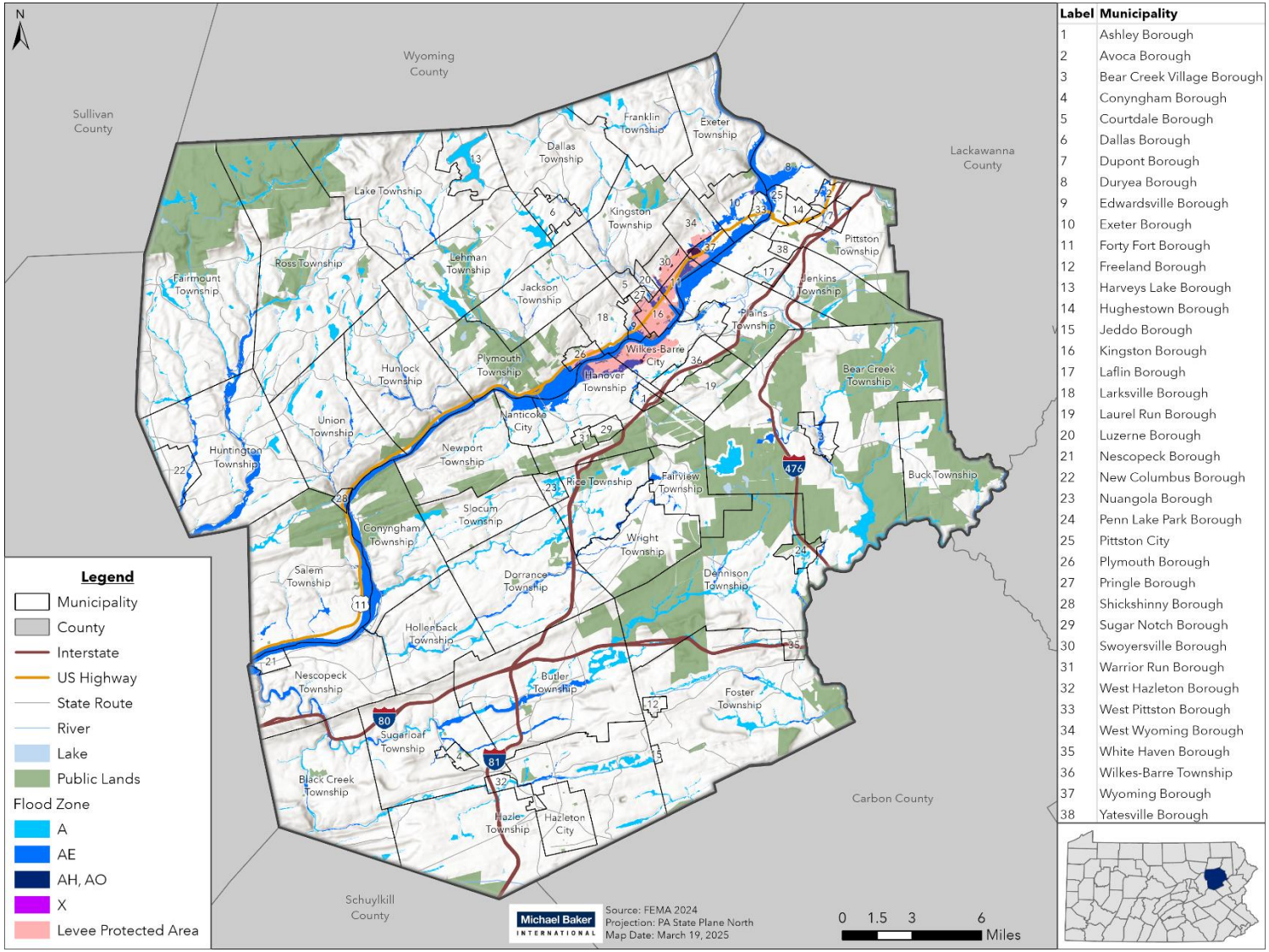


A new Preliminary FIRM and FIS were issued for Luzerne County in June 2024. The revised flood hazard information focused on river communities and made changes to base-flood elevations that impact flood insurance and development. This best available flood hazard data, which was used to update this flood hazard profile, included current effective FIRM data and incorporated Letters of Map Revision (LOMRs). The FIRM and FIS for the entire county can be obtained from the FEMA Map Service Center (http://www.msc.fema.gov) and can be used to identify the expected spatial extent and elevation of flooding from a 1-percent and 0.2-percent-annual

chance event. All but seven municipalities in the County have identified special flood hazard areas (SFHAs). The following municipalities do not have identified SFHAs: Freeland, Hughestown, Jeddo, Sugar Notch, Warrior Run, and Yatesville Boroughs and the City of Hazleton. (FEMA, 2024b). Figure 4.3.4-2 shows the location of watercourses and flood zones in Luzerne County. The location of approximate and detailed (which include BFEs) SFHAs (1-percent-annual chance zones) are shown.

It should also be noted that flooding is not only caused by heavy rain events. Additionally, as described in the Dam Failure Hazard Profile (Appendix H), there are 33 state regulated, high-hazard dams located within the County and eight federally owned, high hazard dams in or upstream of the County. If any one of these dams were to fail, there could be loss of life and property damage resulting from flooding within the dam inundation areas. Flood risk is also associated with levee failure. As part of the Wyoming Valley Levee System, the County operates a Susquehanna River Warning System based on the United States Army Corps of Engineers (USACE) model for the Susquehanna River. The system details which structures in the river communities are impacted by various flood stages on the River. Additional information on levees can be found in Section 4.3.15.

Figure 4.3.4-2 Map showing the location of watercourses and flood zones throughout Luzerne County



Label	Municipality
1	Ashley Borough
2	Avoca Borough
3	Bear Creek Village Borough
4	Conyngham Borough
5	Courtdale Borough
6	Dallas Borough
7	Dupont Borough
8	Duryea Borough
9	Edwardsville Borough
10	Exeter Borough
11	Forty Fort Borough
12	Freeland Borough
13	Harveys Lake Borough
14	Hughestown Borough
15	Jeddo Borough
16	Kingston Borough
17	Laflin Borough
18	Larksville Borough
19	Laurel Run Borough
20	Luzerne Borough
21	Nescopeck Borough
22	New Columbus Borough
23	Nuangola Borough
24	Penn Lake Park Borough
25	Pittston City
26	Plymouth Borough
27	Pringle Borough
28	Shickshinny Borough
29	Sugar Notch Borough
30	Swoyersville Borough
31	Warrior Run Borough
32	West Hazleton Borough
33	West Pittston Borough
34	West Wyoming Borough
35	White Haven Borough
36	Wilkes-Barre Township
37	Wyoming Borough
38	Yatesville Borough

4.3.4.2. Range of Magnitude

Flooding in Luzerne County has mainly been caused by heavy rainfall. Some areas have experienced rain events bringing more than three to as many as eight inches of rain to the area within a day. Luzerne County has become wetter with Avoca breaking the 2008 precipitation record of 12.47" with 13.01" in from 2023 to 2024. Along with this, Avoca was about 3" above normal in 2024 (NOAA NWS, 2024a). In 2011, the Susquehanna River was measured at almost twice its flood stage, with a record-breaking crest of 42.66 feet (NOAA, 2019). Flooding in the County can be exacerbated when heavy rain occurs in late winter by accelerating the melting of snow. Flooding can also be exacerbated locally by the presence of impermeable surfaces due to increased development of buildings and pavement or lack of appropriately sized flood water detention basins.

Flooding in Luzerne County can be worsened if the flow of water is obstructed in some way such as by an undersized culvert. If undersized culverts trap debris they can create a dam, which would increase flooding in upstream municipalities. Flooding can also be worsened by bridge washouts, like those seen in Bear Creek Township in 2000 and 2002 (NOAA, 2019). Both culvert and bridge washouts can cause damage to transportation infrastructure, making response and recovery actions more difficult.

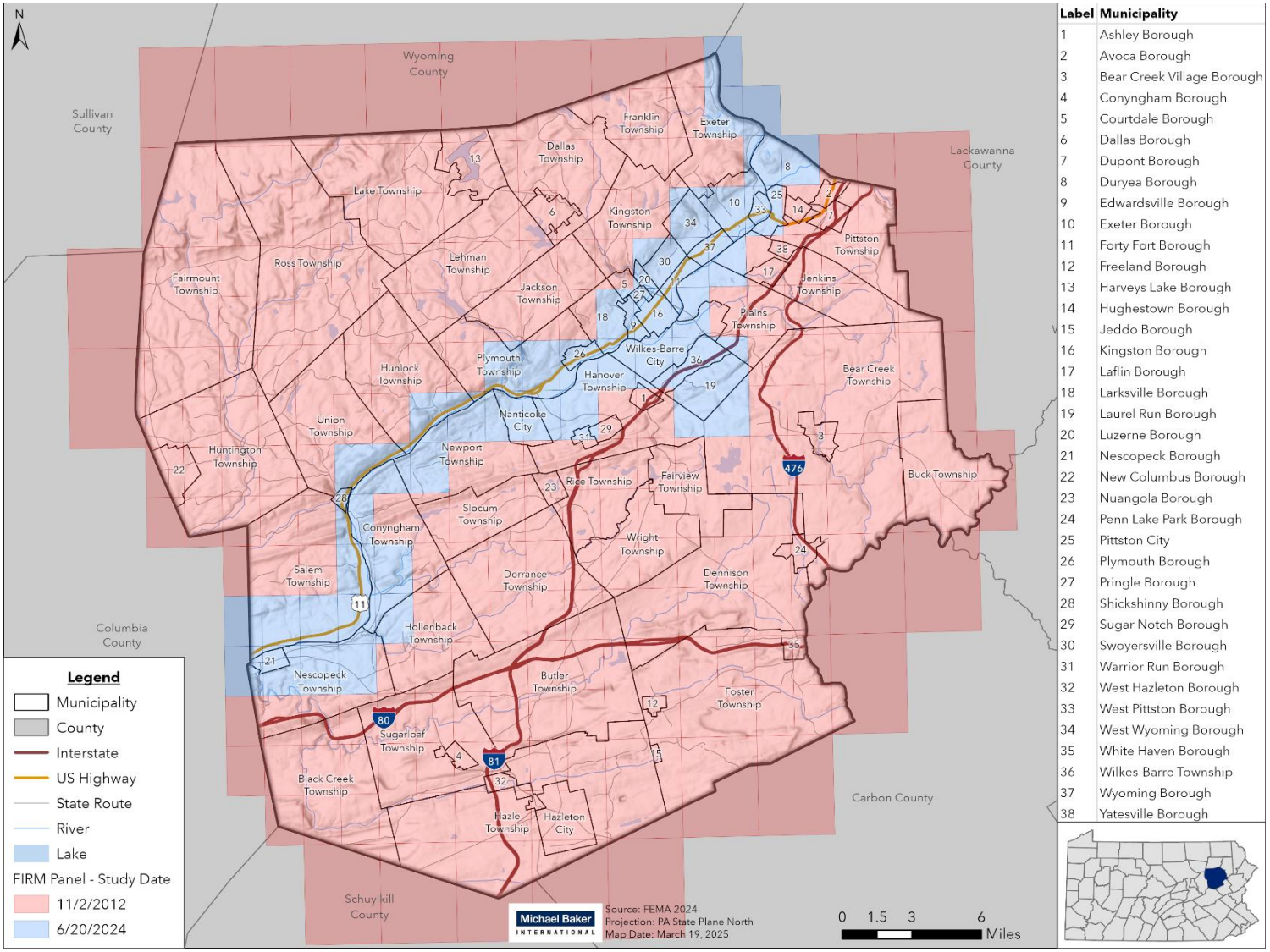
Hurricanes and Tropical Storms can also contribute to flooding in the County. One of the worst flooding events occurred in June 1972, when Hurricane Agnes inundated levees along the Susquehanna River and caused widespread flooding throughout the County. In June 2006, Luzerne County experienced its worst flooding since Hurricane Agnes. Multiple days of rain resulted in over $110,000,000 in damage. This event damaged 150 roads and over 1,000 homes, destroyed 2 businesses, and triggered a city-wide evacuation in the City of Wilkes-Barre. While the evacuation was successful and protected many city residents, there were three casualties in other locations that were unable to evacuate. Another, severe flood event occurred in June 2011 when slow moving thunderstorms dumped 5-6 inches of rain, causing flash flooding. More than 200 structures were impacted by flooding (NOAA, 2019). A more recent example of flooding transpired on September 1st, 2021 from Solomon's Creek. Prolonged heavy rain resulted in flash flooding and small stream flooding throughout the surrounding area with Solomon's Creek reaching street level of the Waller Street bridge by nightfall. Residents were evacuated and an emergency shelter was opened.

Although floods can cause damage to property and loss of life, floods are naturally occurring events that benefit riparian systems. Such benefits include groundwater recharge and the introduction of nutrient rich sediment improving soil fertility. However, the destruction of riparian buffers through development, changes to land use and land cover throughout a watershed, and the introduction of chemical or biological contaminants which often accompany human presence cause environmental harm when floods occur. Hazardous material facilities are potential sources of contamination during flood events. Other negative environmental impacts of flooding include water-borne diseases, heavy siltation, damage or loss of crops, and drowning of both humans and animals.

Dams, levees, and reservoirs act as flood protection measures in Luzerne County. There have been some instances of levee inundation in the past. The Luzerne County Flood Protection Authority (LCFPA) was organized in 1996 to maintain five of County's levees (LCFPA, 2019). Please see section 4.3.15 for more information on levees. There are 104 state regulated dams in Luzerne County and seven reservoirs upstream of Luzerne County along the Susquehanna River and its tributaries that provide some flood control and reduce flood hazards within the Susquehanna River watershed; four are in Pennsylvania in Susquehanna and Tioga Counties, and three are in New York. Please see Appendix H: Dam Failure hazard profile for additional data and information on dam hazards in Luzerne County.

Figure 4.3.4-3 shows the DFIRM panels and corresponding flood study dates throughout Luzerne County. DFIRM panels are sections of focus for flood studies that delineate flood zones and hazard areas. The map highlights that there was a countywide flood study in 2012, and sections along the Susquehanna River were updated in 2024. Though the most recent DFIRM update was in 2024, there may be sections of the county that could benefit from an additional updated flood study.

Figure 4.3.4-3 Map showing the FIRM panels and study dates in Luzerne County



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13	Harveys Lake Borough
14	Hughestown Borough
15	Jeddo Borough
16	Kingston Borough
17	Laflin Borough
18	Larksville Borough
19	Laurel Run Borough
20	Luzerne Borough
21	Nescopeck Borough
22	New Columbus Borough
23	Nuangola Borough
24	Penn Lake Park Borough
25	Pittston City
26	Plymouth Borough
27	Pringle Borough
28	Shickshinny Borough
29	Sugar Notch Borough
30	Swoyersville Borough
31	Warrior Run Borough
32	West Hazleton Borough
33	West Pittston Borough
34	West Wyoming Borough
35	White Haven Borough
36	Wilkes-Barre Township
37	Wyoming Borough
38	Yatesville Borough

The following community lifelines are affected by floods, flash floods, and ice jams:

Table 4.3.4-1 Most Likely Lifelines Impacted by Floods, Flash Foods, and Ice Jams

LIFELINES	NOTES
Safety and Security	Government operations and facilities, including police, fire, and search and rescue are needed for response and recovery.
Food, Hydration, Shelter	Significant risk to buildings is posed and can create issues for food and water access.
Transportation	Transportation routes will be affected due to direct damage from flooding and potential compounding hazards like landslides.
Hazardous Materials	Floods may affect hazardous materials storage due to damage to facilities.

4.3.4.3. Past Occurrence

Luzerne County has a long history of flooding problems. The Susquehanna River runs through the central portion of the County, with several tributary streams, creeks, and runs traversing the surrounding areas. This topography has contributed to numerous major floods and localized flash flooding (FEMA, 2012). Flooding remains the number one hazard for the city of Wilkes-Barre with Mill Creek, Laurel Run, and Solomon's Creek flowing through the city. Since the last plan update, Solomon's Creek flood gates have been erected at least six times. One event led to the evacuation of 200 people. Table 4.3.3.-1 lists flooding events in Luzerne County since 1993. Estimated property damages include every loss to any type of facility (residential, commercial, agricultural, or industrial) and include structure, content, and crop damages. Not included in this listing are severe flood events that occurred prior to 1993. Two events to note are flooding caused by Hurricane Agnes in June 1972 and Hurricane Eloise in September 1975. The Hurricane Agnes flood was a major historical disaster that many community members recall today. Due to widespread damage, it remains one of the worst flood events that Luzerne County has ever experienced. More recently, Hurricane Ida in 2021 caused damage to areas in the county after rainfall led to flooding. The Wilkes-Barre/Scranton International Airport reported a daily record 5.09" inches of rainfall, over 2 inches higher than the previous mark set in 2003 (Haberski, 2021). Flooding in Wilkes-Barre, Hazleton, and Hanover resulted in road closures and infrastructure damage. Luzerne County was included in federal disaster declarations in the aftermath of the storm, granting them eligibility for federal funding assistance to address impacts (Keely, 2021).

Table 4.3.4-2 Flood and flash flood events impacting Luzerne County from 1996-2024 (NOAA NCEI, 2025). Note that property damage values are estimates based on best available information from NOAA's database. "Countywide" indicates several locations in the County were affected.

LOCATION	DATE	TYPE	REPORTED DAMAGE ($)*
Countywide	02/27/2000	Flood	*not provided*
City of Wilkes-Barre	06/06/2000	Flood	*not provided*
Hanover Township	07/15/2000	Flash flood	*not provided*
City of Wilkes-Barre	07/30/2000	Flash flood	*not provided*
City of Hazleton	08/01/2000	Flood	*not provided*
City of Wilkes-Barre	11/25/2001	Flood	*not provided*
Newport Township	05/13/2002	Flood	*$500,000*
Bear Creek Township	05/28/2002	Flash flood	*$5,000,000*
Countywide	03/21/2003	Flood	*$50,000*
City of Wilkes-Barre	06/14/2003	Flash flood	*$50,000*
White Haven Borough	08/06/2003	Flash flood	*$1,000,000*
Kingston Township	08/16/2003	Flash flood	*$20,000*
Fairmount Township	05/26/2004	Flash flood	*$200,000*
Countywide	09/18/2004	Flash flood	*$5,000,000*
Countywide	11/28/2004	Flash flood	*$10,000*
Countywide	01/14/2005	Flood	*not provided*
Countywide	03/29/2005	Flood, flash flood	*$120,000*
Countywide	04/02/2005 - 04/03/2005	Flood	*$1,500,000*
Countywide	06/26/2006 - 06/28/2006	Flood	*$110,035,000*
Countywide	07/11/2006	Flash flood	*$2,000*
Countywide	11/16/2006	Flash flood	*$37,000*
City of Wilkes-Barre	03/16/2007	Flood	*not provided*
Forty Fort Borough	03/05/2008	Flood	*$40,000*
Lehman Township and Jackson Township	03/08/2008	Flash flood	*$25,000*
Countywide	07/03/2009	Flash flood	*$23,000*
Buck Township	09/30/2010	Flash flood	*$10,000*
Wright Township	03/10/2011	Flash flood	*$50,000*
Edwardsville Borough	04/26/2011	Flash flood	*$95,000*
City of Nanticoke	04/28/2011	Flash flood	*$380,000*
Larksville Borough	07/03/2011	Flash flood	*$1,500,000*
Countywide	07/25/2011	Flash flood	*$15,000*

Table 4.3.4-2 Flood and flash flood events impacting Luzerne County from 1996-2024 (NOAA NCEI, 2025). Note that property damage values are estimates based on best available information from NOAA's database. "Countywide" indicates several locations in the County were affected.

LOCATION	DATE	TYPE	REPORTED DAMAGE ($)*
Countywide	08/26/2011- 08/28/2011	Flood	*$210,000*
Countywide	09/07/2011- 09/08/2011	Flood, flash flood	*$45,000,000*
Countywide	09/27/2011- 09/28/2011	Flash flood	*$35,000*
Countywide	06/27/2013	Flash flood	*$105,000*
Fairview Township	06/30/2013	Flash flood	*$5,000*
Sugar Notch Borough	07/17/2017	Flash flood	*$20,000*
City of Wilkes-Barre	07/20/2017	Flash flood	*$20,000*
Countywide	01/23/2018 - 01/24/2018	Flood	*not provided*
Countywide	07/25/2018	Flash flood	*$170,000*
City of Wilkes-Barre	05/29/2019	Flood	*$1,000*
Countywide	07/06/2019	Flash flood	*$885,000*
Nescopeck Township	08/15/2019	Flash flood	*$10,000*
City of Wilkes-Barre	04/30/2020	Flood	*$5,000*
City of Wilkes-Barre	08/24/2020	Flood, flash flood	*$60,000*
Countywide	12/24/2020	Flood	*$15,000*
Countywide	06/08/2021	Flood	*$60,000*
Countywide	0822/2021	Flood	*$40,000*
Countywide	09/01/2021	Flood	*$39,000*
Kingston Township	07/09/2023	Flood	*$10,000*
Countywide	09/09/2023	Flood	*$5,210,000*
Countywide	12/18/2023	Flood	*$105,000*
Pittston Township	06/21/2024	Flood	*$17,000*
City of Nanticoke	08/03/2024	Flood	*$11,000*
Dallas Township	08/09/2024	Flood	*$16,000*

**Reported damages may be underestimated and do not necessarily reflect total loss.*

In addition to the past flood events, the NFIP identifies properties that experience frequent flooding and can be used to determine areas of higher risk. These properties are identified through the NFIP when they receive more than one payment for flood damages. The NFIP defines a Repetitive Loss (RL) property as "any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling ten-year period, since 1978". The RL data provided in Table 4.3.3-2 represents the NFIP's definition of RL.

Under FEMA's Hazard Mitigation Assistance (HMA), in regard to mitigation grant funding, RL is defined as a structure that:

a) Is covered by a contract for flood insurance made available under the NFIP; and
b) Has incurred flood-related damage on two occasions, in which the cost of the repair, on the average, equaled or exceeded 25 percent of the market value of the structure at the time of each such flood event; and
c) At the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage (ICC). (Note: Homes are eligible for ICC coverage after the first loss, however the cost for ICC is part of all policies.)

A Severe Repetitive Loss property is a structure that:

a) Is covered under a contract for flood insurance made available under the NFIP; and
b) Has incurred flood related damage (i) For which four or more separate claims payments have been made under flood insurance coverage with the amount of each such claim exceeding $5,000, and with the cumulative amount of such claims payments exceeding $20,000; or (ii) For which at least two separate claims payments have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the insured structure.

Countywide RL and SRL data was provided in the 2023 State Hazard Mitigation Plan (SHMP). According to the 2023 data, Luzerne County has 458 total RL properties that recorded 1,435 losses. The total building payments are $36.5 million while contents payments are $9.3 million. There are 92 SRL properties that recorded 471 losses. The total building payments are $14.7 million while contents payments are $4.6 million for these properties.

Table 4.3.3-2 displays repetitive loss and severe repetitive loss properties by jurisdiction and type in Luzerne County as of 2023. This is the most up-to-date information available at the jurisdiction level as of May 2025. The County will work with FEMA to obtain more recent data that may help guide mitigation work in the future.

Using the 2023 data, the City of Wilkes-Barre has the most repetitive loss properties (88). Shickshinny Borough has the most mitigated repetitive loss properties (16). Of these 458 repetitive loss properties in the County in 2023, the most were single family homes (314). The following list includes the SRL properties for municipalities as of 2018: six in West Pittston Borough, three in Plymouth Township, two in Plains Township, two in Shickshinny Borough, and one each in Hunlock Township, Jenkins Township, Nescopeck Township, the City of Pittston, the City of Wilkes-Barre, and Wright Township.

Table 4.3.4-3 Total and mitigated Repetitive Loss and Severe Repetitive Loss properties in Luzerne County (FEMA, 2023).

MUNICIPALITY	SINGLE FAMILY		2-4 FAMILY		ASSMD CONDO		OTHER RESID		NON RESIDNT		TOTAL	
	TOTAL	MIT	TOTAL	MIT	TOTAL	MIT	TOTAL	MIT	TOTAL	MIT	TOTAL	MIT
Ashley Borough	2	0	0	0	0	0	0	0	0	0	2	0
Avoca Borough	3	0	0	0	0	0	0	0	1	0	4	0
Bear Creek Village Borough	1	0	0	0	0	0	0	0	0	0	0	0
Bear Creek Township	0	0	0	0	0	0	0	0	0	0	0	0
Black Creek Township	1	0	0	0	0	0	0	0	0	0	1	0
Buck Township	0	0	0	0	0	0	0	0	0	0	0	0
Butler Township	12	1	0	0	0	0	0	0	0	0	14	1
Conyngham Borough	0	0	0	0	0	0	0	0	0	0	0	0
Conyngham Township	10	6	3	0	0	0	0	0	2	1	15	7
Courtdale Borough	0	0	0	0	0	0	0	0	0	0	0	0
Dallas Borough	1	0	0	0	0	0	0	0	0	0	1	0
Dallas Township	1	0	0	0	0	0	0	0	0	0	1	0
Dennison Township	0	0	0	0	0	0	0	0	0	0	0	0
Dorrance Township	0	0	0	0	0	0	0	0	0	0	0	0
Dupont Borough	0	0	0	0	0	0	0	0	0	0	0	0
Duryea Borough	1	0	0	0	0	0	0	0	1	0	2	0
Edwardsville Borough	0	0	0	0	0	0	0	0	0	0	0	0
Exeter Borough	6	0	0	0	0	0	0	0	4	0	10	0
Exeter Township	2	0	0	0	0	0	0	0	2	1	4	1
Fairmount Township	2	0	0	0	0	0	0	0	0	0	2	0
Fairview Township	0	0	0	0	0	0	0	0	0	0	0	0
Forty Fort Borough	0	0	0	0	0	0	0	0	0	0	0	0
Foster Township	0	0	0	0	0	0	0	0	0	0	0	0
Franklin Township	0	0	0	0	0	0	0	0	0	0	0	0
Freeland Borough	0	0	0	0	0	0	0	0	0	0	0	0
Hanover Township	5	0	0	0	0	0	0	0	3	0	8	0
Harveys Lake Borough	1	0	0	0	0	0	0	0	0	0	1	0

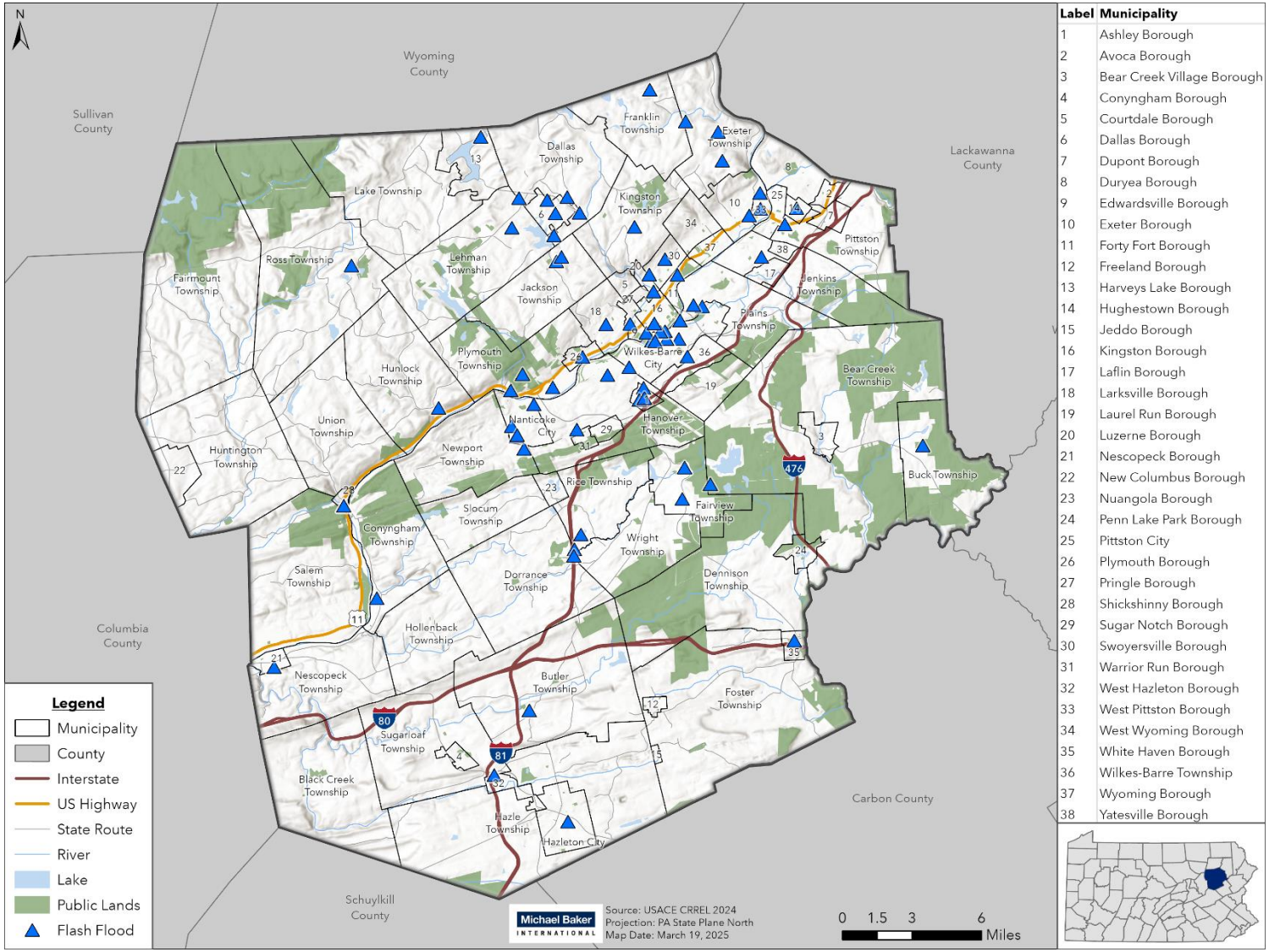
Table 4.3.4-3 Total and mitigated Repetitive Loss and Severe Repetitive Loss properties in Luzerne County (FEMA, 2023).

MUNICIPALITY	SINGLE FAMILY		2-4 FAMILY		ASSMD CONDO		OTHER RESID		NON RESIDNT		TOTAL	
	TOTAL	MIT	TOTAL	MIT	TOTAL	MIT	TOTAL	MIT	TOTAL	MIT	TOTAL	MIT
Hazle Township	0	0	0	0	0	0	0	0	1	0	1	0
City of Hazleton	0	0	0	0	0	0	0	0	0	0	0	0
Hollenback Township	0	0	0	0	0	0	0	0	0	0	0	0
Hughestown Borough	0	0	0	0	0	0	0	0	0	0	0	0
Hunlock Township	9	0	0	0	0	0	0	0	3	0	12	0
Huntington Township	0	0	0	0	0	0	0	0	0	0	0	0
Jackson Township	0	0	0	0	0	0	0	0	0	0	0	0
Jeddo Borough	0	0	0	0	0	0	0	0	0	0	0	0
Jenkins Township	18	11	1	1	0	0	0	0	4	0	23	12
Kingston Borough	5	4	0	0	0	0	0	0	0	0	4	4
Kingston Township	2	0	0	0	0	0	0	0	1	0	3	0
Laflin Borough	0	0	0	0	0	0	0	0	0	0	0	0
Lake Township	1	0	0	0	0	0	0	0	0	0	1	0
Larksville Borough	0	0	0	0	0	0	0	0	0	0	0	0
Laurel Run Borough	0	0	0	0	0	0	0	0	0	0	0	0
Lehman Township	0	0	0	0	0	0	0	0	0	0	0	0
Luzerne Borough	3	1	0	0	0	0	0	0	2	0	5	1
City of Nanticoke	3	1	2	0	0	0	0	0	1	0	4	1
Nescopeck Borough	0	0	1	1	0	0	0	0	1	0	2	1
Nescopeck Township	12	2	0	0	0	0	0	0	1	0	13	2
New Columbus Borough	0	0	0	0	0	0	0	0	0	0	0	0
Newport Township	0	0	0	0	0	0	0	0	0	0	0	0
Nuangola Borough	0	0	0	0	0	0	0	0	0	0	0	0
Penn Lake Park Borough	0	0	0	0	0	0	0	0	0	0	0	0
City of Pittston	0	0	0	0	0	0	0	0	0	0	0	0
Pittston Township	1	0	0	0	0	0	0	0	0	0	1	0
Plains Township	15	10	7	1	0	0	0	0	11	0	33	11

Table 4.3.4-3 Total and mitigated Repetitive Loss and Severe Repetitive Loss properties in Luzerne County (FEMA, 2023).

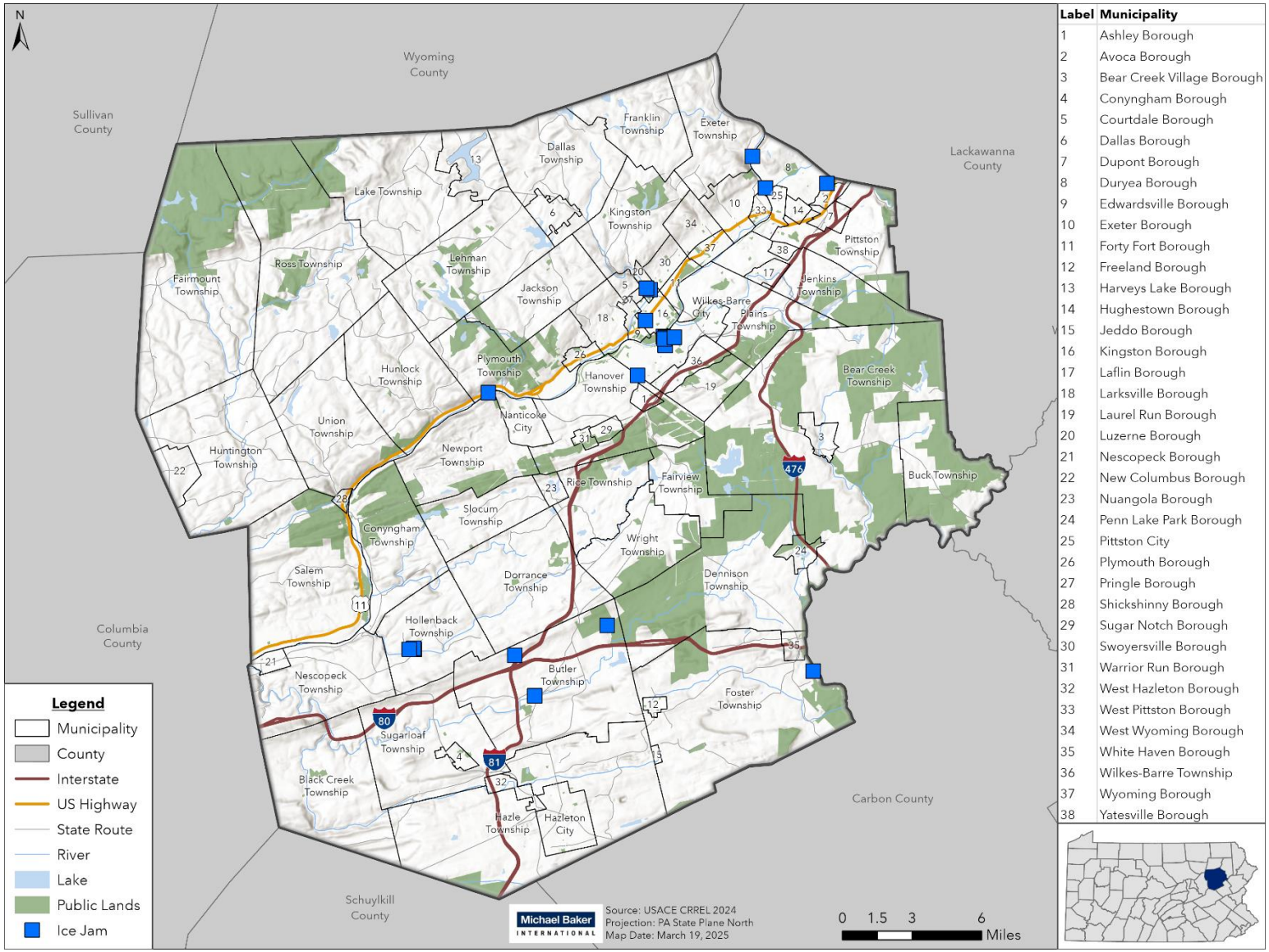
MUNICIPALITY	SINGLE FAMILY		2-4 FAMILY		ASSMD CONDO		OTHER RESID		NON RESIDNT		TOTAL	
	TOTAL	MIT	TOTAL	MIT	TOTAL	MIT	TOTAL	MIT	TOTAL	MIT	TOTAL	MIT
Plymouth Borough	3	0	0	0	0	0	0	0	0	0	3	0
Plymouth Township	38	13	4	0	0	0	1	0	10	0	53	13
Pringle Borough	0	0	0	0	0	0	0	0	1	0	1	0
Rice Township	0	0	0	0	0	0	0	0	0	0	0	0
Ross Township	0	0	0	0	0	0	0	0	0	0	0	0
Salem Township	9	0	0	0	0	0	0	0	1	0	10	0
Shickshinny Borough	30	12	7	3	0	0	0	0	9	1	46	16
Slocum Township	0	0	0	0	0	0	0	0	0	0	0	0
Sugarloaf Township	0	0	0	0	0	0	0	0	0	0	0	0
Sugar Notch Borough	0	0	0	0	0	0	0	0	0	0	0	0
Swoyersville Borough	2	0	0	0	0	0	0	0	0	0	2	0
Union Township	0	0	0	0	0	0	0	0	0	0	0	0
Warrior Run Borough	0	0	0	0	0	0	0	0	0	0	0	0
West Hazleton Borough	0	0	0	0	0	0	0	0	0	0	0	0
West Pittston Borough	51	11	13	2	0	0	0	0	8	1	72	14
West Wyoming Borough	0	0	0	0	0	0	0	0	0	0	0	0
White Haven Borough	0	0	0	0	0	0	0	0	0	0	0	0
City of Wilkes-Barre	51	1	29	0	0	0	0	0	8	1	88	2
Wilkes-Barre Township	0	0	0	0	0	0	0	0	0	0	1	0
Wright Township	2	0	1	0	0	0	0	0	1	0	3	0
Wyoming Borough	0	0	1	1	0	0	0	0	0	0	1	1
Yatesville Borough	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	314	73	66	9	0	0	1	0	77	5	458	87

Figure 4.3.4-4 Map showing the location of flash floods throughout Luzerne County (USACE CRREL 2024)



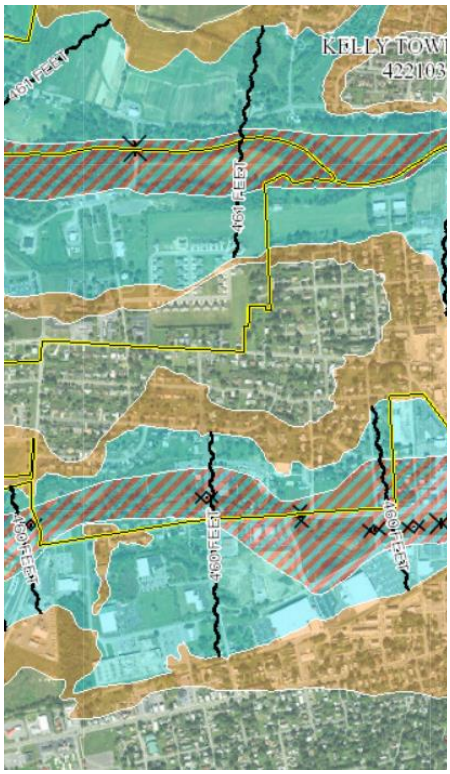
Label	Municipality
1	Ashley Borough
2	Avoca Borough
3	Bear Creek Village Borough
4	Conyngham Borough
5	Courtdale Borough
6	Dallas Borough
7	Dupont Borough
8	Duryea Borough
9	Edwardsville Borough
10	Exeter Borough
11	Forty Fort Borough
12	Freeland Borough
13	Harveys Lake Borough
14	Hughestown Borough
15	Jeddo Borough
16	Kingston Borough
17	Laflin Borough
18	Larksville Borough
19	Laurel Run Borough
20	Luzerne Borough
21	Nescopeck Borough
22	New Columbus Borough
23	Nuangola Borough
24	Penn Lake Park Borough
25	Pittston City
26	Plymouth Borough
27	Pringle Borough
28	Shickshinny Borough
29	Sugar Notch Borough
30	Swoyersville Borough
31	Warrior Run Borough
32	West Hazleton Borough
33	West Pittston Borough
34	West Wyoming Borough
35	White Haven Borough
36	Wilkes-Barre Township
37	Wyoming Borough
38	Yatesville Borough

Figure 4.3.4-5 Map showing the location of ice jams throughout Luzerne County (USACE CRREL 2024)



Label	Municipality
1	Ashley Borough
2	Avoca Borough
3	Bear Creek Village Borough
4	Conyngham Borough
5	Courtdale Borough
6	Dallas Borough
7	Dupont Borough
8	Duryea Borough
9	Edwardsville Borough
10	Exeter Borough
11	Forty Fort Borough
12	Freeland Borough
13	Harveys Lake Borough
14	Hughestown Borough
15	Jeddo Borough
16	Kingston Borough
17	Laflin Borough
18	Larksville Borough
19	Laurel Run Borough
20	Luzerne Borough
21	Nescopeck Borough
22	New Columbus Borough
23	Nuangola Borough
24	Penn Lake Park Borough
25	Pittston City
26	Plymouth Borough
27	Pringle Borough
28	Shickshinny Borough
29	Sugar Notch Borough
30	Swoyersville Borough
31	Warrior Run Borough
32	West Hazleton Borough
33	West Pittston Borough
34	West Wyoming Borough
35	White Haven Borough
36	Wilkes-Barre Township
37	Wyoming Borough
38	Yatesville Borough

Floods are the most common and costly natural catastrophe in the United States. In terms of economic disruption, property damage, and loss of life, floods are "nature's number-one disaster" (FEMA, 2019). For that reason, flood insurance is a critical way for citizens to protect their property against flood loss. Home and business owners can purchase flood insurance through private insurers or through the National Flood Insurance Program.



Luzerne County's flood zones can be viewed on FEMA's National Flood Hazard Layer: https://www.fema.gov/national-flood-hazard-layer-nfhl

Congress established the NFIP in 1968 to help control the growing cost of federal disaster relief (FEMA, 2019). The NFIP, administrated through FEMA, offers federally backed flood insurance at discounted rates when communities adopt and enforce effective floodplain management ordinances to reduce future flood losses based on flood maps. The NFIP is based on voluntary participation of communities but is required for communities to receive federal disaster relief funding.

Table 4.3.4-4 lists the Luzerne County municipalities participating in the NFIP.

The minimum floodplain management requirements to be a community in good standing in the NFIP include:

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

Table 4.3.4-4 Luzerne County Municipal Participation in the National Flood Insurance Program (FEMA, 2025).

COMMUNITY	PARTICIPATION STATUS	CID	INITIAL FIRM IDENTIFIED	CURRENT EFFECTIVE MAP DATE
Ashley Borough	Participating	420596	09/30/1980	06/20/2024
Avoca Borough	Participating	420597	07/16/1981	11/02/2012
Bear Creek Village Borough	Participating	422756	11/02/2012	11/02/2012
Bear Creek Township	Participating	421136	09/29/1978	06/20/2024
Black Creek Township	Participating	420958	09/03/1980	11/02/2012
Buck Township	Participating	421824	04/15/1981	11/02/2012
Butler Township	Participating	420599	12/16/1980	11/02/2012
Conyngham Borough	Participating	420992	07/16/1980	11/02/2012
Conyngham Township	Participating	420600	02/16/1977	06/20/2024
Courtdale Borough	Participating	420601	06/01/1979	06/20/2024
Dallas Borough	Participating	421825	01/02/1981	11/02/2012
Dallas Township	Participating	420602	04/01/1988	11/02/2012
Dennison Township	Participating	422271	04/15/1981	11/02/2012
Dorrance Township	Participating	421826	08/15/1980	11/02/2012
Dupont Borough	Participating	422250	06/15/1981	11/02/2012
Duryea Borough	Participating	420603	06/18/1980	06/20/2024
Edwardsville Borough	Participating	420604	04/15/1977	06/20/2024
Exeter Borough	Participating	420605	05/16/1977	06/20/2024
Exeter Township	Participating	420606	09/15/1983	06/20/2024
Fairmount Township	Participating	421827	04/01/1981	11/02/2012
Fairview Township	Participating	420993	06/01/1979	06/20/2024
Forty Fort Borough	Participating	420607	04/01/1977	06/20/2024
Foster Township	Participating	421828	04/01/1981	11/02/2012
Franklin Township	Participating	421829	05/19/1981	11/02/2012
Freeland Borough	Participating	422637	11/02/2012	11/02/2012
Hanover Township	Participating	420608	05/16/1977	06/20/2024
Harveys Lake Borough	Participating	420609	12/02/1980	11/02/2012
Hazle Township	Participating	421830	04/01/1981	11/02/2012
City of Hazleton	Participating	421203	11/02/2012	11/02/2012
Hollenback Township	Participating	421831	09/17/1980	06/20/2024
Hughestown Borough	Participating	422626	11/02/2012	11/02/2012

Table 4.3.4-4 Luzerne County Municipal Participation in the National Flood Insurance Program (FEMA, 2025).

COMMUNITY	PARTICIPATION STATUS	CID	INITIAL FIRM IDENTIFIED	CURRENT EFFECTIVE MAP DATE
Hunlock Township	Participating	420994	04/01/1980	06/20/2024
Huntington Township	Participating	421832	04/15/1981	11/02/2012
Jackson Township	Participating	420610	09/17/1980	06/20/2024
Jeddo Borough	Participating	422269	11/02/2012	11/02/2012
Jenkins Township	Participating	420611	05/16/1977	06/20/2024
Kingston Borough	Participating	420612	06/01/1977	06/20/2024
Kingston Township	Participating	420613	01/02/1981	06/20/2024
Laflin Borough	Participating	420995	12/02/1980	06/20/2024
Lake Township	Participating	421833	09/03/1980	11/02/2012
Larksville Borough	Participating	420614	04/01/1977	06/20/2024
Laurel Run Borough	Participating	421818	09/01/1987	06/20/2024
Lehman Township	Participating	420615	12/02/1980	11/02/2012
Luzerne Borough	Participating	420616	04/15/1977	06/20/2024
City of Nanticoke	Participating	420617	04/15/1977	06/20/2024
Nescopeck Borough	Participating	420618	02/01/1980	06/20/2024
Nescopeck Township	Participating	420619	08/01/1980	06/20/2024
New Columbus Borough	Participating	421819	03/16/1981	11/02/2012
Newport Township	Participating	421822	12/02/1980	06/20/2024
Nuangola Borough	Participating	422272	09/28/1979	11/02/2012
Penn Lake Park Borough	Participating	422645	12/05/1980	11/02/2012
City of Pittston	Participating	420620	05/02/1977	06/20/2024
Pittston Township	Participating	421834	06/15/1981	06/20/2024
Plains Township	Participating	420621	05/16/1977	06/20/2024
Plymouth Borough	Participating	420622	04/01/1977	06/20/2024
Plymouth Township	Participating	420623	04/15/1977	06/20/2024
Pringle Borough	Participating	420624	05/02/1977	06/20/2024
Rice Township	Participating	420996	01/02/1981	11/02/2012
Ross Township	Participating	421835	04/15/1981	11/02/2012
Salem Township	Participating	420625	03/18/1980	06/20/2024
Shickshinny Borough	Participating	420626	12/31/1976	06/20/2024
Slocum Township	Not Participating	422712	11/02/2012	11/02/2012
Sugarloaf Township	Participating	420997	07/02/1980	11/02/2012
Sugar Notch Borough	Participating	421820	11/02/2012	06/20/2024

Table 4.3.4-4 Luzerne County Municipal Participation in the National Flood Insurance Program (FEMA, 2025).

COMMUNITY	PARTICIPATION STATUS	CID	INITIAL FIRM IDENTIFIED	CURRENT EFFECTIVE MAP DATE
Swoyersville Borough	Participating	420627	06/15/1977	06/20/2024
Union Township	Participating	421836	09/30/1980	06/20/2024
Warrior Run Borough	Participating	422270	06/25/1976	06/20/2024
West Hazleton Borough	Participating	421821	11/02/2012	11/02/2012
West Pittston Borough	Participating	420628	04/15/1977	06/20/2024
West Wyoming Borough	Participating	420629	04/15/1977	06/20/2024
White Haven Borough	Participating	420630	08/01/1977	11/02/2012
City of Wilkes-Barre	Participating	420631	09/30/1977	06/20/2024
Wilkes-Barre Township	Participating	421823	12/02/1980	06/20/2024
Wright Township	Participating	420632	01/16/1981	11/02/2012
Wyoming Borough	Participating	420633	11/16/1977	06/20/2024
Yatesville Borough	Participating	420634	11/02/2012	11/02/2012

4.3.4.4. Future Occurrence

In this plan, the term "Special Flood Hazard Area" is used rather than floodplain to clarify that the area under consideration is identified on the FIRM as having at least a 1-percent chance of flooding in any given year. Historically, the area with a 1-percent chance of flooding in any given year has been called the "100-year floodplain" or the "base flood" and the area with a 0.2-percent chance of flooding in any given year has been called the "500-year floodplain." As these terms can be misleading by suggesting that there will be a flood only every 100 or 500 years respectively, they are not used in this plan. The 1- and 0.2 percent-annual-chance-floods are delineated on the Luzerne County FIRM. Areas subject to 2 percent- and 10 percent-annual-chance-events are not shown on FIRMs, however, water surface elevations associated with these events are included in the flood source profiles contained in the FIS Report. The most recent FIS for each county in Pennsylvania is available from the FEMA Map Service Center (http://www.msc.fema.gov)

The table below shows a range of flood recurrence intervals and associated probabilities of occurrence.

Table 4.3.4-5 Recurrence intervals and associated probabilities of occurrence (FEMA, 2007).

RECURRENCE INTERVAL	CHANCE OF OCCURRENCE IN ANY GIVEN YEAR (%)
10 year	10
50 year	2
100 year	1
500 year	0.2

In Luzerne County, flooding occurs commonly and can take place during any season of the year. However, the possibility of flooding is greatly reduced during the winter months. Although most severe floods are attributable to rainfall alone, the spring floods can be compounded by snowmelt and moving ice. The major floods in the late summer and fall are often associated with tropical storms moving up the Atlantic coastline. Within the flood-susceptible areas in Luzerne County, it is expected that the character of flooding will remain essentially unchanged from what has been experienced for many years. However, some increase in the severity and frequency of flooding may result due to planned or recent development within the floodplains of the various streams, as well as increased intensity and frequency of rain events. Therefore, the future occurrence of floods in Luzerne County can be characterized as *highly likely* as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1).

Changing climates are increasing the frequency and magnitude of flood events. The Fourth National Climate Assessment identified more flooding occurring in the Northeast Region (US GCRP, 2018). Increasing temperatures are linked to increasing amounts and intensity of precipitation, which could increase frequency and severity of flood events.

The Climate Mapping for Resilience and Adaptation (CMRA) Tool provides a county-level assessment report for flooding, shown in Figure 4.3.4-3 below. According to CMRA, the average annual precipitation is expected to increase while the number of days per year with precipitation may decrease. The annual days that exceed the 99th percentile precipitation is projected to increase as well. Lastly, the number of days with a maximum temperature below 32 degrees Fahrenheit is projected to decrease. These projections combine to show that future precipitation may be more intense and during the winter months it will be less likely to turn into snow.

Figure 4.3.4-6 Luzerne County Flooding Hazard Assessment Report (CMRA, 2025)

Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Annual average total precipitation	41" 40 - 43	43" 41 - 47	44" 41 - 47	44" 41 - 49	44" 40 - 48	44" 41 - 49	46" 42 - 50
Days per year with precipitation (wet days)	208 days 205 - 214	206 days 194 - 217	206 days 191 - 215	206 days 193 - 219	205 days 187 - 216	205 days 191 - 214	202 days 174 - 226
Maximum period of consecutive wet days	13 days 12 - 14	13 days 12 - 15	13 days 12 - 16	13 days 12 - 16	13 days 12 - 17	13 days 12 - 16	14 days 11 - 21
Annual days with:							
Annual days with total precipitation > 1inch	3 days 3 - 4	4 days 3 - 5	4 days 3 - 5	4 days 3 - 5	5 days 3 - 6	5 days 4 - 6	6 days 4 - 7
Annual days with total precipitation > 2 inches	0 days 0 - 0	0 days 0 - 1	0 days 0 - 0	0 days 0 - 1	0 days 0 - 1	0 days 0 - 1	1 days 0 - 1
Annual days with total precipitation > 3 inches	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0
Annual days that exceed 99th percentile precipitation	5 days 4 - 6	6 days 5 - 7	6 days 5 - 8	6 days 5 - 8	7 days 6 - 8	7 days 6 - 9	8 days 7 - 10
Days with maximum temperature below 32 °F	39 days 36 - 41	29 days 16 - 38	28 days 20 - 38	25 days 13 - 36	23 days 14 - 35	22 days 9 - 34	14 days 4 - 27

N/A = Data Not Available for the selected area

4.3.4.5. Vulnerability Assessment

Flooding can lead to property loss as well as to loss of life. Flooding damages structures, including homes and businesses, vehicles, and infrastructure, including roadways. People who are surrounded by flood waters may at some point require evacuation, placing their lives and the lives of rescuers in danger. Flooding can disrupt the operation of businesses and schools. Recovery from flood damages can be time consuming and costly.

Flood vulnerability is described in terms of what community assets, structures, and infrastructure are situated in locations where flooding is anticipated. For purposes of assessing vulnerability, this plan focuses on those that are located within the SFHA. Please note that while other floods are possible, information about the extent and depths for the flood frequencies likely to be seen in this floodplain are available for all municipalities countywide, thus providing a consistent basis for analysis. Flood vulnerability maps for each applicable local municipality, showing the SFHA, addressable structures, critical facilities and transportation routes within it, are included in Appendix D. These maps were created using FEMA Countywide data from the current effective FIRMS.

Table 4.3.4-6 displays the 2020 population per municipality that lives within the SFHA. The City of Wilkes-Barre has the most people living in the SFHA (2,169). Exeter Borough has the largest percentage of people living in the SFHA (38%).

Some structures and infrastructure in each jurisdiction with SFHAs are at risk of flood damage. Table 4.3.4-6 also displays the total number of structures and critical facilities located within the SFHA. Note that some municipalities may have more critical facilities in the SFHA than structures. This is because bridges are considered critical facilities but were not counted as structures. Approximately 4% of all addressable structures (5,424 structures) in Luzerne County are located within the SFHA and are therefore the most vulnerable to flood losses. The City of Wilkes-Barre has the most structures located in the SFHA (885), and Shickshinny Borough has the highest percentage of structures located in the SFHA (31%). Therefore, these communities would be the most vulnerable in a 1%-annual-chance flood event. Most municipalities in Luzerne County have 5% or less of their structures located in the SFHA. Municipalities with more than 5% of their structures in the SFHA are Conyngham Township, Exeter Borough, Forty Fort Borough, Hanover Township, Harveys Lake Borough, Hunlock Township, Kingston Borough, Penn Lake Park Borough, Plymouth Township, Shickshinny Borough, West Pittston Borough, West Wyoming Borough, and the City of Wilkes-Barre.

Critical facilities are located within flood-prone areas for the majority of communities in Luzerne County. These include fire stations, police stations, and municipal buildings. Structures like medical facilities may also require special attention during times of flooding for evacuation purposes are also located in flood-prone areas. Table 4.3.3-5 shows the number of critical facilities located in the SFHA. Out of 1,917 critical facilities identified throughout Luzerne County, 502 are in the 1%-annual-chance floodplain. Hunlock Township has the most critical facilities located in the 1%-annual-chance floodplain with 23. Several municipalities have over a

third of their critical facilities in the SFHA. These are Bear Creek Township, Black Creek Township, Conyngham Township, Dallas Borough, Dorrance Township, Exeter Borough, Fairmount Township, Foster Township, Harveys Lake Borough, Hollenback Township, Hunlock Township, Huntington Township, Jackson Township, Kingston Township, Lake Township, Penn Lake Park Borough, Plymouth Township, Salem Township, Shickshinny Borough, and Union Township. These municipalities may be more vulnerable during flood events if many of their critical facilities were impacted. A complete listing of critical facilities is in Appendix E.

Table 4.3.4-7 shows the number of structures in the SFHA by generalized land use type. Most vulnerable structures (3,906) are residential properties, followed by commercial (649). Floods also have a significant impact on agricultural crops, especially vulnerable communities with extensive farmlands.

In 2022, there were 4,953 NFIP policies in force across Luzerne County. A total of 4,116 NFIP claims have been made since 1978 for flood damages to structures. In total, NFIP payments for flood damages in the County have exceeded $92 million (PEMA, 2023).

Table 4.3.4-6 Structures, Critical Facilities and Population Flood Vulnerability for Luzerne County

Municipality	Total Structures in Municipality	Structures in SFHA*	Percent of Structures in SFHA	Total Critical Facilities in Municipality	Total Critical Facilities in SFHA	Percent Critical Facilities in SFHA	Total 2020 Population	2020 Population in SFHA†	Percent Population in SFHA
Ashley Borough	1,281	62	5%	22	7	32%	2,596	61	2%
Avoca Borough	1,294	62	5%	21	4	19%	2,507	104	4%
Bear Creek Village Borough	1,713	5	0%	50	11	22%	2,754	63	2%
Bear Creek Township	179	4	2%	7	5	71%	291	39	13%
Black Creek Township	1,452	51	4%	35	13	37%	1,909	61	3%
Buck Township	301	2	1%	9	1	11%	379	39	10%
Butler Township	4,499	95	2%	88	16	18%	9,485	463	5%
Conyngham Borough	871	2	0%	8	1	13%	1,825	0	0%
Conyngham Township	919	94	10%	21	8	38%	1,312	90	7%
Courtdale Borough	395	2	1%	5	0	0%	689	0	0%
Dallas Borough	1,209	25	2%	11	4	36%	2,694	76	3%
Dallas Township	3,528	23	1%	60	14	23%	9,099	93	1%
Dennison Township	717	32	4%	30	8	27%	963	49	5%
Dorrance Township	1,564	9	1%	49	19	39%	2,076	31	1%
Dupont Borough	1,463	59	4%	32	9	28%	2,539	12	0%
Duryea Borough	2,496	23	1%	17	3	18%	5,036	116	2%
Edwardsville Borough	1,521	37	2%	10	2	20%	4,929	218	4%
Exeter Borough	2,520	633	25%	14	5	36%	5,514	2,076	38%

Table 4.3.4-6 Structures, Critical Facilities and Population Flood Vulnerability for Luzerne County

Municipality	Total Structures in Municipality	Structures in SFHA*	Percent of Structures in SFHA	Total Critical Facilities in Municipality	Total Critical Facilities in SFHA	Percent Critical Facilities in SFHA	Total 2020 Population	2020 Population in SFHA†	Percent Population in SFHA
Exeter Township	1,223	29	2%	26	4	15%	2,051	58	3%
Fairmount Township	1,146	25	2%	42	21	50%	1,210	54	4%
Fairview Township	1,901	5	0%	24	3	13%	4,703	182	4%
Forty Fort Borough	2,201	288	13%	19	4	21%	4,239	986	23%
Foster Township	2,002	15	1%	30	10	33%	3,408	31	1%
Franklin Township	1,063	5	0%	22	7	32%	1,716	28	2%
Freeland Borough	1,119	0	0%	5	0	0%	3,833	0	0%
Hanover Township	5,005	359	7%	95	17	18%	11,445	521	5%
Harveys Lake Borough	1,871	293	16%	15	7	47%	2,788	219	8%
Hazle Township	5,022	15	0%	61	10	16%	10,160	100	1%
City of Hazleton	6,310	0	0%	29	0	0%	29,963	0	0%
Hollenback Township	969	9	1%	18	11	61%	1,139	61	5%
Hughestown Borough	706	0	0%	4	0	0%	1,329	0	0%
Hunlock Township	1,503	143	10%	36	23	64%	2,223	89	4%
Huntington Township	1,739	24	1%	54	22	41%	2,053	283	14%
Jackson Township	1,394	7	1%	36	15	42%	4,631	19	0%
Jeddo Borough	36	0	0%	1	0	0%	108	0	0%
Jenkins Township	2,193	77	4%	21	2	10%	4,283	99	2%
Kingston Borough	5,083	350	7%	33	2	6%	13,349	799	6%
Kingston Township	3,249	54	2%	45	21	47%	7,108	40	1%

Table 4.3.4-6 Structures, Critical Facilities and Population Flood Vulnerability for Luzerne County

Municipality	Total Structures in Municipality	Structures in SFHA*	Percent of Structures in SFHA	Total Critical Facilities in Municipality	Total Critical Facilities in SFHA	Percent Critical Facilities in SFHA	Total 2020 Population	2020 Population in SFHA†	Percent Population in SFHA
Laflin Borough	612	15	2%	13	4	31%	1,451	22	2%
Lake Township	1,331	18	1%	29	12	41%	1,993	8	0%
Larksville Borough	2,126	21	1%	12	2	17%	4,225	0	0%
Laurel Run Borough	293	0	0%	4	0	0%	558	0	0%
Lehman Township	2,071	3	0%	40	6	15%	3,346	14	0%
Luzerne Borough	1,365	2	0%	12	3	25%	2,711	0	0%
City of Nanticoke	4,409	26	1%	26	4	15%	10,628	11	0%
Nescopeck Borough	875	15	2%	2	0	0%	1,480	7	0%
Nescopeck Township	975	44	5%	30	9	30%	1,081	9	1%
New Columbus Borough	206	4	2%	9	3	33%	222	8	4%
Newport Township	1,829	11	1%	15	4	27%	4,433	12	0%
Nuangola Borough	402	15	4%	1	0	0%	666	133	20%
Penn Lake Park Borough	232	16	7%	4	2	50%	360	55	15%
City of Pittston	3,056	20	1%	14	2	14%	7,591	30	0%
Pittston Township	1,807	9	0%	38	1	3%	3,186	429	13%
Plains Township	4,771	193	4%	79	9	11%	9,808	0	0%
Plymouth Borough	2,394	7	0%	17	0	0%	5,763	40	1%
Plymouth Township	1,129	168	15%	24	13	54%	1,717	146	9%
Pringle Borough	504	0	0%	9	1	11%	893	0	0%
Rice Township	1,480	16	1%	40	12	30%	3,632	206	6%
Ross Township	2,012	19	1%	53	15	28%	2,726	261	10%

Table 4.3.4-6 Structures, Critical Facilities and Population Flood Vulnerability for Luzerne County

Municipality	Total Structures in Municipality	Structures in SFHA*	Percent of Structures in SFHA	Total Critical Facilities in Municipality	Total Critical Facilities in SFHA	Percent Critical Facilities in SFHA	Total 2020 Population	2020 Population in SFHA†	Percent Population in SFHA
Salem Township	2,613	54	2%	55	21	38%	4,027	307	8%
Shickshinny Borough	327	100	31%	7	6	86%	632	149	24%
Slocum Township	828	1	0%	13	3	23%	1,054	0	0%
Sugarloaf Township	460	0	0%	5	0	0%	1,001	30	3%
Sugar Notch Borough	2,203	11	0%	45	11	24%	3,869	0	0%
Swoyersville Borough	2,681	100	4%	20	2	10%	5,021	311	6%
Union Township	1,443	32	2%	32	16	50%	2,035	40	2%
Warrior Run Borough	295	0	0%	2	0	0%	527	0	0%
West Hazleton Borough	1,165	5	0%	13	1	8%	5,163	0	0%
West Pittston Borough	2,122	517	24%	5	1	20%	4,652	1,083	23%
West Wyoming Borough	1,487	115	8%	10	1	10%	2,638	396	15%
White Haven Borough	521	0	0%	15	1	7%	1,166	0	0%
City of Wilkes-Barre	14,135	885	6%	104	21	20%	44,328	2,169	5%
Wilkes-Barre Township	1,540	8	1%	33	0	0%	3,213	129	4%
Wright Township	2,609	10	0%	39	5	13%	5,722	58	1%
Wyoming Borough	1,542	46	3%	11	3	27%	3,102	209	7%
Yatesville Borough	320	0	0%	1	0	0%	638	0	0%

Table 4.3.4-6 Structures, Critical Facilities and Population Flood Vulnerability for Luzerne County

Municipality	Total Structures in Municipality	Structures in SFHA*	Percent of Structures in SFHA	Total Critical Facilities in Municipality	Total Critical Facilities in SFHA	Percent Critical Facilities in SFHA	Total 2020 Population	2020 Population in SFHA†	Percent Population in SFHA
Total	**143,827**	**5,424**	**4%**	**1,986**	**503**	**25%**	**325,594**	**13,432**	**4%**

** Calculated by overlaying Luzerne County GIS structure data and FEMA's SFHA.*

† Calculated by selecting the 2020 census block centroids that intersect the SFHAs in order to provide an approximation of populations living near the SFHA.

Table 4.3.4-7 Structures Flood Vulnerability by Land Use for Luzerne County

Municipality	Agriculture	Commercial	Conservation	Industrial	Mining	Mixed Use	Residential	Special Purpose	Total per Municipality
Ashley Borough	0	0	0	0	0	0	62	0	62
Avoca Borough	0	1	0	1	0	0	60	0	62
Bear Creek Township	0	0	3	0	0	0	2	0	5
Bear Creek Village Borough	0	0	2	0	0	0	2	0	4
Black Creek Township	0	20	13	0	0	0	18	0	51
Buck Township	0	1	0	0	0	0	1	0	2
Butler Township	0	6	0	0	0	2	87	0	95
Conyngham Borough	0	0	0	2	0	0	0	0	2
Conyngham Township	4	3	12	1	0	0	74	0	94
Courtdale Borough	0	2	0	0	0	0	0	0	2
Dallas Borough	0	14	0	0	0	3	8	0	25

Table 4.3.4-7 Structures Flood Vulnerability by Land Use for Luzerne County

Municipality	Agriculture	Commercial	Conservation	Industrial	Mining	Mixed Use	Residential	Special Purpose	Total per Municipality
Dallas Township	9	10	0	0	0	0	4	0	23
Dennison Township	0	0	6	0	0	0	26	0	32
Dorrance Township	4	0	3	0	0	0	2	0	9
Dupont Borough	0	15	0	0	0	0	44	0	59
Duryea Borough	3	2	0	6	8	0	4	0	23
Edwardsville Borough	0	6	3	0	0	0	28	0	37
Exeter Borough	0	30	10	19	0	0	574	0	633
Exeter Township	0	4	0	0	0	0	25	0	29
Fairmount Township	17	0	0	0	0	0	8	0	25
Fairview Township	0	3	0	0	0	0	2	0	5
Forty Fort Borough	0	17	5	12	0	0	254	0	288
Foster Township	0	0	0	0	0	0	15	0	15
Franklin Township	3	0	0	0	0	0	2	0	5
Hanover Township	0	63	6	23	0	0	267	0	359
Harveys Lake Borough	0	8	0	0	0	0	33	252	293
Hazle Township	0	10	3	2	0	0	0	0	15
Hollenback Township	8	0	1	0	0	0	0	0	9
Hunlock Township	25	23	2	2	0	0	91	0	143
Huntington Township	16	2	0	0	0	0	6	0	24
Jackson Township	2	0	0	0	0	0	4	1	7
Jenkins Township	0	29	0	12	0	0	36	0	77
Kingston Borough	0	31	0	4	0	0	315	0	350

Table 4.3.4-7 Structures Flood Vulnerability by Land Use for Luzerne County

MUNICIPALITY	AGRICULTURE	COMMERCIAL	CONSERVATION	INDUSTRIAL	MINING	MIXED USE	RESIDENTIAL	SPECIAL PURPOSE	TOTAL PER MUNICIPALITY
Kingston Township	2	25	8	2	0	0	17	0	54
Laflin Borough	0	4	0	0	0	0	11	0	15
Lake Township	10	6	0	0	0	0	2	0	18
Larksville Borough	0	12	0	1	0	0	8	0	21
Lehman Township	2	0	1	0	0	0	0	0	3
Luzerne Borough	0	2	0	0	0	0	0	0	2
Nanticoke City	0	18	0	5	0	0	3	0	26
Nescopeck Borough	0	0	0	0	0	0	15	0	15
Nescopeck Township	9	0	13	0	0	0	22	0	44
New Columbus Borough	4	0	0	0	0	0	0	0	4
Newport Township	0	2	1	0	1	0	7	0	11
Nuangola Borough	0	0	4	0	0	0	11	0	15
Penn Lake Park Borough	0	0	3	0	0	0	13	0	16
Pittston City	0	3	0	17	0	0	0	0	20
Pittston Township	0	0	0	4	0	0	5	0	9
Plains Township	0	38	60	4	0	0	91	0	193
Plymouth Borough	0	0	2	5	0	0	0	0	7
Plymouth Township	0	95	0	0	0	0	73	0	168
Rice Township	0	0	1	0	0	0	15	0	16
Ross Township	13	0	0	0	0	0	6	0	19
Salem Township	4	8	35	4	0	0	3	0	54
Shickshinny Borough	0	34	1	0	7	0	58	0	100

Table 4.3.4-7 Structures Flood Vulnerability by Land Use for Luzerne County

MUNICIPALITY	AGRICULTURE	COMMERCIAL	CONSERVATION	INDUSTRIAL	MINING	MIXED USE	RESIDENTIAL	SPECIAL PURPOSE	TOTAL PER MUNICIPALITY
Slocum Township	1	0	0	0	0	0	0	0	1
Sugarloaf Township	2	1	5	0	0	0	3	0	11
Swoyersville Borough	0	1	2	0	0	0	97	0	100
Union Township	10	6	2	0	0	0	14	0	32
West Hazleton Borough	0	0	0	5	0	0	0	0	5
West Pittston Borough	0	39	5	0	22	0	451	0	517
West Wyoming Borough	0	8	0	15	0	0	92	0	115
Wilkes-Barre City	0	26	9	45	0	0	802	3	885
Wilkes-Barre Township	0	0	0	7	0	0	1	0	8
Wright Township	0	2	0	0	0	0	8	0	10
Wyoming Borough	3	19	0	0	0	0	24	0	46
Total	**151**	**649**	**221**	**198**	**38**	**5**	**3,906**	**256**	**5,424**

** Calculated by overlaying Luzerne County GIS structure data and FEMA's SFHA.*

† Calculated by selecting the 2020 census block centroids that intersect the SFHAs in order to provide an approximation of populations living near the SFHA.

Table 4.3.4-8 shows the number of mobile homes located in the SFHA in each municipality. Mobile homes are more vulnerable to flood risk because they can be washed out if the proper protection measures are not taken. FEMA recommends anchoring or elevation techniques to protect mobile homes from flood risk. More information for these techniques can be found online: https://www.fema.gov/manufactured-mobile-home. Rice Township has the greatest number of mobile homes in the SFHA (11). Dupont Borough has the highest percentage of mobile homes in the SFHA; however, the municipality only has four total mobile homes, so it does not have as high as risk as municipalities with larger numbers of mobile homes. There are four municipalities with greater than 10% of their mobile homes within the SFHA; making them more vulnerable to flood damages. These are Avoca Borough, Dupont Borough, Exeter Township, and Rice Township. In total, there are 24 mobile homes with their centroids located within the SFHA.

Table 4.3.4-8 Mobile Home Flood Vulnerability in Luzerne County

MUNICIPALITY	TOTAL MOBILE HOMES	TOTAL MOBILE HOMES IN SFHA	PERCENT MOBILE HOMES IN SFHA	MUNICIPALITY	TOTAL MOBILE HOMES	TOTAL MOBILE HOMES IN SFHA	PERCENT MOBILE HOMES IN SFHA
Ashley Borough	171	0	0%	Kingston Township	143	0	0%
Avoca Borough	5	1	20%	Lake Township	40	1	3%
Bear Creek Township	3	0	0%	Larksville Borough	4	0	0%
Black Creek Township	11	1	9%	Laurel Run Borough	116	0	0%
Buck Township	3	0	0%	Lehman Township	81	0	0%
Butler Township	35	0	0%	Nanticoke city	1	0	0%
Conyngham Township	5	0	0%	Nescopeck Borough	2	0	0%
Dallas Township	168	0	0%	Nescopeck Township	3	0	0%
Dennison Township	19	0	0%	New Columbus Borough	2	0	0%
Dorrance Township	15	0	0%	Pittston City	1	0	0%
Dupont Borough	4	2	50%	Pittston Township	66	0	0%

Table 4.3.4-8 Mobile Home Flood Vulnerability in Luzerne County

MUNICIPALITY	TOTAL MOBILE HOMES	TOTAL MOBILE HOMES IN SFHA	PERCENT MOBILE HOMES IN SFHA	MUNICIPALITY	TOTAL MOBILE HOMES	TOTAL MOBILE HOMES IN SFHA	PERCENT MOBILE HOMES IN SFHA
Duryea Borough	3	0	0%	Plains Township	111	0	0%
Exeter Borough	182	2	1%	Plymouth Township	1	0	0%
Exeter Township	15	3	20%	Pringle Borough	1	0	0%
Fairmount Township	117	2	2%	Rice Township	57	11	19%
Foster Township	73	0	0%	Ross Township	60	0	0%
Franklin Township	87	0	0%	Salem Township	130	1	1%
Freeland Borough	11	0	0%	Slocum Township	1	0	0%
Hanover Township	54	0	0%	Sugarloaf Township	5	0	0%
Harveys Lake Borough	20	0	0%	Union Township	8	0	0%
Hazle Township	174	0	0%	Warrior Run Borough	4	0	0%
Hazleton city	91	0	0%	West Wyoming Borough	2	0	0%
Hollenback Township	8	0	0%	White Haven Borough	44	0	0%
Hunlock Township	11	0	0%	Wilkes-Barre City	1	0	0%
Huntington Township	6	0	0%	Wright Township	3	0	0%
Jackson Township	1	0	0%	Yatesville Borough	2	0	0%
Jenkins Township	330	0	0%	**Total**	**2,511**	**24**	**1%**

Luzerne County is also vulnerable to flood risk on Toxic Release Inventory facilities. Section 4.3.17 describes Luzerne's County risk to Hazardous Materials Release in depth.

Additional information on flood vulnerability and losses in Luzerne County, including the 1%-annual-chance flood event results from HAZUS, FEMA's loss estimation software, is provided in Section 4.4.3: Potential Loss Estimates.

Luzerne County's older and historic places make important contributions to its communities' overall quality of life, economy, and sense of place. In the wake of several disasters in recent years including hurricanes Sandy and Irene and Tropical Storm Lee, the Pennsylvania State Historic Preservation Office (PA SHPO) and the Pennsylvania Emergency Management Agency (PEMA) are encouraging counties to integrate historic preservation considerations into local hazard mitigation plans. By prioritizing historic resources for mitigation, local officials and hazard mitigation planners can help preserve communities' historic built environments—and sense of place—for many years to come. **Appendix G Historic and Cultural Resources** goes into detail on the vulnerability of historic and cultural resources in Luzerne County.

4.3.4.6. Equity in Vulnerable Communities

In terms of equity, residents living within mobile homes or other manufactured homes will experience risks associated with floods, flash floods, and ice jams at a disproportionate rate due to the manufacturing of these homes. This means areas of Jenkins Township, Ashley Borough, Dallas Township, Exeter Township, Fairmount Township, Hazle Township, Kingston Township, Laurel Run Borough, Plains Township, and Salem Township may be particularly vulnerable. Communities with an aged housing stock may also be more susceptible due to aged infrastructure and dated building practices. People currently experiencing homelessness are highly susceptible to flooding as they lack secure shelter. Equitable policies must ensure access to emergency shelters, temporary housing, and long-term housing solutions for people displaced by flooding. In terms of evacuation, households without vehicles or with people who have disabilities will need assistance.

4.3.5. HAILSTORM

4.3.5.1. Location and Extent

Hailstorm events can occur in all areas of Luzerne County. Neither the duration of the storm nor the extent of the area affected by such an occurrence can be predicted. Hail precipitation is often produced at the front of a severe thunderstorm or in conjunction with a tornado event. Hailstorms occur when ice crystals form within a low pressure front due to the rapid rise of warm air into the upper atmosphere and the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until, having developed sufficient weight, they fall as precipitation in the form of balls or irregularly shaped masses of ice. Hailstones are formed most commonly in thunderstorms with intense updraft, high liquid water content, large vertical extent, large water droplets, and cloud layers below freezing (NOAA NSSL, 2020).

4.3.5.2. Range of Magnitude

Hail is described qualitatively and quantitatively by its size and can range from 0.2 inches to 4.5 inches; as shown in Table 4.3.4-1. The size of hail is dependent on the strength of the upward air movement along the front of a thunderstorm, called the updraft. Hailstone nuclei are buoyed or lifted by the updraft and increase in size the longer the stone is held aloft. Weaker updrafts create smaller hailstones while strong updrafts provide a longer amount of time for hailstone nuclei to grow in diameter (NOAA NSSL, 2020). Luzerne County has experienced hail ranging in size from 0.75 to 2.08 inches in diameter (NOAA NCEI, 2024).

Table 4.3.5-1 Hailstone size and relationship to updraft speed (NOAA NSSL, 2020).

HAILSTONE SIZE	MEASUREMENT (INCHES)	UPDRAFT SPEED (MPH)
Pea	0.25	24
Marble	0.50	35
Dime	0.70	38
Penny	0.75	40
Nickel	0.88	46
Quarter	1.00	49
Half Dollar	1.25	54
Walnut	1.50	60
Golf Ball	1.75	64
Hen Egg	2.00	69
Tennis Ball	2.50	77
Baseball	2.75	81
Teacup	3.00	84
Grapefruit	4.00	98
Softball	4.50	103

Hailstorms can cause significant damage to crops, livestock and property, depending on the size, duration, and intensity of hail precipitation. Automobiles and aircraft are particularly susceptible to damage. Also, people are at risk for serious injury if they don't seek immediate shelter. Since hail precipitation ususally occurs during thunderstorm events, the impacts of other hazards associated with thunderstorms (i.e. strong winds, intense precipitation, etc.) often occur simultaneously (NOAA NSSL, 2020).

A potential worst-case scenario of a hailstorm would be if a storm carrying hail of over two inches were to occur over a prolonged period in a predominantly agricultural area. Because hail can cause significant crop damage, a storm of this magnitude would potentially destroy agricultural yields and result in significant lost revenue, as well as property damage and injuries.

The potential impacts of hailstorms on community lifelines are as follows:

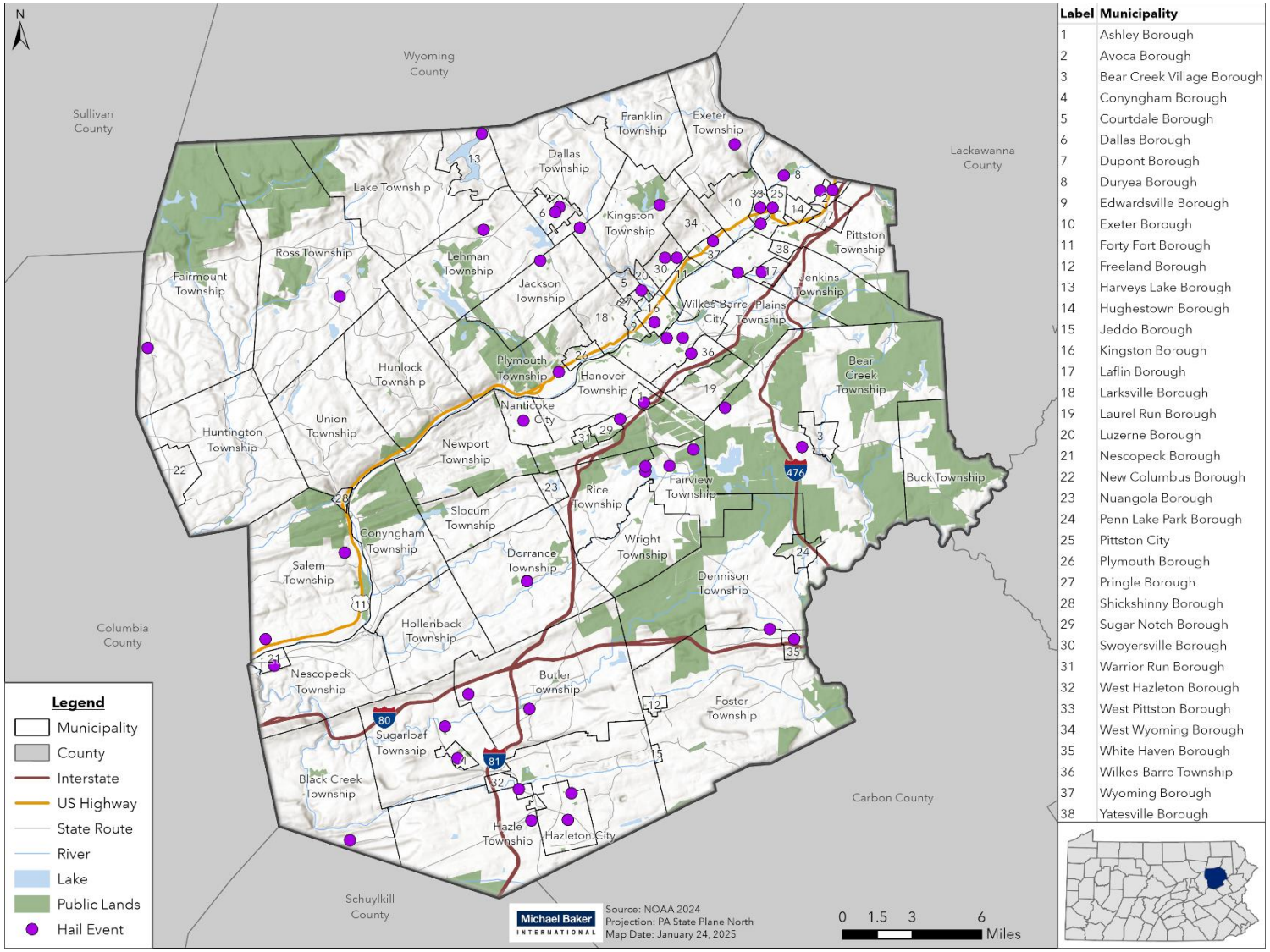
Table 4.3.5-2 Most Likely Lifelines Impacted by Hailstorm

LIFELINES	NOTES
Safety and Security	Government operations and facilities, including police, may be needed for response and recovery.
Food, Hydration, Shelter	Hailstorms can cause severe crop damage even during minor events. This may impact the availability and cost of food and may cause adverse economic impacts to farmers.
Health and Medical	Hailstorms can cause severe vehicular damage and may render roadways temporarily impassable. This may impact emergency responders' ability to safely transport patients during hailstorm events.
Transportation	Hailstorms can cause severe vehicular damage and may render roadways temporarily impassable. This may impact mass transit and railways.

4.3.5.3. Past Occurrence

Figure 4.3.5-1 shows a map of the number of recorded hailstorm events in Luzerne County between 1980 and 2024. A hailstorm event is defined as a storm with hail of ¾ inches or greater in diameter. According to PEMA, approximately 96 percent of hailstorm events occurred during the months of April, May, June, July, August, and September. In addition, approximately 87% of historic events occurred during the afternoon or evening. Both results are consistent with the relationship between hail and thunderstorms, which most often occur during late spring, summer, and early fall months.

Figure 4.3.5-1 Number of hailstorm events in Luzerne County from 1980-2024 (NOAA NCEI, 2024).



Label	Municipality
1	Ashley Borough
2	Avoca Borough
3	Bear Creek Village Borough
4	Conyngham Borough
5	Courtdale Borough
6	Dallas Borough
7	Dupont Borough
8	Duryea Borough
9	Edwardsville Borough
10	Exeter Borough
11	Forty Fort Borough
12	Freeland Borough
13	Harveys Lake Borough
14	Hughestown Borough
15	Jeddo Borough
16	Kingston Borough
17	Laflin Borough
18	Larksville Borough
19	Laurel Run Borough
20	Luzerne Borough
21	Nescopeck Borough
22	New Columbus Borough
23	Nuangola Borough
24	Penn Lake Park Borough
25	Pittston City
26	Plymouth Borough
27	Pringle Borough
28	Shickshinny Borough
29	Sugar Notch Borough
30	Swoyersville Borough
31	Warrior Run Borough
32	West Hazleton Borough
33	West Pittston Borough
34	West Wyoming Borough
35	White Haven Borough
36	Wilkes-Barre Township
37	Wyoming Borough
38	Yatesville Borough

NOAA reports 84 hail events in Luzerne County from 2000-2024. This includes damage estimates for all hailstorms reported by local field offices. A list of all damages aggregated to the municipal scale is provided in the table below. PEMA determined that these events have caused a total of $40,000 in property damage in Luzerne County.

Table 4.3.5-3 Previous hail events in Luzerne County between 1950 and 2019 (NOAA NCEI, 2019). Note that "countywide" indicates that the event occurred in multiple locations.

LOCATION	DATE	ESTIMATED MAGNITUDE (inches)	ESTIMATED PROPERTY DAMAGE ($)
Dorrance Township	05/24/2000	1.75	*not provided*
Lehman Township and Jackson Township	07/10/2001	1.00	*not provided*
Nanticoke City	07/11/2001	1.75	*not provided*
White Haven Borough	05/11/2003	0.75	*not provided*
Wilkes-Barre City	08/16/2003	0.75	*not provided*
Dallas Township	05/24/2004	1.00	*not provided*
Nescopeck Township	06/06/2005	0.75	*not provided*
Nanticoke City	04/24/2006	0.88	*not provided*
White Haven Borough	05/30/2006	0.75	*not provided*
Countywide	06/09/2006	0.84	*not provided*
Countywide	07/09/2006	0.82	*not provided*
West Hazleton Borough	07/11/2006	0.75	*not provided*
Harveys Lake Borough	05/31/2007	0.75	*not provided*
Wilkes-Barre City	07/06/2007	0.75	*not provided*
Countywide	08/17/2007	1.08	*$25,000*
Countywide	06/20/2008	0.94	*not provided*
Countywide	08/10/2008	0.75	*not provided*
Countywide	06/15/2009	0.88	*not provided*
Hazleton City	07/19/2010	0.88	*not provided*
Ashley Borough	09/13/2010	1.00	*not provided*
Countywide	09/22/2010	0.88	*not provided*
Forty Fort Borough	04/26/2011	1.00	*$10,000*
Countywide	05/26/2011	1.17	*not provided*
Countywide	06/09/2011	0.75	*not provided*
Conyngham Township	08/13/2011	1.00	*not provided*
White Haven Borough	08/19/2011	1.00	*not provided*
Conyngham Township	09/04/2011	0.88	*not provided*
Pittston City	06/22/2012	1.00	*not provided*
Nescopeck Township	07/26/2012	0.75	*not provided*
Countywide	09/06/2012	0.83	*not provided*
Duryea Borough	04/10/2013	1.00	*not provided*

Table 4.3.5-3 Previous hail events in Luzerne County between 1950 and 2019 (NOAA NCEI, 2019). Note that "countywide" indicates that the event occurred in multiple locations.

LOCATION	DATE	ESTIMATED MAGNITUDE (inches)	ESTIMATED PROPERTY DAMAGE ($)
Dallas Township	06/24/2013	1.75	*$2,000*
Countywide	05/22/2014	0.88	*not provided*
Countywide	03/16/2016	0.88	*not provided*
Countywide	02/25/2017	1.38	*not provided*
Countywide	07/17/2017	1.25	*$3,000*
Duryea Borough	05/10/2018	0.75	*not provided*
Countywide	05/15/5018	0.75	*not provided*
Countywide	04/15/2019	1.13	*not provided*
Dallas Township	05/19/2019	0.75	*not provided*
Kingston Township	04/15/2019	1.5	*not provided*
Pittston City	04/15/2019	0.75	*not provided*
Dallas Township	05/19/2019	0.75	*not provided*
Fairmount Township	05/26/2021	1	*not provided*
Conyngham Township	07/7/2021	1	*not provided*
Duryea Borough	07/1/2022	1	*not provided*
Hazleton City	09/7/2023	1	*not provided*
Hanover Township	04/14/2024	0.75	*not provided*
Dorrance Township	06/26/2024	1	*not provided*

4.3.5.4. Future Occurrence

It is not possible to predict the formation of a hailstorm with more than a few days' lead time. The past occurrences in the County described above, however, indicate that this event is one that can happen several times in any given year, most likely during the late spring and summer months. Based on prior occurrences, the County can expect a 1-49.9% probability of hailstorms occurring annually. Therefore, the future occurrence of hailstorms in Luzerne County can be considered *possible* as defined by the Risk Factor methodology probability criteria (See Table 4.4-1).

4.3.5.5. Vulnerability Assessment

All of Luzerne County, including all critical infrastructure, is vulnerable to the effects of hail, as the storm cells that produce this hazard are spread over a large (multi-county) area. The area of damage due to these storms is relatively small, in that a single storm does not cause widespread devastation but may cause damage in a focused area of the storm.

As a hazard, damage to crops and vehicles are typically the most significant impacts of hailstorms. Damage to trees, shrubs, and other vegetation may occur during hailstorm events through defoliation. Unless there are compounding stresses, natural vegetation can typically recover over time following the event. However, crops such as corn and soybeans can be damaged to the point of total loss, particularly if an event occurs later in the growing season.

Potential losses from a hailstorm event can be derived from agricultural sales information as reported in the Drought hazard profile, Section 4.3.1. According to the 2022 USDA Census of Agriculture, there are 376 farms located in Luzerne County. These businesses sold approximately $30,268,000 in agricultural products in 2022, the majority of which came from crop sales (85%).

Table 4.3.5-4 below shows the Expected Annual Losses for each census tract in the county according to FEMA's National Risk Index.

Table 4.3.5-4 Expected Annual Losses to Hail by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2001.00	Wilkes-Barre City	$1,479.79	Relatively Low
2002.00	Wilkes-Barre City	$1,145.77	Relatively Low
2003.00	Wilkes-Barre City	$612.16	Very Low
2004.00	Wilkes-Barre City	$834.16	Very Low
2005.00	Wilkes-Barre City	$894.94	Very Low
2006.00	Wilkes-Barre City	$704.62	Very Low
2007.00	Wilkes-Barre City	$1,186.47	Relatively Low
2008.00	Wilkes-Barre City	$1,168.75	Relatively Low
2009.00	Wilkes-Barre City	$1,021.11	Relatively Low
2010.00	Wilkes-Barre City	$875.20	Very Low
2011.00	Wilkes-Barre City	$421.25	Very Low
2012.00	Wilkes-Barre City	$895.92	Very Low
2013.00	Wilkes-Barre City	$740.87	Very Low
2014.00	Wilkes-Barre City	$763.32	Very Low
2015.00	Wilkes-Barre City	$798.18	Very Low
2016.00	Wilkes-Barre City	$985.00	Very Low
2101.00	Pittston Township	$1,365.14	Relatively Low
2102.00	Dupont Borough	$875.56	Very Low
2103.00	Avoca Borough	$860.87	Very Low
2104.00	Hughestown Borough	$471.77	Very Low
2105.00	Duryea Borough	$1,760.79	Relatively Low
2106.00	Pittston City	$933.09	Very Low
2107.00	Pittston City	$616.11	Very Low
2108.00	Pittston City	$1,060.16	Relatively Low
2110.00	West Pittston Borough	$1,667.82	Relatively Low
2111.01	Exeter Borough	$2,007.70	Relatively Low
2111.02	Exeter Township	$734.47	Very Low
2112.01	Dallas Borough	$1,013.69	Relatively Low
2112.03	Franklin Township	$616.47	Very Low
2112.04	Dallas Township	$2,455.62	Relatively Low
2112.05	Dallas Township	$892.37	Very Low

Table 4.3.5-4 Expected Annual Losses to Hail by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2113.01	Jackson Township	$1,498.62	Relatively Low
2113.02	Lehman Township	$1,270.65	Relatively Low
2113.03	Harveys Lake Borough	$1,032.02	Relatively Low
2113.04	Lake Township	$713.39	Very Low
2114.00	Kingston Township	$2,530.26	Relatively Low
2115.00	West Wyoming Borough	$974.63	Very Low
2116.00	Wyoming Borough	$1,134.91	Relatively Low
2117.01	Jenkins Township	$1,996.60	Relatively Low
2117.02	Laflin Borough	$572.81	Very Low
2118.00	Plains Township	$825.40	Very Low
2119.00	Plains Township	$2,219.24	Relatively Low
2120.00	Plains Township	$651.08	Very Low
2121.00	Forty Fort Borough	$1,540.45	Relatively Low
2122.00	Swoyersville Borough	$1,748.78	Relatively Low
2123.00	Luzerne Borough	$972.40	Very Low
2127.00	Kingston Borough	$1,822.08	Relatively Low
2128.00	Kingston Borough	$1,225.13	Relatively Low
2129.00	Kingston Borough	$487.87	Very Low
2130.00	Kingston Borough	$479.26	Very Low
2131.00	Kingston Borough	$584.34	Very Low
2132.00	Edwardsville Borough	$1,633.41	Relatively Low
2133.00	Courtdale Borough	$575.39	Very Low
2134.00	Larksville Borough	$1,378.66	Relatively Low
2136.00	Plymouth Borough	$687.30	Very Low
2137.00	Plymouth Borough	$665.07	Very Low
2138.00	Plymouth Borough	$499.28	Very Low
2139.00	Plymouth Township	$569.36	Very Low
2141.00	Nanticoke City	$1,128.67	Relatively Low
2142.00	Nanticoke City	$958.20	Very Low
2143.00	Nanticoke City	$730.51	Very Low
2144.00	Nanticoke City	$663.34	Very Low
2145.00	Hanover Township	$565.43	Very Low
2146.00	Hanover Township	$1,522.93	Relatively Low
2149.00	Hanover Township	$481.02	Very Low
2150.00	Sugar Notch Borough	$506.32	Very Low
2151.00	Ashley Borough	$830.32	Very Low
2152.00	Wilkes-Barre Township	$1,202.87	Relatively Low
2153.00	Bear Creek Township	$1,410.04	Relatively Low
2154.00	Dennison Township	$877.39	Very Low
2155.01	Fairview Township	$1,553.56	Relatively Low

Table 4.3.5-4 Expected Annual Losses to Hail by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2155.02	Wright Township	$2,201.12	Relatively Low
2155.03	Rice Township	$1,214.59	Relatively Low
2155.04	Dorrance Township	$1,279.24	Relatively Low
2156.00	Newport Township	$1,445.45	Relatively Low
2157.01	Hunlock Township	$723.25	Very Low
2157.02	Union Township	$892.42	Very Low
2158.00	Ross Township	$917.66	Very Low
2159.00	Fairmount Township	$1,144.55	Relatively Low
2161.00	Salem Township	$1,399.45	Relatively Low
2162.00	Conyngham Township	$1,707.37	Relatively Low
2164.00	Black Creek Township	$654.12	Very Low
2165.01	Conyngham Borough	$604.43	Very Low
2165.02	Sugarloaf Township	$1,372.93	Relatively Low
2166.01	Butler Township	$1,109.10	Relatively Low
2166.02	Butler Township	$2,057.11	Relatively Low
2167.00	Freeland Borough	$1,244.62	Relatively Low
2168.00	Foster Township	$1,225.46	Relatively Low
2169.00	Hazle Township	$1,527.46	Relatively Low
2170.01	Hazle Township	$1,380.28	Relatively Low
2170.02	Hazle Township	$1,135.94	Relatively Low
2171.00	Hazleton City	$1,207.90	Relatively Low
2172.00	Hazleton City	$1,240.10	Relatively Low
2173.00	Hazleton City	$1,245.41	Relatively Low
2174.00	Hazleton City	$594.61	Very Low
2175.00	Hazleton City	$1,091.64	Relatively Low
2176.00	Hazleton City	$1,135.82	Relatively Low
2177.00	Hazleton City	$1,719.06	Relatively Low
2178.00	Hazleton City	$1,259.39	Relatively Low
2179.00	Hazle Township	$1,755.23	Relatively Low
2180.00	Hanover Township	$1,436.77	Relatively Low
TOTAL		**$112,500.62**	

4.3.5.6. Equity in Vulnerable Communities

In terms of equity, unhoused populations may be most at risk of adverse impacts of hailstorms. Low-income groups who may live in older or less well-maintained dwellings may also be at heightened risk of adverse impacts. Rural areas of the County may be disproportionately impacted by hailstorms due to crop impacts.

4.3.6. HURRICANE, TROPICAL STORM, NOR'EASTER

4.3.6.1. Location and Extent

Tropical storms impacting Luzerne County develop in tropical or sub-tropical waters found in the Atlantic Ocean, Gulf of Mexico, or Caribbean Sea. Cyclones with maximum sustained winds of less than 39 miles per hour are called tropical depressions. A tropical storm is a cyclone with maximum sustained winds between 39-74 mph. These storms sometimes develop into hurricanes with wind speeds in excess of 74 mph. Although Luzerne County is located over 100 miles inland from the Atlantic Coast, tropical storms and hurricanes can track inland causing heavy rainfall and strong winds.

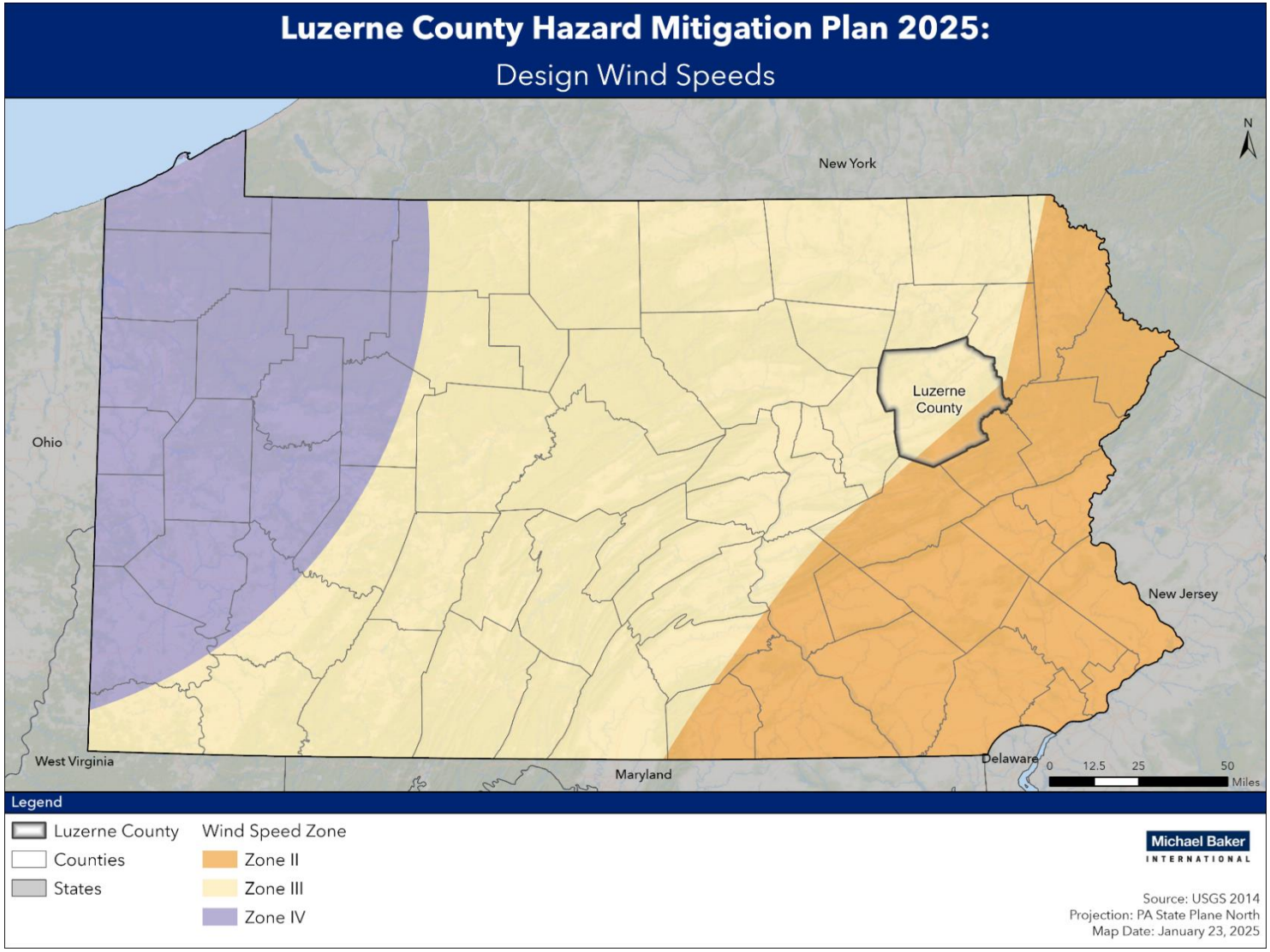
Nor'easters are extra-tropical storms which typically develop from low-pressure centers off the Atlantic Coast between Georgia and New Jersey during the winter months (NOAA NWS, 2024b). Extra-tropical is a term used to describe a hurricane or tropical storm that has lost its 'tropical' characteristics due to being fueled by cold air instead of warm; while the name has changed, the storm system may still have tropical storm or hurricane force winds (Morgan, 2014).

Hurricanes, tropical storms, and nor'easters are regional events that can impact areas as large as hundreds or thousands of miles across through the life of the storm. Therefore, all communities within Luzerne County are equally subject to the impacts of hurricanes, tropical storms, and nor'easters that track through or near the region. Areas in Luzerne County which are subject to flooding, wind, and winter storm damage are particularly vulnerable in these situations.

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

Luzerne County falls in Zone II and Zone III, which are classified as 160 mph and 200 mph wind zones, respectively. This means design wind speeds for shelters and critical facilities should be able to withstand a three second gust of up to 160 mph and 200 mph, regardless of whether the gust is the result of a tornado, hurricane, tropical storm, or windstorm event. In Luzerne, County, all new residential and commercial structures are required to be constructed per the International Building Code, which requires structures to be designed to a 90-mph wind speed. Therefore, the impact to future development due to high wind events is expected to be minimal.

Figure 4.3.6-1 Design wind speeds for community shelters across the United States (USGS, 2014).



4.3.6.2. Range of Magnitude

The impacts associated with hurricanes and tropical storms are primarily wind damage and flooding. It is not uncommon for tornadoes to develop during these events. Historical tropical storm and hurricane events have brought intense rainfall that can lead to damaging floods, and northeast winds, which, when combined with waterlogged soils can cause trees and utility poles to fall. Nor'easters can also bring damaging rain and wind but because they often occur during the winter months, they bring the additional threat of snow and ice associated with winter storms. Heavy snow can cause roof collapse in older homes, and ice presents a threat of slipping and tree branch collapse. More information on the range of magnitude of winter storms can be found in Section 4.3.13.

The impact tropical storm or hurricane events have on an area is typically measured in terms of wind speed. Expected damage from hurricane force winds is measured using the Saffir-Simpson Scale. The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds, barometric pressure, and storm surge potential (characteristic of tropical storms and hurricanes), which are combined to estimate potential damage. Table 4.3.5-1 lists Saffir-Simpson Scale categories with associated wind speeds and expected damages. Categories 3, 4, and 5 are classified as "major" hurricanes. While major hurricanes comprise only 20 of all tropical cyclones making landfall, they account for over 70 percent of the damage in the United States.

Table 4.3.6-1 Saffir-Simpson Scale categories with associated wind speeds and damages (NHC, 2021).

STORM CATEGORY	WIND SPEED (mph)	DESCRIPTION OF DAMAGES
1	74-95	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap, and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3	111-129	Devastating damage will occur: Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.

Table 4.3.6-1 Saffir-Simpson Scale categories with associated wind speeds and damages (NHC, 2021).		
STORM CATEGORY	**WIND SPEED (mph)**	**DESCRIPTION OF DAMAGES**
4	130-156	Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted, and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5	>157	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

The likelihood of these damages occurring in Luzerne County is assessed in Section 4.3.5.4, Future Occurrence. It is important to recognize the potential for flooding events during hurricanes, tropical storms, and nor'easters; the risk assessment and associated impact for these events is included in Section 4.3.4. Environmental impacts associated with hurricanes and tropical storms are consistent with the impacts described for flooding in Section 4.3.4.2 and tornadoes and windstorms in Section 4.3.11.2. Wind impacts in Luzerne County generally include downed trees and utility poles, which can spark widespread utility interruptions. Wind impacts are particularly an issue for mobile homes and other manufactured housing; these structures are often not well-anchored and are highly susceptible to wind damage in a hurricane, tropical storm, or nor'easter. The impact of severe winter weather which sometimes occurs during nor'easter events is discussed in Section 4.3.13.2.

The worst-case scenario for a hurricane, tropical storm, or nor'easter event in Luzerne County was Hurricane Agnes, which struck the Wyoming Valley in June 1972 and caused over 16 inches in rain. The Susquehanna River reached a depth of 34.23 feet. The City of Wilkes-Barre was particularly impacted by the hurricane. Water inundated the entire Southern portion of the city.

The potential impacts of hurricanes, tropical storms, or a nor'easter on community lifelines are as follows:

Table 4.3.6-2 Most Likely Lifelines Impacted by Hurricanes, Tropical Storms, or Nor'easter	
LIFELINES	**NOTES**
Safety and Security	Government operations and facilities, including police, fire, and search and rescue are needed for response and recovery.

Table 4.3.6-2 Most Likely Lifelines Impacted by Hurricanes, Tropical Storms, or Nor'easter	
Food, Hydration, Shelter	Severe storms present a significant risk to buildings and infrastructure and can create issues for food and water access.
Energy (Power & Fuel)	The power grid and issues of fuel availability either due to direct damage or increased usage may occur.
Transportation	Transportation corridors may be affected due to direct damage from storm conditions, and potential impacts of other compounding hazards such as flooding and transportation incidents.
Hazardous Materials	Damage to facilities and other storage areas from storm or flooding damage may affect hazardous materials.

4.3.6.3. Past Occurrence

NOAA's Coastal Services Center maintains records of all coastal storms occurring in the United States since the 1850s. The following table lists all coastal storms having centers of circulation to pass through or within 30 nautical miles of Luzerne County. Typically, when these storms reach Luzerne County, they have lost their hurricane speed winds, so structural damage is usually not as bad as coastal communities may experience.

Table 4.3.6-3 Previous tropical storm events with centers of circulation within 30 nautical miles of Luzerne County.

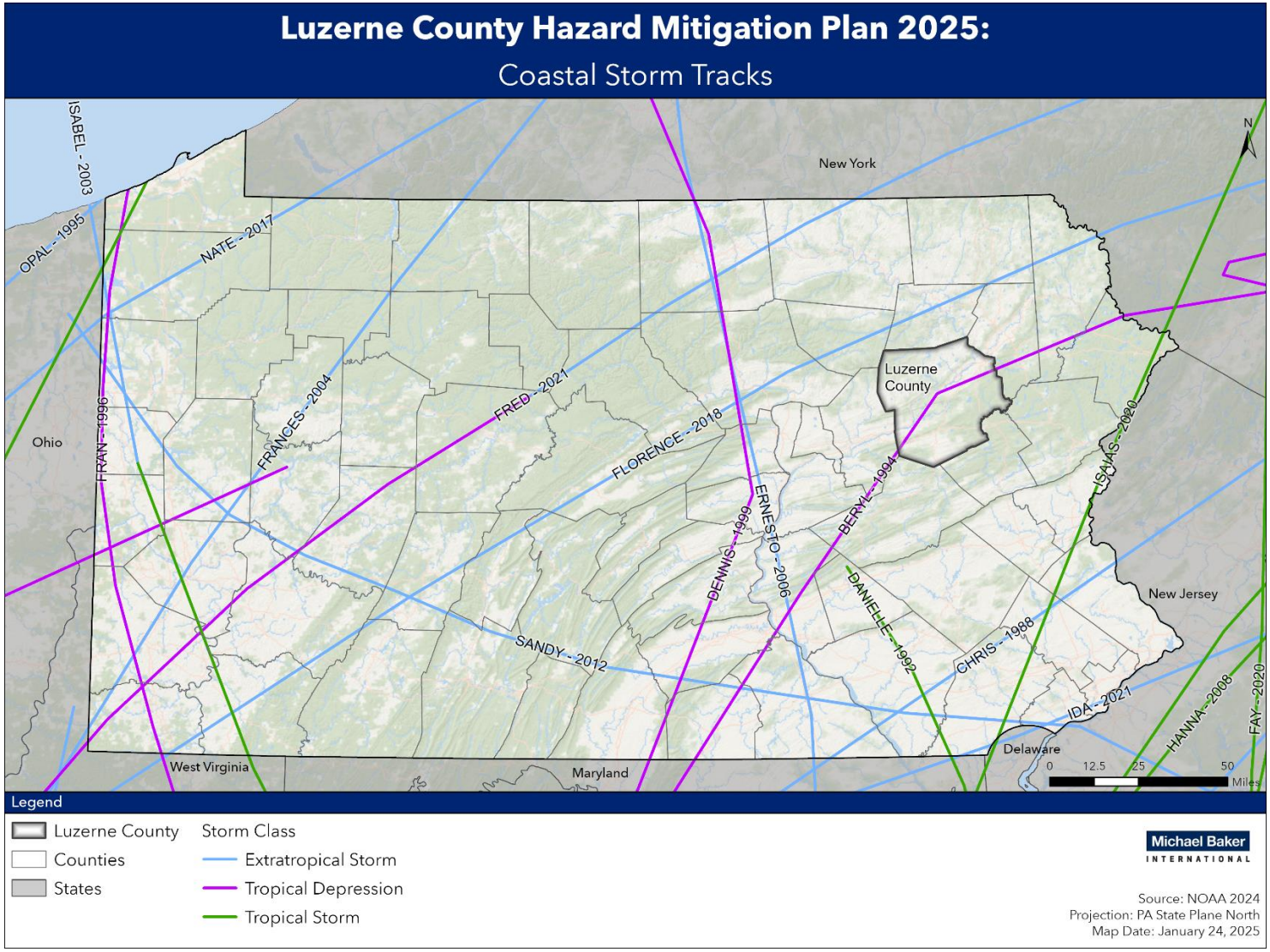
YEAR	EVENT	STRENGTH IN/NEAR LUZERNE COUNTY
2020	Isaias	Tropical Storm
2018	Florence	Hurricane

Figure 4.3.6-2 shows the tracking of some of these storm events in or near Luzerne County. It is important to note that a number of hurricane and tropical storm events have impacted the County without tracking through or near it; these storm events include Hurricane Sandy (2012), Tropical Storm Lee (2011), Hurricane Irene (2011), Hurricane Katrina (2005), and Tropical Depression Ivan (2004). Each of these storm events resulted in a Presidential Disaster Declaration. Hurricane Sandy mostly resulted in downed trees and power outages, as well as the closure of schools and Luzerne County Transportation Authority (LCTA) buses for two days (Times Leader, 2012a; Times Leader, 2012b). Tropical Storm Lee and Hurricane Irene caused significant damage throughout the county. The storms occurred just two weeks apart, which added to post disaster complications. Tropical Storm Lee had an average rainfall of ten inches of rain over three days, and the Susquehanna River crested at a record level of 42.66 feet. During

Tropical Depression Ivan, the Susquehanna River caused extensive damage throughout Wilkes-Barre but was running so high that officials had difficulty making assessments (Scolforo, 2004). Overall, Ivan resulted in 4 to 7 inches of rain in central Pennsylvania and caused more than $264 million in property damage (Kiner, 2019). In addition, Hurricane Agnes (1972) did not track in or near Luzerne County but resulted in significant flooding in the City of Wilkes-Barre as described in Section 4.3.4 above. These examples indicate that Luzerne County is vulnerable to damage from flooding and heavy winds when hurricanes and tropical storms come near the region. The following map highlights storms that have tracked through Luzerne County while also showing the storms that have tracked through the remaining parts of Pennsylvania.

The NOAA NCEI database does not track nor'easters as a separate weather event; they are tracked as high wind, heavy snow, and/or coastal flooding events, so a complete listing is not available. However, other sources provide record that some of the winter storms listed in Section 4.3.13.3 were nor'easters. An example is a nor'easter that took place on October 29, 2011, and brought 1-3" of snow accumulation with 9-16" of accumulation in higher elevations. The heavy, wet snow brought tree and utility damage, causing half a million power outages state-wide. More recently, a nor'easter produced very heavy snowfall across parts of Central New York and Northeast Pennsylvania on December 16th and 17th, 2020. Snow accumulated to be 10 to 20 inches and transportation impacts were extensive with numerous road closures and delays (NCEI, 2025).

Figure 4.3.6-2 Historical coastal storm events tracking in or near Luzerne County



4.3.6.4. Future Occurrence

Although hurricanes and tropical storms can cause flood events consistent with 100- and 500-year levels, their probability of occurrence is measured relative to wind speed. The future occurrence of hurricanes, tropical storms, and nor'easters can be considered *likely*, as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1). It is difficult to assign a probability to the future occurrence of nor'easters in Luzerne County; however, the storms are possible in the county.

Hurricane activity in the North Atlantic has increased since the 1970s, with storms migrating northward and generating more destructive potential (Kossin et al. 2017 & Shortle et al. 2015). However, activity does vary year to year, due to factors such as natural variability in ocean circulation, volcanic eruptions, and Saharan dust. In addition, changing climatic conditions have led to more favorable conditions for large storms.

The relationship between climate change and hurricanes is complex due to the variety of potential factors that impact their development. For example, dust from the Sahara Desert that is lifted high in the atmosphere during a particularly hot and dry summer can inhibit the development of some hurricane formation. Consensus does seem to be that future storms will produce more precipitation. This is because warming sea and air temperatures allow for more moisture in the air, providing more fuel for potential storms. The warming of the Atlantic, which is partially due to human activity like the production of greenhouse gases, has already been associated with an increase in extreme precipitation events in the northeast United States since 1996 (Huang et al., 2018). Global storm intensity is also expected to increase as a larger proportion of storms will reach Category 4 and 5 levels, but regional projections are more uncertain due to the complexity of factors. There is also a tentative connection with a general slowdown of atmospheric circulation due to warming in the Arctic, which may lead to these stronger storms lingering longer in each place. The larger rainfall totals, stronger winds, and potentially lingering storm paths will greatly increase the destructive potential of storms.

The effect of having more intense Category 4 and 5 storms may increase potential damage in the Atlantic 30% by 2100 (see NOAA GFDL's site for more details here https://www.gfdl.noaa.gov/global-warming-and-hurricanes/). In addition to those impacts, storm activity has been occurring before the official start of hurricane season (June 1st) more and more frequently, potentially signaling an extended season each year (Truchelut, et al. 2022).

Although Luzerne County is not likely to experience the severe high winds faced in more coastal communities during a nor'easter, the county is subject to heavy snow, ice, and blizzard conditions.

4.3.6.5. Vulnerability Assessment

A vulnerability assessment for hurricanes, tropical storms, and nor'easters focuses on the impacts of flooding and severe wind. Therefore, the assessment for flood-related vulnerability is addressed in Section 4.3.4. In addition, mobile/manufactured homes are vulnerable to hurricanes, tropical storms, and nor'easters. Section 4.3.11 discusses vulnerability to wind

damage and includes Table 4.3.11-5 which shows the number of mobile homes per community. The County is also vulnerable to severe winter weather impacts caused by nor'easters which are evaluated in Section 4.3.13.

4.3.6.6. Equity in Vulnerable Communities

Regarding equity, residents living within mobile homes or other manufactured homes will experience risks associated with severe storms at a disproportionate rate compared to other housing types due to their susceptibility to high winds and floods. This means areas of Duryea Borough, New Columbus Borough, Huntington Township, Ashley Borough, Exeter Township, and Butler Township may be particularly vulnerable. Households with no vehicles, lack of internet access, and/or no access to smartphones may have extra hurdles if evacuation is needed in the face of this hazard. This includes a large majority of the population as less populated and more rural areas are more likely to not have reliable internet access or smartphones while more urban areas such as State College Borough have limited vehicle access. Populations of people experiencing homelessness will require extra help finding locations to shelter in place.

4.3.7. LANDSLIDE

4.3.7.1. Location and Extent

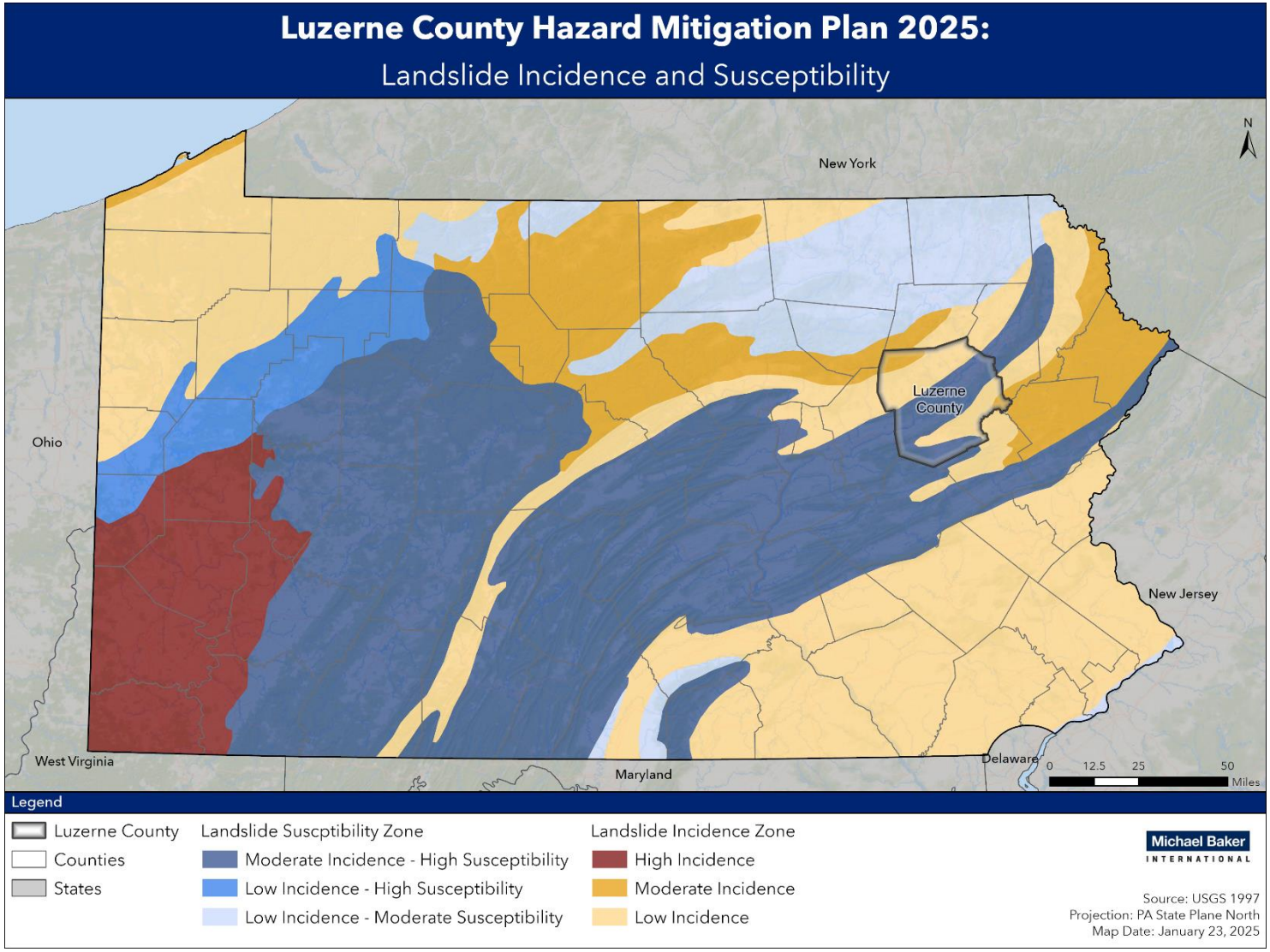
A landslide is the downward and outward movement of slope-forming soil, rock, and vegetation reacting to the force of gravity. Landslides may be triggered by both natural and human-caused changes in the environment, including heavy rain, rapid snow melt, steepening of slopes due to construction, erosion, earthquakes, and changes in groundwater levels. Mudflows, mudslides, rockfalls, rockslides, and rock topples are all forms of a landslide (DCNR, 2020a). Landslides usually occur in areas of Luzerne County with moderate to steep slopes and during high precipitation. Many slope failures are associated with precipitation events – periods of sustained above-average precipitation, specific rainstorms, or snowmelt events. Areas experiencing erosion, decline in vegetation cover, and earthquakes are also susceptible to landslides. Human activities that contribute to slope failure include altering the natural slope gradient, increasing soil water content, and removing vegetation cover (DCNR,2001). The geologic instabilities that cause landslides to occur are often exacerbated by highway projects in which the earth is cut, and soil is loosened.

The USGS identifies Luzerne County as falling into several zones of landslide susceptibility and incidence (Figure 4.3.6-1). A Northern and Southeastern portion of the County fall into the *Low Incidence* zone, meaning that these areas have low susceptibility to landslides with a low incidence of occurrence. The Northwest corner of the County falls into the *Moderate Incidence* zone, meaning that this area has moderate susceptibility to landslides with a moderate incidence of occurrence. The remaining areas in the Central, Northern, and Southern parts of the County fall into the *Moderate Incidence/High Susceptibility* zone, meaning these areas have high susceptibility to landslides with a moderate incidence of occurrence.

A slope greater than 7% (approximately around 15 degrees) needs special considerations for building roads according to common engineering practice, and a slope of 15% (approximately around 25 degrees) is generally unstable and highly sensitive to surface changes. Slopes greater than 25% are very unstable.

Given the right conditions, landslides can occur anywhere in the County. The Susquehanna River and Lackawanna River valleys are prone to larger landslides triggered by the rivers' undercutting of the slope material consisting of stratified sedimentary rock. A 1989 report by the Geological Society of America (GSA) identified thirteen potential "rock block" slides on Shickshinny Mountain. At the time when the report was written, one rock block slide had occurred when slopes were undercut by the construction of a roadway.

Figure 4.3.7-1 Map of general landslide hazard areas and municipalities in Luzerne County



4.3.7.2. Range of Magnitude

Landslide velocity can vary from rapid to slow, and the amount of material moving in a landslide can range from a relatively small amount to a large amount. Landslides can include falling, sliding, or flowing of rocks and soil or a combination of these different types of motion.

The impact of landslides on the environment depends on the size and specific location of the event. In general, impacts include:

- Changes to topography
- Damage or destruction of vegetation
- Potential diversion or blockage of water in the vicinity of streams, rivers, etc.
- Increased sediment runoff both during and after event (DCNR,2001)

Landslides in Luzerne County have reportedly involved a small amount of rocks tumbling down a hillside; here, a small amount means an amount sufficient to fill the shoulder of a road for a linear distance of about 10 feet with rock, but not enough to block the entire roadway. A more damaging scenario could occur in Luzerne County if a landslide occurred along one of the major interstates. The landslide could cause damage to vehicles and the roadway and injuries to people. In addition, the landslide would have secondary effects caused by shutting down the roadway.

A possible worst-case scenario for landslides in Luzerne County could occur on Shickshinny Mountain. Although the probability of a Shickshinny Mountain rock block slide is low, the impacts would be substantial. The deposition of landslide material in the Susquehanna River would fill the river channel and act as a dam, backing up river water upstream of the slide. It is difficult to estimate the volume of material that would be deposited, but the upstream inundation area could potentially include communities upstream of the slide to the northern limits of Luzerne County, like the City of Wilkes-Barre. Eventually, the material acting as a dam would breach, and a flood wave would travel downstream along the river. It is possible that the resulting upstream inundation area and downstream flood wave would rival the limits of the SFHA.

The following community lifelines are affected by landslides:

Table 4.3.7-1 Most Likely Lifelines Impacted by Landslide

LIFELINES	NOTES
	Government officials will be called into action in response. Monitoring landslide risks, mapping vulnerable areas, and awareness outreach to help people become, more aware of erosion risks.
	Promoting site and building residing standards to minimize risk and even removing existing buildings from hazard areas.

Table 4.3.7-1 Most Likely Lifelines Impacted by Landslide	
Transportation	Response and recovery due to potential damage to transportation infrastructure.

4.3.7.3. Past Occurrence

A comprehensive inventory of landslides events in Pennsylvania does not exist. The NCDC database captures landslides as they occur in conjunction with severe storms; the NCDC database does not report any landslides in Luzerne County. However, representatives from the County and municipal officials identified several incidents of falling rock that have occurred. Historically, there have been several reports of small landslides within the County. All the reports have been isolated to roadway rock falls, two of which and have resulted in minor road closures along secondary routes. In 1986, a slide developed approximately two miles southeast of the City of Nanticoke where the slopes had been undercut during the construction of I-81.

4.3.7.4. Future Occurrence

Given that no damage due to landslide has been recorded in Luzerne County, the future occurrence of landslides can be considered *unlikely* as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1). However, there is the possibility of some rock falling from a steep slope, given that this occurred several times in the past. These events are expected to be small, and cause little to no damage. The probability of large-scale future landslide events in Luzerne County is considered low due to the County's position over the glaciated low plateau physiographic province. This is a geological formation with low landslide potential. Mismanaged intense development in steeply sloped areas could increase the frequency of occurrence.

4.3.7.5. Vulnerability Assessment

A landslide might cause a structure to collapse or might cause minor damages such as broken windows. A landslide might cause a roadway to be temporarily blocked. Transportation routes throughout the County located at the base or crest of cliffs should be considered vulnerable to this hazard. Roadways around Shickshinny Mountain are most vulnerable to landslide events, based on understandings of past events. A comprehensive inventory of these areas is not available.

Table 4.3.6-1 details the number of structures, critical facilities and population in each municipality that are in areas with steep slopes and may, therefore, experience damages should a landslide occur. According to PEMA, Luzerne County is among the top three most vulnerable Pennsylvania Counties to landslide by numbers of vulnerable people and buildings with more than 243,000 people in the vulnerable population. Additionally, there are over 105,000 vulnerable buildings, which add up to over $27,000,000,000 in exposed building value. This is

78% of the total building value in Luzerne County. While the occurrence of a massive, devastating landslide is unlikely, the impacts can greatly impact a community.

Butler Township has the largest number of structures in steep slope areas over 15% (418), while Shickshinny Borough has the greatest percentage of structures in these areas (27.83%). This vulnerability assessment also measures the number and percentage of critical facilities in steep slope areas across Luzerne County. Hanover Township and the City of Wilkes-Barre have the largest number of critical facilities in steep slope areas over 15% with 12 each. These municipalities are all more vulnerable to landslide events based on their existing topography and the location of their structures and critical facilities. It is much more likely that a landslide event will occur in a steep slope area over 15%. While all municipalities have some steep slope areas, those with the most structures and critical facilities on this geography are more likely to incur damages from a landslide event.

Table 4.3.6-2 depicts the number of structures in each municipality located in areas susceptible to landslides due to steep slopes by land use type. Most vulnerable structures (2,215) are residential properties, followed by agriculture (476).

Table 4.3.7-2 Structures, Critical Facilities and Population Landslide Vulnerability for Luzerne County

MUNICIPALITY	TOTAL STRUCTURES IN MUNICIPALITY	STRUCTURES IN STEEP SLOPE AREAS OVER 15%	PERCENT OF STRUCTURES IN STEEP SLOPE AREAS OVER 15%	TOTAL CRITICAL FACILITIES IN MUNICIPALITY	TOTAL CRITICAL FACILITIES IN STEEP SLOPE AREAS OVER 15%	PERCENT CRITICAL FACILITIES IN STEEP SLOPE AREAS OVER 15%	TOTAL 2020 POPULATION	2020 POPULATION IN STEEP SLOPE AREAS OVER 15%	PERCENT POPULATION IN STEEP SLOPE AREAS OVER 15%
Ashley Borough	1,281	17	1%	22	3	14%	2,596	455	18%
Avoca Borough	1,294	39	3%	21	2	10%	2,507	285	11%
Bear Creek Township	1,713	38	2%	50	6	12%	2,754	42	2%
Bear Creek Village Borough	179	7	4%	7	1	14%	291	50	17%
Black Creek Township	1,452	38	3%	35	5	14%	1,909	218	11%
Buck Township	301	9	3%	9	0	0%	379	0	0%
Butler Township	4,499	121	3%	88	10	11%	9,485	893	9%
Conyngham Borough	871	4	0%	8	0	0%	1,825	16	1%
Conyngham Township	919	19	2%	21	1	5%	1,312	431	33%
Courtdale Borough	395	8	2%	5	1	20%	689	30	4%
Dallas Borough	1,209	41	3%	11	0	0%	2,694	141	5%
Dallas Township	3,528	122	3%	60	4	7%	9,099	546	6%
Dennison Township	717	18	3%	30	4	13%	963	20	2%
Dorrance Township	1,564	29	2%	49	7	14%	2,076	150	7%
Dupont Borough	1,463	23	2%	32	2	6%	2,539	197	8%
Duryea Borough	2,496	27	1%	17	3	18%	5,036	95	2%
Edwardsville Borough	1,521	49	3%	10	1	10%	4,929	253	5%
Exeter Borough	2,520	23	1%	14	0	0%	5,514	32	1%
Exeter Township	1,223	41	3%	26	6	23%	2,051	208	10%
Fairmount Township	1,146	51	4%	42	8	19%	1,210	85	7%

Table 4.3.7-2 Structures, Critical Facilities and Population Landslide Vulnerability for Luzerne County

MUNICIPALITY	TOTAL STRUCTURES IN MUNICIPALITY	STRUCTURES IN STEEP SLOPE AREAS OVER 15%	PERCENT OF STRUCTURES IN STEEP SLOPE AREAS OVER 15%	TOTAL CRITICAL FACILITIES IN MUNICIPALITY	TOTAL CRITICAL FACILITIES IN STEEP SLOPE AREAS OVER 15%	PERCENT CRITICAL FACILITIES IN STEEP SLOPE AREAS OVER 15%	TOTAL 2020 POPULATION	2020 POPULATION IN STEEP SLOPE AREAS OVER 15%	PERCENT POPULATION IN STEEP SLOPE AREAS OVER 15%
Fairview Township	1,901	45	2%	24	1	4%	4,703	584	12%
Forty Fort Borough	2,201	6	0%	19	0	0%	4,239	137	3%
Foster Township	2,002	27	1%	30	4	13%	3,408	142	4%
Franklin Township	1,063	32	3%	22	3	14%	1,716	89	5%
Freeland Borough	1,119	11	1%	5	0	0%	3,833	54	1%
Hanover Township	5,005	138	3%	95	12	13%	11,445	920	8%
Harveys Lake Borough	1,871	108	6%	15	1	7%	2,788	0	0%
Hazle Township	5,022	51	1%	61	6	10%	10,160	810	8%
City of Hazleton	6,310	49	1%	29	0	0%	29,963	432	1%
Hollenback Township	969	17	2%	18	1	6%	1,139	47	4%
Hughestown Borough	706	23	3%	4	0	0%	1,329	115	9%
Hunlock Township	1,503	50	3%	36	5	14%	2,223	328	15%
Huntington Township	1,739	54	3%	54	3	6%	2,053	248	12%
Jackson Township	1,394	67	5%	36	13	36%	4,631	2,235	48%
Jeddo Borough	36	2	6%	1	0	0%	108	2	2%
Jenkins Township	2,193	46	2%	21	4	19%	4,283	159	4%
Kingston Borough	5,083	3	0%	33	0	0%	13,349	71	1%
Kingston Township	3,249	161	5%	45	7	16%	7,108	997	14%
Laflin Borough	612	20	3%	13	3	23%	1,451	292	20%
Lake Township	1,331	48	4%	29	4	14%	1,993	230	12%
Larksville Borough	2,126	58	3%	12	0	0%	4,225	379	9%

Table 4.3.7-2 Structures, Critical Facilities and Population Landslide Vulnerability for Luzerne County

MUNICIPALITY	TOTAL STRUCTURES IN MUNICIPALITY	STRUCTURES IN STEEP SLOPE AREAS OVER 15%	PERCENT OF STRUCTURES IN STEEP SLOPE AREAS OVER 15%	TOTAL CRITICAL FACILITIES IN MUNICIPALITY	TOTAL CRITICAL FACILITIES IN STEEP SLOPE AREAS OVER 15%	PERCENT CRITICAL FACILITIES IN STEEP SLOPE AREAS OVER 15%	TOTAL 2020 POPULATION	2020 POPULATION IN STEEP SLOPE AREAS OVER 15%	PERCENT POPULATION IN STEEP SLOPE AREAS OVER 15%
Laurel Run Borough	293	5	2%	4	0	0%	558	336	60%
Lehman Township	2,071	58	3%	40	5	13%	3,346	160	5%
Luzerne Borough	1,365	23	2%	12	3	25%	2,711	396	15%
City of Nanticoke	4,409	91	2%	26	1	4%	10,628	1,029	10%
Nescopeck Borough	875	2	0%	2	0	0%	1,480	0	0%
Nescopeck Township	975	23	2%	30	2	7%	1,081	121	11%
New Columbus Borough	206	4	2%	9	0	0%	222	16	7%
Newport Township	1,829	82	4%	15	1	7%	4,433	903	20%
Nuangola Borough	402	12	3%	1	0	0%	666	0	0%
Penn Lake Park Borough	232	1	0%	4	3	75%	360	0	0%
City of Pittston	3,056	117	4%	14	0	0%	7,591	1,112	15%
Pittston Township	1,807	44	2%	38	2	5%	3,186	445	14%
Plains Township	4,771	65	1%	79	5	6%	9,808	880	9%
Plymouth Borough	2,394	122	5%	17	1	6%	5,763	488	8%
Plymouth Township	1,129	90	8%	24	4	17%	1,717	645	38%
Pringle Borough	504	12	2%	9	1	11%	893	12	1%
Rice Township	1,480	24	2%	40	6	15%	3,632	136	4%
Ross Township	2,012	48	2%	53	4	8%	2,726	302	11%
Salem Township	2,613	52	2%	55	1	2%	4,027	337	8%
Shickshinny Borough	327	21	6%	7	0	0%	632	141	22%

Table 4.3.7-2 Structures, Critical Facilities and Population Landslide Vulnerability for Luzerne County

MUNICIPALITY	TOTAL STRUCTURES IN MUNICIPALITY	STRUCTURES IN STEEP SLOPE AREAS OVER 15%	PERCENT OF STRUCTURES IN STEEP SLOPE AREAS OVER 15%	TOTAL CRITICAL FACILITIES IN MUNICIPALITY	TOTAL CRITICAL FACILITIES IN STEEP SLOPE AREAS OVER 15%	PERCENT CRITICAL FACILITIES IN STEEP SLOPE AREAS OVER 15%	TOTAL 2020 POPULATION	2020 POPULATION IN STEEP SLOPE AREAS OVER 15%	PERCENT POPULATION IN STEEP SLOPE AREAS OVER 15%
Slocum Township	828	40	5%	13	2	15%	1,054	26	2%
Sugarloaf Township	2,203	41	2%	5	1	20%	1,001	34	3%
Sugar Notch Borough	468	56	11.97%	45	2	4%	3,869	1,261	33%
Swoyersville Borough	2,681	18	1%	20	0	0%	5,021	452	9%
Union Township	1,443	37	3%	32	5	16%	2,035	500	25%
Warrior Run Borough	295	14	5%	2	0	0%	527	0	0%
West Hazleton Borough	1,165	2	0%	13	2	15%	5,163	11	0%
West Pittston Borough	2,122	2	0%	5	0	0%	4,652	3	0%
West Wyoming Borough	1,487	13	1%	10	0	0%	2,638	66	3%
White Haven Borough	521	17	3%	15	2	13%	1,166	59	5%
City of Wilkes-Barre	14,135	163	1%	104	16	15%	44,328	2,882	7%
Wilkes-Barre Township	1,540	35	2%	33	6	18%	3,213	493	15%
Wright Township	2,609	37	1%	39	2	5%	5,722	186	3%
Wyoming Borough	1,542	3	0%	11	0	0%	3,102	76	2%
Yatesville Borough	320	15	5%	1	0	0%	638	88	14%
Total	143,827	3,080	2%	1,986	208	10%	325,594	26,014	8%

**Calculated by selecting the 2020 census block centroids that intersect the Slope Grade areas above 15%. Provides and approximation of populations living near areas susceptible to landslides.*

Table 4.3.7-3 Structures Landslide Vulnerability for Luzerne County

MUNICIPALITY	AGRICULTURE	COMMERCIAL	CONSERVATION	INDUSTRIAL	MINING	MIXED USE	RESIDENTIAL	SPECIAL PURPOSE	TOTAL PER MUNICIPALITY
Ashley Borough	0	4	0	0	0	0	13	0	17
Avoca Borough	0	3	0	2	0	0	34	0	39
Bear Creek township	8	2	1	0	0	0	27	0	38
Bear Creek Village Borough	0	0	0	0	0	0	7	0	7
Black Creek township	7	0	7	0	0	0	24	0	38
Buck township	0	0	4	0	0	0	5	0	9
Butler township	0	3	0	0	0	5	110	3	121
Conyngham Borough	0	1	0	0	0	0	3	0	4
Conyngham township	9	1	0	0	1	0	8	0	19
Courtdale Borough	1	0	0	0	0	0	7	0	8
Dallas Borough	0	5	4	0	0	0	32	0	41
Dallas township	30	11	0	3	0	0	78	0	122
Dennison township	0	0	0	0	0	0	18	0	18
Dorrance township	12	0	9	4	0	0	4	0	29
Dupont Borough	0	3	0	0	0	0	20	0	23
Duryea Borough	0	1	0	2	0	0	24	0	27
Edwardsville Borough	0	1	2	0	0	0	46	0	49
Exeter Borough	0	1	0	0	0	0	22	0	23
Exeter township	0	1	0	0	0	0	40	0	41
Fairmount township	43	2	5	0	0	0	1	0	51
Fairview township	0	6	2	0	0	0	37	0	45

Table 4.3.7-3 Structures Landslide Vulnerability for Luzerne County

MUNICIPALITY	AGRICULTURE	COMMERCIAL	CONSERVATION	INDUSTRIAL	MINING	MIXED USE	RESIDENTIAL	SPECIAL PURPOSE	TOTAL PER MUNICIPALITY
Forty Fort Borough	0	0	0	0	0	0	6	0	6
Foster township	9	0	2	0	0	0	16	0	27
Franklin township	20	0	0	0	0	0	12	0	32
Freeland Borough	0	0	0	0	0	0	11	0	11
Hanover township	0	6	0	4	0	0	128	0	138
Harveys Lake Borough	0	2	0	0	0	0	97	9	108
Hazle township	0	4	0	0	10	0	37	0	51
Hazleton city	0	9	1	1	0	0	36	2	49
Hollenback township	16	0	1	0	0	0	0	0	17
Hughestown Borough	0	1	0	0	0	0	22	0	23
Hunlock township	30	5	1	0	1	0	13	0	50
Huntington township	48	1	0	0	0	0	5	0	54
Jackson township	14	9	0	0	1	0	40	3	67
Jeddo Borough	0	0	0	0	0	0	2	0	2
Jenkins township	0	1	0	6	0	0	39	0	46
Kingston Borough	0	0	0	0	0	0	3	0	3
Kingston township	20	4	6	0	0	0	131	0	161
Laflin Borough	0	1	0	0	0	0	19	0	20
Lake township	43	0	2	0	0	0	3	0	48
Larksville Borough	5	7	0	2	2	0	41	1	58
Laurel Run Borough	0	0	1	0	0	0	4	0	5
Lehman township	30	0	3	0	0	0	25	0	58

Table 4.3.7-3 Structures Landslide Vulnerability for Luzerne County

MUNICIPALITY	AGRICULTURE	COMMERCIAL	CONSERVATION	INDUSTRIAL	MINING	MIXED USE	RESIDENTIAL	SPECIAL PURPOSE	TOTAL PER MUNICIPALITY
Luzerne Borough	0	4	0	0	0	0	19	0	23
Nanticoke city	0	2	0	0	0	0	88	1	91
Nescopeck Borough	0	0	0	0	0	0	2	0	2
Nescopeck Township	18	0	3	1	0	0	1	0	23
New Columbus Borough	4	0	0	0	0	0	0	0	4
Newport township	0	8	0	0	4	0	70	0	82
Nuangola Borough	0	0	0	0	0	0	12	0	12
Penn Lake Park Borough	0	0	0	0	0	0	1	0	1
Pittston City	0	20	0	0	0	0	97	0	117
Pittston township	0	5	0	6	0	0	33	0	44
Plains township	0	12	7	2	0	0	44	0	65
Plymouth Borough	0	1	2	3	0	0	116	0	122
Plymouth township	0	4	0	0	0	0	86	0	90
Pringle Borough	0	0	0	1	0	0	11	0	12
Rice township	2	0	2	0	0	0	20	0	24
Ross township	39	5	2	0	0	0	2	0	48
Salem township	13	10	12	7	0	0	10	0	52
Shickshinny Borough	0	3	0	0	0	0	18	0	21
Slocum township	12	0	0	0	0	0	28	0	40
Sugar Notch Borough	0	0	0	0	0	0	7	0	7
Sugarloaf township	14	5	9	0	0	0	13	0	41

Table 4.3.7-3 Structures Landslide Vulnerability for Luzerne County

MUNICIPALITY	AGRICULTURE	COMMERCIAL	CONSERVATION	INDUSTRIAL	MINING	MIXED USE	RESIDENTIAL	SPECIAL PURPOSE	TOTAL PER MUNICIPALITY
Swoyersville Borough	0	1	2	0	0	0	15	0	18
Union township	28	2	1	0	0	0	6	0	37
Warrior Run Borough	0	0	0	0	0	0	14	0	14
West Hazleton Borough	0	0	0	0	0	0	2	0	2
West Pittston Borough	0	0	0	0	0	0	2	0	2
West Wyoming Borough	1	1	0	0	0	0	11	0	13
White Haven Borough	0	2	3	0	0	0	12	0	17
Wilkes-Barre city	0	10	2	2	0	0	148	1	163
Wilkes-Barre Township	0	2	0	1	0	0	32	0	35
Wright township	0	2	5	1	0	0	29	0	37
Wyoming Borough	0	0	0	0	0	0	3	0	3
Yatesville Borough	0	0	0	1	1	0	13	0	15
Total	476	194	101	49	20	5	2,215	20	3,080

** Calculated by overlaying Luzerne County GIS structure data with Slope Grade areas above 15%.*

Table 4.3.7-4 below shows the Expected Annual Losses for each census tract in the county according to FEMA's National Risk Index.

Table 4.3.7-4 Expected Annual Losses to Landslide by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2001.00	Wilkes-Barre City	$2,723.06	Relatively Moderate
2002.00	Wilkes-Barre City	$1,000.42	Relatively Low
2003.00	Wilkes-Barre City	$657.11	Relatively Low
2004.00	Wilkes-Barre City	$672.94	Relatively Low
2005.00	Wilkes-Barre City	$1,618.14	Relatively Moderate
2006.00	Wilkes-Barre City	$816.91	Relatively Low
2007.00	Wilkes-Barre City	$913.15	Relatively Low
2008.00	Wilkes-Barre City	$1,120.85	Relatively Low
2009.00	Wilkes-Barre City	$627.62	Relatively Low
2010.00	Wilkes-Barre City	$35.66	Very Low
2011.00	Wilkes-Barre City	$877.08	Relatively Low
2012.00	Wilkes-Barre City	$2,422.78	Relatively Moderate
2013.00	Wilkes-Barre City	$1,932.61	Relatively Moderate
2014.00	Wilkes-Barre City	$1,715.48	Relatively Moderate
2015.00	Wilkes-Barre City	$295.80	Relatively Low
2016.00	Wilkes-Barre City	$405.86	Relatively Low
2101.00	Pittston Township	$2,390.78	Relatively Moderate
2102.00	Dupont Borough	$1,465.61	Relatively Moderate
2103.00	Avoca Borough	$837.66	Relatively Low
2104.00	Hughestown Borough	$182.87	Relatively Low
2105.00	Duryea Borough	$1,104.30	Relatively Low
2106.00	Pittston City	$1,723.54	Relatively Moderate
2107.00	Pittston City	$1,590.61	Relatively Moderate
2108.00	Pittston City	$496.17	Relatively Low
2110.00	West Pittston Borough	$1,311.23	Relatively Moderate
2111.01	Exeter Borough	$1,485.37	Relatively Moderate
2111.02	Exeter Township	$679.00	Relatively Low
2112.01	Dallas Borough	$1,241.92	Relatively Moderate
2112.03	Franklin Township	$599.82	Relatively Low
2112.04	Dallas Township	$3,861.63	Relatively Moderate
2112.05	Dallas Township	$727.55	Relatively Low
2113.01	Jackson Township	$1,876.52	Relatively Moderate
2113.02	Lehman Township	$1,545.70	Relatively Moderate
2113.03	Harveys Lake Borough	$1,430.17	Relatively Moderate
2113.04	Lake Township	$687.52	Relatively Low
2114.00	Kingston Township	$3,389.47	Relatively Moderate

Table 4.3.7-4 Expected Annual Losses to Landslide by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2115.00	West Wyoming Borough	$1,079.27	Relatively Low
2116.00	Wyoming Borough	$0.00	No Expected Annual Losses
2117.01	Jenkins Township	$2,434.76	Relatively Moderate
2117.02	Laflin Borough	$1,147.79	Relatively Low
2118.00	Plains Township	$407.23	Relatively Low
2119.00	Plains Township	$2,636.18	Relatively Moderate
2120.00	Plains Township	$1,111.16	Relatively Low
2121.00	Forty Fort Borough	$40.70	Very Low
2122.00	Swoyersville Borough	$841.98	Relatively Low
2123.00	Luzerne Borough	$1,055.01	Relatively Low
2127.00	Kingston Borough	$1,054.18	Relatively Low
2128.00	Kingston Borough	$0.91	Very Low
2129.00	Kingston Borough	$0.00	No Expected Annual Losses
2130.00	Kingston Borough	$0.00	No Expected Annual Losses
2131.00	Kingston Borough	$0.00	No Expected Annual Losses
2132.00	Edwardsville Borough	$1,346.75	Relatively Moderate
2133.00	Courtdale Borough	$361.31	Relatively Low
2134.00	Larksville Borough	$602.91	Relatively Low
2136.00	Plymouth Borough	$0.00	No Expected Annual Losses
2137.00	Plymouth Borough	$0.00	No Expected Annual Losses
2138.00	Plymouth Borough	$0.00	No Expected Annual Losses
2139.00	Plymouth Township	$963.96	Relatively Low
2141.00	Nanticoke City	$712.38	Relatively Low
2142.00	Nanticoke City	$338.26	Relatively Low
2143.00	Nanticoke City	$1,340.12	Relatively Moderate
2144.00	Nanticoke City	$943.11	Relatively Low
2145.00	Hanover Township	$899.34	Relatively Low
2146.00	Hanover Township	$3,685.17	Relatively Moderate
2149.00	Hanover Township	$912.81	Relatively Low
2150.00	Sugar Notch Borough	$496.15	Relatively Low
2151.00	Ashley Borough	$668.36	Relatively Low
2152.00	Wilkes-Barre Township	$2,114.51	Relatively Moderate
2153.00	Bear Creek Township	$1,331.00	Relatively Moderate
2154.00	Dennison Township	$915.29	Relatively Low

Table 4.3.7-4 Expected Annual Losses to Landslide by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2155.01	Fairview Township	$1,027.64	Relatively Low
2155.02	Wright Township	$4,863.18	Relatively Moderate
2155.03	Rice Township	$1,392.42	Relatively Moderate
2155.04	Dorrance Township	$1,598.30	Relatively Moderate
2156.00	Newport Township	$2,497.67	Relatively Moderate
2157.01	Hunlock Township	$1,054.35	Relatively Low
2157.02	Union Township	$1,525.23	Relatively Moderate
2158.00	Ross Township	$1,074.24	Relatively Low
2159.00	Fairmount Township	$1,424.41	Relatively Moderate
2161.00	Salem Township	$19,277.39	Relatively High
2162.00	Conyngham Township	$2,931.44	Relatively Moderate
2164.00	Black Creek Township	$1,459.22	Relatively Moderate
2165.01	Conyngham Borough	$498.18	Relatively Low
2165.02	Sugarloaf Township	$2,955.97	Relatively Moderate
2166.01	Butler Township	$2,579.08	Relatively Moderate
2166.02	Butler Township	$2,076.77	Relatively Moderate
2167.00	Freeland Borough	$206.90	Relatively Low
2168.00	Foster Township	$999.71	Relatively Low
2169.00	Hazle Township	$2,407.61	Relatively Moderate
2170.01	Hazle Township	$2,315.77	Relatively Moderate
2170.02	Hazle Township	$2,992.22	Relatively Moderate
2171.00	Hazleton City	$68.28	Relatively Low
2172.00	Hazleton City	$174.68	Relatively Low
2173.00	Hazleton City	$100.54	Relatively Low
2174.00	Hazleton City	$597.23	Relatively Low
2175.00	Hazleton City	$157.75	Relatively Low
2176.00	Hazleton City	$0.00	No Expected Annual Losses
2177.00	Hazleton City	$1,088.03	Relatively Low
2178.00	Hazleton City	$128.93	Relatively Low
2179.00	Hazle Township	$1,483.34	Relatively Moderate
2180.00	Hanover Township	$2,504.10	Relatively Moderate
TOTAL		**$139,364.10**	

4.3.7.6. Equity in Vulnerable Communities

Equity considerations include those who live in manufactured homes as they are highly susceptible to any ground disturbances. This means areas of Laurel Run Borough, Jenkins Township, and Ashley Borough may be particularly vulnerable. Low-income communities, which may have weaker infrastructure, such as poorly maintained roads and inadequate drainage

systems which exacerbate landslide risks, will also be at a higher risk. In terms of immediate safety risks, vulnerable populations, such as the elderly, people with disabilities, or those without access to emergency shelters, may face greater risks. This means areas of Conyngham Borough, New Columbus Borough, Penn Lake Park Borough, Salem Township, and Black Creek Township may be particularly vulnerable.

4.3.8. PANDEMIC AND INFECTIOUS DISEASE

4.3.8.1. Location and Extent

Pandemic is defined as a disease affecting or attacking the population of an extensive region, including several countries, and/or continent(s). It is further described as extensively epidemic. Generally, pandemic diseases cause sudden, pervasive illness in all age groups on a global scale. Infectious diseases are also highly virulent and can spread either directly or indirectly from person to person.

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

Luzerne County is concerned with the possibility of a pandemic flu outbreak. Influenza, also known as "the flu", is a contagious disease that is caused by the influenza virus and most commonly attacks the respiratory tract in humans. Influenza is considered to have pandemic potential if it is novel, meaning that people have no immunity to it; virulent, meaning that it causes deaths in normally healthy individuals; and easily transmittable from person-to-person. Pandemic influenza planning began in response to the H5N1 (avian) flu outbreak in the late 1990s and early 2000s (Knobler, Mack, Mahmoud, et al, 2005). Different strands of influenza mutate over time and replace older stands of the virus and thus may have drastically different effects.

In 2009, H1N1 (swine) flu broke out into pandemic proportions, but now has been reduced to a regular human flu virus that circulates each season (CDC, 2009). According to the federal government's Pandemic Influenza Plan 2017 Update, "pandemic influenza viruses can originate anywhere, vary in severity and population penetration, and each pandemic will differ in its range and impact" (USDHHS, 2017).

Avian influenza, also known as "bird flu", typically infects birds. However, a recent strain, H5N1, has caused concern in the United States due to its ability to pass from wild birds to poultry then on to people (Mayo Clinic, 2024).

In late 2019 and early 2020, a novel coronavirus began to spread into a worldwide pandemic. Named COVID-19, this type of coronavirus is a new virus that causes respiratory illness and is extremely contagious even prior to exhibiting symptoms and may be transmitted between people even if the infected person is asymptomatic. The virus is believed to have originated in the Wuhan province of China, quickly spreading to nearby countries in late 2019 and the whole world by March 2020. Flu-like in nature, symptoms of COVID-19 virus include fever, cough, shortness of breath, and diarrhea. In extreme COVID-19 cases that require hospitalization,

patients may require ventilators to support breathing and may pass away from the virus or related reasons (CDC, 2022a).

4.3.8.2. Range of Magnitude

The magnitude of a pandemic or infectious disease threat in Luzerne County will range significantly depending on the aggressiveness of the virus in question and the ease of transmission. Pandemic influenza is easily transmitted from person to person, but advances in medical technologies have greatly reduced the number of deaths caused by influenza over time. The magnitude of a pandemic may be exacerbated by the fact that an influenza pandemic will cause outbreaks across the United States, limiting the ability to transfer assistance from one jurisdiction to another. Additionally, effective preventative and therapeutic measures, including vaccines and other medications, will likely be in short supply or will not be available.

In terms of lives lost, the impact various pandemic influenza outbreaks have had globally over the last century has declined (see Table 4.3.8-2). The severity of illness from the 2009 H1N1 swine flu virus varied, with the gravest cases occurring mainly among those considered at high risk. High risk populations considered more vulnerable include children, older adults, pregnant people, and chronic disease patients with reduced immune system capacity. These populations are described in more detail in Section 4.3.8.5. Most people infected with H1N1 swine flu in 2009 recovered without needing medical treatment. However, unlike a regular flu season, according to the Centers for Disease Control (CDC), of the people who died, as many as 77% were 18 to 64 years old. Additionally, up to 11% of the deaths were estimated to have occurred in those 17 years old and younger.

The 1918 Spanish flu pandemic was the worst-case pandemic event in the 20th century both Pennsylvania and worldwide. While county-specific data is unavailable, and mortality figures were probably under-reported, it is recorded that 8,000 Pennsylvanians died from the flu or its complications in the first month alone (US DHHS, 2010). Infection rates were much worse in denser cities, which should be a high priority for response actions in future influenza pandemic events.

First reaching the County in March 2020, COVID-19 is still impacting populations in Luzerne County at the time of this plan development. This virus quickly became a great concern in the early months of the pandemic due to its high rates of transmission and high incidence of mortality in addition to so little being known about it. The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes. Most people infected with COVID-19 will experience mild to moderate respiratory illness and recover without requiring special treatment.

Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness (PA DOH, 2023a). Some people who have been infected with COVID-19 can experience long-term effects from the infection, known as post-COVID conditions (PCC) or long COVID. PCCs can include a wide range of ongoing health problems that can last weeks, months, or years. Some

general symptoms of PCC can include ongoing fatigue, symptoms that get worse with physical or mental activity, fever, difficulty breathing, chest pain, heart palpitations, headache, dizziness, diarrhea, and joint or muscle pain. These are more often found in people who had severe COVID-19 illness, but anyone who has been infected with COVID-19 can experience PCCs.

Those not vaccinated and who become infected may have a higher risk of developing PCCs, compared to people previously vaccinated. In some cases, a person with PCCs may not have tested positive for the virus or known they were infected (CDC, 2022b). Viruses like COVID-19 constantly change through mutation, which sometimes results in a new variant of the virus. Some changes and mutations may allow the virus to spread more easily or make it resistant to treatments and vaccines. It is essential to track and monitor the incidence of variants during a pandemic to effectively respond to changing trends in transmission and patient care (WHO, 2023). Variants are designated as:

- Variant Under Monitoring (VUM): Variants where data indicates there is a potential or clear impact on approved or authorized medical countermeasures or that have been associated with more severe disease or increased transmission but are no longer detected or are circulating at very low levels in the United States.
- Variant of Interest (VOI): A variant with specific genetic markers that have been associated with changes to receptor binding, reduced neutralization by antibodies generated against previous infection or vaccination, reduced efficacy of treatments, potentially diagnostic impact, or predicated increase in transmissibility or disease severity.
- Variant of Concern (VOC): A variant for which there is evidence of an increase in transmissibility, more severe disease (for example, increased hospitalizations or deaths), significant reduction in neutralizations by antibodies generated during previous infection or vaccination, reduced effectiveness of treatments or vaccines, or diagnostics detection failures.

The potential impacts of pandemic and infectious diseases:

Table 4.3.8-1 Most Likely Lifelines Impacted by Pandemic and Infectious Diseases

LIFELINES	NOTES
Safety and Security	Anticipate both causal and cascading impacts where community safety is threatened due to disease, with the administration of government services being negatively impacted because of widespread illness. Mitigation for this lifeline should be focused on developing response plans to ensure services are able to be administered even during potential staffing shortages or regulations.

Table 4.3.8-1 Most Likely Lifelines Impacted by Pandemic and Infectious Diseases	
LIFELINES	**NOTES**
Food, Hydration, Shelter	Anticipate a cascading relationship for the Food, Water, Shelter lifeline in response and recovery. Widespread disease outbreaks and resulting staffing issues will cause issues at different points along the commercial food supply chain. Agricultural production may be impacted as well.
Health and Medical	Anticipate a causal and cascading relationship for the Health and Medical lifeline in response and recovery due to direct impacts from the increase in patients, potential staffing issues, and supply chain disruptions that may also result as disease impacts become more widespread. Mitigation actions for this lifeline should be focused on stockpiling critical resources and developing procedures to respond to emergency staffing issues.

4.3.8.3. Past Occurrence

The United States Department of Health and Human Services estimates that influenza pandemics have occurred for at least 300 years at unpredictable intervals. There have been several pandemic influenza outbreaks over the past 100 years. A list of events and worldwide deaths are shown in Table 4.3.8-2.

Table 4.3.8-2 List of previous significant outbreaks of influenza since 2000 (Global Security, 2009; WHO, 2025).

DATE	PANDEMIC	WORLDWIDE DEATHS (APPROXIMATE)
1918-1920	Spanish Flu / H1N1	50 million
1957-1958	Asian Flu / H2N2	1.5-2 million
1968-1969	Hong Kong Flu / H3N2	1 million
2009 - 2010	Swine Flu / A/H1N1	12,000
2019 - Present	COVID-19	7 million

Confirmed flu cases have more than doubled in Luzerne County from 2021 to 2023. Figure 4.3.8-3 lists the number of confirmed flu cases in Luzerne County by flu season. According to the Pennsylvania Department of Health (DOH), there were 6,807confirmed cases in the most recent influenza season from September 2022 to March 2023 (PA DOH, 2023).

The CDC marked the 2014-2015 flu season as severe, with approximately 710,000 hospitalizations. The CDC does not track national deaths in adults, but the organization reported 148 pediatric deaths from influenza. The 2017-2018 flu season was another severe season. The CDC reported that the H3N2 flu, along with other strains including H1N1, led to

more cases, doctors' visits, hospital visits, and deaths than previous flu seasons. The CDC also noted that the flu became widespread in all states and jurisdictions at the same time. In January 2018, approximately halfway through the flu season, 37 pediatric deaths were reported. The CDC estimated that 34 million Americans were affected by the flu (CDC, 2018).

Table 4.3.8-3 Confirmed Flu Cases in Luzerne County by Flu Season (PA DOH, 2023)

FLU SEASON	NUMBER OF CONFIRMED CASES
2014/15	1,898
2015/16	1,037
2016/17	1,315
2017/18	4,615
2018/19	3,096
2019/20	3,721
2020/21	2020/21 influenza season data is not available because influenza activity was abnormally low likely due to COVID-19 mitigation measures.
2021/22	2,738
2022/23	6,807

The COVID-19 outbreak began in China in November 2019. The virus reached the United States in late February 2020, and most counties in Pennsylvania were affected by March 2020. By the end of 2020, there were 18,244 reported COVID-19 associated deaths in Pennsylvania, with 506 deaths reported in Luzerne County. In 2021, there were 609 COVID-19-related deaths reported in Luzerne County. In 2022, that number dropped to 431 deaths. The death toll continued to decline in 2023, with 138 reported deaths in the County (PA Division of Health Informatics, 2024).

4.3.8.4. Future Occurrence

Future occurrences of pandemics and infectious diseases are unclear. The precise timing of pandemic influenza is uncertain, but occurrences are most likely when the Influenza Type A virus makes a dramatic change, or antigenic shift, that results in a new or "novel" virus to which the population has no immunity. This emergence of a novel virus is the first step toward a pandemic. Future pandemics may also emerge from other diseases, especially invasive pathogens that Pennsylvanians do not have natural immunity. It is impossible to predict this type of hazard. The best form of county response is to expect that these events can occur at any time and to constantly evaluate resources and update emergency response plans. Climate change is increasing the likelihood of future pandemics due to shifts in the behaviors of hosts, vectors, and pathogens, along with changing weather patterns, migration shifts, and changes in livestock and agriculture practices which may allow new transmission pathways to develop.

Climate change may also increase the prevalence of waterborne and foodborne illnesses (Kayesa et al, 2024).

Climate change will also force animals into different migration patterns and into new habitats, which will create new interactions and opportunities for pathogens to infect new hosts; this is a concern as most pandemics are driven by diseases that are passed from animals to humans (Baker & Metcalf, 2022). Tick populations may increase as a result of climate changes, especially warmer winters that allow them to be active for longer periods of the year and expand the ranges they can survive in. Since 2019, the Asian long horned tick and the gulf coast tick have been discovered in Pennsylvania possibly due to changing environmental conditions that allow them to survive (Petelin, 2023). Some health threats that the CDC believes climate change will increase the risk of are:

- Anaplasmosis and Lyme disease
- Dengue
- Fungal diseases
- Hantavirus
- Harmful algae blooms
- Rabies
- Salmonellosis
- Vibriosis
- West Nile virus

It is important to note that even if these changes do not originate in Pennsylvania, the interconnectedness of global commerce and tourism increase the risks of diseases spreading across the world from their origin. Future pandemics and infectious disease outbreaks may emerge from a long list of diseases, and invasive pathogens for which Pennsylvanians lack natural immunity present a significant danger.

Looking at the number of historical incidences of pandemic-potential diseases, the probability of future pandemic events can be considered *possible* according to the Risk Factor Methodology (see Table 4.4-1).

4.3.8.5. Vulnerability Assessment

Certain population groups are at higher risk of pandemic flu infection. This population group includes people 65 years and older, children younger than 5 years old, pregnant people, and people of any age with certain chronic medical conditions. Such conditions include but are not limited to diabetes, heart disease, asthma and kidney disease (CDC, 2015). Schools, colleges, convalescent centers, and other institutions serving those younger than 5 years old and older than 65 years old, are locations conducive to faster transmission of pandemic influenza since populations identified as being at high risk are concentrated at these facilities or because of a large number of people living in close quarters. In general, jurisdictions that are more densely populated are more vulnerable to disease threats when the disease is directly spread from human to human, but every jurisdiction in the Commonwealth has some vulnerability to pandemic and infectious disease threats.

There are some occupation-specific risks that may make some employees more vulnerable. For example, those working in direct patient care situations are more likely to be exposed to a pandemic disease.

There are no true environmental impacts of pandemics and infectious disease threats, but there will be significant economic and social costs beyond the possibility of disease-related deaths. Widespread illness may increase the likelihood of shortages of personnel to perform essential community services. In addition, high rates of illness and worker absenteeism occur within the business community, and these contribute to social and economic disruption. Social and economic disruptions could be temporary but may be amplified in today's closely interrelated and interdependent systems of trade and commerce. Social disruption may be greatest when rates of absenteeism impair essential services, such as power, transportation, and communications.

Jurisdictional losses in a pandemic or infectious disease outbreak stem from lost wages and productivity, not losses to buildings or land. Losses are difficult to estimate because the exact rates of absenteeism and cost of treating a widespread disease will depend on the virus or bacterium in question, the availability of vaccination or treatment, and the severity of symptoms. For historical context, though, the Asian and Hong Kong Flu pandemics killed over 1.5 million people worldwide and caused an estimated $32 billion loss due to lost productivity and medical expenses (Smith, 2004). With Pennsylvania's economy so integral to the national economy, economic losses from a pandemic or infectious disease threat could be significant.

An avian flu outbreak could cause some economic loss for poultry farmers in Luzerne County. According to the 2022 USDA Agricultural Census, poultry and egg sales totaled around $164,000 in Luzerne County in 2022.

It is expected that there will be immense losses due to the COVID-19 pandemic. Thousands of individuals were laid off across the commonwealth as non-essential businesses were forced to close. In just one week in 2020, over three million Americans filed for unemployment; the greatest amount ever. There is specific concern for those who worked in service and hospitality industries. Construction projects and other businesses are in limbo, while many others decide to permanently close. However, the commonwealth and the federal government are releasing relief packages for individuals and businesses. The Luzerne County Chamber of Commerce compiled a growing list with links to medical information, relief packages, and other resources. It is currently unknown how COVID-19 will change the economic environment of the County.

4.3.8.6. Equity in Vulnerable Communities

Equity considerations during pandemics and infectious disease outbreaks are crucial as there are a number of populations at an increased risk. Those living with chronic medical conditions, older adults, and young children may be particularly susceptible to the effects of pandemics and infectious disease outbreaks. Additionally, low-income populations are more likely to lack access to quality healthcare and have pre-existing health conditions. Furthermore, these populations may be unable to follow quarantine measures as they may be essential workers or

live in group quarters. Populations of people 65 and older are overall more susceptible to severe outcomes related to infectious disease, especially those currently residing within congregate care facilities. Households with inadequate broadband connections will have inequitable access to both remote work and remote learning. Having measures and protections in place for these groups is essential to mitigate and reduce the extensivity of this hazard.

4.3.9. RADON EXPOSURE

4.3.9.1. Location and Extent

Radioactivity caused by airborne radon has been recognized for many years as an important component in the natural background radioactivity exposure of humans, but it was not until the 1980s that the wide geographic distribution of elevated values in houses and the possibility of extremely high radon values in houses was recognized. In 1984, routine monitoring of employees leaving the Limerick nuclear power plant near Reading, PA, showed that the readings on Mr. Stanley Watras frequently exceeded expected radiation levels, yet only natural, non-fission-product radioactivity was detected on him. Radon levels in his home were detected around 2,500 pCi/L (pico Curies per Liter), much higher than the 4 pCi/L guideline of the Environmental Protection Agency or even the 67 pCi/L limit for uranium miners. As a result of this event, the Reading Prong section of Pennsylvania where Watras lived became the focus of the first large-scale radon scare in the world.

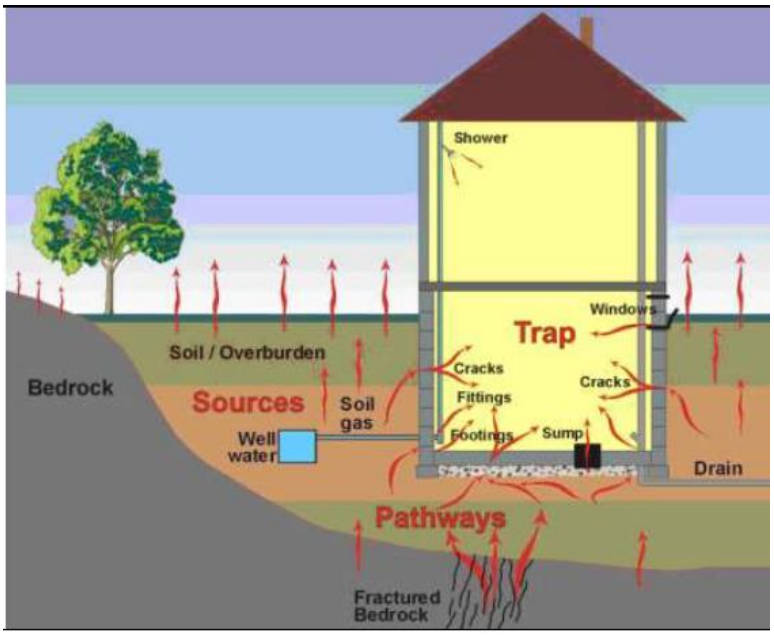
Radon is a gas that cannot be seen or smelled. It is a noble gas that originates by the natural radioactive decay of uranium and thorium. Like other noble gases (e.g., helium, neon, and argon), radon forms essentially no chemical compounds and tends to exist as a gas or as a dissolved atomic constituent in groundwater. Two isotopes of radon are significant in nature, 222Rn and 220Rn, formed in the radioactive decay series of 238U and 232Th, respectively. The isotope thoron (i.e. 220Rn) has a half-life (time for decay of half of a given group of atoms) of 55 seconds, barely long enough for it to migrate from its source to the air inside a house and pose a health risk. However, radon (i.e. 222Rn), which has a half-life of 3.8 days, is a widespread hazard (DOI, 1992).

The distribution of radon is correlated with the distribution of radium (i.e. 226Ra), its immediate radioactive parent, and with uranium, its original ancestor. Due to the short half-life of radon, the distance that radon atoms can travel from their parent before decay is generally limited to distances of feet or tens of feet (DOI,1992).

Three sources of radon are now recognized in houses (shown in Figure 4.3.9-1):

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

Figure 4.3.9-1 Sketch of radon entry points into a house (Arizona Geological Survey, 2006).



High radon levels were initially thought to be exacerbated in houses that are tightly sealed, but it is now recognized that rates of air flow into and out of houses, plus the location of air inflow and the radon content of air in the surrounding soil, are key factors in radon concentrations. Outflows of air from a house, caused by a furnace, fan, thermal "chimney" effect, or win effects, require that air be drawn into the house to compensate. If the upper part of the house is tight enough to impede influx of outdoor air (radon concentration generally <0.1 pCi/L), then an appreciable fraction of the air may be drawn in from the soil or fractured bedrock through the foundation and slab beneath the house, or through cracks in openings for pipes, sumps, and similar features (see figure 4.3.7-1). Soil gas typically contains from a few hundred to a few thousand pCi/L of radon; therefore, even a small rate of soil gas inflow can lead to elevated radon concentrations in a house.

The radon concentration of soil gas depends on a number of soil properties, the importance of which is still being evaluated. In general, ten to fifty percent 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 air flow, 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.

Each county in Pennsylvania is classified as having a *low, moderate,* or *high* radon hazard potential. Luzerne County is classified as having a high hazard, meaning that the predicted indoor radon level is greater than 4 pCi/L (see Figure 4.3.9-2).

Areas where houses have high levels of radon can be divided into three groups in terms of uranium content in rock and soil:

- Areas of very elevated uranium content (>50 parts per million (ppm)) around uranium deposits and prospects. Although very high levels of radon can occur in such areas, the hazard normally is restricted to within a few hundred feet of the deposit. In Pennsylvania, such localities occupy an insignificant area.
- Areas of common rocks having higher than average uranium content (5 to 50 ppm). In Pennsylvania, such rock types include granitic and felsic alkali igneous rocks and black shales. In the Reading Prong, high uranium values in rock or soil and high radon levels in houses are associated with Precambrian granitic gneisses commonly containing 10 to 20 ppm uranium but locally containing more than 500 ppm uranium. In Pennsylvania, elevated uranium occurs in black shales of the Devonian Marcellus Formation and possibly the Ordovician Martinsburg Formation. High radon values are locally present in areas underlain by these formations.
- Areas of soil or bedrock that have normal uranium content but properties that promote high radon levels in houses. This group is incompletely understood at present. Relatively high soil permeability can lead to high radon, the clearest example being houses built on glacial eskers. Limestone-dolomite soils also appear to be predisposed for high radon levels in houses, perhaps because of the deep clay-rich residuum in which radium is concentrated by weathering on iron oxide or clay surfaces, coupled with moderate porosity and permeability.

The second factor listed above is most likely the cause of radon levels in Luzerne County, although high test results may be a result of multiple factors. Figures 4.3.9-3, 4.3.9-4, 4.3.9-5, and 4.3.9-6 show the radon test data available for Luzerne County by zip code. As shown in Figure 4.3.9-3, most communities have average basement radon readings between 4.0-8.0 pCi/L, while many communities had maximum basement readings over 200 pCi/L.

Figure 4.3.9-2 Radon Hazard Zones in Pennsylvania (EPA, 2021).

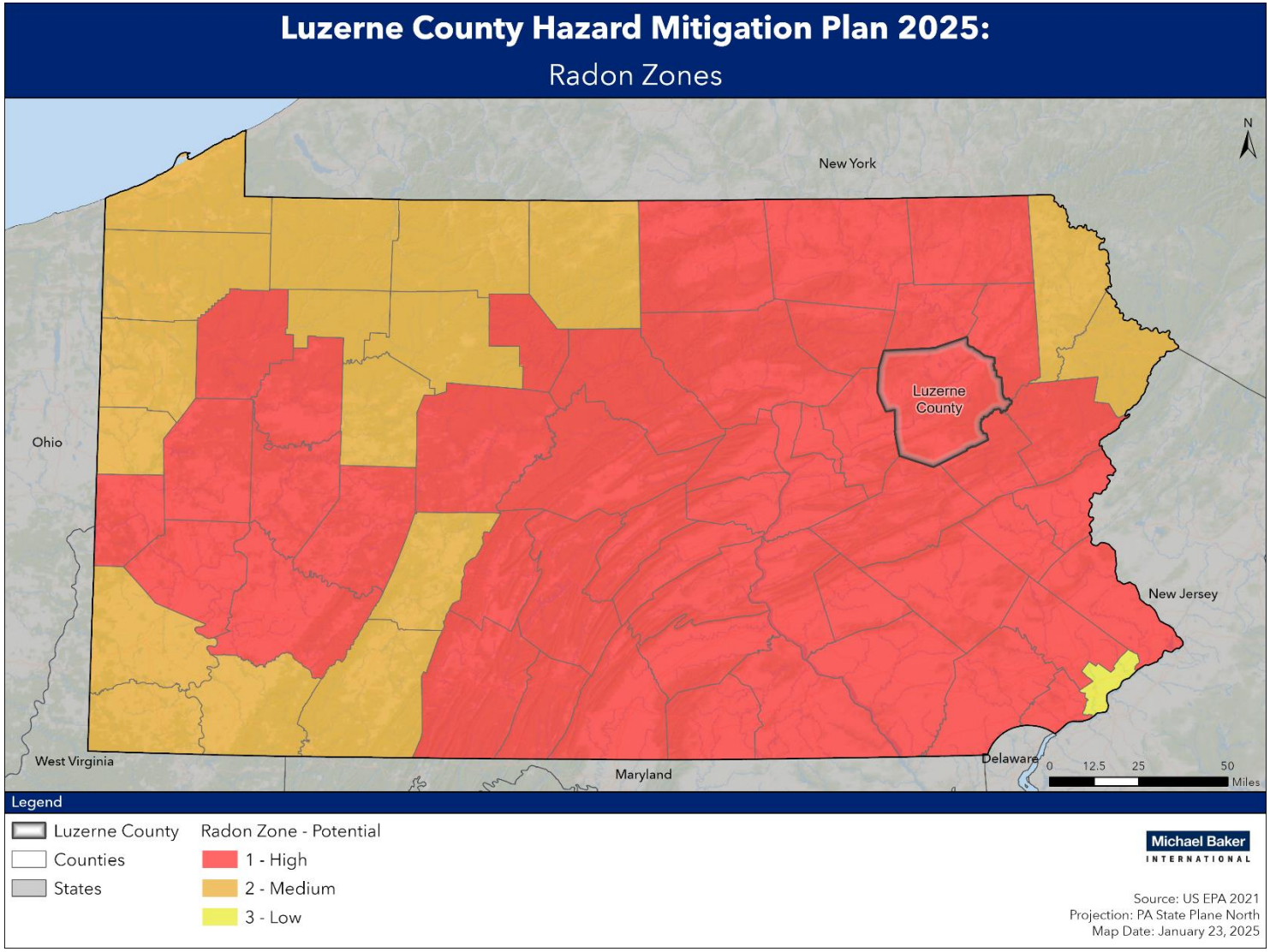
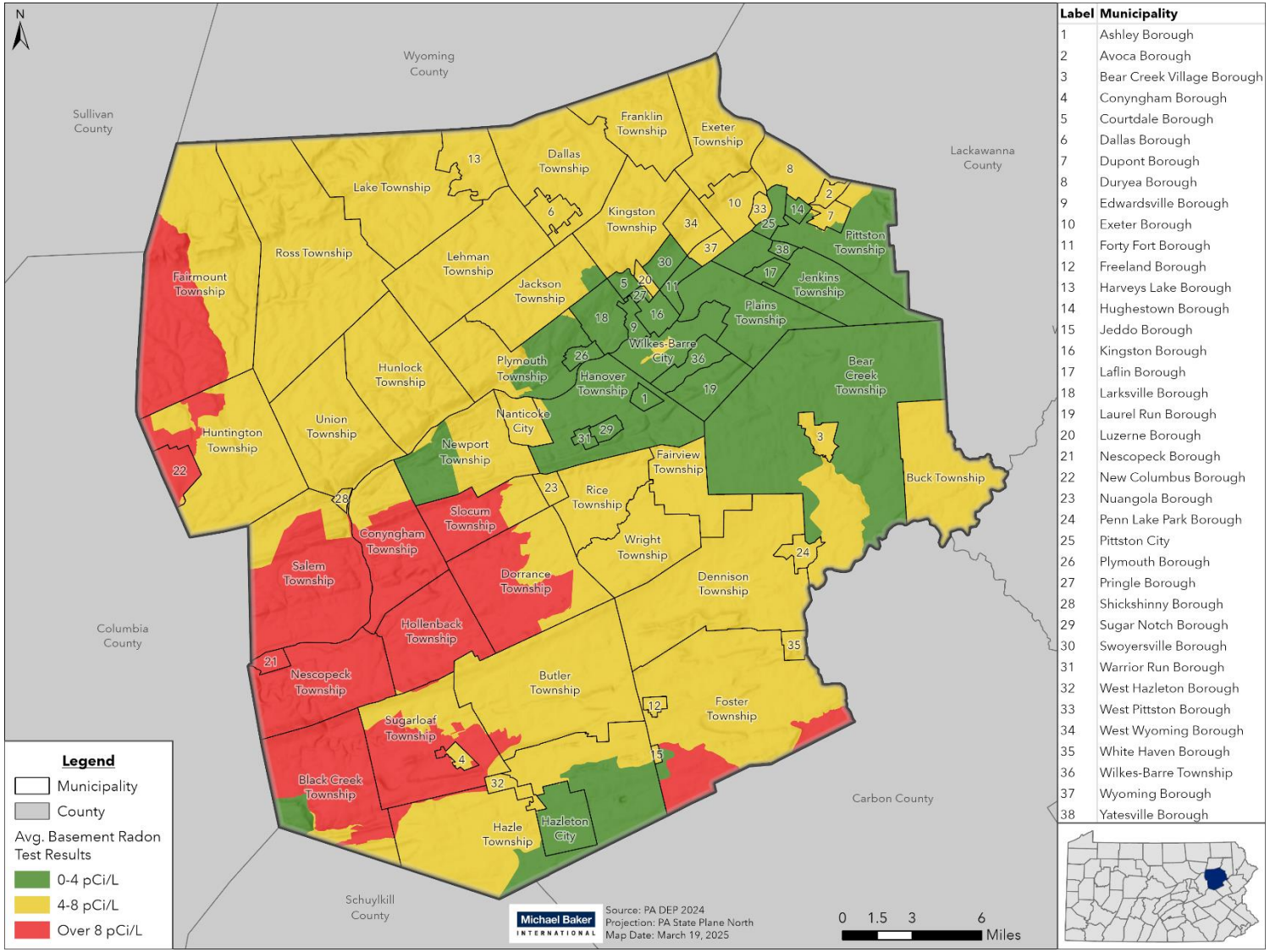
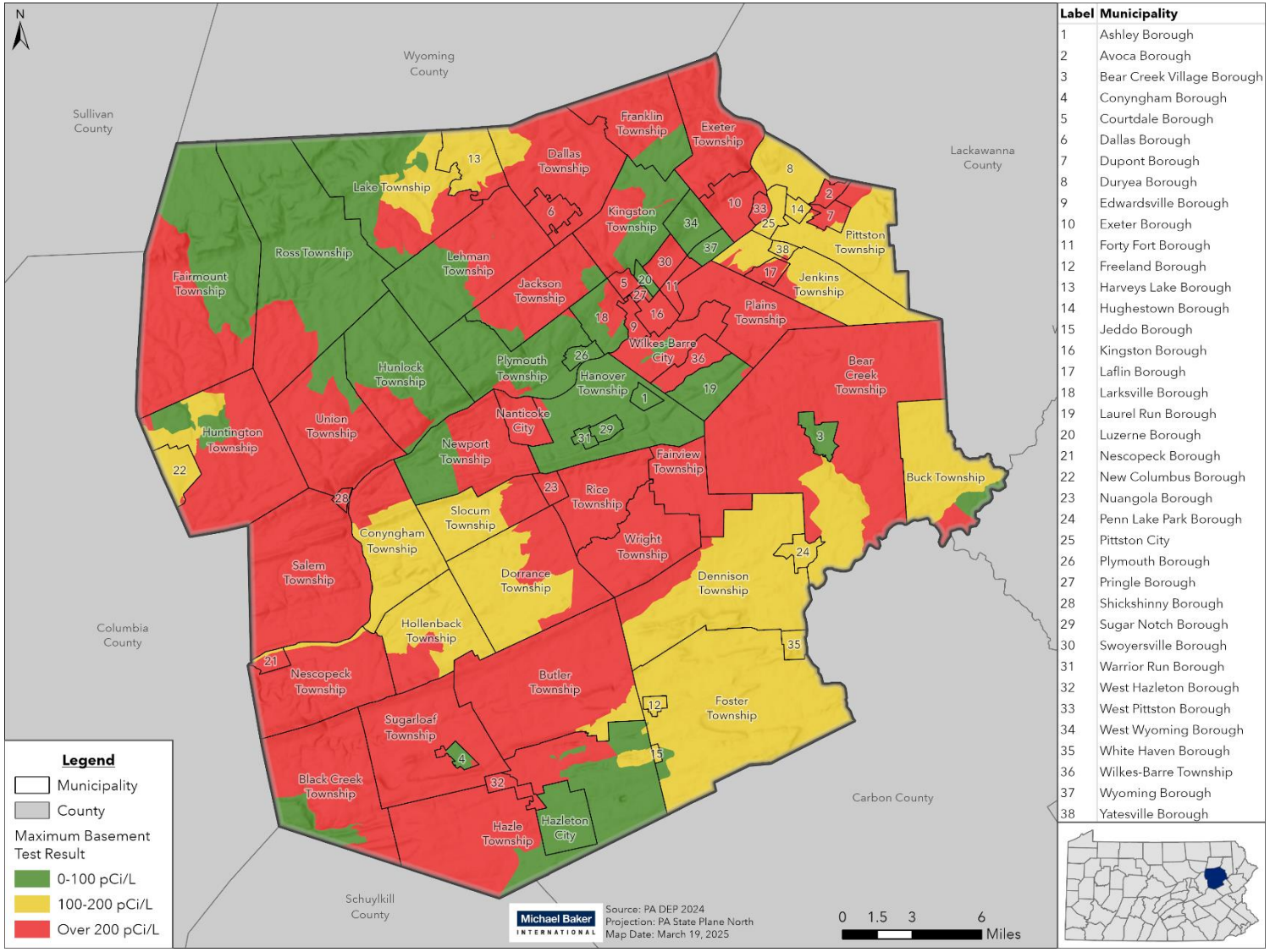


Figure 4.3.9-3 Luzerne County Average Basement Radon Test Results (EPA, 2021).



Label	Municipality
1	Ashley Borough
2	Avoca Borough
3	Bear Creek Village Borough
4	Conyngham Borough
5	Courtdale Borough
6	Dallas Borough
7	Dupont Borough
8	Duryea Borough
9	Edwardsville Borough
10	Exeter Borough
11	Forty Fort Borough
12	Freeland Borough
13	Harveys Lake Borough
14	Hughestown Borough
15	Jeddo Borough
16	Kingston Borough
17	Laflin Borough
18	Larksville Borough
19	Laurel Run Borough
20	Luzerne Borough
21	Nescopeck Borough
22	New Columbus Borough
23	Nuangola Borough
24	Penn Lake Park Borough
25	Pittston City
26	Plymouth Borough
27	Pringle Borough
28	Shickshinny Borough
29	Sugar Notch Borough
30	Swoyersville Borough
31	Warrior Run Borough
32	West Hazleton Borough
33	West Pittston Borough
34	West Wyoming Borough
35	White Haven Borough
36	Wilkes-Barre Township
37	Wyoming Borough
38	Yatesville Borough

Figure 4.3.9-4 Luzerne County Maximum Basement Radon Results (EPA, 2021).



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34	West Wyoming Borough
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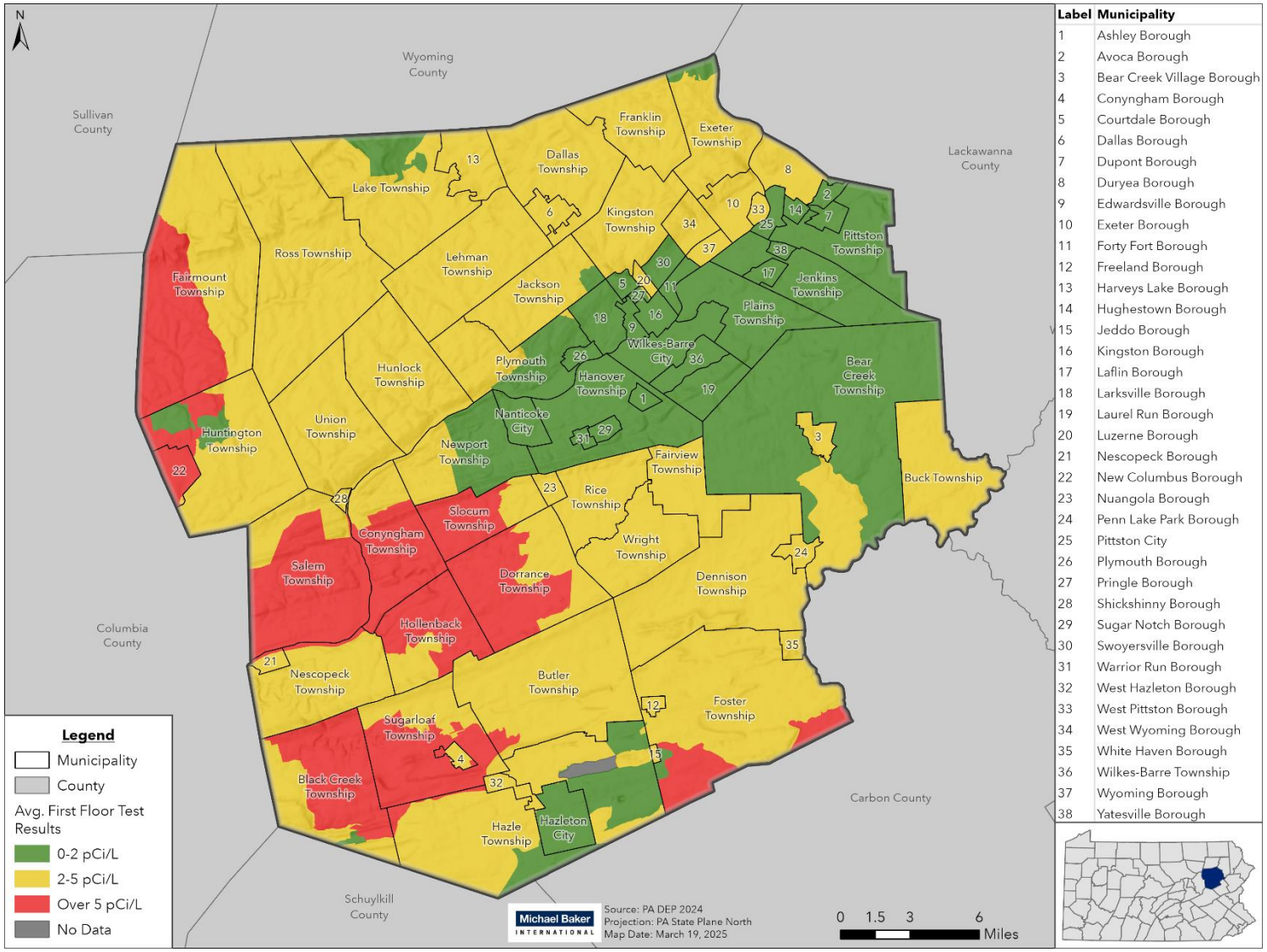
36	Wilkes-Barre Township
37	Wyoming Borough
38	Yatesville Borough

Figure 4.3.9-5 Luzerne County Average First Floor Radon Test Results (EPA, 2021).



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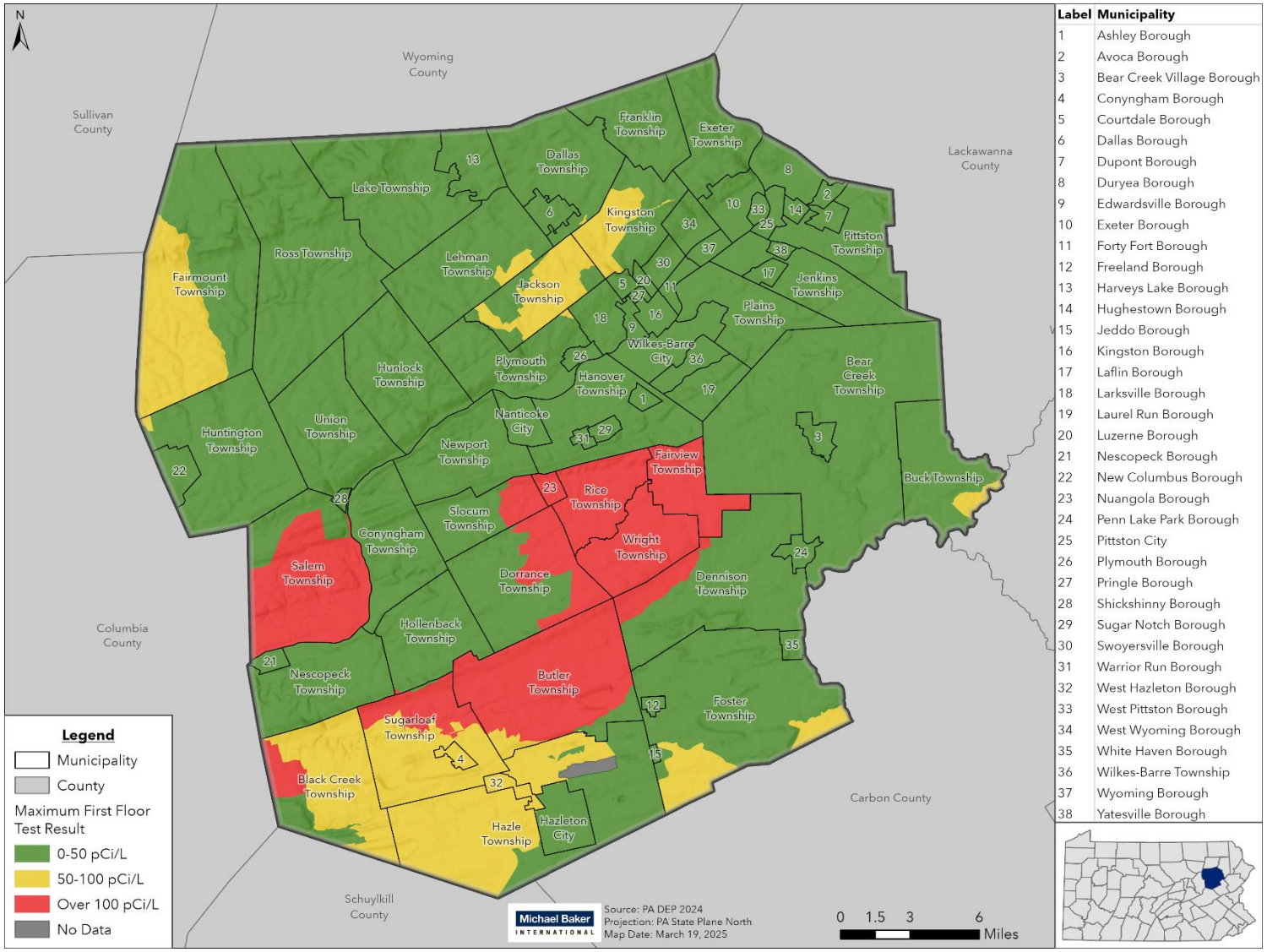
38	Yatesville Borough

Figure 4.3.9-6 Luzerne County Max First Floor Radon Test Results (EPA, 2021).



4.3.9.2. Range of Magnitude

Exposure to radon is the second leading cause of lung cancer after smoking. It is the number one cause of lung cancer among non-smokers. Radon is responsible for about 21,000 lung cancer deaths every year; approximately 2,900 of which occur among people who have never smoked. Lung cancer is the only known effect on human health from exposure to radon in air and thus far, there is no evidence that children are at greater risk of lung cancer than adults (CDC, 2024). The main hazard is from the radon daughter products (218Po, 214Pb, 214Bi), or the byproduct released as radon decays, which may become attached to lung tissue and induce lung cancer by their radioactive decay (WHO, 2023b).

According to the EPA, the average radon concentration in the indoor air of homes nationwide is about 1.3 pCi/L. The EPA recommends homes be fixed if the radon level is 4 pCi/L or more. However, because there is no known safe level of exposure to radon, the EPA also recommends that Americans consider fixing their home for radon levels between 2 pCi/L and 4 pCi/L (US EPA, 2016). Table 4.3.8-1 shows the relationship between various radon levels, probability of lung cancer, comparable risks from other hazards, and action thresholds. As is shown in the table, a smoker exposed to radon has a much higher risk of lung cancer.

Table 4.3.9-1 Radon risk for smokers and non-smokers (EPA, 2016).

RADON LEVEL (CCI/L)	IF 1,000 PEOPLE WERE EXPOSED TO THIS LEVEL OVER A LIFETIME*	RISK OF CANCER FROM RADON EXPOSURE COMPARES TO**	ACTION THRESHOLD
SMOKERS			
20	About 260 people could get lung cancer	250 times the risk of drowning	Fix Structure
10	About 150 people could get lung cancer	200 times the risk of dying in a home fire	
8	About 120 people could get lung cancer	30 times the risk of dying in a fall	
4	About 62 people could get lung cancer	5 times the risk of dying in a car crash	
2	About 32 people could get lung cancer	6 times of the risk of dying from food poison	Consider fixing structure between 2 and 4 pCi/L
1.3	About 20 people could get lung cancer	(Average indoor radon level)	Reducing radon levels below 2pCi/L is difficult
0.4	About 3 people could get lung cancer	(Average outdoor radon level)	
NON-SMOKERS			
20	About 36 people could get lung cancer	35 times the risk of drowning	Fix Structure
10	About 18 people could get lung cancer	20 times the risk of dying in a home fire	
8	About 15 people could get lung cancer	4 times the risk of dying in a fall	

Table 4.3.9-1 Radon risk for smokers and non-smokers (EPA, 2016).

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

The worst-case scenario for radon exposure would be that a large area of tightly sealed homes provided residents with high levels of exposure over a prolonged period without the resident being aware. This worst-case scenario exposure then could lead to large numbers of people with cancer attributed to the radon exposure.

The potential impacts of radon exposure community lifelines are as follows:

Table 4.3.9-2 Most Likely Lifelines Impacted by Radon Exposure

LIFELINES	NOTES
	Direct exposure to radon can pose serious health risks and impact the safety of the community.
	Shelters may be at risk if exposed to radon.
	Exposure will increase the chances of lung cancer-causing potential increase in the amount of services and resources needed if communities develop more instances of cancer.

4.3.9.3. Past Occurrence

Current data on abundance and distribution of radon as it affects individual houses in the state of Pennsylvania in general is considered incomplete and potentially biased. Luzerne County is not an exception. The EPA 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 (PADEP, 2019).

The Pennsylvania Department of Environmental Protection Bureau of Radiation Protection provides information for homeowners on how to test for radon in their houses. If a test results in radon concentrations over 4 pCi/L, then the Bureau works to help the homeowners make repairs to their houses to mitigate against high radon levels. The total number tests reported to the Bureau since 1990 and their results are provided by zip code on the Bureau's website. However, this information is only provided if over 30 tests total were reported in order to best approximate the average for the area.

In Luzerne County, 30 ZIP codes have sufficient tests reported to the Bureau to list their findings, which are shown in Table 4.3.9-3. This table does not include the ZIP codes for which insufficient data was collected in both basements and first floors.

Table 4.3.9-3 Radon level tests and results in Luzerne County zip codes (PADEP, 2025).

ZIP CODE	BASEMENT			FIRST FLOOR		
	NUMBER OF TESTS	MAXIMUM RESULT (PCI/L)	AVERAGE RESULT (PCI/L)	NUMBER OF TESTS	MAXIMUM RESULT (PCI/L)	AVERAGE RESULT (PCI/L)
17814	386	370	16.9	98	55.5	5.1
17815	4505	627.5	11.7	698	501	5.3
17878	135	168.4	16	35	35	7.1
18201	1716	63.5	3.5	289	10.2	1.3
18202	1269	310	7.7	101	23	3.4
18219	463	84.7	7.8	55	59.9	5
18249	891	294	10.8	119	56.2	5.8
18255	607	148.1	13.1	106	85	5.7
18424	848	69.5	4.7	308	52	2.1
18518	1227	78.7	4.3	127	32.3	2.3
18603	1955	433.7	10.2	402	1003	6.6
18610	757	353.7	7.3	320	22.7	2.3
18612	3989	173	4.7	350	49	2.4
18615	121	218.2	9.6	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*
18617	101	9	2.3	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*
18618	461	118.3	4.5	92	49.9	2.2
18621	442	54.1	7.1	45	22.7	2.9
18634	1317	609	4	165	14.8	1.3
18635	362	276.9	21.4	44	42.4	4.6
18636	50	90.7	6.4	*Insufficient Data*	*Insufficient Data*	*Insufficient Data*
18640	1931	107	3.7	204	13.8	1.7
18641	802	607	6.2	84	11.1	2.1

Table 4.3.9-3 Radon level tests and results in Luzerne County zip codes (PADEP, 2025).

ZIP CODE	BASEMENT			FIRST FLOOR		
	NUMBER OF TESTS	MAXIMUM RESULT (PCI/L)	AVERAGE RESULT (PCI/L)	NUMBER OF TESTS	MAXIMUM RESULT (PCI/L)	AVERAGE RESULT (PCI/L)
18642	663	108.2	4.2	82	9.8	2
18643	1925	46.8	3.6	151	36.2	2.2
18644	1560	56.8	4.7	195	25.9	2
18651	614	98.6	3.4	106	14.6	1.5
18655	620	218.6	7	94	20	2.6
18656	273	98	5.8	39	12.7	3.6
18660	344	116.1	8.9	51	40.5	5.9
18661	810	146	5.5	189	48.7	2.6
18701	139	39	4.9	46	12.1	0.9
18702	3959	204	2.8	564	12.5	1.2
18704	3959	204	2.8	564	12.5	1.2
18705	1727	401	3.2	181	16.6	1.4
18706	817	31.4	2.6	254	47.2	1.8
18707	5031	302	4.4	426	123.4	2.2
18708	2714	1938	5.7	204	55.1	3
18709	314	53.3	4.5	51	16.2	2.6

4.3.9.4. Future Occurrence

Radon exposure retains a significant probability given present soil, geologic, and geomorphic factors in Luzerne County. Future occurrence of high radon level hazards can be considered *possible* by the Risk Factor Methodology probability criteria (See Table 4.4-1). Development in areas where previous radon levels have been significantly high will continue to be more susceptible to exposure. However, new incidents of concentrated exposure may occur with future development or deterioration of older structures. Exposure can be limited with proper testing for both past and future development and appropriate mitigation measures.

4.3.9.5. Vulnerability Assessment

Houses in Luzerne County, particularly in high vulnerability areas, could be susceptible to moderate levels of radon. Smokers can be up to ten times more vulnerable to lung cancer from high levels of radon depending on the level of radon they are exposed to (see Figure 4.3.9-1). Older houses that have crawl spaces or unfinished basements are more vulnerable as well because of the increased exposure to soils which could be releasing higher levels of radon gas. Additionally, houses that rely on wells for their water may face additional risk, although this type of exposure is low and rare in Pennsylvania. Proper testing for radon levels should be completed across Luzerne County, especially in areas of higher incidence levels and for vulnerable populations that face the contributing risks described above. This testing will determine the level of vulnerability that residents face in their homes, as well as in their businesses and schools.

The EPA determines that an average radon mitigation system costs $1,200. The EPA also states that current state surveys show that 1 home in 5 has elevated radon levels. Using this methodology, radon loss estimation is factored by assuming that 20% of the buildings within the ZIP codes with elevated rest results have elevated radon values and each would require a radon mitigation system installed at the EPA estimated average of $1,200. According to the Pennsylvania State Hazard Mitigation Plan, Luzerne County has 133,021 buildings in areas with high radon test results, while approximately 20%, or 26,604, of these buildings will be impacted. The estimated costs for radon mitigation total $31,925,000.

Radon exposure has minimal environmental impacts. Due to the relatively short half-life of radon, it tends to only affect living and breathing organisms such as humans or pets which are routinely in contained areas (i.e. basement or house) where the gas is released.

4.3.9.6. Equity in Vulnerable Communities

Communities with an aged housing stock are the most likely to be exposed to radon exposure as radon creeps in through poor foundations or ventilation systems. Low-income communities are more likely to have aged housing stock, so proper awareness is essential. This includes Ashley Borough, Laurel Run Borough, and Pringle Borough as they have areas with the highest populations below the poverty level. Public awareness materials should also be provided in secondary languages in municipalities such as Hazleton City and West Hazleton Borough who have higher concentrations of households with Limited English Proficiency. Low-income communities may also be at an increased risk as home repairs, testing kits, and mitigation systems are significant financial investments. Additionally, those who live in rural areas, where geological conditions may lead to higher radon levels, are at an increased risk.

4.3.10. SUBSIDENCE, SINKHOLE

4.3.10.1. Location and Extent

There are two common causes of subsidence in Pennsylvania. Dissolution of carbonate rock such as limestone or dolomite, and 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 the voids collapses, leaving surface depressions resulting in karst topography (DCNR,2020b). Characteristic structures associated with karst topography include sinkholes, linear depressions, and caves. Collapse sometimes occurs only after a large amount of activity, or when a heavy burden is placed on the overlying material. This type of subsidence is fairly localized in extent.

In Pennsylvania, research has shown that subsidence may occur, but will not necessarily occur, in areas underlain by carbonate bedrock. Figure 4.3.9-1 shows that a small portion of the Southwestern part of Luzerne County is underlain by carbonate bedrock (i.e., limestone). This area lies over parts of Conyngham Township, Nescopeck Township, and Salem Township. Sinkholes in Pennsylvania are also often due to subsurface mining. There is a strip of abandoned underground mines stretching across Wyoming Valley in the central part of the County, along the Susquehanna River. There are also mines in the southern portion of the County, near the City of Hazleton.

Human activity can accelerate the creation of subsidence or sinkhole events. Leaking water pipes or structures that convey storm-water runoff may also result in areas of subsidence as the water dissolves substantial amounts of rock over time. Poorly managed stormwater may be an exacerbating factor in subsidence events. In some cases, construction, land grading, or earthmoving activities that cause changes in stormwater flow can trigger sinkhole events (DCNR, 2020b).

4.3.10.2. Range of Magnitude

No two subsidence areas or sinkholes are exactly alike. Variations in size and shape, timeframe under which they occur (i.e. gradually or abruptly), and their proximity to development ultimately determines the magnitude of damage incurred. Based on the geologic formations underlying parts of Luzerne County, subsidence and sinkhole events may occur gradually or abruptly. Events could result in minor elevation changes or deep, gaping holes in the ground surface. Subsidence and sinkhole events can cause severe damage in urban environments, although gradual events can be addressed before significant damage occurs. Primarily, problems related to subsidence include the disruption of utility services and damages to private and public property including buildings, roads, and underground infrastructure. If long-term subsidence or sinkhole formation is not recognized and mitigation measures are not implemented, fractures or complete collapse of building foundations and roadways may result. If mitigation measures are not taken, the cost to fill in and stabilize sinkholes can be significant although sinkholes are limited in extent.

General recommendations have been published for site investigations prior to construction of buildings due to the potential for karst subsidence. These recommendations include thorough geotechnical investigations to identify un-collapsed karst features and potential excavation to solid rock prior to construction.

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

Luzerne County is located in four physiographic regions: the Glaciated Low Plateau Section, the Susquehanna Lowland Section, the Anthracite Upland Section, and the Anthracite Valley Section. The Glaciated Low Plateau Section is characterized by red-green-gray sedimentary rocks of the Catskill Formation. The Susquehanna Lowland Section is characterized by ridges which are parallel to the streams that drain the area. The Anthracite Upland section is characterized by mountains and steep-sided valleys. Coal, shale, sandstone, and conglomerate make up this region, which can all contribute to karst topography. The Anthracite Valley Section is a valley with sharp mountain ridges on either side of the valley. Approximately half of the valley (the southwestern end) is noted for its deposits of anthracite. It is important to note that there are many underground mines in the Anthracite Upland and the Anthracite Valley sections of the County.

The magnitude of land subsidence and sinkholes in Luzerne County can be moderate as there have been past occurrences of land subsidence. Experience in Pennsylvania shows that subsidence may cause from a fraction of an inch to several feet of sagging of the surface of the earth and may occur within minutes or over several years.

According to the PADEP, structural damages due to subsidence range from slight damage requiring cosmetic repairs to severe damage requiring foundation replacement or other high-cost repairs.

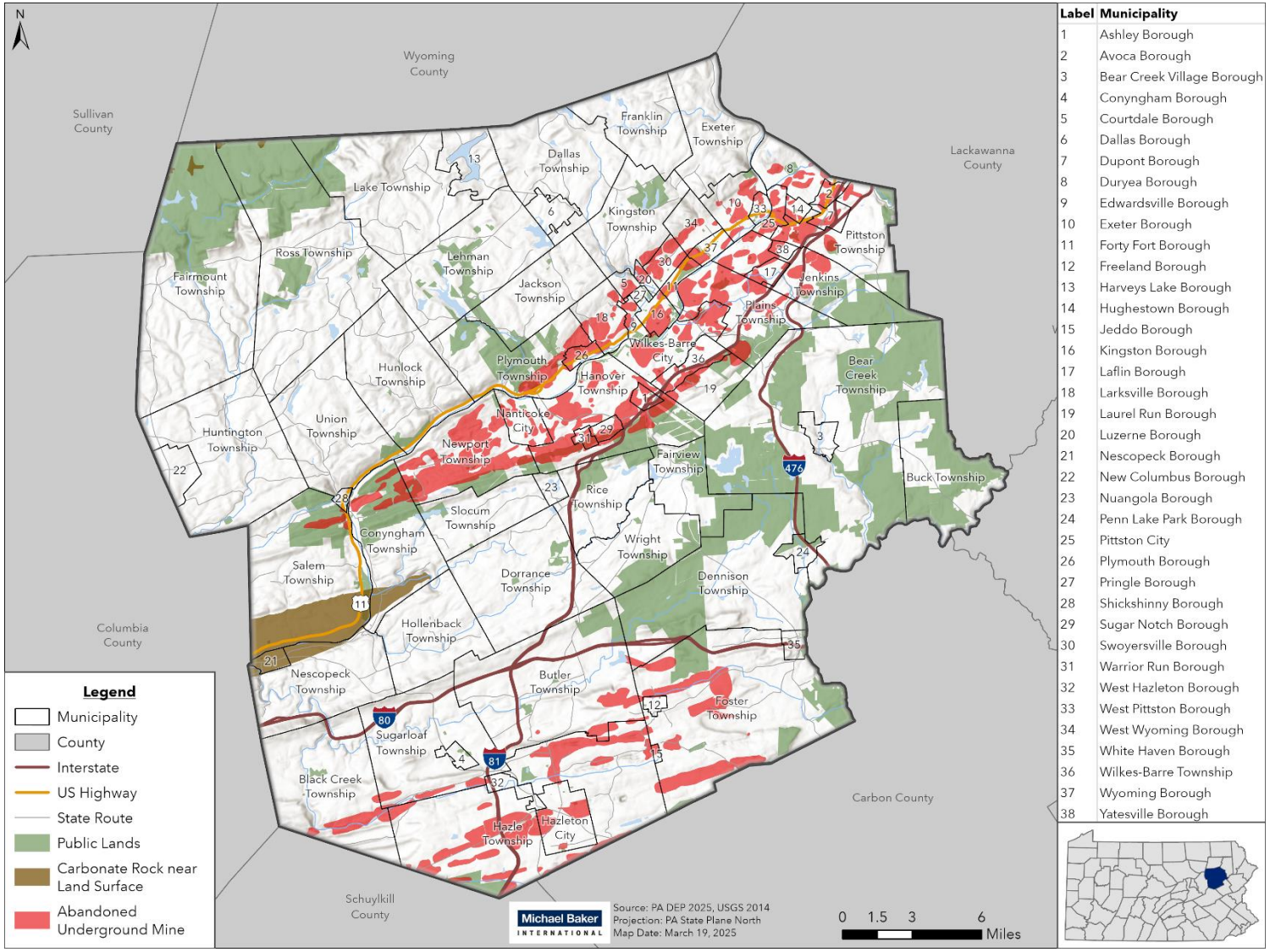
A worst-case scenario for subsidence and sinkholes would be if a sinkhole occurred under a critical facility such as a hospital. Not only could structural damage occur to the building, but there could also be injuries to people as well. In addition, part of the facility would have to be closed in order to repair the structural damage, and this would reduce the hospital's capacity and ability to treat people with other illnesses and injuries.

The following impacts of subsidence and sinkholes on community lifelines are as follows:

Table 4.3.10-1 Most Likely Lifelines Impacted by Subsidence and Sinkholes

LIFELINES	NOTES
Safety and Security	Safety concerns related to sinkholes and subsidence as they have the potential to cause significant harm. Mitigation should be focused on increasing residents' knowledge of risks in their area.
Food, Hydration, Shelter	Significant damage to homes, disruption of water utility services, and potential groundwater contamination may occur.
Transportation	Direct damage to transportation infrastructure may occur depending on the location of the hazard.

Figure 4.3.10-1 Locations with subsidence potential in Luzerne County



Label	Municipality
1	Ashley Borough
2	Avoca Borough
3	Bear Creek Village Borough
4	Conyngham Borough
5	Courtdale Borough
6	Dallas Borough
7	Dupont Borough
8	Duryea Borough
9	Edwardsville Borough
10	Exeter Borough
11	Forty Fort Borough
12	Freeland Borough
13	Harveys Lake Borough
14	Hughestown Borough
15	Jeddo Borough
16	Kingston Borough
17	Laflin Borough
18	Larksville Borough
19	Laurel Run Borough
20	Luzerne Borough
21	Nescopeck Borough
22	New Columbus Borough
23	Nuangola Borough
24	Penn Lake Park Borough
25	Pittston City
26	Plymouth Borough
27	Pringle Borough
28	Shickshinny Borough
29	Sugar Notch Borough
30	Swoyersville Borough
31	Warrior Run Borough
32	West Hazleton Borough
33	West Pittston Borough
34	West Wyoming Borough
35	White Haven Borough
36	Wilkes-Barre Township
37	Wyoming Borough
38	Yatesville Borough

4.3.10.3. Past Occurrence

The Pennsylvania Department of Conservation and Natural Resources (PADCNR) maintains an online *Sinkhole Inventory Database* of sinkholes throughout the Commonwealth. No occurrence of subsidence or sinkholes has been reported for Luzerne County.

However, Luzerne County has a long history of sinkholes and subsidence. At least 26 municipalities in the county have experienced underground mine subsidence incidents in the past. Northeastern Pennsylvania was a prominent coal mining region, and many homes were built on top of active mines. The most intense historic mining operations were generally conducted along the Susquehanna River Corridor. As mines were sold to new companies, safe practices were not always taken, leaving properties overtop of mining areas vulnerable to issues with mine subsidence. In 1909, a sinkhole caused by mine subsidence opened near Pittston Township. A Train drove into the hole, killing two workers. In 1959, mining operations dug within six feet of the Susquehanna River in Jenkins Township near the City of Pittston. Underground mines were flooded and have resulted in a mine pool which extends across the width of the Wyoming Valley from the Northern limits of the county, South to the City of Nanticoke. This is known as the Knox Mine Disaster. In February 2008, a collapsed sewer line caused a subsidence in Hanover Township. Later that year in April, a case of mine subsidence damaged two houses in Hazle Township. In April 2019, a road in Wilkes-Barre Township was closed due to a sinkhole. Mine experts investigated the incident as they believed it may have been due to mine subsidence. In September 2023, a large sinkhole opened in Glen Lyon in a housing complex, the same site as a previous sinkhole incident 40 years ago (WNEP, 2023).

Figure 4.3.10-2 Sinkhole in Newport Township (WNEP, 2023)

4.3.10.4. Future Occurrence

Based on geological conditions, subsidence events may possibly occur in the future for the areas in Luzerne County underlain by carbonate rock, or by mines. Sinkholes and surface depressions are dependent on several variables, including land use and water management. Changes in these variables can affect the likelihood and frequency of future subsidence events. Overall, though, the probability of future subsidence and sinkhole events can be considered *possible* according to the Risk Factor Methodology (see Table 4.4-1).

4.3.10.5. Vulnerability Assessment

The secondary effects of sinkhole formation have the potential to cause significant impacts in communities underlain by surface-level limestone and historical mines, including structural damage, damage to transportation systems, and damage to subsurface utility systems. Structures and critical facilities located over limestone and dolomite bedrock are considered vulnerable to sinkholes and are inventories in Table 4.3.10-2. Salem Township has the greatest number of structures on karst topography (1,786), and the second greatest percentage (68%). 100% of the structures in Nescopeck Borough are located on karst topography (874 structures). Salem Township also has the greatest number of critical facilities on karst topography (31), and the second greatest percentage (58%). 100% of the critical facilities in Nescopeck borough are located on karst topography (3 structures). Nescopeck Borough and Salem Township can be considered the most vulnerable municipalities for subsidence hazards based on location of structures in relation to karst topography.

Table 4.3.10-2 shows subsidence vulnerability by structure type. The most vulnerable land use types are residential (1,920). There are no mining, mixed use or special purpose structures vulnerable to subsidence; this is likely as there are far fewer of these facilities than residential and commercial structures in the County.

Table 4.3.10-2 Structures, Critical Facilities and Population Vulnerability to Karst Topography for Luzerne County

MUNICIPALITY	TOTAL STRUCTURES IN MUNICIPALITY	TOTAL STRUCTURES ON KARST TOPOGRAPHY	PERCENT OF STRUCTURES ON KARST TOPOGRAPHY	TOTAL CRITICAL FACILITIES IN MUNICIPALITY	TOTAL CRITICAL FACILITIES STRUCTURES ON KARST TOPOGRAPHY	PERCENT CRITICAL FACILITIES ON KARST	TOTAL POPULATION IN MUNICIPALITY	TOTAL POPULATION KARST TOPOGRAPHY	PERCENT OF POPULATION ON KARST TOPOGRAPHY
Ashley Borough	1,281	0	0%	22	0	0%	2,596	0	0%
Avoca Borough	1,294	0	0%	21	0	0%	2,507	0	0%
Bear Creek Township	1,713	0	0%	50	0	0%	2,754	0	0%
Bear Creek Village Borough	179	0	0%	7	0	0%	291	0	0%
Black Creek Township	1,452	0	0%	35	0	0%	1,909	0	0%
Buck Township	301	0	0%	9	0	0%	379	0	0%
Butler Township	4,499	0	0%	88	0	0%	9,485	0	0%
Conyngham Borough	871	0	0%	8	0	0%	1,825	0	0%
Conyngham Township	919	78	8%	21	3	14%	1,312	143	11%
Courtdale Borough	395	0	0%	5	0	0%	689	0	0%
Dallas Borough	1,209	0	0%	11	0	0%	2,694	0	0%
Dallas Township	3,528	0	0%	60	0	0%	9,099	0	0%
Dennison Township	717	0	0%	30	0	0%	963	0	0%
Dorrance Township	1,564	0	0%	49	0	0%	2,076	0	0%
Dupont Borough	1,463	0	0%	32	0	0%	2,539	0	0%
Duryea Borough	2,496	0	0%	17	0	0%	5,036	0	0%
Edwardsville Borough	1,521	0	0%	10	0	0%	4,929	0	0%
Exeter Borough	2,520	0	0%	14	0	0%	5,514	0	0%
Exeter Township	1,223	0	0%	26	0	0%	2,051	0	0%
Fairmount Township	1,146	0	0%	42	0	0%	1,210	0	0%
Fairview Township	1,901	0	0%	24	0	0%	4,703	0	0%

Table 4.3.10-2 Structures, Critical Facilities and Population Vulnerability to Karst Topography for Luzerne County

MUNICIPALITY	TOTAL STRUCTURES IN MUNICIPALITY	TOTAL STRUCTURES ON KARST TOPOGRAPHY	PERCENT OF STRUCTURES ON KARST TOPOGRAPHY	TOTAL CRITICAL FACILITIES IN MUNICIPALITY	TOTAL CRITICAL FACILITIES STRUCTURES ON KARST TOPOGRAPHY	PERCENT CRITICAL FACILITIES ON KARST	TOTAL POPULATION IN MUNICIPALITY	TOTAL POPULATION KARST TOPOGRAPHY	PERCENT OF POPULATION ON KARST TOPOGRAPHY
Forty Fort Borough	2,201	0	0%	19	0	0%	4,239	0	0%
Foster Township	2,002	0	0%	30	0	0%	3,408	0	0%
Franklin Township	1,063	0	0%	22	0	0%	1,716	0	0%
Freeland Borough	1,119	0	0%	5	0	0%	3,833	0	0%
Hanover Township	5,005	0	0%	95	0	0%	11,445	0	0%
Harveys Lake Borough	1,871	0	0%	15	0	0%	2,788	0	0%
Hazle Township	5,022	0	0%	61	0	0%	10,160	0	0%
City of Hazleton	6,310	0	0%	29	0	0%	29,963	0	0%
Hollenback Township	969	0	0%	18	0	0%	1,139	0	0%
Hughestown Borough	706	0	0%	4	0	0%	1,329	0	0%
Hunlock Township	1,503	0	0%	36	0	0%	2,223	0	0%
Huntington Township	1,739	0	0%	54	0	0%	2,053	0	0%
Jackson Township	1,394	0	0%	36	0	0%	4,631	0	0%
Jeddo Borough	36	0	0%	1	0	0%	108	0	0%
Jenkins Township	2,193	0	0%	21	0	0%	4,283	0	0%
Kingston Borough	5,083	0	0%	33	0	0%	13,349	0	0%
Kingston Township	3,249	0	0%	45	0	0%	7,108	0	0%
Laflin Borough	612	0	0%	13	0	0%	1,451	0	0%
Lake Township	1,331	0	0%	29	0	0%	1,993	0	0%
Larksville Borough	2,126	0	0%	12	0	0%	4,225	0	0%
Laurel Run Borough	293	0	0%	4	0	0%	558	0	0%
Lehman Township	2,071	0	0%	40	0	0%	3,346	0	0%

Table 4.3.10-2 Structures, Critical Facilities and Population Vulnerability to Karst Topography for Luzerne County

MUNICIPALITY	TOTAL STRUCTURES IN MUNICIPALITY	TOTAL STRUCTURES ON KARST TOPOGRAPHY	PERCENT OF STRUCTURES ON KARST TOPOGRAPHY	TOTAL CRITICAL FACILITIES IN MUNICIPALITY	TOTAL CRITICAL FACILITIES STRUCTURES ON KARST TOPOGRAPHY	PERCENT CRITICAL FACILITIES ON KARST	TOTAL POPULATION IN MUNICIPALITY	TOTAL POPULATION KARST TOPOGRAPHY	PERCENT OF POPULATION ON KARST TOPOGRAPHY
Luzerne Borough	1,365	0	0%	12	0	0%	2,711	0	0%
City of Nanticoke	4,409	0	0%	26	0	0%	10,628	0	0%
Nescopeck Borough	875	874	100%	2	2	100%	1,480	1480	100%
Nescopeck Township	975	38	4%	30	2	7%	1,081	20	2%
New Columbus Borough	206	0	0%	9	0	0%	222	0	0%
Newport Township	1,829	0	0%	15	0	0%	4,433	0	0%
Nuangola Borough	402	0	0%	1	0	0%	666	0	0%
Penn Lake Park Borough	232	0	0%	4	0	0%	360	0	0%
City of Pittston	3,056	0	0%	14	0	0%	7,591	0	0%
Pittston Township	1,807	0	0%	38	0	0%	3,186	0	0%
Plains Township	4,771	0	0%	79	0	0%	9,808	0	0%
Plymouth Borough	2,394	0	0%	17	0	0%	5,763	0	0%
Plymouth Township	1,129	0	0%	24	0	0%	1,717	0	0%
Pringle Borough	504	0	0%	9	0	0%	893	0	0%
Rice Township	1,480	0	0%	40	0	0%	3,632	0	0%
Ross Township	2,012	0	0%	53	0	0%	2,726	0	0%
Salem Township	2,613	1,786	68%	55	33	60%	4,027	3,061	76%
Shickshinny Borough	327	0	0%	7	0	0%	632	0	0%
Slocum Township	828	0	0%	13	0	0%	1,054	0	0%
Sugarloaf Township	460	0	0%	5	0	0%	1,001	0	0%
Sugar Notch Borough	2,203	0	0%	45	0	0%	3,869	0	0%

Table 4.3.10-2 Structures, Critical Facilities and Population Vulnerability to Karst Topography for Luzerne County

MUNICIPALITY	TOTAL STRUCTURES IN MUNICIPALITY	TOTAL STRUCTURES ON KARST TOPOGRAPHY	PERCENT OF STRUCTURES ON KARST TOPOGRAPHY	TOTAL CRITICAL FACILITIES IN MUNICIPALITY	TOTAL CRITICAL FACILITIES STRUCTURES ON KARST TOPOGRAPHY	PERCENT CRITICAL FACILITIES ON KARST	TOTAL POPULATION IN MUNICIPALITY	TOTAL POPULATION KARST TOPOGRAPHY	PERCENT OF POPULATION ON KARST TOPOGRAPHY
Swoyersville Borough	2,681	0	0%	20	0	0%	5,021	0	0%
Union Township	1,443	0	0%	32	0	0%	2,035	0	0%
Warrior Run Borough	295	0	0%	2	0	0%	527	0	0%
West Hazleton Borough	1,165	0	0%	13	0	0%	5,163	0	0%
West Pittston Borough	2,122	0	0%	5	0	0%	4,652	0	0%
West Wyoming Borough	1,487	0	0%	10	0	0%	2,638	0	0%
White Haven Borough	521	0	0%	15	0	0%	1,166	0	0%
City of Wilkes-Barre	14,135	0	0%	104	0	0%	44,328	0	0%
Wilkes-Barre Township	1,540	0	0%	33	0	0%	3,213	0	0%
Wright Township	2,609	0	0%	39	0	0%	5,722	0	0%
Wyoming Borough	1,542	0	0%	11	0	0%	3,102	0	0%
Yatesville Borough	320	0	0%	1	0	0%	638	0	0%
Total	**143,827**	**2,776**	**2%**	1,986	40	2%	**325,594**	**4,704**	**1%**

** Calculated by overlaying Luzerne County GIS structure data with areas of carbonate rock near land surface.*

Table 4.3.10-3 Structures Subsidence Vulnerability to Karst Topography by Land Use for Luzerne County

Municipality	Agriculture	Commercial	Conservation	Industrial	Mining	Mixed Use	Residential	Special Purpose	Total per Municipality
Ashley Borough	0	0	0	0	0	0	0	0	0
Avoca Borough	0	0	0	0	0	0	0	0	0
Bear Creek Township	0	0	0	0	0	0	0	0	0
Bear Creek Village Borough	0	0	0	0	0	0	0	0	0
Black Creek Township	0	0	0	0	0	0	0	0	0
Buck Township	0	0	0	0	0	0	0	0	0
Butler Township	0	0	0	0	0	0	0	0	0
Conyngham Borough	0	0	0	0	0	0	0	0	0
Conyngham Township	75	0	3	0	0	0	0	0	78
Courtdale Borough	0	0	0	0	0	0	0	0	0
Dallas Borough	0	0	0	0	0	0	0	0	0
Dallas Township	0	0	0	0	0	0	0	0	0
Dennison Township	0	0	0	0	0	0	0	0	0
Dorrance Township	0	0	0	0	0	0	0	0	0
Dupont Borough	0	0	0	0	0	0	0	0	0
Duryea Borough	0	0	0	0	0	0	0	0	0
Edwardsville Borough	0	0	0	0	0	0	0	0	0
Exeter Borough	0	0	0	0	0	0	0	0	0
Exeter Township	0	0	0	0	0	0	0	0	0
Fairmount Township	0	0	0	0	0	0	0	0	0
Fairview Township	0	0	0	0	0	0	0	0	0

Table 4.3.10-3 Structures Subsidence Vulnerability to Karst Topography by Land Use for Luzerne County

Municipality	Agriculture	Commercial	Conservation	Industrial	Mining	Mixed Use	Residential	Special Purpose	Total per Municipality
Forty Fort Borough	0	0	0	0	0	0	0	0	0
Foster Township	0	0	0	0	0	0	0	0	0
Franklin Township	0	0	0	0	0	0	0	0	0
Freeland Borough	0	0	0	0	0	0	0	0	0
Hanover Township	0	0	0	0	0	0	0	0	0
Harveys Lake Borough	0	0	0	0	0	0	0	0	0
Hazle Township	0	0	0	0	0	0	0	0	0
Hazleton City	0	0	0	0	0	0	0	0	0
Hollenback Township	0	0	0	0	0	0	0	0	0
Hughestown Borough	0	0	0	0	0	0	0	0	0
Hunlock Township	0	0	0	0	0	0	0	0	0
Huntington Township	0	0	0	0	0	0	0	0	0
Jackson Township	0	0	0	0	0	0	0	0	0
Jeddo Borough	0	0	0	0	0	0	0	0	0
Jenkins Township	0	0	0	0	0	0	0	0	0
Kingston Borough	0	0	0	0	0	0	0	0	0
Kingston Township	0	0	0	0	0	0	0	0	0
Laflin Borough	0	0	0	0	0	0	0	0	0
Lake Township	0	0	0	0	0	0	0	0	0
Larksville Borough	0	0	0	0	0	0	0	0	0
Laurel Run Borough	0	0	0	0	0	0	0	0	0
Lehman Township	0	0	0	0	0	0	0	0	0

Table 4.3.10-3 Structures Subsidence Vulnerability to Karst Topography by Land Use for Luzerne County

MUNICIPALITY	AGRICULTURE	COMMERCIAL	CONSERVATION	INDUSTRIAL	MINING	MIXED USE	RESIDENTIAL	SPECIAL PURPOSE	TOTAL PER MUNICIPALITY
Luzerne Borough	0	0	0	0	0	0	0	0	0
Nanticoke City	0	0	0	0	0	0	0	0	0
Nescopeck Borough	18	33	20	27	0	0	776	0	874
Nescopeck Township	23	0	4	0	0	0	11	0	38
New Columbus Borough	0	0	0	0	0	0	0	0	0
Newport Township	0	0	0	0	0	0	0	0	0
Nuangola Borough	0	0	0	0	0	0	0	0	0
Penn Lake Park Borough	0	0	0	0	0	0	0	0	0
Pittston City	0	0	0	0	0	0	0	0	0
Pittston Township	0	0	0	0	0	0	0	0	0
Plains Township	0	0	0	0	0	0	0	0	0
Plymouth Borough	0	0	0	0	0	0	0	0	0
Plymouth Township	0	0	0	0	0	0	0	0	0
Pringle Borough	0	0	0	0	0	0	0	0	0
Rice Township	0	0	0	0	0	0	0	0	0
Ross Township	0	0	0	0	0	0	0	0	0
Salem Township	279	172	93	109	0	0	1,133	0	1,786
Shickshinny Borough	0	0	0	0	0	0	0	0	0
Slocum Township	0	0	0	0	0	0	0	0	0
Sugar Notch Borough	0	0	0	0	0	0	0	0	0
Sugarloaf Township	0	0	0	0	0	0	0	0	0
Swoyersville Borough	0	0	0	0	0	0	0	0	0

Table 4.3.10-3 Structures Subsidence Vulnerability to Karst Topography by Land Use for Luzerne County

MUNICIPALITY	AGRICULTURE	COMMERCIAL	CONSERVATION	INDUSTRIAL	MINING	MIXED USE	RESIDENTIAL	SPECIAL PURPOSE	TOTAL PER MUNICIPALITY
Union Township	0	0	0	0	0	0	0	0	0
Warrior Run Borough	0	0	0	0	0	0	0	0	0
West Hazleton Borough	0	0	0	0	0	0	0	0	0
West Pittston Borough	0	0	0	0	0	0	0	0	0
West Wyoming Borough	0	0	0	0	0	0	0	0	0
White Haven Borough	0	0	0	0	0	0	0	0	0
Wilkes-Barre City	0	0	0	0	0	0	0	0	0
Wilkes-Barre Township	0	0	0	0	0	0	0	0	0
Wright Township	0	0	0	0	0	0	0	0	0
Wyoming Borough	0	0	0	0	0	0	0	0	0
Yatesville Borough	0	0	0	0	0	0	0	0	0
Total	395	205	120	136	0	0	1,920	0	2,776

** Calculated by overlaying Luzerne County GIS structure data with areas of carbonate rock near land surface.*

There are a few measures that can reduce the overall vulnerability to subsidence and sinkholes. Municipal governments may determine guidelines for construction in high-subsidence areas. A community can reduce its vulnerability to subsidence or sinkholes by implementing solutions such as land use controls, insurance programs, subsidence-resistant designs, or in the case of mine-related subsidence, conduct selective support or mine filling. If a sinkhole occurs on private property, it is normally the responsibility of the property owner to initiate repairs. Homeowners' insurance often does not cover damages attributed to subsidence. Since 1987, sinkhole insurance has been available within Pennsylvania and may serve to eliminate the financial burdens placed on the homeowner.

Careful planning is the least-costly and most effective method for reducing vulnerability to subsidence hazards. Municipalities can minimize the potential for sinkhole development through proper maintenance and updating of water utility lines. Zoning laws can also be enacted to regulate development within highly karst areas.

4.3.10.6. Equity in Vulnerable Communities

In terms of equitable hazard mitigation planning, communities that are at risk are often found in rural areas. Land previously used for agriculture, mining, or extraction of water can increase the risk of subsidence and sinkholes due to over-extraction. Simultaneously, rural communities may also lack the resources to prevent or respond to such events. Low-income communities often live in older, poorly constructed homes or areas where housing is cheaper but more vulnerable to geological hazards like subsidence and sinkholes, making them also slightly more at risk.

4.3.11. TORNADO, WINDSTORM

4.3.11.1. Location and Extent

Tornadoes and potentially damaging high winds occur throughout Pennsylvania. Tornados and high winds may be experienced at any location in Luzerne County.

A tornado, a violently rotating funnel-like vortex, is an extraordinary feature of severe thunderstorms. A condensation funnel does not need to reach the ground for a tornado to be present; a debris cloud beneath a thunderstorm is all that is needed to confirm the presence of a tornado, even in the total absence of a funnel. While the extent of tornado damage is usually localized, the extreme winds of this vortex can be among the most destructive on earth when they move through populated, developed areas.

Tornadoes can occur at any time during the day or night but are most frequent during late afternoon into early evening, the warmest hours of the day. May to August is the most likely time for tornados to occur in Pennsylvania. Tornado movement is characterized in two ways: direction and speed of spinning winds and forward movement of the tornado, also known as the storm track. Rotational wind speeds of the vortex can range from 100 mph to more than 250 mph. In addition, the speed of forward motion can be zero to 45 or 50 mph. Therefore, some estimates place the maximum velocity (combination of ground speed, wind speed, and upper winds) of tornadoes at about 300 mph.

The forward motion of the tornado path can be a few hundred yards or several hundred miles in length. The width of tornadoes can vary greatly but generally ranges from less than 100 feet to over a mile in width. Some tornadoes never touch the ground and are short-lived, while others may touch the ground several times over long periods of time.

Straight-line winds often accompany tornados and are caused by the movement of air from areas of higher pressure to areas of lower pressure – the greater the difference in pressure, the stronger the winds. Windstorms are generally defined as sustained wind speeds of 40 mph or greater lasting for one hour or longer, or winds of 58 mph or greater for any duration.

The destruction caused by tornadoes ranges from light to inconceivable depending on the intensity, size, and duration of the storm. Typically, tornadoes cause the greatest damage to structures of light construction, such as mobile homes. The impact of tornado hazards is ultimately dependent on the population or amount of property present in the area in which the tornado occurs. Tornado events are often so severe that property loss or human fatality is typically inevitable if evacuation or proper construction standards are not implemented. The enhanced Fujita Tornado Scale (or the —EF-Scale) classifies U.S. tornadoes into six intensity categories, named EF0 to EF5, based upon the estimated maximum winds occurring within the funnel. The EF-Scale has subsequently become the definitive metric for estimating wind speeds within tornadoes based upon the damage done to buildings and structures.

4.3.11.2. Range of Magnitude

Since 2007 the EF Scale has been used in the United States to describe the magnitude of tornadoes. Prior to 2007, the Fujita Scale (F-Scale) was commonly used to describe magnitude. This scale is based on new information about the relationship between wind speed given in miles per hour (mph) and corresponding damages. The EF Scale categorized tornadoes from EF0 to EF5 with EF0 being the most commonly occurring type of tornado. The strongest tornado recorded in Luzerne County has been a category 2 or EF2 tornado. The following table shows the relationship between the EF- and F- Scales.

Table 4.3.11-1 Enhanced Fujita Scale (EF-Scale) categories with associated wind speeds

FUJITA SCALE		ENHANCED FUJITA SCALE	
F NUMBER	3-SECOND GUST (MPH)	EF NUMBER	3-SECOND GUST (MPH)
0	45–78	0	65–85
1	79–117	1	86–110
2	118–161	2	111–135
3	162–209	3	136–165
4	210–261	4	166–200
5	262–317	5	OVER 200

The types of damages that can be expected with each category of tornado are described in Table 4.3.11-2.

Table 4.3.11-2 Expected Tornado Damages.

F OR EF SCALE	EXAMPLES OF POSSIBLE DAMAGE
0	Light damage. Some damage to chimneys; broken tree branches; shallow-rooted trees pushed over; damage to sign boards.
1	Moderate damage. Roof surface peeled off roofs; mobile homes pushed off foundations or overturned; moving automobiles pushed off roads.
2	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light-object missiles generated.
3	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; cars lifted off ground and thrown.
4	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown, and large missiles generated.
5	Catastrophic damage. Well-built houses swept completely away, leaving only the slab foundations.

Figure 4.3.6-1 in the Hurricane, Tropical Storm, and Nor'easter hazard profile shows wind speed zones developed by the American Society of Civil Engineers based on information including 40 years of tornado history and over 100 years of hurricane history. It identifies wind speeds that could occur across the United States to be used as the basis for design and evaluation of the structural integrity of shelters and critical facilities. Luzerne County falls in Zone II and Zone III, which are classified as 160 mph and 200 mph wind zones, respectively. This meaning design wind speeds for shelters and critical facilities should be able to withstand a three second gust of up to 160 mph and 200 mph, regardless of whether the gust is the result of a tornado, hurricane, tropical storm, or windstorm event. In Luzerne, County, all new residential and commercial structures are required to be constructed per the International Building Code (IBC), which requires structures to be designed to a 90-mph wind speed.

Since tornado and windstorm events are typically localized, environmental impacts are rarely widespread. However, where these events occur, severe damage to buildings and plant species is likely. This includes loss of trees and an increased threat of wildfire in areas where dead trees are not removed. Hazardous material facilities should meet design requirements to withstand a three-second gust of up to 160 mph in order to prevent release of hazardous materials into the environment.

The potential impacts of a tornado or windstorm on community lifelines are as follows:

Table 4.3.11-3 Most Likely Lifelines impacted by Tornadoes or Windstorms

LIFELINES	NOTES
	Government officials, including police and fire, will be needed for community safety due to potential harm from tornadoes, high winds, and associated weather conditions.
	Tornadoes and windstorms cause significant damage to agricultural operations and structures.
	Energy lifelines in response to recovery due to potential direct damage from tornadoes and windstorms.
	Material storage facilities and operations may be damaged due to significant damage from tornadoes and windstorms.

4.3.11.3. Past Occurrence

Tornado magnitudes in Luzerne County have never exceeded F2/EF2. F2/EF2 tornados have touched down in 2006, 2017, and 2018. The 2018 tornado destroyed several homes and damaged 24 businesses. Roofs, windows, and signs were all damaged at a shopping center,

with one sign found 7 miles from the mall area. The most recent F1 tornado in 2023 did much less damage, destroying mostly trees, a residential roof, and a shed during its time touched down. Table 4.3.11-4 below summarizes previous tornado events in Luzerne County.

Table 4.3.11-4 Previous tornado events between 2000 and 2024 in Luzerne County (NCEI, 2025).

LOCATION	DATE	ESTIMATED LENGTH	ESTIMATED WIDTH	MAGNITUDE	ESTIMATED PROPERTY DAMAGE ($)
Dallas Township	07/22/2006	1.5 miles	75 yards	F0	*$100,000*
Hollenback Township	12/01/2006	20 miles	150 yards	F2	*$1,000,000*
Foster Township	07/26/2012	0.52 miles	75 yards	EF1	*$30,000*
Huntington Township	07/08/2014	0.9 miles	50 yards	EF0	*$5,000*
Wilkes-Barre City	02/25/2017	7.12 miles	500 yards	EF2	*$250,000*
Wilkes-Barre City	06/13/2018	2.9 miles	150 yards	EF2	*$5,000,000*
Lehman Township	08/12/2023	3.25 miles	150 yards	EF1	*$100,000*

Table 4.3.11-5 Previous windstorm events greater than 50 knots in Luzerne County between 2000 and 2024 (NCEI, 2025).

LOCATION*	DATE	ESTIMATED WIND SPEED (KNOTS)	ESTIMATED PROPERTY DAMAGE ($)
Wilkes-Barre City	05/18/2000	65	*not provided*
Countywide	06/02/2000	55	*not provided*
Countywide	12/12/2000	52	*$100,000*
Salem Township	04/09/2001	52	*not provided*
Hazleton City	04/09/2001	52	*not provided*
Pittston City	05/27/2001	80	*$50,000*
Harveys Lake Borough	07/01/2001	55	*not provided*
Lehman Township	07/01/2001	50	*not provided*
Countywide	03/09/2002	60	*$10,000*
Dallas Township	07/21/2003	55	*$50,000*
Sugarloaf Township	07/21/2003	55	*$5,000*
Countywide	09/19/2003	50	*$50,000*
Countywide	10/15/2003	60	*$100,000*
Countywide	11/13/2003	58	*$30,000*
Harveys Lake Borough	8/20/2004	60	*$10,000*
Harveys Lake Borough	11/25/2004	60	*$50,000*
Huntington Township	06/06/2005	50	*$5,000*
West Pittston Borough	06/09/2005	75	*$100,000*
Huntington Township	07/13/2005	50	*$2,000*

Table 4.3.11-5 Previous windstorm events greater than 50 knots in Luzerne County between 2000 and 2024 (NCEI, 2025).

LOCATION*	DATE	ESTIMATED WIND SPEED (KNOTS)	ESTIMATED PROPERTY DAMAGE ($)
Fairmount Township	08/12/2005	50	*$5,000*
Warrior Run Borough	08/14/2005	50	*$5,000*
Harveys Lake Borough	11/06/2005	50	*$2,000*
Ashley Borough	11/06/2005	57	*not provided*
Kingston Township	11/06/2005	50	*$20,000*
Conyngham Township	11/09/2005	50	*$2,000*
Countywide	11/29/2005	50	*$5,000*
Hazleton City	02/17/2006	57	*$10,000*
Nanticoke City	07/02/2006	50	*$1,000*
New Columbus Borough	08/03/2006	50	*$1,000*
Countywide	12/01/2006	55	*$5,000*
Nescopeck Township	12/01/2006	55	*$10,000*
Nuangola Borough	12/01/2006	66	*not provided*
Avoca Borough	12/01/2006	57	*not provided*
Wilkes-Barre City	06/08/2007	50	*not provided*
Kingston Township	06/08/2007	50	*not provided*
Huntington Township	06/19/2007	50	*not provided*
Ross Township	06/19/2007	50	*not provided*
Shickshinny Borough	06/19/2007	52	*not provided*
Kingston Township	06/19/2007	52	*not provided*
Kingston Township	06/27/2007	50	*not provided*
Wilkes-Barre City	07/27/2007	50	*$5,000*
Forty Fort Borough	08/07/2007	50	*$25,000*
Pringle Borough	08/07/2007	50	*$10,000*
Conyngham Township	08/25/2007	50	*not provided*
Jackson Township	06/10/2008	50	*not provided*
Ross Township	06/10/2008	50	*$10,000*
Wilkes-Barre City	06/10/2008	50	*not provided*
Hazleton City	06/16/2008	55	*not provided*
Huntington Township	07/17/2008	50	*not provided*
Nescopeck Borough	07/17/2008	50	*$2,000*
Conyngham Township	07/17/2008	50	*not provided*
Dallas Township	06/26/2009	50	*$10,000*
Wilkes-Barre City	04/08/2010	50	*$1,000*
Ross Township	04/08/2010	50	*$2,000*
Nescopeck Borough	09/22/2010	50	*not provided*
Black Creek Township	09/22/2010	50	*not provided*

Table 4.3.11-5 Previous windstorm events greater than 50 knots in Luzerne County between 2000 and 2024 (NCEI, 2025).

LOCATION*	DATE	ESTIMATED WIND SPEED (KNOTS)	ESTIMATED PROPERTY DAMAGE ($)
West Pittston Borough	10/11/2010	50	*$2,000*
Exeter Township	10/11/2010	50	*$2,000*
Exeter Township	10/11/2010	50	*$2,000*
Countywide	04/16/2011	52	*$50,000*
Countywide	04/16/2011	54	*$10,000*
Lehman Township	04/26/2011	61	*$75,000*
Lehman Township	04/28/2011	60	*$50,000*
Lehman Township	04/28/2011	83	*$50,000*
Swoyersville Borough	05/30/2011	50	*$3,000*
Forty Fort Borough	06/09/2011	52	*not provided*
Fairview Township	07/18/2011	50	*$2,000*
Harveys Lake Borough	07/18/2011	50	*$1,000*
Edwardsville Borough	07/25/2011	50	*$10,000*
Kingston Township	07/25/2011	50	*$5,000*
Wilkes-Barre City	08/13/2011	50	*$5,000*
Conyngham Township	08/13/2011	50	*$3,000*
Hazle Township	08/13/2011	50	*$4,000*
Countywide	08/28/2011	50	*$100,000*
Ross Township	05/29/2012	50	*$1,000*
Plains Township	06/22/2012	61	*$10,000*
Butler Township	07/07/2012	50	*$2,000*
Nescopeck Borough	07/07/2012	50	*$2,000*
Hazleton City	07/07/212	50	*$3,000*
Hazleton City	07/26/2012	50	*$10,000*
Butler Township	07/26/2012	50	*$2,000*
Countywide	10/29/2012	58	*$400,000*
Fairview Township	04/10/2013	50	*$10,000*
Pringle Borough	06/24/2013	50	*$2,000*
Dallas Township	07/08/2014	50	*$30,000*
Exeter Township	07/08/2014	61	*$30,000*
Newport Township	07/13/2014	50	*$5,000*
Bear Creek Township	07/13/2014	50	*$5,000*
Hazleton City	09/06/2014	50	*$5,000*
Newport Township	06/28/2016	55	*$4,000*
Pittston City	07/25/2016	50	*$5,000*
Shickshinny Borough	07/25/2016	55	*$5,000*
Wilkes-Barre City	02/25/2017	60	*not provided*

Table 4.3.11-5 Previous windstorm events greater than 50 knots in Luzerne County between 2000 and 2024 (NCEI, 2025).

LOCATION*	DATE	ESTIMATED WIND SPEED (KNOTS)	ESTIMATED PROPERTY DAMAGE ($)
Wilkes-Barre City	05/01/2017	52	*$3,000*
Slocum Township	07/17/2017	50	*$3,000*
Ashley Borough	07/20/2017	50	*$3,000*
Exeter Township	05/10/2018	50	*$5,000*
Ross Township	05/15/5018	50	*$15,000*
Nanticoke City	05/15/5018	50	*$10,000*
Wilkes-Barre City	05/15/2018	50	*$15,000*
Duryea Borough	05/15/2018	50	*$1,000*
Nanticoke City	05/15/2018	50	*$2,000*
Hollenback Township	06/13/2018	65	*$30,000*
Lehman Township	06/24/2018	50	*$20,000*
Wilkes-Barre City	07/17/2018	50	*$5,000*
Shickshinny Borough	10/02/2018	50	*$10,000*
Slocum Township	10/02/2018	50	*$15,000*
Ross Township	04/15/2019	70	*$10,000*
Dallas Township	04/15/2019	70	*$10,000*
Plains Township	04/15/2019	50	*$15,000*
Pittston City	04/15/2019	50	*$10,000*
Edwardsville Borough	04/15/2019	50	*$2,000*
Kingston Township	04/15/2019	50	*$5,000*
Kingston Township	04/15/2019	50	*$5,000*
Nescopeck Borough	05/19/2019	50	*$5,000*
Shickshinny Borough	05/19/2019	50	*$5,000*
Conyngham Township	05/19/2019	50	*$5,000*
Hollenback Township	05/19/2019	50	*$5,000*
Forty Fort Borough	05/19/2019	50	*$5,000*
Edwardsville Borough	05/19/2019	50	*$5,000*
Wilkes-Barre City	05/19/2019	50	*$10,000*
Shickshinny Borough	05/19/2019	50	*$10,000*
Lehman Township	05/19/2019	50	*$10,000*
Larksville Borough	05/19/2019	50	*$5,000*
Larksville Borough	05/19/2019	50	*$10,000*
Newport Township	05/29/2019	50	*$5,000*
Rice Township	05/29/2019	50	*$5,000*
Nescopeck Pass	05/29/2019	50	*$5,000*
Lehman Township	07/02/2019	50	*$10,000*
Pittston City	07/21/2019	50	*$10,000*

Table 4.3.11-5 Previous windstorm events greater than 50 knots in Luzerne County between 2000 and 2024 (NCEI, 2025).

LOCATION*	DATE	ESTIMATED WIND SPEED (KNOTS)	ESTIMATED PROPERTY DAMAGE ($)
Fairmount Township	07/21/2019	50	*$5,000*
Nuangola Borough	07/21/2019	50	*$5,000*
Pittston City	07/30/2019	50	*$10,000*
Duryea Borough	07/30/2019	50	*$5,000*
Dallas Township	08/02/2019	50	*$5,000*
Harveys Lake Borough	08/02/2019	50	*$5,000*
Duryea Borough	08/08/2019	50	*$5,000*
Fairmount Township	08/15/2019	50	*$5,000*
Ross Township	08/15/2019	50	*$5,000*
Salem Township	08/17/2019	50	*$10,000*
Salem Township	08/17/2019	50	*$5,000*
Shickshinny Borough	08/18/2019	50	*$5,000*
Kingston Township	08/18/2019	50	*$10,000*
Sugarloaf Township	03/20/2020	61	*$30,000*
Wilkes-Barre City	08/24/2020	50	*$10,000*
Wilkes-Barre Township	08/24/2020	50	*$5,000*
Huntington Township	08/24/2020	50	*$5,000*
Newport Township	08/24/2020	50	*$5,000*
Union Township	08/29/2020	50	*$5,000*
Fairmount Township	06/21/2021	50	*$5,000*
Jenkins Township	07/06/2021	50	*$1,000*
Huntington Township	07/09/2021	50	*$3,000*
Union Township	07/09/2021	50	*$3,000*
Nescopeck Borough	07/11/2021	50	*$3,000*
Kingston Township	07/17/2021	50	*$3,700*
Fairmount Township	07/27/2021	50	*$3,000*
Dallas Township	07/27/2021	50	*$3,000*
Nanticoke City	07/27/2021	50	*$1,500*
Wilkes-Barre City	07/27/2021	50	*$1,500*
Nuangola Borough	07/27/2021	50	*$2,000*
Luzerne Borough	07/27/2021	50	*$1,000*
Slocum Township	07/27/2021	50	*$3,000*
Shickshinny Borough	08/01/2021	50	*$1,000*
Hanover Township	08/01/2021	50	*$1,000*
Conyngham Township	08/01/2021	50	*$3,000*
Ross Township	08/12/2021	50	*$3,000*
Swoyersville Borough	08/12/2021	50	*$1,000*

Table 4.3.11-5 Previous windstorm events greater than 50 knots in Luzerne County between 2000 and 2024 (NCEI, 2025).

LOCATION*	DATE	ESTIMATED WIND SPEED (KNOTS)	ESTIMATED PROPERTY DAMAGE ($)
Nanticoke City	08/12/2021	50	*$750*
Nescopeck Borough	09/13/2021	50	*$3,000*
Black Creek Township	09/13/2021	50	*$5,000*
Wilkes-Barre City	09/13/2021	50	*$1,000*
Huntington Township	03/07/2022	50	*$5,000*
Ross Township	03/07/2022	50	*$5,000*
Shickshinny Borough	03/07/2022	50	*$5,000*
Hunlock Township	03/07/2022	50	*$5,000*
Lehman Township	03/07/2022	50	*$5,000*
Dallas Borough	03/07/2022	50	*$5,000*
Fairview Township	03/07/2022	50	*$5,000*
Hazleton City	03/07/2022	50	*$5,000*
New Columbus Borough	03/19/2022	50	*$1,000*
Wilkes-Barre City	03/19/2022	50	*$10,000*
Ross Township	03/31/2022	50	*$5,000*
Ross Township	03/31/2022	50	*$2,000*
Harveys Lake Borough	03/31/2022	50	*$1,000*
Dorrance Township	07/12/2022	50	*$1,000*
Wilkes-Barre City	07/12/2022	50	*$1,000*
Wilkes-Barre City	07/22/2022	50	*$2,500*
Exeter Borough	07/22/2022	50	*$6,000*
Wilkes-Barre City	07/24/2022	50	*$250*
Plains Township	07/24/2022	50	*$2,500*
Pittston City	07/24/2022	50	*$250*
Parsons Township	07/24/2022	50	*$3,000*
White Haven Borough	08/04/2022	50	*$5,000*
Hollenback Township	02/21/2023	60	*$12,000*
Newport Township	06/27/2023	50	*$2,500*
Harveys Lake Borough	06/27/2023	50	*$3,000*
Freeland Borough	06/27/2023	50	*$5,000*
West Pittston Borough	07/07/2023	50	*$2,500*
Wilkes-Barre City	07/07/2023	50	*$1,000*
Pittston City	07/17/2023	50	*$2,000*
White Haven Borough	07/27/2023	50	*$2,500*
Sugarloaf Township	09/07/2023	50	*$3,000*
Hollenback Township	09/07/2023	50	*$5,000*
Hanover Township	09/07/2023	50	*$2,000*

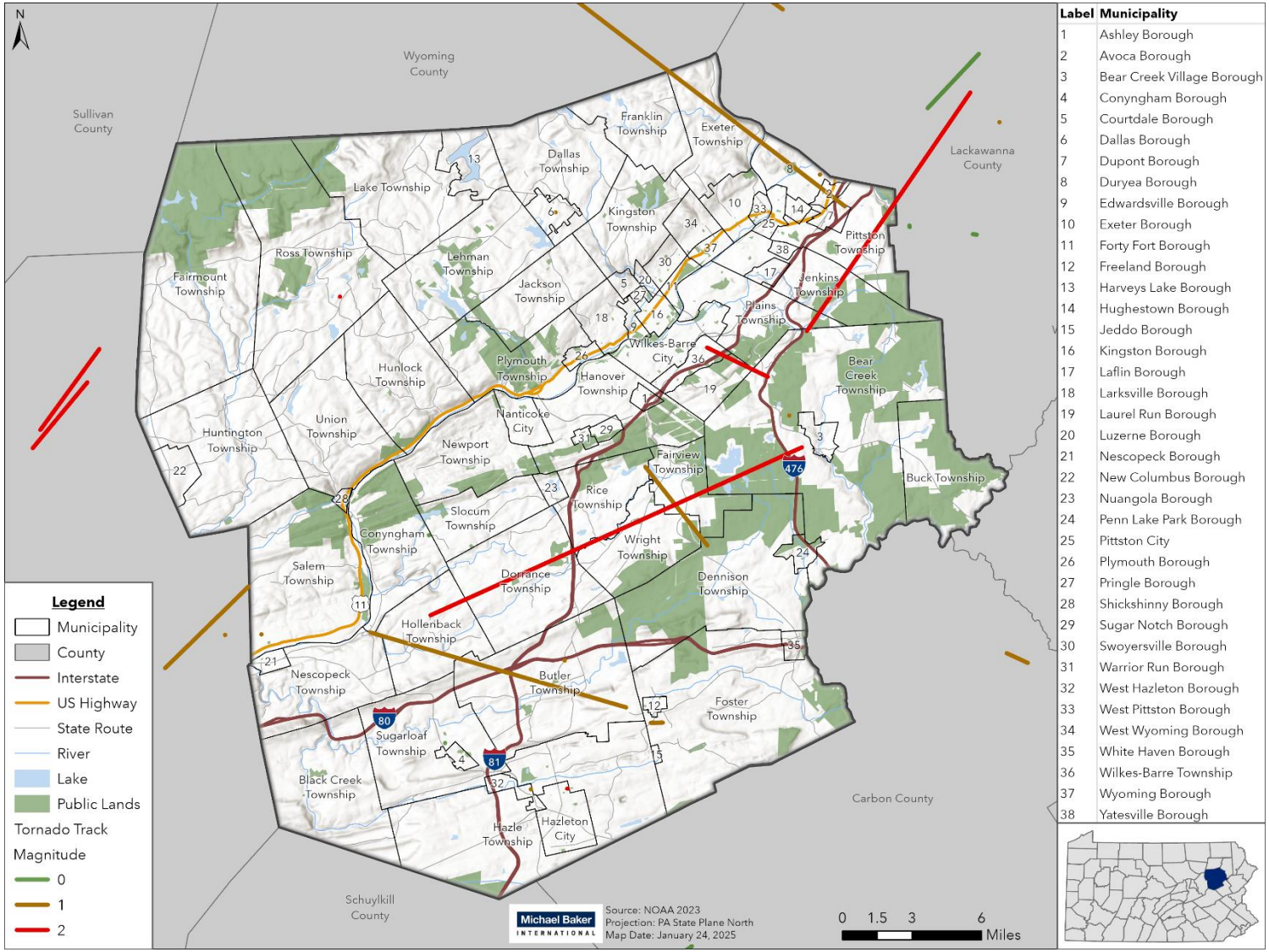
Table 4.3.11-5 Previous windstorm events greater than 50 knots in Luzerne County between 2000 and 2024 (NCEI, 2025).

LOCATION*	DATE	ESTIMATED WIND SPEED (KNOTS)	ESTIMATED PROPERTY DAMAGE ($)
Hanover Township	09/07/2023	50	*$1,000*
Newport Township	09/07/2023	50	*$1,000*
Hanover Township	09/07/2023	50	*$2,500*
Newport Township	09/07/2023	50	*$3,000*
Lehman Township	09/07/2023	50	*$3,000*
Harveys Lake Borough	09/07/2023	50	*$5,000*
Nescopeck Borough	04/14/2024	50	*$5,000*
Nescopeck Township	04/14/2024	50	*$5,000*
Nescopeck Township	04/14/2024	50	*$5,000*
West Wyoming Borough	06/21/2024	50	*$3,000*
Wyoming Borough	06/21/2024	50	*$3,000*
Harveys Lake Borough	06/22/2024	50	*$5,000*
Dallas Township	06/22/2024	50	*$21,000*
Nescopeck Township	06/26/2024	50	*$1,000*
Nescopeck Township	06/26/2024	52	*$14,000*
Luzerne Borough	06/26/2024	50	*$5,000*
Nescopeck Township	06/26/2024	50	*$3,000*
Luzerne Borough	06/26/2024	50	*$2,500*
Rice Township	06/26/2024	50	*$1,000*
Nescopeck Township	06/26/2024	50	*$2,500*
Fairview Township	06/26/2024	50	*$1,000*
Hunlock Township	06/26/2024	50	*$1,000*
Ashley Borough	06/26/2024	50	*$1,000*
Kingston Township	06/26/2024	50	*$1,000*
Jackson Township	06/30/2024	50	*$5,000*
Wilkes-Barre Township	06/30/2024	50	*$5,000*
Harveys Lake Borough	07/15/2024	50	*$2,500*
Kingston Township	07/15/2024	50	*$2,500*
Duryea Borough	07/15/2024	50	*$1,000*
Newport Township	07/17/2024	50	*$5,000*
Slocum Township	07/17/2024	50	*$5,000*
Buck Township	07/17/2024	50	*$5,000*
New Columbus Borough	08/06/2024	50	*$6,000*

*Location as stated on the NOAA Storm Events Database

Figure 4.3.11-1 below shows that tornado activity has occurred throughout the entire County.

Figure 4.3.11-1 Tornadoes That Have Touched Down in Luzerne County



Label	Municipality
1	Ashley Borough
2	Avoca Borough
3	Bear Creek Village Borough
4	Conyngham Borough
5	Courtdale Borough
6	Dallas Borough
7	Dupont Borough
8	Duryea Borough
9	Edwardsville Borough
10	Exeter Borough
11	Forty Fort Borough
12	Freeland Borough
13	Harveys Lake Borough
14	Hughestown Borough
15	Jeddo Borough
16	Kingston Borough
17	Laflin Borough
18	Larksville Borough
19	Laurel Run Borough
20	Luzerne Borough
21	Nescopeck Borough
22	New Columbus Borough
23	Nuangola Borough
24	Penn Lake Park Borough
25	Pittston City
26	Plymouth Borough
27	Pringle Borough
28	Shickshinny Borough
29	Sugar Notch Borough
30	Swoyersville Borough
31	Warrior Run Borough
32	West Hazleton Borough
33	West Pittston Borough
34	West Wyoming Borough
35	White Haven Borough
36	Wilkes-Barre Township
37	Wyoming Borough
38	Yatesville Borough

4.3.11.4. Future Occurrence

Seven tornadoes were reported for Luzerne County for the entire 2000–2024 period in NCEI. Therefore, the annual probability of being in the path of a tornado in Luzerne County is relatively minor. While the chance of being hit by a tornado is small, the damage that results when the tornado arrives can be potentially devastating. An F4 tornado, with a 0.01-percent-annual probability of occurring, can carry wind velocities of 200 mph, resulting in a force of more than 100 pounds per square foot of surface area. This is a "wind load" that exceeds the design limits of most buildings.

In recent years, there have been increasing numbers of tornadoes and windstorms around Luzerne County in Pennsylvania. An event in August 2019 brought down trees and utility lines across the county. These damaged vehicles and blocked roadways. While most of the recent windstorms and tornadoes have occurred outside of the county, their proximity contributes to future risk. Because more windstorms have been seen in the central Pennsylvania region, it is possible that an increasing number of tornadoes will be seen in Luzerne County.

Climate models project atmospheric conditions conducive to severe thunderstorms, tornadoes, and hail and wind will become more likely, but those events may not actually become more frequent themselves (Kossin et al. 2017). Projecting tornado activity based on more conducive conditions is difficult, as less than 10% of severe thunderstorms even produce tornadoes (Treisman, 2021). Therefore, the impact of climate change on this hazard's occurrence and intensity is unknown.

According to NCEI, there have been 240 wind events in Luzerne County between 2000 and 2024. Luzerne County experiences windstorm events more commonly than tornadoes, which causes power failures, loss of communication networks, and residents requiring temporary shelters and provision of supplies. The probability of tornadoes and windstorms in Luzerne County can be considered *possible* as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1).

4.3.11.5. Vulnerability Assessment

For tornadoes or high winds, aged and dilapidated structures or structures not built to applicable building codes are more susceptible to damage. Mobile homes and campgrounds are especially susceptible to damage due to tornado or high wind. Strong winds can rip roofs off of any dilapidated structures and overturn mobile homes. Past experience with tornadoes in Luzerne County shows that death and injury are indeed possibilities.

Vulnerability to the effects of a tornado or high wind is somewhat dependent upon the age of a structure because as building codes become more stringent, buildings are capable of enduring greater wind forces.

In Luzerne County, high winds occur annually. The most common detrimental effects are interruptions in power supply and communications services due to downed wires and blocked roadways due to downed trees. Most severe power failures or outages are regional events. With

the loss of power, electrical-powered equipment and systems will not be operational. Examples include lighting, HVAC and ancillary support equipment, communication systems, ventilation system, refrigerators, sterilizers, and medical equipment. This can cause food spoilage, loss of heat or air conditions, basement flooding (sump pump failure), lack of light, loss of water (well pump failure), lack of phone service, or lack of internet. While it is most often a short-term nuisance rather than a catastrophic hazard, utility interruptions can cause challenges for communications and response, particularly in more rural areas of the county. A worst-case scenario for utility interruption in Luzerne County would involve a power outage during winter snow or ice storms, which have the potential to cause power outages for prolonged periods of time.

High winds often occur during hurricanes, tropical storms, and nor'easters. Information about potential annualized losses due to hurricane winds can be found in Section 4.3.6.

All structures and infrastructure might be exposed to the effects of a tornado or other high winds. Depending upon the severity of a tornado or high wind, any existing structures might be damaged to some extent. Any future structures might be exposed to tornados or high winds as this hazard does not occur in specific locations. However, future buildings will be somewhat protected from the effects of tornado or high wind as they will meet the most current State building code requirements for bracing and roof design.

Manufactured housing (i.e. mobiles homes or trailers) is particularly vulnerable to high winds and tornadoes. The U.S. Census Bureau defines manufactured homes as "movable dwellings, eight feet or wider and 40 feet or longer, design to be towed on its own chassis, with transportation gear integral to the unit when it leaves the factory, and without need of a permanent foundation (U.S. Census, 2020)." They can include multi-wide and expandable manufactured homes but exclude travel trailers, motor homes, and modular housing. Due to their lightweight and often unanchored design, manufactured housing is extremely vulnerable to high winds and will generally sustain the most damage.

Table 4.3.11-5 below displays the number of manufactured housing units per municipality in Luzerne County. Jenkins Township has the highest total number of mobile homes with over 300. Additionally, there are nine other municipalities that have over 100 mobile homes each including Ashley Borough, Dallas Township, Exeter Township, Fairmount Township, Hazle Township, Kingston Township, Laurel Run Borough, Plains Township, and Salem Township. Laurel Run Borough has the greatest proportion of mobile homes, with over 15% of residential structures being mobile homes.

Table 4.3.11-6 Mobile Homes in Luzerne County

MUNICIPALITY	TOTAL RESIDENTIAL STRUCTURES	TOTAL MOBILE HOMES	PERCENT MOBILE HOMES	MUNICIPALITY	TOTAL RESIDENTIAL STRUCTURES	TOTAL MOBILE HOMES	PERCENT MOBILE HOMES
Ashley Borough	1,262	171	14%	Laflin Borough	639	0	0%
Avoca Borough	1,225	5	0%	Lake Township	787	40	5%
Bear Creek Township	1,304	3	0%	Larksville Borough	2,158	4	0%
Bear Creek Village Borough	171	0	0%	Laurel Run Borough	227	116	51%
Black Creek Township	1,118	11	1%	Lehman Township	1,618	81	5%
Buck Township	267	3	1%	Luzerne Borough	1,579	0	0%
Butler Township	3,941	35	1%	Nanticoke City	5,109	1	0%
Conyngham Borough	817	0	0%	Nescopeck Borough	782	2	0%
Conyngham township	714	5	1%	Nescopeck Township	497	3	1%
Courtdale Borough	261	0	0%	New Columbus Borough	123	2	2%
Dallas Borough	1,241	0	0%	Newport Township	2,070	0	0%
Dallas Township	3,773	168	4%	Nuangola Borough	406	0	0%
Dennison Township	525	19	4%	Penn Lake Park Borough	251	0	0%
Dorrance Township	956	15	2%	Pittston City	3,951	1	0%
Dupont Borough	1,329	4	0%	Pittston Township	1,370	66	5%
Duryea Borough	2,288	3	0%	Plains Township	4,928	111	2%
Edwardsville Borough	2,228	0	0%	Plymouth Borough	2,971	0	0%
Exeter Borough	2,856	182	6%	Plymouth Township	749	1	0%
Exeter Township	1,202	15	1%	Pringle Borough	483	1	0%
Fairmount Township	609	117	19%	Rice Township	1,437	57	4%
Fairview Township	1,786	0	0%	Ross Township	1,433	60	4%
Forty Fort Borough	1,908	0	0%	Salem Township	2,251	130	6%

Table 4.3.11-6 Mobile Homes in Luzerne County

MUNICIPALITY	TOTAL RESIDENTIAL STRUCTURES	TOTAL MOBILE HOMES	PERCENT MOBILE HOMES	MUNICIPALITY	TOTAL RESIDENTIAL STRUCTURES	TOTAL MOBILE HOMES	PERCENT MOBILE HOMES
Foster Township	2,060	73	4%	Shickshinny Borough	355	0	0%
Franklin Township	758	87	11%	Slocum Township	520	1	0%
Freeland Borough	1,863	11	1%	Sugar Notch Borough	509	0	0%
Hanover Township	5,267	54	1%	Sugarloaf Township	1,437	5	0%
Harveys Lake Borough	1,770	20	1%	Swoyersville Borough	2,512	0	0%
Hazle Township	4,850	174	4%	Union Township	886	8	1%
Hazleton City	12,681	91	1%	Warrior Run Borough	221	4	2%
Hollenback Township	470	8	2%	West Hazleton Borough	1,844	0	0%
Hughestown Borough	682	0	0%	West Pittston Borough	2,274	0	0%
Hunlock Township	957	11	1%	West Wyoming Borough	1,316	2	0%
Huntington Township	942	6	1%	White Haven Borough	499	44	9%
Jackson Township	1,009	1	0%	Wilkes-Barre City	19,993	1	0%
Jeddo Borough	72	0	0%	Wilkes-Barre Township	1,694	0	0%
Jenkins Township	2,124	330	16%	Wright Township	2,242	3	0%
Kingston Borough	6,278	0	0%	Wyoming Borough	1,647	0	0%
Kingston Township	3,365	143	4%	Yatesville Borough	315	2	1%
				Total	151,012	2,511	2%

Table 4.3.11-7 below shows the Expected Annual Losses to severe wind for each census tract in the county according to FEMA's National Risk Index.

Table 4.3.11-7 Expected Annual Losses to Severe Wind by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2001.00	Wilkes-Barre City	$10,273.87	Relatively Low
2002.00	Wilkes-Barre City	$5,213.55	Relatively Low
2003.00	Wilkes-Barre City	$3,233.23	Relatively Low
2004.00	Wilkes-Barre City	$4,014.93	Relatively Low
2005.00	Wilkes-Barre City	$5,026.53	Relatively Low
2006.00	Wilkes-Barre City	$3,259.35	Relatively Low
2007.00	Wilkes-Barre City	$5,811.38	Relatively Low
2008.00	Wilkes-Barre City	$5,393.07	Relatively Low
2009.00	Wilkes-Barre City	$4,780.92	Relatively Low
2010.00	Wilkes-Barre City	$3,783.78	Relatively Low
2011.00	Wilkes-Barre City	$1,970.59	Relatively Low
2012.00	Wilkes-Barre City	$4,938.35	Relatively Low
2013.00	Wilkes-Barre City	$3,916.56	Relatively Low
2014.00	Wilkes-Barre City	$3,756.14	Relatively Low
2015.00	Wilkes-Barre City	$3,794.80	Relatively Low
2016.00	Wilkes-Barre City	$3,374.15	Relatively Low
2101.00	Pittston Township	$8,210.82	Relatively Low
2102.00	Dupont Borough	$3,444.99	Relatively Low
2103.00	Avoca Borough	$3,348.76	Relatively Low
2104.00	Hughestown Borough	$1,997.70	Relatively Low
2105.00	Duryea Borough	$7,144.94	Relatively Low
2106.00	Pittston City	$3,047.54	Relatively Low
2107.00	Pittston City	$2,530.90	Relatively Low
2108.00	Pittston City	$3,913.02	Relatively Low
2110.00	West Pittston Borough	$5,452.82	Relatively Low
2111.01	Exeter Borough	$6,824.05	Relatively Low
2111.02	Exeter Township	$2,393.83	Relatively Low
2112.01	Dallas Borough	$3,713.08	Relatively Low
2112.03	Franklin Township	$2,025.48	Relatively Low
2112.04	Dallas Township	$8,722.83	Relatively Low
2112.05	Dallas Township	$2,977.32	Relatively Low
2113.01	Jackson Township	$5,405.76	Relatively Low
2113.02	Lehman Township	$5,827.46	Relatively Low
2113.03	Harveys Lake Borough	$3,674.79	Relatively Low
2113.04	Lake Township	$2,338.94	Relatively Low
2114.00	Kingston Township	$8,121.49	Relatively Low

Table 4.3.11-7 Expected Annual Losses to Severe Wind by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2115.00	West Wyoming Borough	$3,427.06	Relatively Low
2116.00	Wyoming Borough	$3,900.33	Relatively Low
2117.01	Jenkins Township	$9,670.81	Relatively Low
2117.02	Laflin Borough	$2,925.88	Relatively Low
2118.00	Plains Township	$5,366.84	Relatively Low
2119.00	Plains Township	$7,897.45	Relatively Low
2120.00	Plains Township	$2,094.77	Relatively Low
2121.00	Forty Fort Borough	$5,208.91	Relatively Low
2122.00	Swoyersville Borough	$5,289.44	Relatively Low
2123.00	Luzerne Borough	$3,183.05	Relatively Low
2127.00	Kingston Borough	$7,011.44	Relatively Low
2128.00	Kingston Borough	$4,600.12	Relatively Low
2129.00	Kingston Borough	$2,637.24	Relatively Low
2130.00	Kingston Borough	$2,454.28	Relatively Low
2131.00	Kingston Borough	$3,180.26	Relatively Low
2132.00	Edwardsville Borough	$6,849.79	Relatively Low
2133.00	Courtdale Borough	$1,949.65	Relatively Low
2134.00	Larksville Borough	$6,870.04	Relatively Low
2136.00	Plymouth Borough	$3,377.50	Relatively Low
2137.00	Plymouth Borough	$3,616.53	Relatively Low
2138.00	Plymouth Borough	$2,271.47	Relatively Low
2139.00	Plymouth Township	$3,092.46	Relatively Low
2141.00	Nanticoke City	$5,704.58	Relatively Low
2142.00	Nanticoke City	$4,938.09	Relatively Low
2143.00	Nanticoke City	$4,333.59	Relatively Low
2144.00	Nanticoke City	$3,352.94	Relatively Low
2145.00	Hanover Township	$2,908.16	Relatively Low
2146.00	Hanover Township	$10,486.35	Relatively Low
2149.00	Hanover Township	$2,580.78	Relatively Low
2150.00	Sugar Notch Borough	$2,746.12	Relatively Low
2151.00	Ashley Borough	$4,102.65	Relatively Low
2152.00	Wilkes-Barre Township	$8,510.95	Relatively Low
2153.00	Bear Creek Township	$9,367.53	Relatively Low
2154.00	Dennison Township	$5,952.56	Relatively Low
2155.01	Fairview Township	$8,364.39	Relatively Low
2155.02	Wright Township	$16,096.45	Relatively Moderate
2155.03	Rice Township	$6,736.46	Relatively Low
2155.04	Dorrance Township	$7,224.18	Relatively Low
2156.00	Newport Township	$7,524.95	Relatively Low
2157.01	Hunlock Township	$3,743.19	Relatively Low

Table 4.3.11-7 Expected Annual Losses to Severe Wind by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2157.02	Union Township	$4,955.70	Relatively Low
2158.00	Ross Township	$4,723.17	Relatively Low
2159.00	Fairmount Township	$6,000.88	Relatively Low
2161.00	Salem Township	$8,474.83	Relatively Low
2162.00	Conyngham Township	$9,770.43	Relatively Low
2164.00	Black Creek Township	$3,831.74	Relatively Low
2165.01	Conyngham Borough	$3,274.25	Relatively Low
2165.02	Sugarloaf Township	$8,761.76	Relatively Low
2166.01	Butler Township	$6,494.88	Relatively Low
2166.02	Butler Township	$10,986.04	Relatively Low
2167.00	Freeland Borough	$6,408.83	Relatively Low
2168.00	Foster Township	$7,877.52	Relatively Low
2169.00	Hazle Township	$7,917.95	Relatively Low
2170.01	Hazle Township	$15,602.82	Relatively Moderate
2170.02	Hazle Township	$7,534.81	Relatively Low
2171.00	Hazleton City	$5,383.92	Relatively Low
2172.00	Hazleton City	$5,999.24	Relatively Low
2173.00	Hazleton City	$7,143.69	Relatively Low
2174.00	Hazleton City	$3,418.17	Relatively Low
2175.00	Hazleton City	$5,540.63	Relatively Low
2176.00	Hazleton City	$4,857.28	Relatively Low
2177.00	Hazleton City	$7,981.38	Relatively Low
2178.00	Hazleton City	$5,340.61	Relatively Low
2179.00	Hazle Township	$10,142.33	Relatively Low
2180.00	Hanover Township	$8,618.98	Relatively Low
TOTAL		**$552,248.82**	

Table 4.3.11-8 below shows the Expected Annual Losses to tornado for each census tract in the county according to FEMA's National Risk Index.

Table 4.3.11-8 Expected Annual Losses to Tornado by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2001.00	Wilkes-Barre City	$52,735.55	Relatively Low
2002.00	Wilkes-Barre City	$29,714.65	Relatively Low
2003.00	Wilkes-Barre City	$17,691.74	Relatively Low
2004.00	Wilkes-Barre City	$22,522.61	Relatively Low
2005.00	Wilkes-Barre City	$27,079.89	Relatively Low

Table 4.3.11-8 Expected Annual Losses to Tornado by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2006.00	Wilkes-Barre City	$18,489.33	Relatively Low
2007.00	Wilkes-Barre City	$32,443.66	Relatively Low
2008.00	Wilkes-Barre City	$30,614.58	Relatively Low
2009.00	Wilkes-Barre City	$27,027.58	Relatively Low
2010.00	Wilkes-Barre City	$21,892.22	Relatively Low
2011.00	Wilkes-Barre City	$11,143.01	Very Low
2012.00	Wilkes-Barre City	$26,729.60	Relatively Low
2013.00	Wilkes-Barre City	$21,445.76	Relatively Low
2014.00	Wilkes-Barre City	$20,943.17	Relatively Low
2015.00	Wilkes-Barre City	$21,375.17	Relatively Low
2016.00	Wilkes-Barre City	$21,388.81	Relatively Low
2101.00	Pittston Township	$36,390.91	Relatively Low
2102.00	Dupont Borough	$16,840.00	Relatively Low
2103.00	Avoca Borough	$16,420.60	Relatively Low
2104.00	Hughestown Borough	$9,577.58	Very Low
2105.00	Duryea Borough	$34,795.80	Relatively Low
2106.00	Pittston City	$18,155.68	Relatively Low
2107.00	Pittston City	$12,470.10	Very Low
2108.00	Pittston City	$19,478.24	Relatively Low
2110.00	West Pittston Borough	$35,105.27	Relatively Low
2111.01	Exeter Borough	$43,489.54	Relatively Low
2111.02	Exeter Township	$15,425.02	Relatively Low
2112.01	Dallas Borough	$23,223.97	Relatively Low
2112.03	Franklin Township	$13,069.84	Very Low
2112.04	Dallas Township	$55,018.54	Relatively Low
2112.05	Dallas Township	$19,067.38	Relatively Low
2113.01	Jackson Township	$33,603.59	Relatively Low
2113.02	Lehman Township	$34,041.17	Relatively Low
2113.03	Harveys Lake Borough	$23,165.86	Relatively Low
2113.04	Lake Township	$15,042.66	Relatively Low
2114.00	Kingston Township	$52,559.98	Relatively Low
2115.00	West Wyoming Borough	$21,652.75	Relatively Low
2116.00	Wyoming Borough	$24,786.67	Relatively Low
2117.01	Jenkins Township	$50,152.47	Relatively Low
2117.02	Laflin Borough	$13,790.42	Very Low
2118.00	Plains Township	$26,775.57	Relatively Low
2119.00	Plains Township	$49,451.60	Relatively Low
2120.00	Plains Township	$13,523.29	Very Low
2121.00	Forty Fort Borough	$33,240.47	Relatively Low
2122.00	Swoyersville Borough	$34,784.15	Relatively Low

Table 4.3.11-8 Expected Annual Losses to Tornado by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2123.00	Luzerne Borough	$20,485.92	Relatively Low
2127.00	Kingston Borough	$42,439.51	Relatively Low
2128.00	Kingston Borough	$28,123.71	Relatively Low
2129.00	Kingston Borough	$14,366.89	Relatively Low
2130.00	Kingston Borough	$13,538.50	Very Low
2131.00	Kingston Borough	$17,268.81	Relatively Low
2132.00	Edwardsville Borough	$39,903.41	Relatively Low
2133.00	Courtdale Borough	$12,435.01	Very Low
2134.00	Larksville Borough	$38,202.22	Relatively Low
2136.00	Plymouth Borough	$18,838.88	Relatively Low
2137.00	Plymouth Borough	$19,642.06	Relatively Low
2138.00	Plymouth Borough	$12,946.98	Very Low
2139.00	Plymouth Township	$16,817.27	Relatively Low
2141.00	Nanticoke City	$31,578.49	Relatively Low
2142.00	Nanticoke City	$27,194.38	Relatively Low
2143.00	Nanticoke City	$23,039.62	Relatively Low
2144.00	Nanticoke City	$18,560.09	Relatively Low
2145.00	Hanover Township	$16,024.40	Relatively Low
2146.00	Hanover Township	$53,919.94	Relatively Low
2149.00	Hanover Township	$14,071.91	Relatively Low
2150.00	Sugar Notch Borough	$14,924.49	Relatively Low
2151.00	Ashley Borough	$22,849.64	Relatively Low
2152.00	Wilkes-Barre Township	$43,514.43	Relatively Low
2153.00	Bear Creek Township	$41,628.21	Relatively Low
2154.00	Dennison Township	$25,903.37	Relatively Low
2155.01	Fairview Township	$45,530.77	Relatively Low
2155.02	Wright Township	$81,745.88	Relatively Moderate
2155.03	Rice Township	$36,836.51	Relatively Low
2155.04	Dorrance Township	$39,088.12	Relatively Low
2156.00	Newport Township	$41,344.24	Relatively Low
2157.01	Hunlock Township	$20,594.26	Relatively Low
2157.02	Union Township	$26,805.96	Relatively Low
2158.00	Ross Township	$26,205.89	Relatively Low
2159.00	Fairmount Township	$32,983.35	Relatively Low
2161.00	Salem Township	$44,854.42	Relatively Low
2162.00	Conyngham Township	$52,417.82	Relatively Low
2164.00	Black Creek Township	$20,445.03	Relatively Low
2165.01	Conyngham Borough	$17,800.45	Relatively Low
2165.02	Sugarloaf Township	$45,814.09	Relatively Low
2166.01	Butler Township	$34,638.78	Relatively Low

Table 4.3.11-8 Expected Annual Losses to Tornado by Census Tract (FEMA NRI, 2025)			
CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2166.02	Butler Township	$59,950.56	Relatively Low
2167.00	Freeland Borough	$35,301.58	Relatively Low
2168.00	Foster Township	$36,982.71	Relatively Low
2169.00	Hazle Township	$43,513.91	Relatively Low
2170.01	Hazle Township	$73,652.98	Relatively Moderate
2170.02	Hazle Township	$39,086.19	Relatively Low
2171.00	Hazleton City	$30,870.34	Relatively Low
2172.00	Hazleton City	$33,606.67	Relatively Low
2173.00	Hazleton City	$38,287.76	Relatively Low
2174.00	Hazleton City	$18,310.48	Relatively Low
2175.00	Hazleton City	$30,636.24	Relatively Low
2176.00	Hazleton City	$28,195.38	Relatively Low
2177.00	Hazleton City	$45,228.20	Relatively Low
2178.00	Hazleton City	$31,079.95	Relatively Low
2179.00	Hazle Township	$54,262.50	Relatively Low
2180.00	Hanover Township	$45,702.55	Relatively Low
TOTAL		**$3,038,328.15**	

Overall, however, tornado and windstorm events are not specific to select parts of the County. Rather, a tornado could strike in any part of the County at any time and could cause as much or as little damage as possible for the given magnitude event. Historically, however, Luzerne County has been most typically impacted by minimal (EF0-EF2) tornadoes, with no event resulting in significant monetary damages.

Environmental impacts from tornadoes can include debris in streams, wetlands, and other sensitive environmental features. Tree damage is commonly seen after high wind events. Hazardous material facilities should meet design requirements for the wind zones identified in Figure 4.3.6-1 in order to prevent release of hazardous materials into the environment.

4.3.11.6. Equity in Vulnerable Communities

Regarding equity, there are several communities of consideration when it comes to planning for tornadoes and windstorms. Manufactured home communities, primarily mobile homes, are extremely at risk in the face of tornadoes as they are highly susceptible to high-speed winds. This means areas of Duryea Borough, New Columbus Borough, Huntington Township, Ashley Borough, Exeter Township, and Butler Township may be particularly vulnerable. Additionally, households without vehicles, smartphones, or people with disabilities are also at higher risk if evacuation becomes necessary as all these factors present significant barriers to active response times. As previously mentioned, this includes most municipalities as many have relatively high concentrations of at least one of those population groups.

4.3.12. WILDFIRE

4.3.12.1. Location and Extent

Wildfire is an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures. A wildland fire is a wildfire in an area in which development is essentially nonexistent, except for roads, railroads, power lines, and similar facilities. An urban-wildland interface fire is a wildfire in a geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels.

Wildfires can occur at any time of the year but are most likely to occur in the County during a drought. Wildland fires in Pennsylvania can occur in fields, grass, and brush as well as in the forest itself. Under dry conditions or drought, wildfires have the potential to burn forests as well as croplands. Any small fire in a wooded area, if not quickly detected and suppressed, can get out of control. Most wildland fires are caused by human carelessness, negligence, and ignorance. Wildfires in Pennsylvania are most commonly the result of debris burning, or the burning of trash or yard waste in a person's backyard. Incendiary causes accounted for the largest number of acres burned in Pennsylvania. (DCNR, 2025). However, some are precipitated by lightning strikes and in rare instances, spontaneous combustion.

Luzerne County is generally rural in nature, consisting of large tracts of undeveloped and forested lands. Therefore, a wildfire could develop in any portion of the County. The most high-risk areas of the County are at the forest-urban interface, where the potential for wildfire to spread to structures is greatest.

4.3.12.2. Range of Magnitude

Wildfire events can range from small fires that can be managed by local firefighters to large fires impacting many acres of land. Large events may require evacuation from one or more communities and necessitate regional or national firefighting support. The impact of a severe wildfire can be devastating. A wildfire has the potential to kill people, livestock, fish, and wildlife. They often destroy property, valuable timber, and forage, recreational, and scenic values.

Vegetation loss is often an environmental concern with wildfires, but it typically is not a serious impact in that they burn dead trees, leaves, and grasses to allow more open space for new and different types of vegetation to grow and receive sunlight. Another positive effect of wildfire is that it stimulates the growth of new shoots on trees and shrubs and its heat can open pinecones and other seed pods. The most significant negative impact is the potential for severe erosion, silting of stream beds and reservoirs, and flooding due to ground-cover loss following a fire event.

In addition to the risk wildfires pose to the general public and property owners, the safety of firefighters is also a concern. Although loss of life among firefighters does not occur often in Pennsylvania, it is always a risk. More common firefighting injuries include falls, sprains, abrasions, or heat-related injuries such as dehydration. Response to wildfires also exposes

emergency responders to the risk of motor vehicle accidents and can place them in remote acres away from the communities that they are chartered to protect.

The potential impacts of wildfire on community lifelines are as follows:

Table 4.3.12-1 Most Likely Lifelines Impacted by Wildfire

LIFELINES	NOTES
	Fire departments will need to respond and possibly recover where community safety is threatened.
	Wildfire directly threatens structures including shelters.
	Potential serious injuries and fatalities may occur.

4.3.12.3. Past Occurrence

Luzerne County has experienced several smaller brush fires in the past five years resulting in damage to structures. One of these fires occurred on October 31, 2024, in Laurel Run Borough after a backyard debris burning which got out of hand spread into a larger brush fire (Cherkauskas, 2024). As a result of the fire spreading three sheds and a house were affected and deemed unviable for use. On November 8th, 2024, the Luzerne County Council issued a countywide ban on open burning following a prolonged period of dry weather causing significant drought conditions (Mark, 2024).

From 2014-2019, there were 511 wildfire events in Pennsylvania State Forest District 11 reported to the PADCNR Bureau of Forestry (BOF). District 11 consists of Luzerne County in addition to Lackawanna, Susquehanna, Wayne, and Wyoming Counties. This number does not include wildfires that were not reported to PADCNR or that were controlled solely by the volunteer fire departments in the County, but it is the most current and comprehensive list of wildfire occurrences available for the region surrounding Luzerne County. Table 4.3.12-2 shows the list of wildfire events reported to the PADCNR.

Table 4.3.12-2 List of wildfire events reported in PA State Forest District 11 from 2014-2019 (DCNR, 2019).

YEAR	TOTAL # OF FIRES	TOTAL AREA (ACRES)	% TOTAL FIRES	%TOTAL AREA (ACRES)
2014	103	1842.7	11.8%	18.7%
2015	140	518.0	17.1%	12.4%

Table 4.3.12-2 List of wildfire events reported in PA State Forest District 11 from 2014-2019 (DCNR, 2019).

YEAR	TOTAL # OF FIRES	TOTAL AREA (ACRES)	% TOTAL FIRES	%TOTAL AREA (ACRES)
2016	102	411.8	12.0%	3.4%
2017	48	307.4	9.0%	18.6%
2018	76	126.4	11.0%	6.9%
2019	42	85.5	7.8%	12.3%

Notes: % Total Fires and % Total area represent percentages of the entire state of Pennsylvania.

Figure 4.3.12-1 maps the origins of the wildfire events which were reported to the NIFC. Table 4.3.12-3 lists the total number of wildfires per municipality and the total burned acres of those wildfires. It is important to note that this is not an inclusive map of all wildfires, just those with known locations. The map and table show that previous occurrences of wildfires have occurred throughout the entire County between 2002 and 2023.

Table 4.3.12-3 Wildfires by Municipality (NIFC, 2024)

MUNICIPALITY	NUMBER OF WILDFIRES	TOTAL ACRES BURNED
Ashley Borough	2	1.1
Bear Creek Township	47	306.3
Bear Creek Village Borough	3	13.5
Black Creek Township	13	39.7
Buck Township	11	251
Butler Township	38	51
Conyngham Borough	1	0.25
Conyngham Township	14	53.1
Courtdale Borough	6	22
Dallas Borough	1	1
Dallas Township	9	10
Dennison Township	19	157.5
Dorrance Township	20	47.9
Dupont Borough	2	7
Duryea Borough	18	63.2
Edwardsville Borough	1	0.3
Exeter Borough	13	82.6
Exeter Township	29	217.9
Fairmount Township	21	23.6
Fairview Township	15	112.5
Foster Township	34	1,022.5
Franklin Township	9	24.1
Freeland Borough	3	6.3

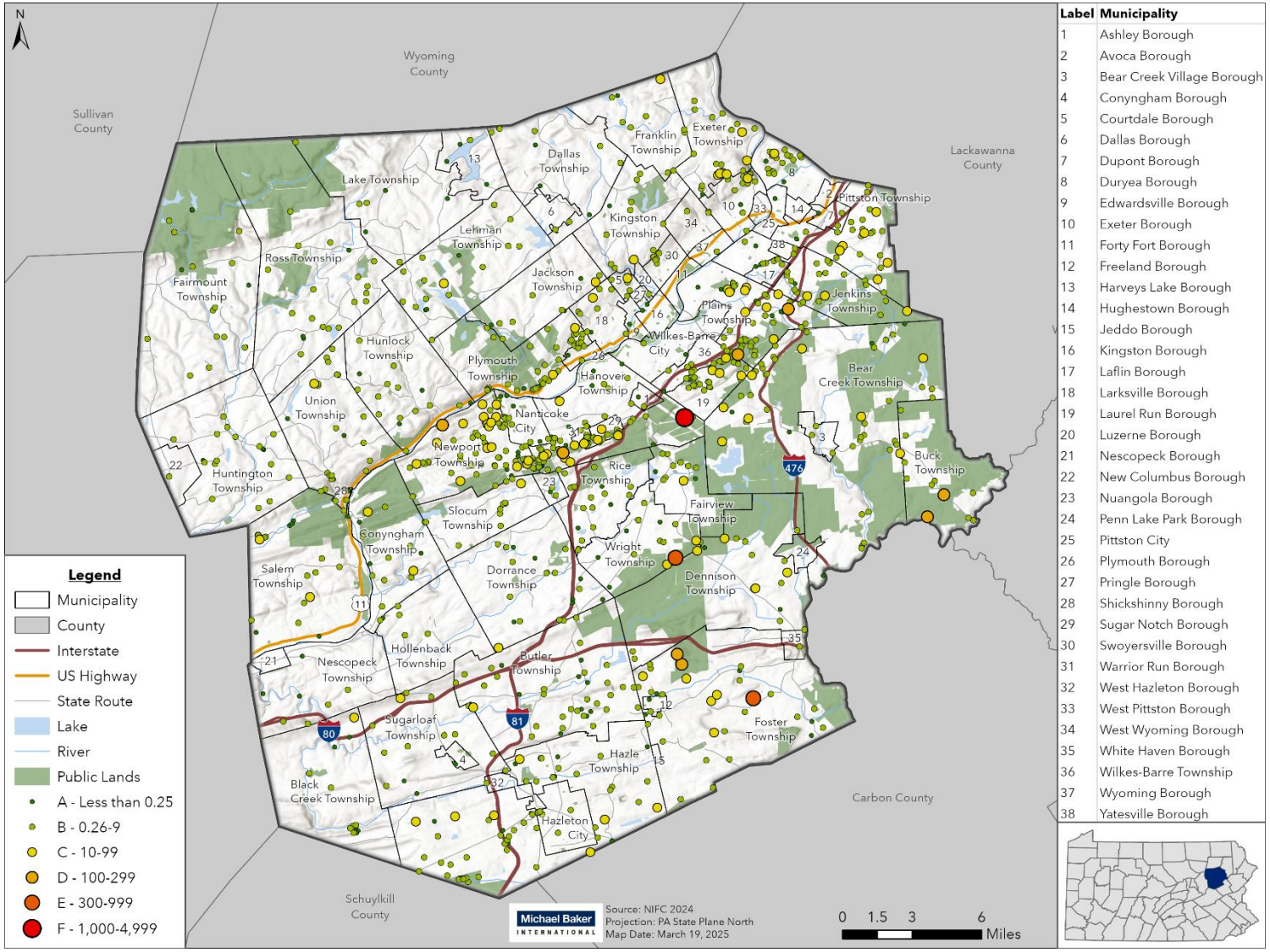
Table 4.3.12-3 Wildfires by Municipality (NIFC, 2024)

MUNICIPALITY	NUMBER OF WILDFIRES	TOTAL ACRES BURNED
Hanover Township	52	2,466
Harveys Lake Borough	4	1.45
Hazle Township	60	309.4
Hazleton City	6	8
Hollenback Township	5	7.8
Hunlock Township	16	15.5
Huntington Township	18	20.3
Jackson Township	10	27.5
Jenkins Township	26	165.1
Kingston Borough	2	0.2
Kingston Township	12	32.8
Laflin Borough	5	7.1
Lake Township	7	4.6
Larksville Borough	9	61.6
Laurel Run Borough	29	177.7
Lehman Township	17	41.3
Nanticoke City	13	17.2
Nescopeck Township	7	7.85
New Columbus Borough	1	1
Newport Township	77	733.5
Nuangola Borough	3	1.9
Pittston City	1	0.3
Pittston Township	29	140.9
Plains Township	51	656.1
Plymouth Borough	3	2.6
Plymouth Township	45	116.7
Pringle Borough	1	1
Rice Township	17	23.5
Ross Township	21	35.8
Salem Township	24	49
Shickshinny Borough	4	4.1
Slocum Township	12	27
Sugar Notch Borough	7	65.5
Sugarloaf Township	14	29.1
Swoyersville Borough	6	18
Union Township	22	42.1
Warrior Run Borough	15	53.8
West Hazleton Borough	1	0.5
West Wyoming Borough	4	5
White Haven Borough	1	2.5
Wilkes-Barre City	2	7.1

Table 4.3.12-3 Wildfires by Municipality (NIFC, 2024)

MUNICIPALITY	NUMBER OF WILDFIRES	TOTAL ACRES BURNED
Wilkes-Barre Township	10	16.1
Wright Township	15	448.3
Wyoming Borough	1	1
Yatesville Borough	1	1
Total	1,015	8,368.1

Figure 4.3.12-1 Wildfire origins in Luzerne County between 2002 and 2023



4.3.12.4. Future Occurrence

There have been over 500 wildfire events reported to the PADCNR over the past six years. Previous events indicate that wildfires will continue to occur yearly in Luzerne County. Therefore, the probability of a wildfire is estimated to be more than ninety percent in any given year and can be considered *likely* as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1). The likelihood of a fire attaining significant size and intensity is unpredictable and highly dependent on environmental conditions and firefighting response.

The Climate Mapping for Resilience and Adaptation (CMRA) Tool provides a county-level assessment report for wildfire, shown in Figure 4.3.12-2 below. The future climate indicators for wildfire are precipitation and temperatures thresholds. According to CMRA, the days per year with no precipitation are projected to increase slightly while the days with maximum temperatures above 90 degrees Fahrenheit are expected to increase significantly. These projections show that the conditions in the future may make wildfires more likely.

Figure 4.3.12-2 Luzerne County Wildfire Hazard Assessment Report (CMRA, 2024)

Future Climate Indicators

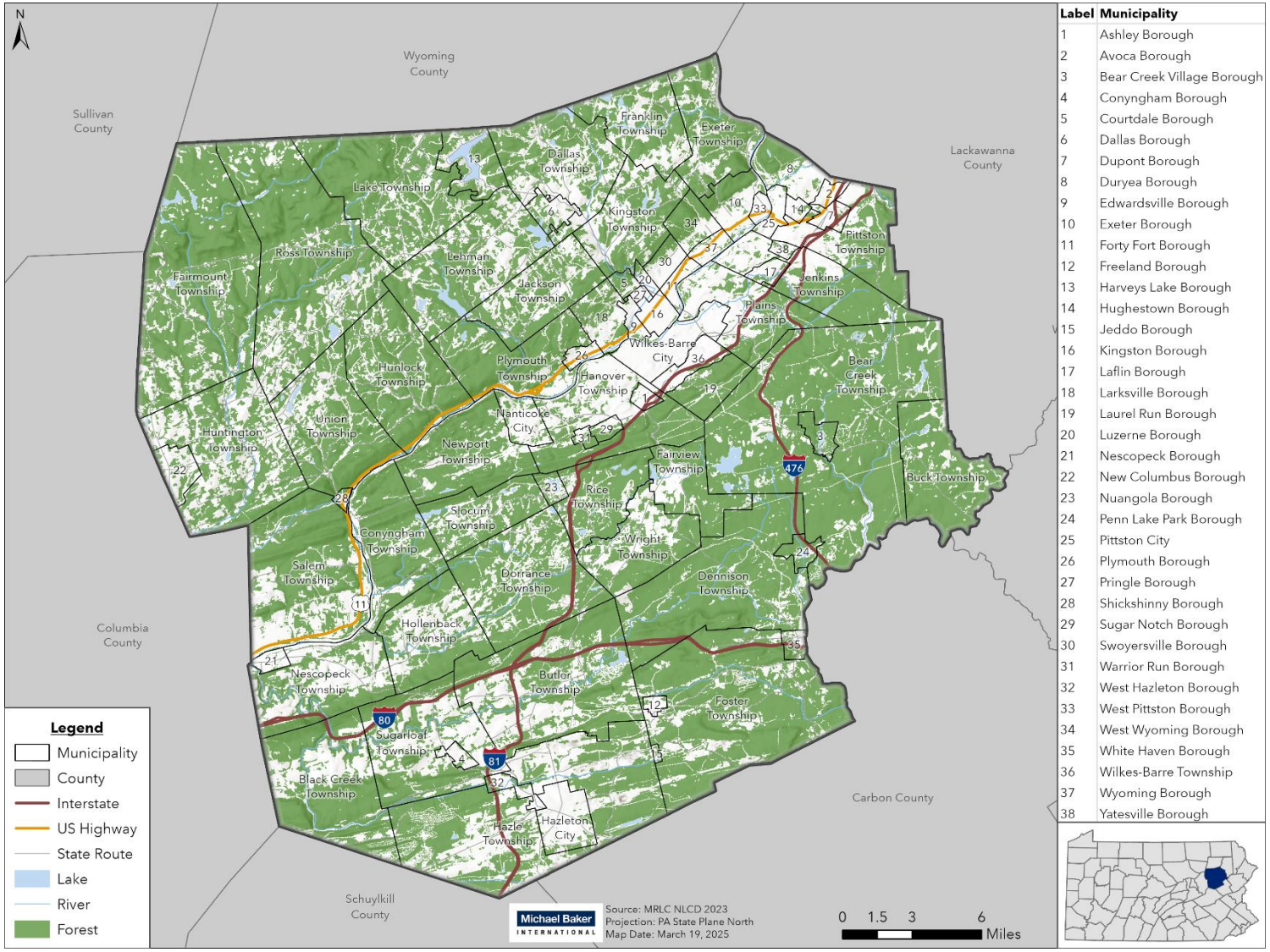
Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Days per year with no precipitation (dry days)	**157 days** 151 - 160	**159 days** 148 - 171	**159 days** 150 - 174	**160 days** 147 - 172	**160 days** 149 - 178	**160 days** 151 - 174	**163 days** 139 - 191
Maximum number of consecutive dry days	**10 days** 9 - 11	**10 days** 9 - 12	**10 days** 9 - 13	**10 days** 9 - 13	**11 days** 9 - 14	**11 days** 9 - 13	**12 days** 10 - 14
Days per year with precipitation (wet days)	**208 days** 205 - 214	**206 days** 194 - 217	**206 days** 191 - 215	**206 days** 193 - 219	**205 days** 187 - 216	**205 days** 191 - 214	**202 days** 174 - 226
Temperature thresholds:							
Annual days with maximum temperature > 90°F	**3 days** 3 - 7	**13 days** 5 - 29	**15 days** 6 - 28	**20 days** 7 - 43	**27 days** 10 - 49	**28 days** 9 - 60	**58 days** 19 - 93
Annual days with maximum temperature > 100°F	**0 days** 0 - 0	**0 days** 0 - 2	**0 days** 0 - 4	**1 days** 0 - 7	**2 days** 0 - 13	**2 days** 0 - 7	**11 days** 0 - 45

N/A = Data Not Available for the selected area

4.3.12.5. Vulnerability Assessment

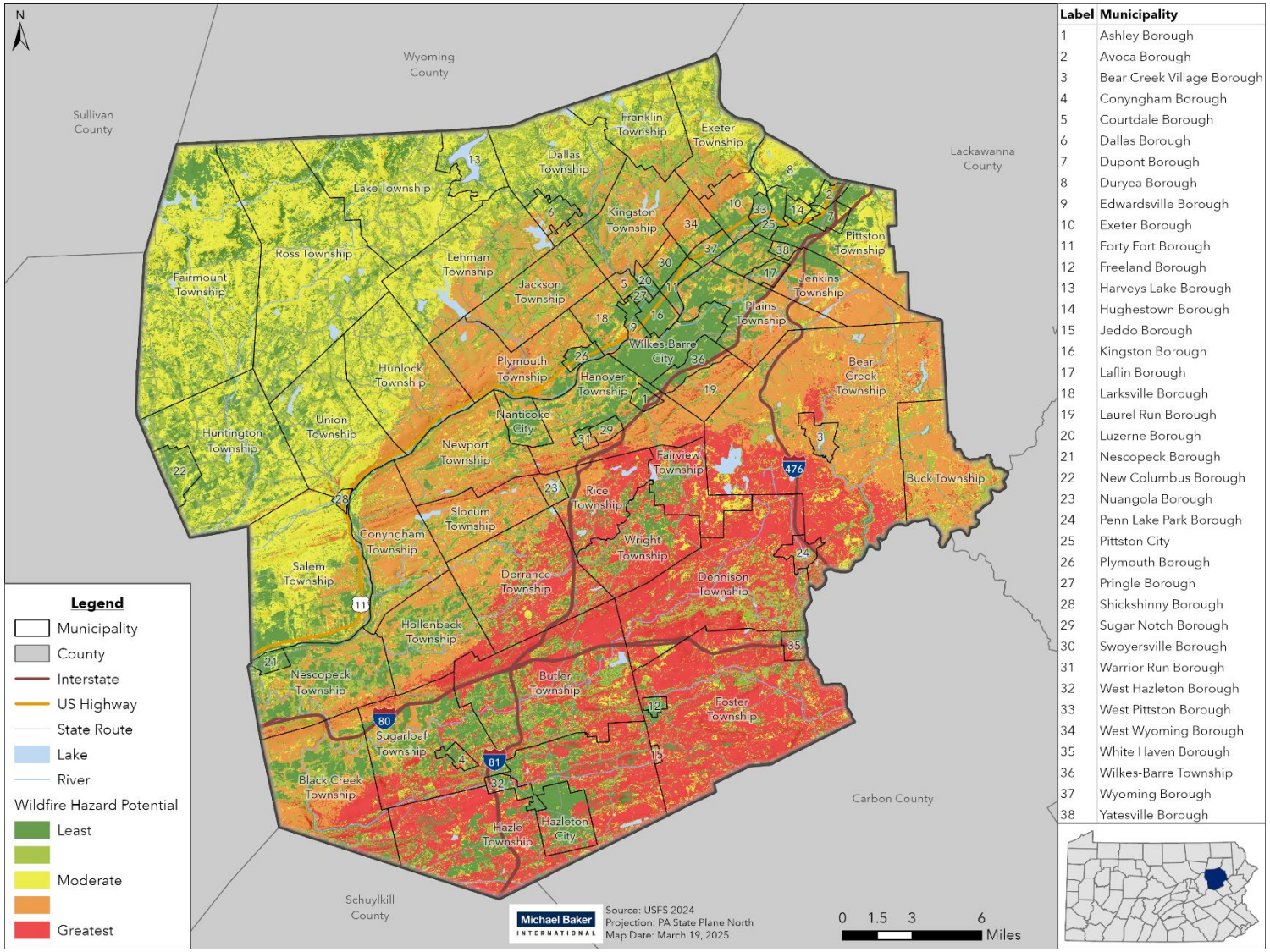
Figure 4.3.12-3 shows wooded areas throughout Luzerne County in 2024. The County has significant forest coverage, which is also particularly vulnerable to wildfire events. Many municipalities in the County have more than 90 percent forest coverage, particularly in the southeastern portion of the County. Based on the concentration of forest coverage, Bear Creek, Buck, and Dennison Townships are vulnerable to wildfire hazard. More populated communities around Wilkes-Barre City, Hanover Township, and Plains Township have less coverage but are still surrounded by a significant amount of forested land. These communities that have more developed areas adjacent to wooded land also have potentially greater vulnerability to wildfire hazard, which is also generally consistent with the high hazard potential areas in Figure 4.3.12-4. The PADCNR-BOF has conducted an independent wildfire hazard risk assessment for the various municipalities across Luzerne County. Results of that assessment are shown in Figure 4.3.12-4. *Wildfire hazard* is defined based on conditions that affect wildfire ignition and/or behavior such as fuel, topography, and local weather. Based on this assessment, eighteen jurisdictions have a *high* wildfire rating. Twenty-five municipalities within Luzerne County have a *medium* wildfire hazard potential. Twenty-nine jurisdictions, generally spatially concentrated around the Susquehanna River, are considered to have *low* wildfire hazard potential. All four cities in Luzerne County are listed as having no wildfire hazard potential.

Figure 4.3.12-3 Forested Land Cover in Luzerne County



Label	Municipality
1	Ashley Borough
2	Avoca Borough
3	Bear Creek Village Borough
4	Conyngham Borough
5	Courtdale Borough
6	Dallas Borough
7	Dupont Borough
8	Duryea Borough
9	Edwardsville Borough
10	Exeter Borough
11	Forty Fort Borough
12	Freeland Borough
13	Harveys Lake Borough
14	Hughestown Borough
15	Jeddo Borough
16	Kingston Borough
17	Laflin Borough
18	Larksville Borough
19	Laurel Run Borough
20	Luzerne Borough
21	Nescopeck Borough
22	New Columbus Borough
23	Nuangola Borough
24	Penn Lake Park Borough
25	Pittston City
26	Plymouth Borough
27	Pringle Borough
28	Shickshinny Borough
29	Sugar Notch Borough
30	Swoyersville Borough
31	Warrior Run Borough
32	West Hazleton Borough
33	West Pittston Borough
34	West Wyoming Borough
35	White Haven Borough
36	Wilkes-Barre Township
37	Wyoming Borough
38	Yatesville Borough

Figure 4.3.12-4 Wildfire hazard potential in Luzerne County



Label	Municipality
1	Ashley Borough
2	Avoca Borough
3	Bear Creek Village Borough
4	Conyngham Borough
5	Courtdale Borough
6	Dallas Borough
7	Dupont Borough
8	Duryea Borough
9	Edwardsville Borough
10	Exeter Borough
11	Forty Fort Borough
12	Freeland Borough
13	Harveys Lake Borough
14	Hughestown Borough
15	Jeddo Borough
16	Kingston Borough
17	Laflin Borough
18	Larksville Borough
19	Laurel Run Borough
20	Luzerne Borough
21	Nescopeck Borough
22	New Columbus Borough
23	Nuangola Borough
24	Penn Lake Park Borough
25	Pittston City
26	Plymouth Borough
27	Pringle Borough
28	Shickshinny Borough
29	Sugar Notch Borough
30	Swoyersville Borough
31	Warrior Run Borough
32	West Hazleton Borough
33	West Pittston Borough
34	West Wyoming Borough
35	White Haven Borough
36	Wilkes-Barre Township
37	Wyoming Borough
38	Yatesville Borough

Wildfires have the potential to destroy huge areas of vegetation with no regard to the man-made structures within those areas. The rural areas in which these fires occur generally have little firefighting infrastructure such as hydrants, and the fire departments servicing those areas may take extended time to reach and ultimately extinguish the fire.

The structures, critical facilities and population most vulnerable to wildfire hazards are identified in Table 4.3.12-3. Please note that the individual vulnerability of communities will differ based on the design of the urban/wildland interface, the number of ingress and egress points into a community, and the availability of water to fight fires. Butler Township and Wright Township have the largest number of structures within high wildfire hazard areas (618 and 418 structures). Foster Township, Butler Township, Hazle Township and Hanover Township have the highest number of critical facilities in high wildfire hazard areas (6, 5, 5 and 5 critical facilities). These municipalities have the highest vulnerability to damage in a wildfire event.

Table 4.3.12-4 shows wildfire vulnerability by structure type. As discussed above, forested areas are the most susceptible to wildfire hazards.

Table 4.3.12-4 Structures, Critical Facilities and Population Wildfire Vulnerability for Luzerne County

MUNICIPALITY	TOTAL STRUCTURES IN MUNICIPALITY	STRUCTURES IN HIGH WILDFIRE HAZARD AREAS	PERCENT OF STRUCTURES	TOTAL CRITICAL FACILITIES IN MUNICIPALITY	TOTAL CRITICAL FACILITIES IN HIGH WILDFIRE HAZARD AREAS	PERCENT CRITICAL FACILITIES	TOTAL POPULATION IN MUNICIPALITY	POPULATION IN HIGH WILDFIRE HAZARD AREAS	PERCENT OF POPULATION
Ashley Borough	1,281	1	0%	22	0	0%	2,596	0	0%
Avoca Borough	1,294	0	0%	21	0	0%	2,507	0	0%
Bear Creek Township	1,713	93	5%	50	3	6%	2,754	439	16%
Bear Creek Village Borough	179	0	0%	7	0	0%	291	6	2%
Black Creek Township	1,452	52	4%	35	0	0%	1,909	543	28%
Buck Township	301	8	3%	9	1	11%	379	0	0%
Butler Township	4,499	618	14%	88	5	6%	9,485	4,312	45%
Conyngham Borough	871	63	7%	8	0	0%	1,825	357	20%
Conyngham Township	919	0	0%	21	0	0%	1,312	153	12%
Courtdale Borough	395	0	0%	5	0	0%	689	0	0%
Dallas Borough	1,209	0	0%	11	0	0%	2,694	17	1%
Dallas Township	3,528	1	0%	60	0	0%	9,099	0	0%
Dennison Township	717	127	18%	30	2	7%	963	524	54%
Dorrance Township	1,564	223	14%	49	3	6%	2,076	1,367	66%
Dupont Borough	1,463	0	0%	32	0	0%	2,539	0	0%
Duryea Borough	2,496	0	0%	17	0	0%	5,036	0	0%
Edwardsville Borough	1,521	0	0%	10	0	0%	4,929	0	0%
Exeter Borough	2,520	0	0%	14	0	0%	5,514	0	0%
Exeter Township	1,223	2	0%	26	1	4%	2,051	0	0%
Fairmount Township	1,146	0	0%	42	0	0%	1,210	0	0%
Fairview Township	1,901	241	13%	24	0	0%	4,703	1,443	31%

Table 4.3.12-4 Structures, Critical Facilities and Population Wildfire Vulnerability for Luzerne County

MUNICIPALITY	TOTAL STRUCTURES IN MUNICIPALITY	STRUCTURES IN HIGH WILDFIRE HAZARD AREAS	PERCENT OF STRUCTURES	TOTAL CRITICAL FACILITIES IN MUNICIPALITY	TOTAL CRITICAL FACILITIES IN HIGH WILDFIRE HAZARD AREAS	PERCENT CRITICAL FACILITIES	TOTAL POPULATION IN MUNICIPALITY	POPULATION IN HIGH WILDFIRE HAZARD AREAS	PERCENT OF POPULATION
Forty Fort Borough	2,201	0	0%	19	0	0%	4,239	0	0%
Foster Township	2,002	289	14%	30	6	20%	3,408	1,836	54%
Franklin Township	1,063	3	0%	22	0	0%	1,716	0	0%
Freeland Borough	1,119	7	1%	5	0	0%	3,833	254	7%
Hanover Township	5,005	3	0%	95	5	5%	11,445	0	0%
Harveys Lake Borough	1,871	0	0%	15	0	0%	2,788	0	0%
Hazle Township	5,022	241	5%	61	5	8%	10,160	3,104	31%
City of Hazleton	6,310	29	0%	29	0	0%	29,963	303	1%
Hollenback Township	969	9	1%	18	0	0%	1,139	108	9%
Hughestown Borough	706	0	0%	4	0	0%	1,329	0	0%
Hunlock Township	1,503	0	0%	36	0	0%	2,223	0	0%
Huntington Township	1,739	0	0%	54	0	0%	2,053	0	0%
Jackson Township	1,394	1	0%	36	0	0%	4,631	39	1%
Jeddo Borough	36	0	0%	1	0	0%	108	2	2%
Jenkins Township	2,193	2	0%	21	1	5%	4,283	0	0%
Kingston Borough	5,083	0	0%	33	0	0%	13,349	0	0%
Kingston Township	3,249	1	0%	45	0	0%	7,108	20	0%
Laflin Borough	612	0	0%	13	0	0%	1,451	0	0%
Lake Township	1,331	0	0%	29	0	0%	1,993	0	0%
Larksville Borough	2,126	1	0%	12	0	0%	4,225	0	0%
Laurel Run Borough	293	0	0%	4	0	0%	558	0	0%
Lehman Township	2,071	1	0%	40	0	0%	3,346	43	1%

Table 4.3.12-4 Structures, Critical Facilities and Population Wildfire Vulnerability for Luzerne County

MUNICIPALITY	TOTAL STRUCTURES IN MUNICIPALITY	STRUCTURES IN HIGH WILDFIRE HAZARD AREAS	PERCENT OF STRUCTURES	TOTAL CRITICAL FACILITIES IN MUNICIPALITY	TOTAL CRITICAL FACILITIES IN HIGH WILDFIRE HAZARD AREAS	PERCENT CRITICAL FACILITIES	TOTAL POPULATION IN MUNICIPALITY	POPULATION IN HIGH WILDFIRE HAZARD AREAS	PERCENT OF POPULATION
Luzerne Borough	1,365	0	0%	12	0	0%	2,711	0	0%
City of Nanticoke	4,409	0	0%	26	0	0%	10,628	0	0%
Nescopeck Borough	875	0	0%	2	0	0%	1,480	0	0%
Nescopeck Township	975	2	0%	30	0	0%	1,081	36	3%
New Columbus Borough	206	0	0%	9	0	0%	222	0	0%
Newport Township	1,829	1	0%	15	1	7%	4,433	0	0%
Nuangola Borough	402	4	1%	1	0	0%	666	78	12%
Penn Lake Park Borough	232	28	12%	4	1	25%	360	151	42%
City of Pittston	3,056	0	0%	14	0	0%	7,591	0	0%
Pittston Township	1,807	1	0%	38	0	0%	3,186	0	0%
Plains Township	4,771	0	0%	79	0	0%	9,808	0	0%
Plymouth Borough	2,394	0	0%	17	0	0%	5,763	0	0%
Plymouth Township	1,129	5	0%	24	0	0%	1,717	0	0%
Pringle Borough	504	0	0%	9	0	0%	893	0	0%
Rice Township	1,480	202	14%	40	1	3%	3,632	2,159	59%
Ross Township	2,012	0	0%	53	0	0%	2,726	0	0%
Salem Township	2,613	1	0%	55	0	0%	4,027	0	0%
Shickshinny Borough	327	0	0%	7	0	0%	632	0	0%
Slocum Township	828	6	1%	13	0	0%	1,054	59	6%
Sugarloaf Township	460	0	0%	5	0	0%	1,001	101	10%
Sugar Notch Borough	2,203	244	11%	45	1	2%	3,869	1,632	42%

Table 4.3.12-4 Structures, Critical Facilities and Population Wildfire Vulnerability for Luzerne County

MUNICIPALITY	TOTAL STRUCTURES IN MUNICIPALITY	STRUCTURES IN HIGH WILDFIRE HAZARD AREAS	PERCENT OF STRUCTURES	TOTAL CRITICAL FACILITIES IN MUNICIPALITY	TOTAL CRITICAL FACILITIES IN HIGH WILDFIRE HAZARD AREAS	PERCENT CRITICAL FACILITIES	TOTAL POPULATION IN MUNICIPALITY	POPULATION IN HIGH WILDFIRE HAZARD AREAS	PERCENT OF POPULATION
Swoyersville Borough	2,681	1	0%	20	0	0%	5,021	0	0%
Union Township	1,443	0	0%	32	0	0%	2,035	0	0%
Warrior Run Borough	295	0	0%	2	0	0%	527	0	0%
West Hazleton Borough	1,165	10	1%	13	0	0%	5,163	210	4%
West Pittston Borough	2,122	0	0%	5	0	0%	4,652	0	0%
West Wyoming Borough	1,487	0	0%	10	0	0%	2,638	0	0%
White Haven Borough	521	27	5%	15	1	7%	1,166	161	14%
City of Wilkes-Barre	14,135	0	0%	104	0	0%	44,328	0	0%
Wilkes-Barre Township	1,540	0	0%	33	0	0%	3,213	0	0%
Wright Township	2,609	418	16%	39	1	3%	5,722	3,408	60%
Wyoming Borough	1,542	0	0%	11	0	0%	3,102	0	0%
Yatesville Borough	320	0	0%	1	0	0%	638	0	0%
Total	**143,827**	**2,966**	**2%**	1,986	38	2%	325,594	22,865	7%

Table 4.3.12-5 Structures in Wildfire Hazard Areas by Land Use in Luzerne County

Municipality	Agriculture	Commercial	Conservation	Industrial	Mining	Mixed Use	Residential	Special Purpose	Total per Municipality
Ashley Borough	0	0	0	0	0	0	1	0	1
Avoca Borough	0	0	0	0	0	0	0	0	0
Bear Creek Township	5	0	5	0	0	0	83	0	93
Bear Creek Village Borough	0	0	0	0	0	0	0	0	0
Black Creek Township	4	1	4	0	0	0	43	0	52
Buck Township	0	0	4	0	0	0	4	0	8
Butler Township	0	12	0	4	0	26	574	2	618
Conyngham Borough	0	1	0	1	0	0	61	0	63
Conyngham Township	0	0	0	0	0	0	0	0	0
Courtdale Borough	0	0	0	0	0	0	0	0	0
Dallas Borough	0	0	0	0	0	0	0	0	0
Dallas Township	1	0	0	0	0	0	0	0	1
Dennison Township	0	0	20	0	0	0	107	0	127
Dorrance Township	56	6	87	4	0	0	70	0	223
Dupont Borough	0	0	0	0	0	0	0	0	0
Duryea Borough	0	0	0	0	0	0	0	0	0
Edwardsville Borough	0	0	0	0	0	0	0	0	0
Exeter Borough	0	0	0	0	0	0	0	0	0
Exeter Township	0	0	0	0	0	0	2	0	2
Fairmount Township	0	0	0	0	0	0	0	0	0

Table 4.3.12-5 Structures in Wildfire Hazard Areas by Land Use in Luzerne County

Municipality	Agriculture	Commercial	Conservation	Industrial	Mining	Mixed Use	Residential	Special Purpose	Total per Municipality
Fairview Township	0	10	2	0	0	0	229	0	241
Forty Fort Borough	0	0	0	0	0	0	0	0	0
Foster Township	87	8	40	4	0	0	143	7	289
Franklin Township	1	0	0	0	0	0	2	0	3
Freeland Borough	0	0	2	0	0	0	5	0	7
Hanover Township	0	0	1	0	0	0	2	0	3
Harveys Lake Borough	0	0	0	0	0	0	0	0	0
Hazle Township	0	13	6	10	62	0	150	0	241
Hazleton City	0	0	2	3	0	0	24	0	29
Hollenback Township	9	0	0	0	0	0	0	0	9
Hughestown Borough	0	0	0	0	0	0	0	0	0
Hunlock Township	0	0	0	0	0	0	0	0	0
Huntington Township	0	0	0	0	0	0	0	0	0
Jackson Township	0	0	0	0	0	0	1	0	1
Jeddo Borough	0	0	0	0	0	0	0	0	0
Jenkins Township	0	0	0	0	0	0	2	0	2
Kingston Borough	0	0	0	0	0	0	0	0	0
Kingston Township	1	0	0	0	0	0	0	0	1
Laflin Borough	0	0	0	0	0	0	0	0	0
Lake Township	0	0	0	0	0	0	0	0	0
Larksville Borough	0	1	0	0	0	0	0	0	1

Table 4.3.12-5 Structures in Wildfire Hazard Areas by Land Use in Luzerne County

Municipality	Agriculture	Commercial	Conservation	Industrial	Mining	Mixed Use	Residential	Special Purpose	Total per Municipality
Laurel Run Borough	0	0	0	0	0	0	0	0	0
Lehman Township	0	0	0	0	0	0	0	1	1
Luzerne Borough	0	0	0	0	0	0	0	0	0
Nanticoke City	0	0	0	0	0	0	0	0	0
Nescopeck Borough	0	0	0	0	0	0	0	0	0
Nescopeck Township	1	1	0	0	0	0	0	0	2
New Columbus Borough	0	0	0	0	0	0	0	0	0
Newport Township	0	0	0	0	0	0	1	0	1
Nuangola Borough	0	0	0	0	0	0	4	0	4
Penn Lake Park Borough	0	0	0	0	0	0	28	0	28
Pittston City	0	0	0	0	0	0	0	0	0
Pittston Township	0	0	0	0	0	0	1	0	1
Plains Township	0	0	0	0	0	0	0	0	0
Plymouth Borough	0	0	0	0	0	0	0	0	0
Plymouth Township	0	0	0	0	0	0	5	0	5
Pringle Borough	0	0	0	0	0	0		0	
Rice Township	14	1	16	0	0	0	171	0	202
Ross Township	0	0	0	0	0	0	0	0	0
Salem Township	1	0	0	0	0	0	0	0	1
Shickshinny Borough	0	0	0	0	0	0	0	0	0

Table 4.3.12-5 Structures in Wildfire Hazard Areas by Land Use in Luzerne County

Municipality	Agriculture	Commercial	Conservation	Industrial	Mining	Mixed Use	Residential	Special Purpose	Total per Municipality
Slocum Township	3	0	0	0	0	0	3	0	6
Sugar Notch Borough	0	0	0	0	0	0	0	0	0
Sugarloaf Township	68	1	19	1	0	0	155	0	244
Swoyersville Borough	0	0	0	0	0	0	1	0	1
Union Township	0	0	0	0	0	0	0	0	0
Warrior Run Borough	0	0	0	0	0	0	0	0	0
West Hazleton Borough	0	1	0	0	0	0	9	0	10
West Pittston Borough	0	0	0	0	0	0	0	0	0
West Wyoming Borough	0	0	0	0	0	0	0	0	0
White Haven Borough	0	0	4	0	0	0	23	0	27
Wilkes-Barre City	0	0	0	0	0	0	0	0	0
Wilkes-Barre Township	0	0	0	0	0	0	0	0	0
Wright Township	0	6	88	0	0	0	324	0	418
Wyoming Borough	0	0	0	0	0	0	0	0	0
Yatesville Borough	0	0	0	0	0	0	0	0	0
Total	251	62	300	27	62	26	2,228	10	2,966

Table 4.3.12-5 below shows the Expected Annual Losses to wildfire for each census tract in the county according to FEMA's National Risk Index.

Table 4.3.12-6 Expected Annual Losses to Wildfire by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2001.00	Wilkes-Barre City	$95.86	Very Low
2002.00	Wilkes-Barre City	$7.62	Very Low
2003.00	Wilkes-Barre City	$126.25	Very Low
2004.00	Wilkes-Barre City	$0.00	No Expected Annual Losses
2005.00	Wilkes-Barre City	$0.00	No Expected Annual Losses
2006.00	Wilkes-Barre City	$0.00	No Expected Annual Losses
2007.00	Wilkes-Barre City	$0.00	No Expected Annual Losses
2008.00	Wilkes-Barre City	$0.00	No Expected Annual Losses
2009.00	Wilkes-Barre City	$0.00	No Expected Annual Losses
2010.00	Wilkes-Barre City	$2.59	Very Low
2011.00	Wilkes-Barre City	$0.00	No Expected Annual Losses
2012.00	Wilkes-Barre City	$8.37	Very Low
2013.00	Wilkes-Barre City	$3.80	Very Low
2014.00	Wilkes-Barre City	$0.00	No Expected Annual Losses
2015.00	Wilkes-Barre City	$0.00	No Expected Annual Losses
2016.00	Wilkes-Barre City	$42.53	Very Low
2101.00	Pittston Township	$734.78	Relatively Low
2102.00	Dupont Borough	$58.68	Very Low
2103.00	Avoca Borough	$144.66	Very Low
2104.00	Hughestown Borough	$41.34	Very Low
2105.00	Duryea Borough	$191.68	Very Low
2106.00	Pittston City	$97.94	Very Low
2107.00	Pittston City	$74.40	Very Low
2108.00	Pittston City	$1.00	Very Low
2110.00	West Pittston Borough	$122.32	Very Low
2111.01	Exeter Borough	$409.21	Relatively Low
2111.02	Exeter Township	$151.30	Very Low
2112.01	Dallas Borough	$140.53	Very Low
2112.03	Franklin Township	$66.74	Very Low

Table 4.3.12-6 Expected Annual Losses to Wildfire by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2112.04	Dallas Township	$189.48	Very Low
2112.05	Dallas Township	$4.96	Very Low
2113.01	Jackson Township	$53.65	Very Low
2113.02	Lehman Township	$468.29	Relatively Low
2113.03	Harveys Lake Borough	$50.53	Very Low
2113.04	Lake Township	$33.43	Very Low
2114.00	Kingston Township	$394.40	Relatively Low
2115.00	West Wyoming Borough	$12.65	Very Low
2116.00	Wyoming Borough	$142.02	Very Low
2117.01	Jenkins Township	$610.71	Relatively Low
2117.02	Laflin Borough	$268.82	Very Low
2118.00	Plains Township	$224.81	Very Low
2119.00	Plains Township	$274.33	Very Low
2120.00	Plains Township	$83.87	Very Low
2121.00	Forty Fort Borough	$121.93	Very Low
2122.00	Swoyersville Borough	$218.91	Very Low
2123.00	Luzerne Borough	$0.00	No Expected Annual Losses
2127.00	Kingston Borough	$8.76	Very Low
2128.00	Kingston Borough	$0.00	No Expected Annual Losses
2129.00	Kingston Borough	$0.00	No Expected Annual Losses
2130.00	Kingston Borough	$0.00	No Expected Annual Losses
2131.00	Kingston Borough	$42.12	Very Low
2132.00	Edwardsville Borough	$113.66	Very Low
2133.00	Courtdale Borough	$74.10	Very Low
2134.00	Larksville Borough	$273.55	Very Low
2136.00	Plymouth Borough	$43.24	Very Low
2137.00	Plymouth Borough	$0.91	Very Low
2138.00	Plymouth Borough	$59.84	Very Low
2139.00	Plymouth Township	$203.80	Very Low
2141.00	Nanticoke City	$27.86	Very Low
2142.00	Nanticoke City	$115.57	Very Low
2143.00	Nanticoke City	$105.84	Very Low
2144.00	Nanticoke City	$68.93	Very Low
2145.00	Hanover Township	$124.46	Very Low
2146.00	Hanover Township	$545.72	Relatively Low
2149.00	Hanover Township	$146.67	Very Low

Table 4.3.12-6 Expected Annual Losses to Wildfire by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2150.00	Sugar Notch Borough	$116.33	Very Low
2151.00	Ashley Borough	$131.34	Very Low
2152.00	Wilkes-Barre Township	$275.61	Very Low
2153.00	Bear Creek Township	$300.41	Very Low
2154.00	Dennison Township	$113.45	Very Low
2155.01	Fairview Township	$32.86	Very Low
2155.02	Wright Township	$561.08	Relatively Low
2155.03	Rice Township	$633.78	Relatively Low
2155.04	Dorrance Township	$616.32	Relatively Low
2156.00	Newport Township	$377.57	Relatively Low
2157.01	Hunlock Township	$40.64	Very Low
2157.02	Union Township	$291.38	Very Low
2158.00	Ross Township	$106.84	Very Low
2159.00	Fairmount Township	$387.50	Relatively Low
2161.00	Salem Township	$1,038.74	Relatively Low
2162.00	Conyngham Township	$499.21	Relatively Low
2164.00	Black Creek Township	$474.96	Relatively Low
2165.01	Conyngham Borough	$245.25	Very Low
2165.02	Sugarloaf Township	$458.88	Relatively Low
2166.01	Butler Township	$226.72	Very Low
2166.02	Butler Township	$639.08	Relatively Low
2167.00	Freeland Borough	$21.65	Very Low
2168.00	Foster Township	$417.13	Relatively Low
2169.00	Hazle Township	$434.82	Relatively Low
2170.01	Hazle Township	$1,447.56	Relatively Low
2170.02	Hazle Township	$244.76	Very Low
2171.00	Hazleton City	$100.16	Very Low
2172.00	Hazleton City	$67.15	Very Low
2173.00	Hazleton City	$361.59	Relatively Low
2174.00	Hazleton City	$49.34	Very Low
2175.00	Hazleton City	$37.09	Very Low
2176.00	Hazleton City	$0.00	No Expected Annual Losses
2177.00	Hazleton City	$0.00	No Expected Annual Losses
2178.00	Hazleton City	$0.00	No Expected Annual Losses
2179.00	Hazle Township	$171.47	Very Low
2180.00	Hanover Township	$654.25	Relatively Low
TOTAL		**$19,204.33**	

4.3.12.6. Equity in Vulnerable Communities

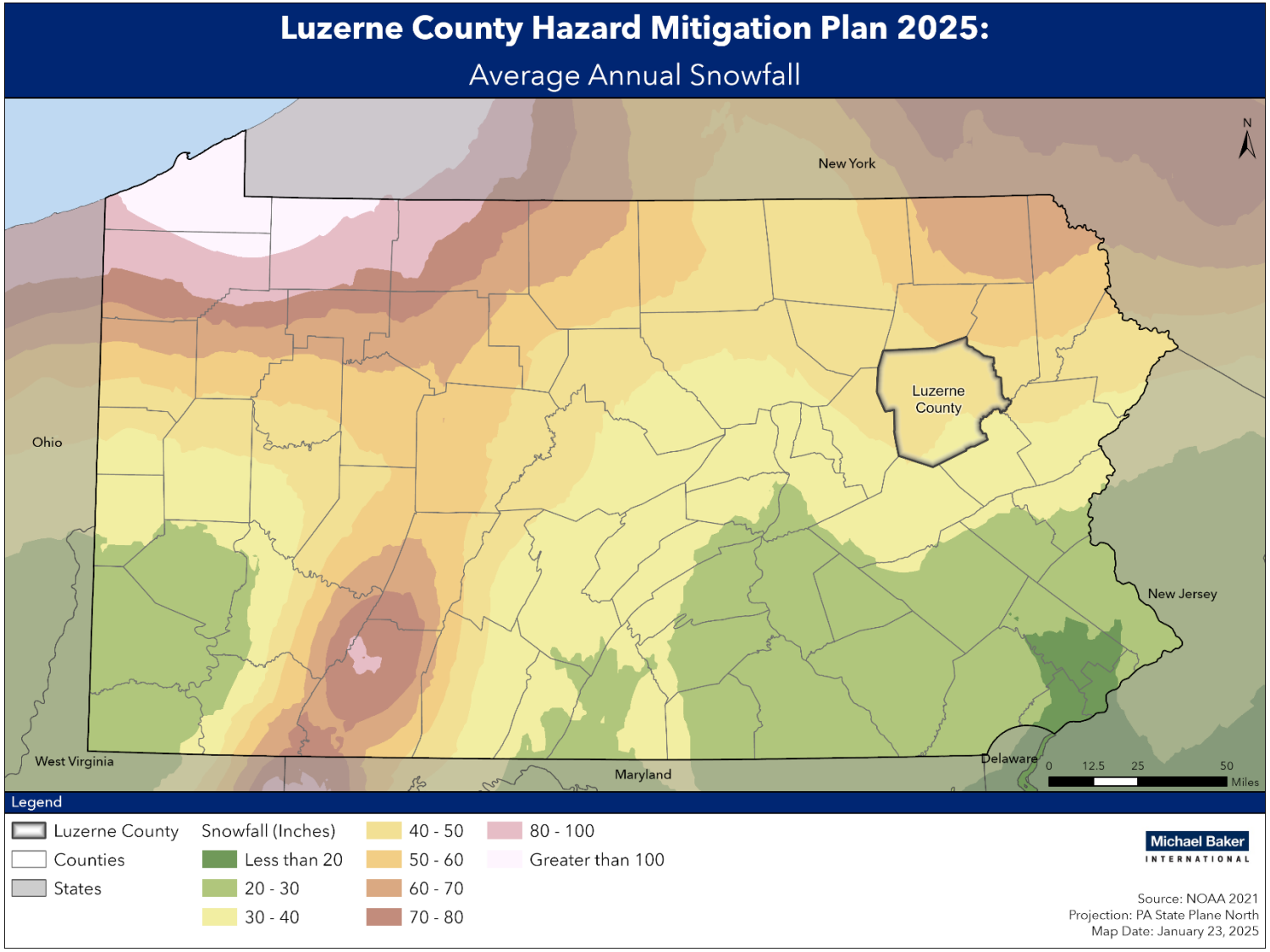
Communities in rural areas are more susceptible due to potential proximity to large fire-prone wooded areas. These areas may have limited evacuation routes, increasing the risk for residents in the path of wildfires. Additionally, households with people with disabilities, specifically related to lung or respiratory issues, are going to be at an increased risk of harm, and county hospitals should be prepared. This means areas of Jeddo Borough, Laurel Run Borough, Ashley Borough, and Exeter Borough may be particularly vulnerable.

4.3.13. WINTER STORM

4.3.13.1. Location and Extent

Heavy snow or ice occurs throughout the Commonwealth of Pennsylvania. Every municipality in Luzerne County is affected by these storms. Luzerne County experiences all levels of winter storms from ice storms and freezing rain to heavy snow and blizzards. Generally, the average annual snowfall is consistent throughout the County, with the area receiving between 30 and 50 inches of snow annually (see the map below). This was the most current data available at the time of this HMP Update.

Figure 4.3.13-1 Mean Annual Snowfall for Pennsylvania and Luzerne County



4.3.13.2. Range of Magnitude

Winter storms consist of cold temperatures, heavy snow or ice and sometimes strong winds. Because winter storms are a regular occurrence in Luzerne County, they are considered hazards only when they result in damage to specific structures and/or overwhelm local capabilities to handle disruptions to traffic, communications, and electric power. The cost of removing snow, repairing damages, especially from ice storms, and the loss to businesses can have a negative economic impact for communities. Winter storms can generate other hazards such as infrastructure disruption (blocked roads and power outages), human-caused hazards (traffic accidents and trapped vehicles), and technological problems (communication system outages and overload). Winter storms can adversely affect roadways, utilities, business activities, and can cause loss of life, frostbite, or freezing.

Winter storms may include one or more of the following weather events:

- Heavy Snowstorm: Accumulations of four inches or more in a six-hour period, or six inches or more in a 12-hour period.
- Sleet Storm: Sleet is formed when snow falling to the earth partially melts as it passes through a layer of warm air. The precipitation then passes through a cold layer of air and refreezes into solid pellets. Sleet causes surfaces to become slippery, posing hazards to pedestrians and motorists.
- Ice Storm: An ice storm occurs when rain freezes upon impact with the ground or other objects such as trees and power lines. Heavy accumulations of ice can bring down trees and topple utility poles, disrupting power and communication for days while crews make the necessary repairs. The icy conditions are also dangerous for pedestrians and vehicular traffic.
- Blizzard: According to the National Weather Service, a blizzard is a severe snowstorm that occurs when wind reaches 35 mph or more. The blowing snow reduces visibility to less the one-quarter of a mile for at least three hours. Storms that meet these criteria are not frequent in Luzerne County; however, storms that produce blizzard-like conditions are a common occurrence.
- Severe Blizzard: Wind velocity of 45 mph, temperatures of 10 degrees Fahrenheit or lower, a high density of blowing snow with visibility frequently measured in feet prevailing over an extended period time.

Any of the above events can result in the closing of secondary roads, particularly in rural locations, loss of utility services and depletion of oil heating supplies. Environmental impacts often include damage to shrubbery and trees due to heavy snow loading, ice build-up and/or high winds, which can break limbs or even bring down large trees. An indirect effect of winter storms is the treatment of roadway surfaces with salt, chemicals, and other de-icing materials which can impair adjacent surfaces through corrosion and impair local water bodies and water

supply (Hinsdale, 2018). Winter storms have a positive environmental impact as well, as gradual melting of snow and ice provides excellent groundwater recharge. However, quickly rising temperatures following a heavy snowfall can cause rapid surface water runoff and severe flooding.

One of the worst examples of a winter storm event in Luzerne County occurred in 2017 when a snowstorm deposited over 30 inches in Northeastern Pennsylvania. The Wilkes-Barre/Scranton airport set an all-time daily snowfall record of 22.1 inches. In January 2003, a slow-moving nor'easter dropped 4-9 inches in Luzerne County. The weight of the snow combined with the weight of ice from a previous storm caused additional power outages. All major roads in the region had motor vehicle accidents. An example of a recent extreme winter storm was the one that occurred on December 16, 2020. Snow accumulated 10 to 20 inches and transportation impacts were extensive with numerous road closures and delays (NCEI, 2025).

The potential impacts of winter storms on community lifelines are as follows:

Table 4.3.13-1 Most Likely Lifelines Impacted by Winter Storm

LIFELINES	NOTES
Safety and Security	Government administrative services may be impacted through transportation infrastructure issues and community safety may be threatened due to potential harm from storm impacts.
Food, Hydration, Shelter	Winter storms can cause damage to structures and water utility infrastructure, while the food supply chain may be disrupted due to impacts on transportation infrastructure.
Energy (Power & Fuel)	Potential direct damage to infrastructure and then potential increased fuel use for those who lost access to electrical heating may occur. Potential for an increase in accidental deaths due to kerosene and carbon monoxide poisoning from the misuse of space heaters and generators during a winter storm event.
Transportation	Transportation lifeline in response and recovery due to direct damage to infrastructure and dangerous road conditions.

4.3.13.3. Past Occurrence

The Commonwealth of Pennsylvania has a long history of winter storms. Winter storms generally occur more than once each year in the County. Four of the twenty-two Presidential Disaster and Emergency Declarations affecting Luzerne County have been in response to hazard events related to winter storms (see Table 4.2-1). The NCEI data on past occurrences for winter storm lists events since 2000, causing $740,000 in damages. These winter storm events are listed in Table 4.3.13-2 below.

Table 4.3.13-2 Previous winter storm events impacting Luzerne County since 2000 (NCEI, 2025).

LOCATION	DATE	TYPE	ESTIMATED PROPERTY DAMAGE ($)
Countywide	01/20/2000	Heavy Snow	*not provided*
Countywide	01/25/2000	Heavy Snow	*not provided*
Countywide	01/30/2000	Heavy Snow	*not provided*
Countywide	02/13/2000	Ice Storm	*not provided*
Countywide	02/18/2000	Heavy Snow	*not provided*
Countywide	04/08/2000	Heavy Snow	*not provided*
Countywide	12/13/2000	Winter Storm	*not provided*
Countywide	12/19/2000	Heavy Snow	*not provided*
Countywide	01/20/2001	Heavy Snow	*not provided*
Countywide	02/05/2001	Heavy Snow	*not provided*
Countywide	02/24/2001	Ice Storm	*not provided*
Countywide	03/04/2001	Heavy Snow	*not provided*
Countywide	01/06/2002	Heavy Snow	*not provided*
Countywide	01/31/2002	Winter Storm	*not provided*
Countywide	02/01/2002	Winter Storm	*not provided*
Countywide	12/05/2002	Heavy Snow	*not provided*
Countywide	12/11/2002	Winter Weather	*not provided*
Countywide	12/24/2002	Heavy Snow	*not provided*
Countywide	01/03/2003	Heavy Snow	*$300,000*
Countywide	02/17/2003	Heavy Snow	*$50,000*
Countywide	12/06/2003	Heavy Snow	*$20,000*
Countywide	03/16/2004	Heavy Snow	*$20,000*
Countywide	01/06/2005	Winter Weather	*$100,000*
Countywide	01/23/2005	Heavy Snow	*$20,000*
Countywide	03/01/2005	Heavy Snow	*$20,000*
Countywide	03/24/2005	Heavy Snow	*$10,000*
Countywide	10/25/2005	Winter Weather	*not provided*
Countywide	12/09/2005	Heavy Snow	*$10,000*
Countywide	12/16/2005	Winter Storm	*$10,000*
Countywide	02/13/2007	Winter Storm	*$75,000*
Countywide	03/16/2007	Heavy Snow	*not provided*
Countywide	04/15/2007	Winter Storm	*not provided*
Countywide	11/17/2007	Winter Weather	*$5,000*
Countywide	02/10/2008	Winter Weather	*$100,000*
Countywide	10/28/2008	Winter Storm	*not provided*
Countywide	12/19/2008	Heavy Snow	*not provided*
Countywide	10/15/2009	Winter Weather	*not provided*

Table 4.3.13-2 Previous winter storm events impacting Luzerne County since 2000 (NCEI, 2025).

LOCATION	DATE	TYPE	ESTIMATED PROPERTY DAMAGE ($)
Countywide	02/10/2010	Winter Storm	*not provided*
Countywide	02/25/2010	Winter Storm	*not provided*
Countywide	02/20/2011	Winter Storm	*not provided*
Countywide	03/23/2011	Winter Storm	*not provided*
Countywide	10/29/2011	Winter Storm	*not provided*
Countywide	01/02/2014	Winter Storm	*not provided*
Countywide	02/05/2014	Winter Storm	*not provided*
Countywide	02/13/2014	Winter Storm	*not provided*
Countywide	11/26/2014	Winter Storm	*not provided*
Countywide	02/01/2015	Heavy Snow	*not provided*
Countywide	01/23/2016	Heavy Snow	*not provided*
Countywide	02/09/2017	Heavy Snow	*not provided*
Countywide	03/09/2017	Heavy Snow	*not provided*
Countywide	03/14/2017	Blizzard	*not provided*
Countywide	03/02/2018	Heavy Snow	*not provided*
Countywide	11/15/2018	Heavy Snow	*not provided*
Countywide	12/16/2020	Heavy Snow	*not provided*
Countywide	01/31/2021	Winter Weather	*not provided*
Countywide	02/01/2021	Winter Storm	*not provided*
Countywide	03/12/2022	Heavy Snow	*not provided*
Countywide	01/06/2024	Heavy Snow	*not provided*
Countywide	02/13/2024	Heavy Snow	*not provided*

4.3.13.4. Future Occurrence

Data from NCDC shows that winter storms are a regular occurrence in Luzerne County. So, the probability of the occurrence of a damaging heavy snow or ice storm in Luzerne County in any given year is 100 percent. The future occurrence of winter storms hazard can be considered *highly likely* as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1).

Climate projections shows that while precipitation totals are expected to increase, the number of days below 32 degrees Fahrenheit may decrease. This may lead to a decrease in the number of winter storms. That said, the polar jet stream and arctic warming may play a part in large-scale storms still being a potential hazard. Cohen, Pfeiffer, and Francis (2018) posited that warming Artic temperatures have led to a weakening of the polar jet stream, which has allowed warmer, yet still very cold, artic air to travel southward and provide the other half of the equation for the intense winter storms seen in the Northeast United States. There is a possibility these storms continue to occur and may even occur more frequently, with the warming Atlantic Ocean generating more fuel and the potential for more intense hot air-cold air clashes that strengthen

storms (Feuerstein, 2022). However, this study has been criticized due to the small size of the 35-year sample and the potential for compounding factors impacting the data, as various climate modeling techniques have so-far been unable to reproduce the effect and confirm the linkage (Blackport and Screen, 2020). More studies are ongoing.

4.3.13.5. Vulnerability Assessment

In Luzerne County, accumulations of snow and/or ice during winter months are expected and normal. The most common detrimental effects of snow and/or ice are not collapsed structures but traffic accidents and interruptions in power supply and communications services.

Some rural areas of the county are susceptible to isolation due to the loss of telephone communication and road closures. Power failures and interruption of water supplies are not uncommon from ice storms as well as heavy snow or blizzard conditions. Emergency medical supplies, food, and fuel are sometimes required during these storms. Particular areas of vulnerability include low-income and elderly populations, mobile homes, and infrastructure such as roadways and utilities that can be damaged by such storms and the low-lying areas that can be impacted by flooding related to rapid snow melt.

Vulnerability to the effects of winter storms on buildings is somewhat dependent on the age of a building because as building codes become more stringent, buildings can support heavier loads and as buildings age, various factors may deteriorate their structural integrity. Vulnerability also depends upon the type of construction and the degree to which a structure has been maintained.

The most vulnerable structures are those that were poorly built or are dilapidated. The weight of heavy snow or ice may lead to structural collapse or to minor property damage. Some shed roofs that protect township and borough road maintenance or firefighting equipment have large span roofs that may collapse under the weight of especially heavy snow or ice although none have collapsed due to recent heavy snow or ice storms.

All structures and infrastructure in Luzerne County are exposed to heavy snow and ice. For this analysis, structures built prior to 1940 are identified as being potentially at risk of being somewhat weakened and more susceptible to damage due to heavy snow or ice. The following table shows the number of housing units in Luzerne County built prior to 1940 according to the US Census Bureau's estimates. The City of Wilkes-Barre has the most structures of any municipality in the county built prior to 1940 (over 9,000). However, Freeland Borough has the largest proportion of housing units built prior to 1940 (56.0%). While the U.S. Census provides estimates for residential structures, the age of non-residential structures is not available.

Table 4.3.13-3 Age of housing units in Luzerne County (U.S. Census, 2023)

MUNICIPALITY	NUMBER OF HOUSING UNITS BUILT PRIOR TO 1940	PERCENT OF TOTAL HOUSING UNITS
Ashley Borough	665	52.7%

Table 4.3.13-3 Age of housing units in Luzerne County (U.S. Census, 2023)

MUNICIPALITY	NUMBER OF HOUSING UNITS BUILT PRIOR TO 1940	PERCENT OF TOTAL HOUSING UNITS
Avoca Borough	622	50.8%
Bear Creek Township	97	7.4%
Bear Creek Village Borough	44	25.7%
Black Creek Township	285	25.5%
Buck Township	29	10.9%
Butler Township	290	7.4%
Conyngham Borough	130	15.9%
Conyngham Township	228	31.9%
Courtdale Borough	81	31.0%
Dallas Borough	140	11.3%
Dallas Township	369	9.8%
Dennison Township	68	13.0%
Dorrance Township	98	10.3%
Dupont Borough	540	40.6%
Duryea Borough	907	39.6%
Edwardsville Borough	771	34.6%
Exeter Borough	650	22.8%
Exeter Township	227	18.9%
Fairmount Township	102	16.7%
Fairview Township	183	10.2%
Forty Fort Borough	930	48.7%
Foster Township	445	21.6%
Franklin Township	122	16.1%
Freeland Borough	1,043	56.0%
Hanover Township	1,432	27.2%
Harveys Lake Borough	308	17.4%
Hazle Township	1,170	24.1%
City of Hazleton	4,208	33.2%
Hollenback Township	85	18.1%
Hughestown Borough	262	38.4%
Hunlock Township	154	16.1%
Huntington Township	168	17.8%
Jackson Township	127	12.6%
Jeddo Borough	40	55.6%
Jenkins Township	390	18.4%
Kingston Borough	2,253	35.9%
Kingston Township	374	11.1%

Table 4.3.13-3 Age of housing units in Luzerne County (U.S. Census, 2023)

MUNICIPALITY	NUMBER OF HOUSING UNITS BUILT PRIOR TO 1940	PERCENT OF TOTAL HOUSING UNITS
Laflin Borough	42	6.6%
Lake Township	105	13.3%
Larksville Borough	769	35.6%
Laurel Run Borough	28	12.3%
Lehman Township	281	17.4%
Luzerne Borough	746	47.2%
City of Nanticoke	2,269	44.4%
Nescopeck Borough	306	39.1%
Nescopeck Township	85	17.1%
New Columbus Borough	54	43.9%
Newport Township	1,101	53.2%
Nuangola Borough	110	27.1%
Penn Lake Park Borough	13	5.2%
City of Pittston	1,726	43.7%
Pittston Township	267	19.5%
Plains Township	1,660	33.7%
Plymouth Borough	1,449	48.8%
Plymouth Township	207	27.6%
Pringle Borough	265	54.9%
Rice Township	77	5.4%
Ross Township	256	17.9%
Salem Township	622	27.6%
Shickshinny Borough	157	44.2%
Slocum Township	155	29.8%
Sugarloaf Township	141	9.8%
Sugar Notch Borough	275	54.0%
Swoyersville Borough	626	24.9%
Union Township	152	17.2%
Warrior Run Borough	107	48.4%
West Hazleton Borough	813	44.1%
West Pittston Borough	1,265	55.6%
West Wyoming Borough	354	26.9%
White Haven Borough	236	47.3%
City of Wilkes-Barre	9,374	46.9%
Wilkes-Barre Township	694	41.0%
Wright Township	91	4.1%
Wyoming Borough	628	38.1%

Table 4.3.13-3 Age of housing units in Luzerne County (U.S. Census, 2023)		
MUNICIPALITY	NUMBER OF HOUSING UNITS BUILT PRIOR TO 1940	PERCENT OF TOTAL HOUSING UNITS
Yatesville Borough	89	28.3%
Total	47,632	31.61%

Table 4.3.13-4 below shows the Expected Annual Losses to winter storms for each census tract in the county according to FEMA's National Risk Index.

Table 4.3.13-4 Expected Annual Losses to Winter Storm by Census Tract (FEMA NRI, 2025)			
CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2001.00	Wilkes-Barre City	$3,996.97	Relatively Moderate
2002.00	Wilkes-Barre City	$3,388.98	Relatively Moderate
2003.00	Wilkes-Barre City	$1,762.61	Relatively Low
2004.00	Wilkes-Barre City	$2,443.75	Relatively Moderate
2005.00	Wilkes-Barre City	$2,544.66	Relatively Moderate
2006.00	Wilkes-Barre City	$2,078.44	Relatively Low
2007.00	Wilkes-Barre City	$3,465.09	Relatively Moderate
2008.00	Wilkes-Barre City	$3,448.90	Relatively Moderate
2009.00	Wilkes-Barre City	$3,005.81	Relatively Moderate
2010.00	Wilkes-Barre City	$2,610.03	Relatively Moderate
2011.00	Wilkes-Barre City	$1,240.23	Relatively Low
2012.00	Wilkes-Barre City	$2,557.51	Relatively Moderate
2013.00	Wilkes-Barre City	$2,129.63	Relatively Moderate
2014.00	Wilkes-Barre City	$2,227.41	Relatively Moderate
2015.00	Wilkes-Barre City	$2,206.45	Relatively Moderate
2016.00	Wilkes-Barre City	$2,597.65	Relatively Moderate
2101.00	Pittston Township	$3,343.29	Relatively Moderate
2102.00	Dupont Borough	$2,384.03	Relatively Moderate
2103.00	Avoca Borough	$2,349.09	Relatively Moderate
2104.00	Hughestown Borough	$1,265.93	Relatively Low
2105.00	Duryea Borough	$4,760.01	Relatively Moderate
2106.00	Pittston City	$2,518.47	Relatively Moderate
2107.00	Pittston City	$1,655.01	Relatively Low
2108.00	Pittston City	$2,920.30	Relatively Moderate
2110.00	West Pittston Borough	$4,395.62	Relatively Moderate
2111.01	Exeter Borough	$5,249.88	Relatively Moderate
2111.02	Exeter Township	$1,936.85	Relatively Low
2112.01	Dallas Borough	$2,607.97	Relatively Moderate

Table 4.3.13-4 Expected Annual Losses to Winter Storm by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2112.03	Franklin Township	$1,623.05	Relatively Low
2112.04	Dallas Township	$6,361.05	Relatively Moderate
2112.05	Dallas Township	$2,342.31	Relatively Moderate
2113.01	Jackson Township	$4,263.12	Relatively Moderate
2113.02	Lehman Township	$3,297.77	Relatively Moderate
2113.03	Harveys Lake Borough	$2,671.97	Relatively Moderate
2113.04	Lake Township	$1,881.82	Relatively Low
2114.00	Kingston Township	$6,692.66	Relatively Moderate
2115.00	West Wyoming Borough	$2,530.28	Relatively Moderate
2116.00	Wyoming Borough	$2,960.78	Relatively Moderate
2117.01	Jenkins Township	$4,977.10	Relatively Moderate
2117.02	Laflin Borough	$1,457.22	Relatively Low
2118.00	Plains Township	$2,038.57	Relatively Low
2119.00	Plains Township	$5,757.14	Relatively Moderate
2120.00	Plains Township	$1,723.80	Relatively Low
2121.00	Forty Fort Borough	$4,032.39	Relatively Moderate
2122.00	Swoyersville Borough	$4,677.29	Relatively Moderate
2123.00	Luzerne Borough	$2,562.20	Relatively Moderate
2127.00	Kingston Borough	$4,927.94	Relatively Moderate
2128.00	Kingston Borough	$3,266.42	Relatively Moderate
2129.00	Kingston Borough	$1,383.56	Relatively Low
2130.00	Kingston Borough	$1,388.21	Relatively Low
2131.00	Kingston Borough	$1,672.41	Relatively Low
2132.00	Edwardsville Borough	$4,591.07	Relatively Moderate
2133.00	Courtdale Borough	$1,505.53	Relatively Low
2134.00	Larksville Borough	$3,967.06	Relatively Moderate
2136.00	Plymouth Borough	$2,006.06	Relatively Low
2137.00	Plymouth Borough	$1,903.81	Relatively Low
2138.00	Plymouth Borough	$1,476.83	Relatively Low
2139.00	Plymouth Township	$1,630.06	Relatively Low
2141.00	Nanticoke City	$3,277.33	Relatively Moderate
2142.00	Nanticoke City	$2,772.14	Relatively Moderate
2143.00	Nanticoke City	$2,052.36	Relatively Low
2144.00	Nanticoke City	$1,926.15	Relatively Low
2145.00	Hanover Township	$1,636.40	Relatively Low
2146.00	Hanover Township	$4,122.81	Relatively Moderate
2149.00	Hanover Township	$1,380.70	Relatively Low
2150.00	Sugar Notch Borough	$1,450.12	Relatively Low
2151.00	Ashley Borough	$2,421.11	Relatively Moderate
2152.00	Wilkes-Barre Township	$3,231.84	Relatively Moderate

Table 4.3.13-4 Expected Annual Losses to Winter Storm by Census Tract (FEMA NRI, 2025)

CENSUS TRACT	MUNICIPALITY	EXPECTED ANNUAL LOSSES	EXPECTED ANNUAL LOSS RATING
2153.00	Bear Creek Township	$3,825.54	Relatively Moderate
2154.00	Dennison Township	$2,379.09	Relatively Moderate
2155.01	Fairview Township	$4,456.40	Relatively Moderate
2155.02	Wright Township	$5,857.86	Relatively Moderate
2155.03	Rice Township	$3,462.70	Relatively Moderate
2155.04	Dorrance Township	$3,633.00	Relatively Moderate
2156.00	Newport Township	$4,173.64	Relatively Moderate
2157.01	Hunlock Township	$2,090.66	Relatively Low
2157.02	Union Township	$2,543.43	Relatively Moderate
2158.00	Ross Township	$2,590.68	Relatively Moderate
2159.00	Fairmount Township	$3,290.47	Relatively Moderate
2161.00	Salem Township	$3,912.42	Relatively Moderate
2162.00	Conyngham Township	$4,833.62	Relatively Moderate
2164.00	Black Creek Township	$1,842.29	Relatively Low
2165.01	Conyngham Borough	$1,731.56	Relatively Low
2165.02	Sugarloaf Township	$3,790.21	Relatively Moderate
2166.01	Butler Township	$3,124.94	Relatively Moderate
2166.02	Butler Township	$5,909.72	Relatively Moderate
2167.00	Freeland Borough	$3,601.35	Relatively Moderate
2168.00	Foster Township	$3,372.96	Relatively Moderate
2169.00	Hazle Township	$4,414.17	Relatively Moderate
2170.01	Hazle Township	$3,082.03	Relatively Moderate
2170.02	Hazle Township	$3,105.97	Relatively Moderate
2171.00	Hazleton City	$3,584.81	Relatively Moderate
2172.00	Hazleton City	$3,629.73	Relatively Moderate
2173.00	Hazleton City	$3,525.21	Relatively Moderate
2174.00	Hazleton City	$1,682.28	Relatively Low
2175.00	Hazleton City	$3,167.35	Relatively Moderate
2176.00	Hazleton City	$3,392.93	Relatively Moderate
2177.00	Hazleton City	$5,067.59	Relatively Moderate
2178.00	Hazleton City	$3,766.92	Relatively Moderate
2179.00	Hazle Township	$4,960.29	Relatively Moderate
2180.00	Hanover Township	$4,026.29	Relatively Moderate
TOTAL		**$310,759.12**	

All structures and infrastructure in Luzerne County will be exposed to heavy snow and ice. Because all of Luzerne County has adopted the 2009 IBC and IRC, new construction will be able to withstand the weight of heavy snow or ice.

4.3.13.6. Equity in Vulnerable Communities

During winter storms there will be a disproportionate impact on low-income and marginalized communities. Low-income families are more likely to live in poorly insulated or older homes that are less able to withstand extreme cold. These homes may lack sufficient heating, insulation, and weatherproofing, making them more vulnerable to damage from ice, snow, and cold temperatures. Many low-income households also experience energy insecurity and may struggle to afford heating during winter months. Energy shutoffs due to unpaid bills can leave these population groups dangerously exposed to cold weather. Elderly households or households with people with disabilities may also face additional challenges due to mobility issues. Icy conditions, snow buildup, and impassable roads or sidewalks can prevent them from leaving their homes. This means areas of the City of Wilkes-Barre and the City of Hazleton and may be particularly vulnerable.

HUMAN-MADE HAZARDS

4.3.14. CYBER-TERRORISM

4.3.14.1. Location and Extent

Cyberterrorism is a broad term that refers to acts associated with the convergence of terrorism and cyberspace. Generally, cyberterrorism involves unlawful attacks or threats against computers, networks, and the information stored therein to intimidate or coerce a government or its people to achieve political or social objectives (Denning, 2000). These acts can range from taking control of a host website, to using networked resources to directly cause destruction and harm. The Pennsylvania Governor's Office of Homeland Security defines the following types and methods of cyberattacks:

Table 4.3.14-1 Methods of Cyberattacks (PA OHS, 2022)

THREAT	DESCRIPTION
Botnet (also zombies)	A collection of computers subject to control by an outside party, usually without the knowledge of the owners, using secretly installed software robots. The robots are spread by trojan horses and viruses. The botnets can be used to launch denial-of-service attacks and transmit spam.
Card Skimming	The act of using a skimmer to illegally collect data from the magnetic stripe of a credit, debit or ATM card. This information, copied onto another blank card's magnetic stripe, is then used by an identity thief to make purchases or withdraw cash in the name of the actual account holder. Skimming can take place at an ATM and can occur at restaurants, taxis, or other places where a user surrenders his or her card to an employee.
Denial-of-service attack	Flooding the networks or servers of individuals or organizations with false data requests so they are unable to respond to requests from legitimate users.
Malicious code (also malware)	Any code that can be used to attack a computer by spreading viruses, crashing networks, gathering intelligence, corrupting data, distributing misinformation and interfering with normal operations.
Pharming	The act of sending an e-mail to a user falsely claiming to be an established legitimate enterprise to scam the user into surrendering private information that will be used for identity theft. The e-mail directs the user to visit a website where they are asked to update personal information, such as passwords and credit card, social security, and bank account numbers that the legitimate organization already has. The website, however, is

Table 4.3.14-1 Methods of Cyberattacks (PA OHS, 2022)

THREAT	DESCRIPTION
Phishing	Using fake e-mail to trick individuals into revealing personal information, such as Social Security numbers, debit and credit card account numbers and passwords, for nefarious uses.
Spam	Unsolicited bulk e-mail that may contain malicious software. Spam is now said to account for around 81 percent of all e-mail traffic.
Spear Phishing	A type of phishing attack that focuses on a single user or department within an organization, addressed from someone within the company in a position of trust and requesting information such as login IDs and passwords. Spear phishing scams will often appear to be from a company's own human resources or technical support divisions and may ask employees to update their username and passwords. Once hackers get this data, they can gain entry into secured networks. Another type of spear phishing attack will ask users to click on a link, which deploys spyware that can thieve data.
Spoofing	Making a message or transaction appear to come from a source other than the originator.
Spyware	Software that collects information without a user`s knowledge and transfers it to a third party.
Trojan horse	A destructive program that masquerades as a benign application. Unlike viruses, Trojan horses do not replicate themselves, but they can be just as destructive. One of the most insidious types of Trojan horse is a program that claims to rid your computer of viruses but instead introduces viruses onto your computer.
Virus	A program designed to degrade service, cause inexplicable symptoms or damage networks.
Worm	Program or algorithm that replicates itself over a computer network and usually performs malicious actions, such as using up the computer's resources and possibly shutting the system down. A worm, unlike a virus, has the capability to travel without human action and does not need to be attached to another file or program.

Cyberattacks may not always constitute acts of cyberterrorism because some acts may have relatively small impacts and only produce annoyances. A cyberattack is generally considered an act of cyberterrorism when the following motivations are present:

- Effects-based: What computer attacks result in effects that are disruptive enough to generate fear comparable to a traditional act of terrorism.

- Intent-based: When unlawful or politically motivated computer attacks are committed to intimidate or coerce a government or people to further a political objective, or to cause grave harm or severe economic damage (Rollins and Wilson, 2007).

Cyberattacks can be further divided into the following categories based on the complexity of the attack:

- Simple-Unstructured: Simple-unstructured attacks are the most common. These are amateurish attacks with relatively minimal consequences.
- Advanced-Structured: Advanced-structured attacks are more sophisticated and consequential and have a greater emphasis on targeting victims prior to an attack, resulting in a more debilitating effect.
- Complex-Coordinated: Complex-coordinated attacks are the most advanced and most troublesome type of attack where success could mean a network shutdown (Denning, 2000).

Cyberterrorism can cause severe disruptions to transportation, public safety, and utility services, all of which are critical infrastructure that are highly dependent on information technology. Cyberterrorism can take many forms, including attacks through physical means, electronic means, and use of malicious code. Cyberterrorists can also have a wide range of personal, political, or cultural agendas. All state agencies, as well as individuals, businesses, and other institutions in Luzerne County, are potential targets for cyberterrorism. Potential threats include identity theft, loss of sensitive information, disruption of services, and other malicious activity.

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. Cyber-attacks are also unpredictable and typically occur without warning.

4.3.14.2. Range of Magnitude

In recent years, cyberterrorism has become a significant threat and can impact people, businesses, institutions, local governments, and state agencies to varying degrees. Impacts from a large-scale cyberterrorism event could disrupt the state's economy and potentially threaten its economic stability. The magnitude of a cyberterrorism attack will vary greatly based on the extent of systems affected and duration of the impact. Additionally, the magnitude will vary based upon which specific system is affected by an attack, the ability to preempt an attack, and an attack's effect on continuity of operations. The largest threat to institutions from cyberterrorism comes from any processes that are networked and controlled via computer. The county and individual municipalities should address and take measures to reduce any vulnerabilities that could allow access to sensitive data or processes.

The potential impacts of cyberterrorism on community lifelines are as follows:

Table 4.3.14-2 Most Likely Lifelines Impacted by Cyberterrorism

LIFELINES	NOTES
Safety and Security	Community safety may be threatened, and government services targeted by cyberterrorism activities.
Energy (Power & Fuel)	Energy infrastructure may be a target for cyberterrorism activities.
Hazardous Materials	Hazardous materials facilities and operations may be targets for cyber terrorists.

4.3.14.3. Past Occurrence

In May 2019, there was a cyberattack on the Luzerne County courthouse network. The attack targeted computers with information including property assessment records, budgetary and financial information, and employee time clock reports. Luzerne County government is protected through a cyber risk policy under its general liability insurance. Following the attack, the County selected an outside vendor to assist with remediation. Remediation refers to post cyberattack assessments made to determine what parts of the network are infected and need fixing. The County was forced to shut down its entire network following the attack to stop the virus from spreading (Learn-Andes, 2019).

In March 2023, the Wilkes-Barre Career and Technical Center was subjected to a cyberattack. Ransomware was uploaded to one of the center's servers, which prevented administrators from accessing systems and threatened personal information that was stored on that server. The incident affected several school districts in Luzerne County, and one school closed in response. Impacts of the attack were limited due to anti-hacking software in the school's system (Mehalshick, 2023).

Since 2012, there have been six statewide cyberterrorism related incidents reported to PEMA-KC. An international cyber-attack occurred in 2017; a statewide cyber incident occurred in 2018; cyber-attacks occurred in 2021 and 2022; a cyber threat occurred in 2022; and a cyberattack occurred in 2024. There were also cyber threats and attacks in other Pennsylvania Counties, including York in 2016, and Northampton and the City of Bethlehem in 2017.

Another large-scale attack was the Equifax data breach in 2017, which was estimated to potentially impact over 5.5 million residents of Pennsylvania and over 145.5 million nationally. The information accessed included names, Social Security numbers, birthdates, addresses, and driver's license numbers (PA Office of the Attorney General, 2017). Additionally, in 2014 the largest data breach in history impacted over 3 billion Yahoo user accounts, including the names, email address, date of birth, and telephone numbers of over 500 million users (CSO, 2018). In

terms of a data breach cyber-attack, this could be considered a worst-case scenario event. Other large-scale data breach events have also occurred in recent years and are becoming more common.

In addition to large-scale acts of cyberterrorism, smaller cyberattacks occur daily. Billions of emails are sent each day, and spam and phishing emails account for a significant share of all email traffic. Additionally, brute force attacks, which are trial and error attempts to obtain user passwords and pins, are frequently used by criminals attempting to crack encrypted data or gain access to private accounts. Firewalls can be effective at keeping security threats such as these out, but once a cybercriminal gains access to a system, they can attack from within. For example, gaining access to a state employees email account would allow a hacker to send additional phishing emails from within a network, which may not be as monitored as closely as attacks from outside the system. This is known as spear phishing.

4.3.14.4. Future Occurrence

Cyberterrorism is an emerging hazard that has the potential to impact the County's computer infrastructure and the systems and services that are provided to the public. Concerns about cyberterrorism throughout the United States is growing as its impacts could have potentially crippling effects. Security experts describe the threat of cyberterrorism as imminent. The future occurrence of cyberterrorism can be considered *possible* as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1).

Following its recent cyber-attacks, Luzerne County has put several measures in place to reduce the risk of future attacks. County departments were tasked with creating contingency plans for operation during emergencies, so there is less disruption if future incidents occur. Additionally, all county employees have received mandatory training in cybersecurity measures in 2024. The county is also closing gaps in their system protocols and making enhancements based on an evaluation by the Cybersecurity & Infrastructure Security Agency (CISA).

4.3.14.5. Vulnerability Assessment

Generally, cyberterrorism has no direct effect on the environment; however, the environment may be affected if a hazardous materials release occurred because of critical infrastructure failure resulting from cyberterrorism. Similarly, an act of cyberterrorism on a nuclear power plant could have devastating environmental consequences if the plant suffered an intentional catastrophic failure. Please see Section 4.3.15 for more information on Hazardous Materials Release.

All county and municipal facilities are vulnerable to cyberterrorism. While the physical structures of these buildings are generally not at risk, information systems and data stored within them are vulnerable. Government computer networks contain sensitive information that is integral to the security of the Commonwealth and could be the target of a cyber-attack. County and municipal governments may also possess and maintain forms of personal and financial information, including tax filings, birth and death records, Social Security numbers, medical information, and more. Additionally, many critical facilities that are essential to Luzerne County operations are

reliant upon computer networks to monitor and control critical functions. For example, an attack on a nuclear power plant or the power grid could have detrimental impacts on County services and functions. Additionally, a large-scale computer breach could lead to economic costs in lost productivity to the impacted agency/organization and potentially related businesses and industries. However, lost revenues and productivity would depend on the type of magnitude of the cyberterrorism event.

All communities in Luzerne County are vulnerable on some level, directly or indirectly, to a cyberterrorism attack. However, in general, areas with higher concentrations of government or industry facilities may have higher risk. Additionally, areas with higher concentrations of people, businesses, and critical infrastructure might be at higher risk.

4.3.14.6. Equity in Vulnerable Communities

Households with those 65 or older may be more susceptible to cyber-attacks as older adults tend to have lower levels of digital literacy compared to younger generations. This makes them more susceptible to scams, phishing, and other forms of cybercrime. This includes Dallas Township and the City of Hazleton. People in low-income or marginalized communities often have less access to education and resources on cybersecurity. The communities may not be able to afford the most up to date technology or cybersecurity tools, such as firewalls, antivirus, or secure home networks leaving them more exposed to cyber threats. These communities include Dallas Township, Ashley Borough, as well as the cities of Hazleton, Nanticoke, and Wilkes-Barre.

4.3.15. DAM FAILURE

Due to data sensitivity, the Dam Failure profile can be found in Appendix H.

4.3.16. ENVIRONMENTAL HAZARDS – COAL MINING

4.3.16.1. Location and Extent

Mining, including surface, underground, and open-pit operations, has been an important economic activity in Pennsylvania since before the 1860s and was instrumental in the Commonwealth's development. Coal mining is the most prominent of Pennsylvania's mining activities and continues to be a major industry. Pennsylvania produces two types of coal: bituminous and anthracite. Bituminous coal is typically used for electricity generation and metal production. Anthracite coal, which is rarer than bituminous coal and can reach a high heating point that burns blue flame, is typically used for heating and metal production (PA DEP, 2025e).

While resources other than coal are also mined in Pennsylvania - including metal ores, clay and shale, and limestone - most of these deposits are of limited extent. Coal, in contrast, has been mined under large areas of the state. Counties underlain by coal deposits are at highest risk of environmental hazards resulting from coal mining activities. This area includes the majority of southwest Pennsylvania, situated over the Commonwealth's main bituminous field. Luzerne County's southern and northeast portions lie within the antracite coal region of northeastern Pennsylvania (Luzerne County, 2025).

Figure 4.3.16-1 shows the location of active, inactive, proposed but never materialized and reclamation complete coal mines in Luzerne County and Figure 4.3.16-2 shows the location of abandoned coal mining operations in Luzerne County. Note that the active and abandoned coal mines are primarily located on identified coal fields, however there are mines located outside the field areas.

Table 4.3.16-1 lists the number of active and abandoned coal mines in each municipality in Luzerne County. There are 208 active, 6 inactive, 811 abandoned, 1 proposed but never materialized, and 48 completed reclamation sites throughout the County, for a total of 1,074 coal mines. Data for Coal Mining operations in Pennsylvania is maintained by the Pennsylvania Department of Environmental Protection. Elements within this data include primary operations, such as Surface Mines, but also any facilities related to coal mining operations, including Storage Tanks, Mineral Preparation Plants, Discharge Points, Refuse Processing, and Refuse Disposal Facilities. The numbers above reflect all of these elements. The highest concentration of total coal mines are located in Hazle Township (162 sites) and Newport Township (146 sites). Hazle Township also has the highest concentration of active mines (98 sites), followed by Foster Township (34 sites). The highest number of abandoned mines are located in Hanover Township (125 mines) and Newport Township (123 mines). There are 36 municipalities, listed below, that do not have any coal mines identified by the PA DEP; these are not included in Table 4.3.16-1:

- Bear Creek Township
- Buck Township
- Conyngham Borough
- Dallas Borough
- Dallas Township
- Dennison Township

- Dorrance Township
- Exeter Township
- Fairmount Township
- Fairview Township
- Forty Fort Borough
- Franklin Township
- Harveys Lake Borough
- Hollenback Township
- Hunlock Township
- Huntington Township
- Jackson Township
- Kingston Borough
- Lake Township
- Lehman Township
- Nescopeck Borough
- Nescopeck Township
- New Columbus Borough
- Nuangola Borough
- Penn Lake Part Borough
- Pringle Borough
- Rice Township
- Ross Township
- Shickshinny Borough
- Slocum Township
- Union Township
- West Hazleton Borough
- White Haven Borough
- Wright Township
- Wyoming Borough
- Yatesville Borough

Table 4.3.16-1 Number of Mines by Type in Luzerne County Municipalities (PA DEP, 2024)

MUNICIPALITY	NUMBER OF MINES					
	ACTIVE	INACTIVE	ABANDONED	PROPOSED BUT NEVER MATERIALIZED	RECLAMATION COMPLETE	TOTAL
Ashley Borough	0	0	12	0	0	12
Avoca Borough	5	0	8	0	0	13
Bear Creek Village Borough	0	0	0	0	1	1
Black Creek Township	0	0	9	0	2	11
Butler Township	0	1	7	0	1	9
Conyngham Township	2	0	44	0	0	46
Courtdale Borough	0	0	5	0	0	5
Dupont Borough	0	0	4	0	0	4
Duryea Borough	3	0	14	1	0	18
Edwardsville Borough	0	0	11	0	0	11
Exeter Borough	0	0	23	0	0	23
Foster Township	34	0	25	0	6	65
Freeland Borough	0	0	1	0	0	1
Hanover Township	13	0	125	0	2	140

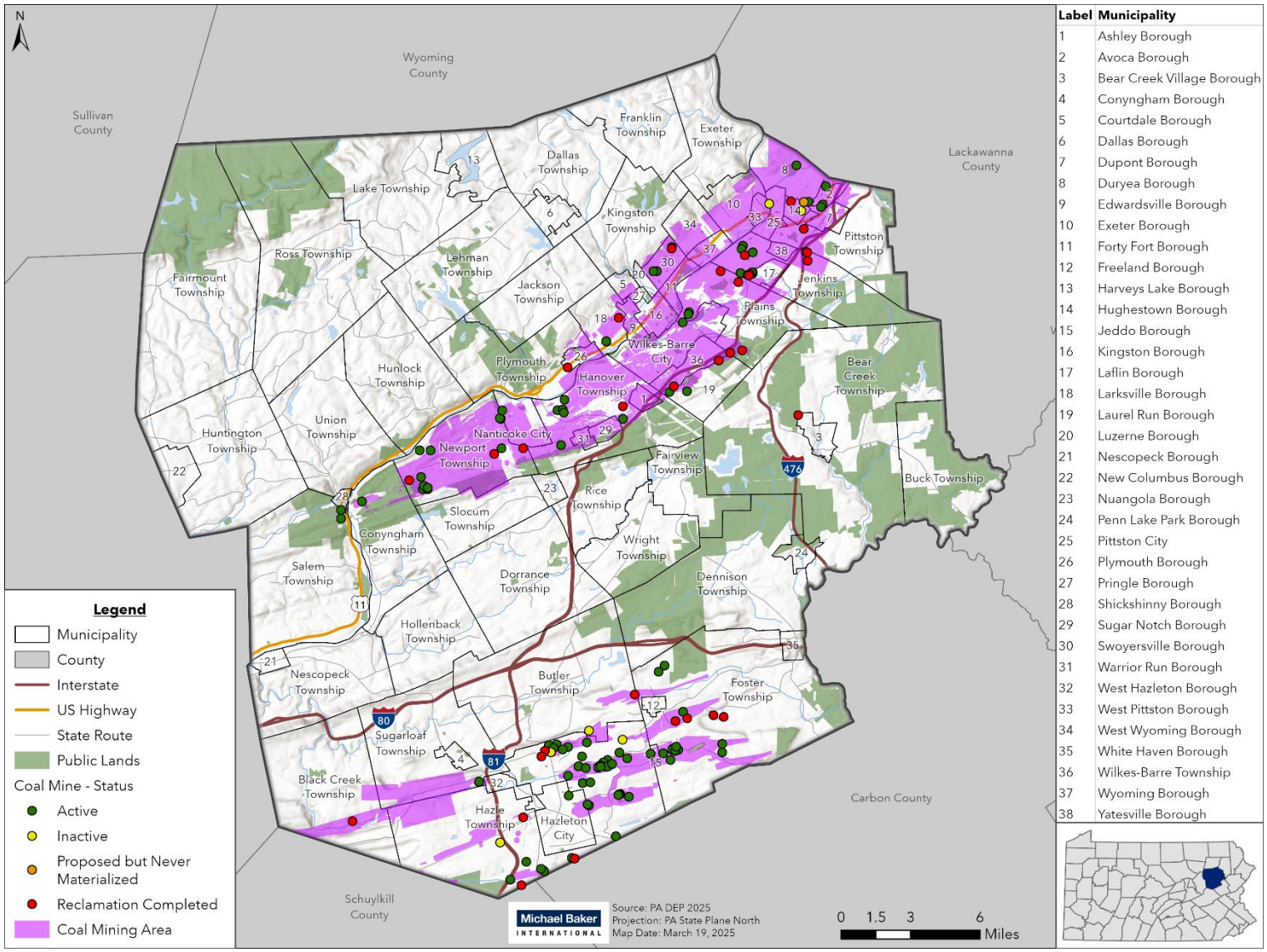
Table 4.3.16-1 Number of Mines by Type in Luzerne County Municipalities (PA DEP, 2024)

MUNICIPALITY	NUMBER OF MINES					
	ACTIVE	INACTIVE	ABANDONED	PROPOSED BUT NEVER MATERIALIZED	RECLAMATION COMPLETE	TOTAL
Hazle Township	98	3	55	0	6	162
Hazleton City	1	0	10	0	0	11
Hughestown Borough	0	1	4	0	1	6
Jeddo Borough	0	0	2	0	0	2
Jenkins Township	7	0	52	0	5	64
Kingston Township	0	0	6	0	0	6
Laflin Borough	4	0	5	0	4	13
Larksville Borough	3	0	17	0	1	21
Laurel Run Borough	2	0	3	0	0	5
Luzerne Borough	0	0	7	0	0	7
Nanticoke City	2	0	19	0	0	21
Newport Township	19	0	123	0	4	146
Pittston City	0	1	17	0		18
Pittston Township	0	0	9	0	1	10
Plains Township	3	0	39	0	7	49
Plymouth Borough	0	0	11	0	1	12
Plymouth Township	0	0	21	0	0	21
Salem Township	3	0	26	0	0	29
Sugar Notch Borough	0	0	9	0	0	9
Sugarloaf Township	2	0	4	0	0	6
Swoyersville Borough	4	0	19	0	2	25
Warrior Run Borough	0	0	9	0	0	9
West Pittston Borough	0	0	2	0	0	2
West Wyoming Borough	0	0	23	0	0	23

Table 4.3.16-1 Number of Mines by Type in Luzerne County Municipalities (PA DEP, 2024)

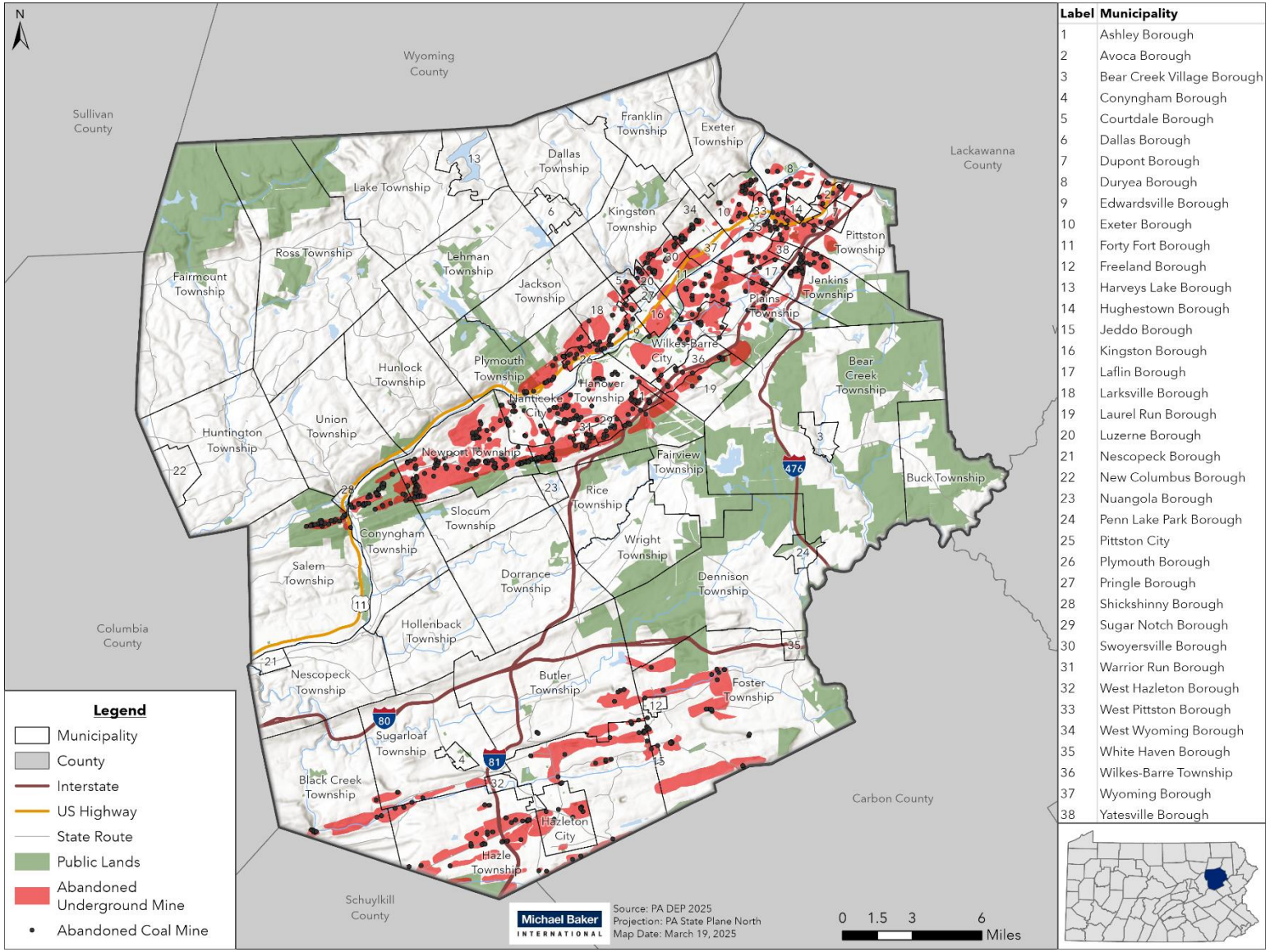
MUNICIPALITY	NUMBER OF MINES					
	ACTIVE	INACTIVE	ABANDONED	PROPOSED BUT NEVER MATERIALIZED	RECLAMATION COMPLETE	TOTAL
Wilkes-Barre City	1	0	19	0	0	20
Wilkes-Barre Township	2	0	12	0	4	18
Total	**208**	**6**	**811**	**1**	**48**	**1,074**

Figure 4.3.16-1 Coal Mines Operations and Areas in Luzerne County



Label	Municipality
1	Ashley Borough
2	Avoca Borough
3	Bear Creek Village Borough
4	Conyngham Borough
5	Courtdale Borough
6	Dallas Borough
7	Dupont Borough
8	Duryea Borough
9	Edwardsville Borough
10	Exeter Borough
11	Forty Fort Borough
12	Freeland Borough
13	Harveys Lake Borough
14	Hughestown Borough
15	Jeddo Borough
16	Kingston Borough
17	Laflin Borough
18	Larksville Borough
19	Laurel Run Borough
20	Luzerne Borough
21	Nescopeck Borough
22	New Columbus Borough
23	Nuangola Borough
24	Penn Lake Park Borough
25	Pittston City
26	Plymouth Borough
27	Pringle Borough
28	Shickshinny Borough
29	Sugar Notch Borough
30	Swoyersville Borough
31	Warrior Run Borough
32	West Hazleton Borough
33	West Pittston Borough
34	West Wyoming Borough
35	White Haven Borough
36	Wilkes-Barre Township
37	Wyoming Borough
38	Yatesville Borough

Figure 4.3.16-2 Abandoned Coal Mines Operations and Areas in Luzerne County



Label	Municipality
1	Ashley Borough
2	Avoca Borough
3	Bear Creek Village Borough
4	Conyngham Borough
5	Courtdale Borough
6	Dallas Borough
7	Dupont Borough
8	Duryea Borough
9	Edwardsville Borough
10	Exeter Borough
11	Forty Fort Borough
12	Freeland Borough
13	Harveys Lake Borough
14	Hughestown Borough
15	Jeddo Borough
16	Kingston Borough
17	Laflin Borough
18	Larksville Borough
19	Laurel Run Borough
20	Luzerne Borough
21	Nescopeck Borough
22	New Columbus Borough
23	Nuangola Borough
24	Penn Lake Park Borough
25	Pittston City
26	Plymouth Borough
27	Pringle Borough
28	Shickshinny Borough
29	Sugar Notch Borough
30	Swoyersville Borough
31	Warrior Run Borough
32	West Hazleton Borough
33	West Pittston Borough
34	West Wyoming Borough
35	White Haven Borough
36	Wilkes-Barre Township
37	Wyoming Borough
38	Yatesville Borough

4.3.16.2. Range of Magnitude

Major impacts from mining include surface-elevation changes and subsidence, modification of vegetation, the chemical degradation and flow redistribution of surface water and groundwater, the creation of mine voids and entry openings, adverse aesthetic impacts, and changes in land use. In addition, active and abandoned mines can also result in injury and loss of human life. This can occur in active mines where workers are injured or killed by mine collapse, entrapment, poisonous gases, inundation, explosions, fires, equipment malfunction, and improper ventilation. Injuries and death, such as All-Terrain Vehicle (ATV) accidents, falling, and drowning, can also occur in abandoned mines.

The mineral-waste disposal from coal mining, also known as abandoned mine drainage (AMD), is also a hazard. Past disposal practices have dotted Pennsylvania's landscape with unsightly refuse piles. Many of the refuse piles contain combustible materials that cause long-term air-quality problems if ignited. Burning refuse piles have also been linked to major underground coal fires, such as those at Centralia and Shamokin in the Anthracite region of Pennsylvania. There is also an active mine fire in Wilkes-Barre Township. Waste Materials from coal mining that contain sulfide minerals can also degrade groundwater and surface water. Coal refuse piles have historically been prolific sources of abandoned mine drainage, which has impaired many streams in Pennsylvania. The environmental impacts of coal mining are many. Mining activities and abandoned mine drainage can contaminate surface and groundwater, create acid mine drainage, cause changes in water temperature, and damage to streams, lakes, ponds, estuaries, and wetland ecosystems. Mine explosions or burning refuse piles can cause air quality problems. Although mine reclamation is required for much surface mining activity, there is still a loss of quality in landscape, damage to vegetation, and degradation of habitat.

Mine areas are also susceptible to subsidence, putting millions of structures in Pennsylvania at risk. Section 4.3.10 provides details on this cascading impact of mining (Commonwealth of Pennsylvania, 2025).

The potential impacts of coal mining on community lifelines are as follows:

Table 4.3.16-2 Most Likely Lifelines Impacted by Coal Mining

LIFELINES	NOTES
	Fire departments may be called into response and recovery if explosions or fires occur.
	Agricultural operations and water supplies may be affected through environmental contamination. There is also potential for land subsidence and structure collapse.

Table 4.3.16-2 Most Likely Lifelines Impacted by Coal Mining

LIFELINES	NOTES
Health and Medical	Environmental contamination can have adverse health impacts on communities, leading to more strain on the local healthcare system.
Energy (Power & Fuel)	Issues with mining operations may lead to additional challenges with energy production.

4.3.16.3. Past Occurrence

Although state and federal (U.S. Department of Labor, EPA, and the Office of Surface Mining and Reclamation) laws require occupational health, safety, and environmental protection in all mining activities, mining accidents still occur. The U.S. Department of Labor Mine Safety and Health Administration (MSHA) tracks mining accidents and injuries. Since 2014, there have been 19 deaths in Pennsylvania resulting from surface and underground coal mining activities. Although there have been many mining accidents in Pennsylvania's early mining history of the 1800's, there is no comprehensive database that tracks the data. Beyond operator accidents, there can be incidents that are a result of falls, drowning, electrocution, and ATV crashes (Mine Safety and Health Administration, 2025).

The DEP Bureau of Mine Safety is required by law to investigate all fatal and serious accidents that occur at underground Commonwealth mines. According to the Bureau, there have been four major mine emergencies in Pennsylvania coal mines. They define a mine emergency as a serious situation or occurrence that happens unexpectedly and demands immediate action or a condition of urgent need for action or assistance such as a state of emergency. Two of these were mine fires and two were inundations.

4.3.16.4. Future Occurrence

It is difficult to forecast the severity and frequency of coal mining accidents and environmental damage in Luzerne County. Although throughout time, the government has strengthened mining and reclamation operation and environmental regulations, permitting, and inspection criteria, this has not prevented mining accidents and environmental damage from occurring. Surface subsidence resulting from underground mining continues to be a major concern of those impacted by the mining industry. Despite the use of deep mine roof-support methods, some subsidence will eventually occur.

Surface subsidence resulting from underground mining continues to be a major concern of those impacted by the mining industry (see Section 4.3.10). Despite the use of deep mine roof support methods, some subsidence will eventually occur. It is likely that Pennsylvania will continue to modify its laws to reflect additional environmental awareness. Stricter controls on reclamation, perhaps specifically addressing the disposal of mining residuals, are likely. State

and federal laws and programs have historically placed an emphasis on environmental preservation and reclamation. As in the past, it seems likely that Pennsylvania will be at the forefront of these programs and future occurrences will decrease.

Abandoned mine drainage is an additional concern for areas previously impacted by mining operations. The risk of AMD could result in the degradation of surface and groundwater quality, impacting both ecosystems and human health. Measures taken by state, federal, and nonprofit entities such as monitoring water quality, remediating contaminated sites, and implementing sustainable mining practices have worked to prevent further environmental harm. However, it is likely some water contamination will occur (EPA, 2025).

Overall, the probability of future coal mining events is *possible* as defined by the Risk Factor Methodology (See Section 4.4-1).

4.3.16.5. Vulnerability Assessment

Table 4.3.16-3 shows the structures, critical facilities and population that are vulnerable to mining incidents. The table only includes municipalities that have coal mines. Structures overlaying underground mine areas are considered vulnerable. There are 59,193 structures in close proximity to coal mining operations countywide (41% of all structures). There are six municipalities that have all of their structures overlaying underground mine areas – Ashley Borough, Avoca Borough, Hughestown Borough, Pittston City, Warrior Run Borough, and Yatesville Borough. There are also ten municipalities that have all of their critical facilities overlaying undergound mine areas – Ashley Borough, Avoca Borough, Duryea Borough, Exeter Borough, Hughestown Borough, Pittston City, Swoyersville Borough, Warrior Run Borough, West Pittston Borough and Yatesville Borough. Table 4.3.16-4 shows structures prone to coal mining by land use. The most prone types of structures are residential (89% of all prone structures).

Table 4.3.16-3 Structures, Critical Facilities and Population Vulnerability to Coal Mining for Luzerne County

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES WITHIN UNDERGROUND COAL MINING AREA	PCT STRUCTURES WITHIN UNDERGROUND COAL MINING	TOTAL CFS WITHIN UNDERGROUND COAL MINING	CFS WITHIN UNDERGROUND COAL MINING AREA	PCT OF CFS WITHIN UNDERGROUND COAL MINING	TOTAL POPULATION	POPULATION ON UNDERGROUND MINE	PCT POPULATION ON UNDERGROUND MINE
Ashley Borough	1,281	1,275	100%	22	22	100%	2,596	2,596	100%
Avoca Borough	1,294	1,294	100%	21	21	100%	2,507	2,507	100%
Bear Creek Township	1,713	0	0%	50	0	0%	2,754	158	6%
Bear Creek Village Borough	179	0	0%	7	0	0%	291	0	0%
Black Creek Township	1,452	65	4%	35	3	9%	1,909	0	0%
Buck Township	301	0	0%	9	0	0%	379	0	0%
Butler Township	4,499	0	0%	88	0	0%	9,485	114	1%
Conyngham Borough	871	0	0%	8	0	0%	1,825	0	0%
Conyngham Township	919	1	0%	21	0	0%	1,312	0	0%
Courtdale Borough	395	236	60%	5	2	40%	689	321	47%
Dallas Borough	1,209	0	0%	11	0	0%	2,694	0	0%
Dallas Township	3,528	0	0%	60	0	0%	9,099	0	0%
Dennison Township	717	0	0%	30	0	0%	963	0	0%
Dorrance Township	1,564	0	0%	49	0	0%	2,076		0%
Dupont Borough	1,463	1,328	91%	32	24	75%	2,539	2389	94%
Duryea Borough	2,496	2,476	99%	17	17	100%	5,036	5036	100%
Edwardsville Borough	1,521	1,224	80%	10	5	50%	4,929	4216	86%
Exeter Borough	2,520	2,274	90%	14	14	100%	5,514	4910	89%

Table 4.3.16-3 Structures, Critical Facilities and Population Vulnerability to Coal Mining for Luzerne County

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES WITHIN UNDERGROUND COAL MINING AREA	PCT STRUCTURES WITHIN UNDERGROUND COAL MINING	TOTAL CFS WITHIN UNDERGROUND COAL MINING	CFS WITHIN UNDERGROUND COAL MINING AREA	PCT OF CFS WITHIN UNDERGROUND COAL MINING	TOTAL POPULATION	POPULATION ON UNDERGROUND MINE	PCT POPULATION ON UNDERGROUND MINE
Exeter Township	1,223	0	0%	26	0	0%	2,051	0	0%
Fairmount Township	1,146	0	0%	42	0	0%	1,210	0	0%
Fairview Township	1,901	0	0%	24	0	0%	4,703	0	0%
Forty Fort Borough	2,201	2,158	98%	19	17	89%	4,239	4239	100%
Foster Township	2,002	85	4%	30	2	7%	3,408	138	4%
Franklin Township	1,063	0	0%	22	0	0%	1,716	0	0%
Freeland Borough	1,119	0	0%	5	0	0%	3,833	0	0%
Hanover Township	5,005	4,302	86%	95	52	55%	11,445	10257	90%
Harveys Lake Borough	1,871	0	0%	15	0	0%	2,788	0	0%
Hazle Township	5,022	243	5%	61	4	7%	10,160	898	9%
City of Hazleton	6,310	1	0%	29	0	0%	29,963	77	0%
Hollenback Township	969	0	0%	18	0	0%	1,139	0	0%
Hughestown Borough	706	706	100%	4	4	100%	1,329	1329	100%
Hunlock Township	1,503	0	0%	36	0	0%	2,223	0	0%
Huntington Township	1,739	0	0%	54	0	0%	2,053	0	0%
Jackson Township	1,394	0	0%	36	0	0%	4,631	0	0%
Jeddo Borough	36	0	0%	1	0	0%	108	2	2%
Jenkins Township	2,193	2,025	92%	21	12	57%	4,283	3968	93%
Kingston Borough	5,083	3,807	75%	33	26	79%	13,349	10075	75%

Table 4.3.16-3 Structures, Critical Facilities and Population Vulnerability to Coal Mining for Luzerne County

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES WITHIN UNDERGROUND COAL MINING AREA	PCT STRUCTURES WITHIN UNDERGROUND COAL MINING	TOTAL CFS WITHIN UNDERGROUND COAL MINING	CFS WITHIN UNDERGROUND COAL MINING AREA	PCT OF CFS WITHIN UNDERGROUND COAL MINING	TOTAL POPULATION	POPULATION ON UNDERGROUND MINE	PCT POPULATION ON UNDERGROUND MINE
Kingston Township	3,249	3	0%	45	0	0%	7,108	0	0%
Laflin Borough	612	108	18%	13	4	31%	1,451	244	17%
Lake Township	1,331	0	0%	29	0	0%	1,993	0	0%
Larksville Borough	2,126	1,249	59%	12	6	50%	4,225	2308	55%
Laurel Run Borough	293	20	7%	4	0	0%	558	0	0%
Lehman Township	2,071	0	0%	40	0	0%	3,346	0	0%
Luzerne Borough	1,365	139	10%	12	2	17%	2,711	379	14%
City of Nanticoke	4,409	3,356	76%	26	17	65%	10,628	8254	78%
Nescopeck Borough	875	0	0%	2	0	0%	1,480	0	0%
Nescopeck Township	975	0	0%	30	0	0%	1,081	0	0%
New Columbus Borough	206	0	0%	9	0	0%	222	0	0%
Newport Township	1,829	1,554	85%	15	10	67%	4,433	3807	86%
Nuangola Borough	402	0	0%	1	0	0%	666	0	0%
Penn Lake Park Borough	232	0	0%	4	0	0%	360	0	0%
City of Pittston	3,056	3,050	100%	14	13	93%	7,591	7591	100%
Pittston Township	1,807	1,121	62%	38	27	71%	3,186	1945	61%
Plains Township	4,771	2,775	58%	79	22	28%	9,808	5916	60%
Plymouth Borough	2,394	1,500	63%	17	5	29%	5,763	3708	64%
Plymouth Township	1,129	20	2%	24	0	0%	1,717	8	0%

Table 4.3.16-3 Structures, Critical Facilities and Population Vulnerability to Coal Mining for Luzerne County

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES WITHIN UNDERGROUND COAL MINING AREA	PCT STRUCTURES WITHIN UNDERGROUND COAL MINING	TOTAL CFS WITHIN UNDERGROUND COAL MINING	CFS WITHIN UNDERGROUND COAL MINING AREA	PCT OF CFS WITHIN UNDERGROUND COAL MINING	TOTAL POPULATION	POPULATION ON UNDERGROUND MINE	PCT POPULATION ON UNDERGROUND MINE
Pringle Borough	504	98	19%	9	0	0%	893	162	18%
Rice Township	1,480	0	0%	40	0	0%	3,632	0	0%
Ross Township	2,012	0	0%	53	0	0%	2,726	0	0%
Salem Township	2,613	0	0%	55	0	0%	4,027	0	0%
Shickshinny Borough	327	0	0%	7	0	0%	632	0	0%
Slocum Township	828	5	1%	13	0	0%	1,054	0	0%
Sugarloaf Township	460	383	83%	5	4	80%	1,001	791	79%
Sugar Notch Borough	2,203	167	8%	45	2	4%	3,869	695	18%
Swoyersville Borough	2,681	2,660	99%	20	20	100%	5,021	5021	100%
Union Township	1,443	0	0%	32	0	0%	2,035	0	0%
Warrior Run Borough	295	295	100%	2	2	100%	527	527	100%
West Hazleton Borough	1,165	0	0%	13	0	0%	5,163	0	0%
West Pittston Borough	2,122	2,104	99%	5	5	100%	4,652	4652	100%
West Wyoming Borough	1,487	910	61%	10	3	30%	2,638	1501	57%
White Haven Borough	521	0	0%	15	0	0%	1,166	0	0%
City of Wilkes-Barre	14,135	11,918	84%	104	77	74%	44,328	35522	80%
Wilkes-Barre Township	1,540	1,490	97%	33	31	94%	3,213	3103	97%

Table 4.3.16-3 Structures, Critical Facilities and Population Vulnerability to Coal Mining for Luzerne County

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES WITHIN UNDERGROUND COAL MINING AREA	PCT STRUCTURES WITHIN UNDERGROUND COAL MINING	TOTAL CFS WITHIN UNDERGROUND COAL MINING	CFS WITHIN UNDERGROUND COAL MINING AREA	PCT OF CFS WITHIN UNDERGROUND COAL MINING	TOTAL POPULATION	POPULATION ON UNDERGROUND MINE	PCT POPULATION ON UNDERGROUND MINE
Wright Township	2,609	0	0%	39	0	0%	5,722	0	0%
Wyoming Borough	1,542	448	29%	11	5	45%	3,102	699	23%
Yatesville Borough	320	320	100%	1	1	100%	638	638	100%
Total	**143,827**	**59,193**	**41%**	1,986	481	24%	**325,594**	**140,701**	**43%**

Table 4.3.16-4 Structures Vulnerable to Coal Mines by Land Use in Luzerne County

MUNICIPALITY	AGRICULTURE	COMMERCIAL	CONSERVATION	INDUSTRIAL	MINING	MIXED USE	RESIDENTIAL	SPECIAL PURPOSE	TOTAL PER MUNICIPALITY
Ashley Borough	0	106	10	8	0	0	1,151	0	1,275
Avoca Borough	0	134	0	14	0	0	1,146	0	1,294
Black Creek Township	0	32	0	1	0	0	32	0	65
Conyngham Township	0	0	0	0	1	0	0	0	1
Courtdale Borough	2	13	0	2	1	0	218	0	236
Dupont Borough	0	170	0	0	0	0	1,158	0	1,328

Table 4.3.16-4 Structures Vulnerable to Coal Mines by Land Use in Luzerne County

MUNICIPALITY	AGRICULTURE	COMMERCIAL	CONSERVATION	INDUSTRIAL	MINING	MIXED USE	RESIDENTIAL	SPECIAL PURPOSE	TOTAL PER MUNICIPALITY
Duryea Borough	4	125	0	63	29	0	2,255	0	2,476
Edwardsville Borough	0	82	3	7	0	0	1,132	0	1,224
Exeter Borough	0	209	46	71	0	0	1,948	0	2,274
Forty Fort Borough	0	131	11	49	0	0	1,967	0	2,158
Foster Township	10	0	5	4	0	0	60	6	85
Hanover Township	0	254	30	112	0	35	3,871	0	4,302
Hazle Township	0	27	1	11	76	0	128	0	243
Hazleton City	0	0	0	1	0	0	0	0	1
Hughestown Borough	0	45	0	14	0	0	647	0	706
Jenkins Township	0	107	0	115	0	0	1,803	0	2,025
Kingston Borough	0	559	2	30	0	0	3,216	0	3,807
Kingston Township	3	0	0	0	0	0	0	0	3
Laflin Borough	0	5	0	10	0	0	93	0	108
Larksville Borough	0	51	0	0	4	0	1,190	4	1,249
Laurel Run Borough	0	0	19	0	0	0	1	0	20
Luzerne Borough	0	16	0	5	0	0	118	0	139
Nanticoke City	0	239	3	21	0	0	3,052	41	3,356
Newport Township	0	138	4	1	33	0	1,378	0	1,554
Pittston City	0	283	0	65	0	0	2,702	0	3,050
Pittston Township	0	98	16	121	0	0	886	0	1,121

Table 4.3.16-4 Structures Vulnerable to Coal Mines by Land Use in Luzerne County

MUNICIPALITY	AGRICULTURE	COMMERCIAL	CONSERVATION	INDUSTRIAL	MINING	MIXED USE	RESIDENTIAL	SPECIAL PURPOSE	TOTAL PER MUNICIPALITY
Plains Township	0	230	122	32	0	0	2,391	0	2,775
Plymouth Borough	0	67	9	6	0	0	1,418	0	1,500
Plymouth Township	0	0	0	6	0	0	14	0	20
Pringle Borough	0	8	0	0	0	0	90	0	98
Slocum Township	5	0	0	0	0	0	0	0	5
Sugar Notch Borough	0	23	3	9	0	0	348	0	383
Sugarloaf Township	15	0	41	7	0	0	104	0	167
Swoyersville Borough	0	69	48	8	0	0	2,535	0	2,660
Warrior Run Borough	0	53	0	8	5	0	229	0	295
West Pittston Borough	0	108	7	0	63	0	1,920	6	2,104
West Wyoming Borough	34	17	0	26	3	0	830	0	910
Wilkes-Barre City	0	887	29	186	0	0	10,768	48	11,918
Wilkes-Barre Township	0	247	0	71	3	0	1,169	0	1,490
Wyoming Borough	6	34	0	0	1	0	407	0	448
Yatesville Borough	0	11	3	26	6	0	274	0	320
Total	**79**	**4,578**	**412**	**1,110**	**225**	**35**	**52,649**	**105**	**59,193**

4.3.16.6. Equity in Vulnerable Communities

Communities near old and existing coal mines are at a higher risk for adverse impacts due to exposure to harmful pollutants, including coal dust, particulate matter, acid mine drainage, and contaminated water sources. These communities are often in rural areas which also are more likely to be dependent on well water. Mitigation efforts should focus on education and ensuring access to clean water. As shown in Table 3.3.16-1 the largest number of active mines within the County fall within Hazle Township and Newport Township. For this reason, the rural areas in these communities should be at the forefront of mitigation and preparedness efforts related to coal mining.

4.3.17. ENVIRONMENTAL HAZARDS – HAZARDOUS MATERIALS RELEASE

4.3.17.1. Location and Extent

Hazardous material releases post threats to the natural environment, the built environment, and public safety through the diffusion of harmful substances, materials, or products. Hazardous materials can include toxic chemicals, infectious substances, biohazardous waste, and any materials that are explosive, corrosive, flammable, or radioactive. Hazardous material releases can occur wherever hazardous materials are manufactured, used, stored, or transported. Such releases can occur along transportation routes or at fixed-site facilities. Hazardous material releases can result in human and wildlife injury, property damage, and contamination of air, water, and soil.

The environmental impacts of hazardous material release include:

- Hydrologic effects – surface and groundwater contamination
- Other effects on water quality such as changes in water temperature
- Damages to streams, lakes, ponds, estuaries, and wetland ecosystems
- Air quality effects – pollutants, smoke, and dust
- Loss of quality in landscape
- Reduced soil quality
- Damage to plant communities – loss of biodiversity; damage to vegetation
- Damage to animal species – animal fatalities; degradation of wildlife and aquatic habitat; pollution of drinking water for wildlife; loss of biodiversity; disease

Transportation of hazardous materials on highways via tankers or trailers accounts for the greatest number of hazardous materials release incidents in Pennsylvania. According to the U.S. DOT's Office of Operations and the U.S. Census Bureau, it is estimated that 11 percent of all freight transported by trucks is hazardous material. Several major highways may be used in Luzerne County for the transport of hazardous materials including I-80, I-81, I-476, US-11 PA-29, PA-93, PA-115, PA-309, PA-315, and PA-940. Luzerne County has over 2,600 linear miles of roadway according to PennDOT's 2018 Pennsylvania Highway Statistics Report (PennDOT, 2018). Many of these roads are used to transport hazardous materials. Additionally, many cross rivers and streams and travel through downtown and residential areas, increasing the potential to pollute surface water and groundwater and cause harm to life and property. Data indicates that highway freight travel accounts for more than 80% of all freight transported within Pennsylvania, and more than 50% of all freight shipped to or from the Commonwealth. The majority of freight travel in Luzerne County occurs on the interstate system roadways, with Interstates 80, 81, and 84 carrying the highest volumes of freight bearing trucks in the Region. Interstates 476 and 380 and U.S. 11 and 6 also carry significant truck volumes. Luzerne County is most vulnerable to accidents at fixed-site facilities along or near these routes.

Potential also exists for hazardous material release incidents to occur along rail lines and pipelines. Large spills can result from collisions or derailments of train cars. Several railroad

accidents have occurred in Pennsylvania involving hazardous materials (NTSB, 2018), though none in Luzerne County. Luzerne County has many miles of railroad throughout the County, mainly used for moving freight. The exact mileage of railroads is not listed, except for the Luzerne County Rail Corporation, which operates 56 miles of freight-only track in the County. The North Shore Railroad Company runs branch line service along the west shore of the Susquehanna River, stopping at the Susquehanna Steam Electric Station. A HAZMAT rail accident in this location would be a worst-case scenario for Luzerne County. See Section 4.3.17 for more information about risk related to Nuclear Power Plants. Active rails are concentrated along the Susquehanna River near the cities of Pittston and Wilkes-Barre. Rail lines extend along US-11 and US-437 (Comp plan, 2011). Additionally, there are lines near the City of Hazleton. There are inactive rail lines located near all areas of active rail lines, with an additional line along PA-309 in the Northern part of Luzerne County (Comp plan, 2011).

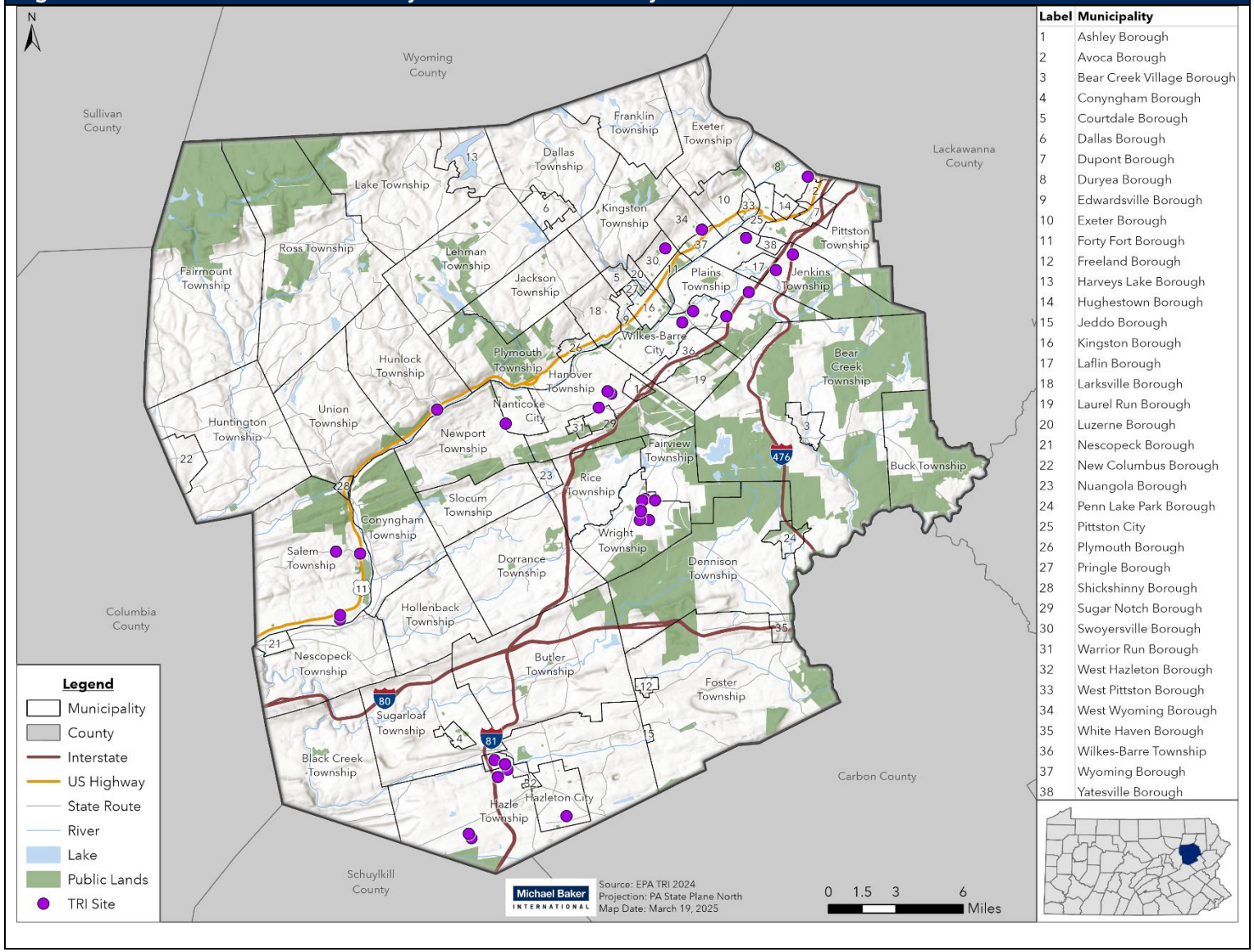
Fixed-site facilities that use, manufacture, or store hazardous materials in Pennsylvania pose significant risk to public health and the environment and must comply with both Title III of the federal Superfund Amendments and Reauthorization Act (SARA), also known as the Emergency Planning and Community Right-to-Know Act (EPCRA), and the Commonwealth's reporting requirements under the Hazardous Materials Emergency Planning and Response Act (1990-165), as amended. These statutes require that all owners or operators of facilities that manufacture, produce, use, import, export, store, supply, or distribute any extremely hazardous substance, as defined by the EPA, at or above the threshold planning quantity, report to the county where the facility is located and the Commonwealth. These facilities are subject to the requirement of assisting the Local Emergency Planning Committee (LEPC) in developing an Off-site Emergency Response Plan. The community right-to-know reporting requirements keep communities abreast of the presence and release of chemicals at individual facilities.

The EPA tracks key information about chemicals handled by industrial facilities through its Toxics Release Inventory (TRI) database. Facilities which employ ten or more full-time employees, and which manufacture or process 25,000 pounds or more, or otherwise use 10,000 pounds or more, of any SARA Section 313-listed toxic chemical during a calendar year are required to report TRI information to the EPA, the federal enforcement agency for SARA Title III, and PEMA. In 2018, Luzerne County had 32 facilities on the EPA's TRI list. See the map below of TRI facility locations. According to the 2018 TRI Factsheet, these facilities managed 2.9 million pounds of production-related waste that year. The TRI Factsheet also lists the top five chemicals released into air and water in Luzerne County in 2018. The biggest releases into the air include glycol ethers, ammonia, styrene, propylene, and xylene. Ammonia accounts for 99% of releases into the water, the other 1% being made up of nickel and other metals.

Nuclear facilities are another type of fixed facility that poses risk of hazard material release. For more information about nuclear incidents, reference Section 4.3.19.

Figure 4.3.17-1 shows the locations of hazardous materials sites in Luzerne County.

Figure 4.3.17-1 Toxic Release Inventory Sites in Luzerne County



Label	Municipality
1	Ashley Borough
2	Avoca Borough
3	Bear Creek Village Borough
4	Conyngham Borough
5	Courtdale Borough
6	Dallas Borough
7	Dupont Borough
8	Duryea Borough
9	Edwardsville Borough
10	Exeter Borough
11	Forty Fort Borough
12	Freeland Borough
13	Harveys Lake Borough
14	Hughestown Borough
15	Jeddo Borough
16	Kingston Borough
17	Laflin Borough
18	Larksville Borough
19	Laurel Run Borough
20	Luzerne Borough
21	Nescopeck Borough
22	New Columbus Borough
23	Nuangola Borough
24	Penn Lake Park Borough
25	Pittston City
26	Plymouth Borough
27	Pringle Borough
28	Shickshinny Borough
29	Sugar Notch Borough
30	Swoyersville Borough
31	Warrior Run Borough
32	West Hazleton Borough
33	West Pittston Borough
34	West Wyoming Borough
35	White Haven Borough
36	Wilkes-Barre Township
37	Wyoming Borough
38	Yatesville Borough

4.3.17.2. Range of Magnitude

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

With a hazardous material release, whether accidental or intentional, there are several potentially mitigating or exacerbating circumstances that will affect its severity or impact. Mitigating conditions are precautionary measures taken in advance to reduce the impact of a release on the surrounding environment. Primary and secondary containment or shielding by sheltering-in-place protects people and property from the harmful effects of a hazardous material release. Exacerbating conditions, characteristics that can enhance or magnify the effects of a hazardous material release include:

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

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

One of the worst recorded hazardous materials incidents known in Pennsylvania occurred in March 2009 when a tractor trailer overturned spilling 33,000 pounds of toxic hydrofluoric acid near Wind Gap, Pennsylvania resulting in the evacuation of 5,000 people (USA Today, 2009). Residents were evacuated because contact with concentrated solutions of the acid can cause severe burns and inhaling the gas can cause respiratory irritation, severe eye damage, and pulmonary edema. More recently in Pennsylvania, a train derailment incident required the evacuation of an entire town of approximately 1,000 residents roughly 100 miles southeast of Pittsburgh. In August 2017, at least 32 cars on a CSX freight train derailed causing some cars to catch fire. CSX reported that one car containing liquid petroleum gas and another containing molten sulfur leaked and caught fire. Additionally, one of the cars collided with a home and set fire to the garage (CBS News, 2017).

Luzerne County could experience many issues if a hazardous material release occurred in the most populous jurisdictions. These include the City of Hazleton, Kingston Borough, the City of Nanticoke, the City of Pittston, and the City of Wilkes-Barre. A hazardous material release would likely cause the evacuation of city residents, visitors, and employees.

The potential impacts of hazardous materials release on community lifelines are as follows:

Table 4.3.17-1 Most Likely Lifelines Impacted by Hazardous Materials Release

LIFELINES	NOTES
	Fire departments may be called into response and recovery if leaks or other issues result in explosions and fires.
	Impacts from hazardous materials releases include environmental contamination, which can impact agricultural operations and water supplies.
	Releases can have adverse impacts on communities, leading to more strain on the local healthcare system.
	Transportation lifeline as release itself or resulting explosions and fires.

4.3.17.3. Past Occurrence

According to the Pipeline and Hazardous Materials Safety Administration, 165,053 hazardous material release incidents have been reported during transportation (including in-transit, loading, and unloading) in the United States since 2010. Pennsylvania alone can account for 8,092 of those incidents, with damages exceeding $31 Million, 68 hospitalizations, and one fatality (PHMSA, 2019). Specific information regarding incident reports by year can be found on the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration website.

Since the passage of SARA, Title III facilities that produce, use, or store hazardous chemicals must notify the public through the county emergency dispatch center and PEMA if an accidental release of a hazardous substance meets or exceeds a designated reportable quantity and affects or has the potential to affect persons and/or the environment outside the plant. SARA Title III and Pennsylvania Act 165 also require a written follow-up report to PEMA and the County. These written follow-up reports include any known or anticipated health risks associated with the release and actions to be taken to mitigate potential future incidents. In addition, Section 204(a) (10) of Act 165 requires PEMA to staff and operate a 24-hour State Emergency Operations Center (SEOC) to provide effective emergency response coordination.

PEMA-KC reports that Luzerne County experienced 157 hazardous material incidents between 2013 and 2018.

4.3.17.4. Future Occurrence

While many hazardous material release incidents have occurred in Pennsylvania in the past, not many have specifically happened in Luzerne County. Hazardous material release incidents are generally considered difficult to predict. An occurrence is largely dependent upon the accidental or intentional actions of a person or group. Risk associated with hazardous materials release is expected to remain moderate. The future occurrence of hazardous materials release incidents in Luzerne County can be characterized as *possible* as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1).

Shifting traffic patterns and the presence of a multitude of hazardous materials in transit through the County warrants the need for development of increased response capability. It is difficult to predict when and where environmental hazards will arise as they are often related to equipment failure and human error. Adequate monitoring through the PADEP will reduce the likelihood of potential impacts to the community and to the environment.

4.3.17.5. Vulnerability Assessment

The vulnerability of a community and the environment to a spill or release of an extremely hazardous substance at a facility or from a transportation accident depends on many variables. These include: the specific chemical, the extent of the spill or release, the proximity of waterways, and the number of people residing in a radius from the facility or accident location that can reasonably be expected to be adversely affected.

Furthermore, the vulnerability of a community and the environment to a hazardous material release from a transportation incident is directly related to several specific variables, namely the mode and class of transportation. Each mode is further subject to several categories of hazard. Each mode of transportation (truck/highway, aircraft, rail, watercraft, or pipeline) has separate and distinct factors affecting vulnerability. Transportation carriers must have response plans in place to address accidents, otherwise the local emergency response team will step in to secure and restore the area. Quick response minimizes the volume and concentration of hazardous materials that disperse through air, water, and soil. All types of population are evaluated in determining the population at risk within the radius of vulnerability including hospitals, schools, assisted care facilities, and critical facilities. There are more than 30 facilities in Luzerne County included on the EPA's TRI and that store extremely hazardous substances. Populations in communities that contain these facilities are more vulnerable to facility releases, particularly those within 1.5 miles of a given facility. Jurisdictions within one-quarter mile of major highways and railways are considered more vulnerable in the event of a transportation incident involving hazardous materials. Note that there is some overlap among these vulnerable jurisdictions. For example, an individual that lives within 1.5 miles of a hazardous materials site may also live within one-quarter mile of a major road.

To determine jurisdictional vulnerability to hazardous materials release, a GIS analysis was conducted to identify all census blocks with centers located in areas characterized by high risk of hazardous material release. As previously defined, high-risk areas are those within one-quarter mile of major Interstates, U.S. highways, state highway, and rail lines, and areas within 1.5 miles of hazardous materials sites identified. The total populations and buildings within these census blocks were summed by county to determine the total vulnerable population and the total number and value of vulnerable buildings. The 2018 Pennsylvania State Hazard Mitigation Plan reports that Luzerne County has a vulnerable population of over 236,000 and over 101,000 vulnerable structures. These buildings make up over 77% of the county building value, valued at over $27 million.

Luzerne County has a low chemical facility rating but has a high transportation threat rating according to PEMA. The County contracts with Datom Products, an environmental protection and remediation organization, for support with hazard materials incidents including spill response.

Table 4.3.17-2 shows the estimated number and percentage of population in each municipality living in hazardous material hazard areas. These numbers are based off 2020 Census population estimates. The City of Wilkes-Barre and the City of Hazleton have the highest populations living in hazard areas (31,886 and 13,290 people respectively). One hundred per cent of the population is located within hazard areas in six municipalities. Municipalities with high numbers and proportions of population located in hazard areas are much more vulnerable in the event of hazardous material release.

Table 4.3.17-2 Structures, Critical Facilities and Population Vulnerability to Hazardous Materials in Luzerne County

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES WITHIN 1.5 MILES OF A TRI FACILITY	PCT STRUCTURES WITHIN 1.5 MILES OF A TRI FACILITY	TOTAL CFS	CFS WITHIN 1.5 MILES OF A TRI FACILITY	PCT CFS WITHIN 1.5 MILES OF A TRI FACILITY	TOTAL POPULATION	POPULATION WITHIN 1.5 MILE OF TRI	PCT POPULATION WITHIN 1.5 MILES OF A TRI FACILITY
Ashley Borough	1,281	1,278	100%	22	19	86%	2,596	2,596	100%
Avoca Borough	1,294	1,294	100%	21	21	100%	2,507	2,507	100%
Bear Creek Township	1,713	0	0%	50	0	0%	2,754	0	0%
Bear Creek Village Borough	179	0	0%	7	0	0%	291	0	0%
Black Creek Township	1,452	0	0%	35	0	0%	1,909	0	0%
Buck Township	301	0	0%	9	0	0%	379	0	0%
Butler Township	4,499	37	1%	88	0	0%	9,485	245	3%
Conyngham Borough	871	114	13%	8	0	0%	1,825	274	15%
Conyngham Township	919	113	12%	21	3	14%	1,312	154	12%
Courtdale Borough	395	0	0%	5	0	0%	689	0	0%
Dallas Borough	1,209	0	0%	11	0	0%	2,694	0	0%
Dallas Township	3,528	0	0%	60	0	0%	9,099	0	0%
Dennison Township	717	0	0%	30	0	0%	963	0	0%
Dorrance Township	1,564	0	0%	49	0	0%	2,076	0	0%
Dupont Borough	1,463	226	15%	32	10	31%	2,539	427	17%
Duryea Borough	2,496	2,388	96%	17	12	71%	5,036	4,928	98%
Edwardsville Borough	1,521		0%	10	0	0%	4,929	0	0%
Exeter Borough	2,520	2,101	83%	14	11	79%	5,514	4,379	79%

Table 4.3.17-2 Structures, Critical Facilities and Population Vulnerability to Hazardous Materials in Luzerne County

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES WITHIN 1.5 MILES OF A TRI FACILITY	PCT STRUCTURES WITHIN 1.5 MILES OF A TRI FACILITY	TOTAL CFS	CFS WITHIN 1.5 MILES OF A TRI FACILITY	PCT CFS WITHIN 1.5 MILES OF A TRI FACILITY	TOTAL POPULATION	POPULATION WITHIN 1.5 MILE OF TRI	PCT POPULATION WITHIN 1.5 MILES OF A TRI FACILITY
Exeter Township	1,223	0	0%	26	0	0%	2,051	0	0%
Fairmount Township	1,146	0	0%	42	0	0%	1,210	0	0%
Fairview Township	1,901	1,134	60%	24	11	46%	4,703	2,751	58%
Forty Fort Borough	2,201	1,378	63%	19	15	79%	4,239	2,626	62%
Foster Township	2,002	0	0%	30	0	0%	3,408	0	0%
Franklin Township	1,063	0	0%	22	0	0%	1,716	0	0%
Freeland Borough	1,119	0	0%	5	0	0%	3,833	0	0%
Hanover Township	5,005	3,182	64%	95	50	53%	11,445	8,052	70%
Harveys Lake Borough	1,871	0	0%	15	0	0%	2,788	0	0%
Hazle Township	5,022	1,570	31%	61	29	48%	10,160	3,384	33%
City of Hazleton	6,310	3,051	48%	29	20	69%	29,963	13,237	44%
Hollenback Township	969	0	0%	18	0	0%	1,139	0	0%
Hughestown Borough	706	12	2%	4	0	0%	1,329	0	0%
Hunlock Township	1,503	274	18%	36	13	**36%**	2,223	282	13%
Huntington Township	1,739	0	0%	54	0	0%	2,053	0	0%
Jackson Township	1,394	0	0%	36	0	0%	4,631	0	0%
Jeddo Borough	36	0	0%	1	0	0%	108	0	0%
Jenkins Township	2,193	2,130	97%	21	19	90%	4,283	4,260	99%
Kingston Borough	5,083	926	18%	33	8	24%	13,349	2,526	19%

Table 4.3.17-2 Structures, Critical Facilities and Population Vulnerability to Hazardous Materials in Luzerne County

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES WITHIN 1.5 MILES OF A TRI FACILITY	PCT STRUCTURES WITHIN 1.5 MILES OF A TRI FACILITY	TOTAL CFS	CFS WITHIN 1.5 MILES OF A TRI FACILITY	PCT CFS WITHIN 1.5 MILES OF A TRI FACILITY	TOTAL POPULATION	POPULATION WITHIN 1.5 MILE OF TRI	PCT POPULATION WITHIN 1.5 MILES OF A TRI FACILITY
Kingston Township	3,249	46	1%	45	0	0%	7,108	60	1%
Laflin Borough	612	612	100%	13	13	100%	1,451	1,451	100%
Lake Township	1,331	0	0%	29	0	0%	1,993	0	0%
Larksville Borough	2,126	0	0%	12	0	0%	4,225	0	0%
Laurel Run Borough	293	0	0%	4	0	0%	558	0	0%
Lehman Township	2,071	0	0%	40	0	0%	3,346	0	0%
Luzerne Borough	1,365	48	4%	12	0	0%	2,711	112	4%
City of Nanticoke	4,409	3,952	90%	26	26	100%	10,628	9,545	90%
Nescopeck Borough	875	0	0%	2	0	0%	1,480		0%
Nescopeck Township	975	152	16%	30	6	20%	1,081	123	11%
New Columbus Borough	206	0	0%	9	0	0%	222	0	0%
Newport Township	1,829	907	50%	15	8	53%	4,433	2,244	51%
Nuangola Borough	402	0	0%	1	0	0%	666	0	0%
Penn Lake Park Borough	232	0	0%	4	0	0%	360	0	0%
City of Pittston	3,056	1,791	59%	14	12	86%	7,591	4,703	62%
Pittston Township	1,807	1,007	56%	38	23	61%	3,186	1,756	55%
Plains Township	4,771	3,940	83%	79	73	92%	9,808	8,092	83%
Plymouth Borough	2,394	0	0%	17	0	0%	5,763	0	0%
Plymouth Township	1,129	0	0%	24	0	0%	1,717	0	0%

Table 4.3.17-2 Structures, Critical Facilities and Population Vulnerability to Hazardous Materials in Luzerne County

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES WITHIN 1.5 MILES OF A TRI FACILITY	PCT STRUCTURES WITHIN 1.5 MILES OF A TRI FACILITY	TOTAL CFS	CFS WITHIN 1.5 MILES OF A TRI FACILITY	PCT CFS WITHIN 1.5 MILES OF A TRI FACILITY	TOTAL POPULATION	POPULATION WITHIN 1.5 MILE OF TRI	PCT POPULATION WITHIN 1.5 MILES OF A TRI FACILITY
Pringle Borough	504	0	0%	9	0	0%	893	0	0%
Rice Township	1,480	311	21%	40	1	3%	3,632	848	23%
Ross Township	2,012	0	0%	53	0	0%	2,726		0%
Salem Township	2,613	810	31%	55	31	56%	4,027	755	19%
Shickshinny Borough	327	0	0%	7	0	0%	632	0	0%
Slocum Township	828	0	0%	13	0	0%	1,054	0	0%
Sugarloaf Township	460	460	100%	5	5	100%	1,001	1,001	100%
Sugar Notch Borough	2,203	313	14%	45	6	13%	3,869	651	17%
Swoyersville Borough	2,681	2,631	98%	20	19	95%	5,021	4,890	97%
Union Township	1,443	0	0%	32	0	0%	2,035	0	0%
Warrior Run Borough	295	253	86%	2	2	100%	527	460	87%
West Hazleton Borough	1,165	1,082	93%	13	13	100%	5,163	4,772	92%
West Pittston Borough	2,122	1,057	50%	5	2	40%	4,652	2,384	51%
West Wyoming Borough	1,487	1,479	99%	10	9	90%	2,638	2,611	99%
White Haven Borough	521	0	0%	15	0	0%	1,166	0	0%
City of Wilkes-Barre	14,135	6,154	44%	104	67	64%	44,328	20,204	46%

Table 4.3.17-2 Structures, Critical Facilities and Population Vulnerability to Hazardous Materials in Luzerne County

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES WITHIN 1.5 MILES OF A TRI FACILITY	PCT STRUCTURES WITHIN 1.5 MILES OF A TRI FACILITY	TOTAL CFS	CFS WITHIN 1.5 MILES OF A TRI FACILITY	PCT CFS WITHIN 1.5 MILES OF A TRI FACILITY	TOTAL POPULATION	POPULATION WITHIN 1.5 MILE OF TRI	PCT POPULATION WITHIN 1.5 MILES OF A TRI FACILITY
Wilkes-Barre Township	1,540	197	13%	33	11	33%	3,213	698	22%
Wright Township	2,609	1,510	58%	39	25	64%	5,722	3,244	57%
Wyoming Borough	1,542	1,542	100%	11	11	100%	3,102	3,102	100%
Yatesville Borough	320	320	100%	1	1	100%	638	638	100%
Total	**143,827**	**51,782**	**36%**	1,986	605	30%	**325,594**	**126,972**	**39%**

Table 4.3.17-3 Structures Vulnerable to Hazardous Material Sites in Luzerne County (Luzerne County GIS 2024, EPA 2024).

MUNICIPALITY	AGRICULTURE	COMMERCIAL	CONSERVATION	INDUSTRIAL	MINING	MIXED USE	RESIDENTIAL	SPECIAL PURPOSE	TOTAL PER MUNICIPALITY
Ashley Borough	0	106	10	8	0	0	1,154	0	1,278
Avoca Borough	0	134	0	14	0	0	1,146	0	1,294
Bear Creek Township	0	0	0	0	0	0	0	0	0
Bear Creek Village Borough	0	0	0	0	0	0	0	0	0
Black Creek Township	0	0	0	0	0	0	0	0	0
Buck Township	0	0	0	0	0	0	0	0	0

Table 4.3.17-3 Structures Vulnerable to Hazardous Material Sites in Luzerne County (Luzerne County GIS 2024, EPA 2024).

MUNICIPALITY	AGRICULTURE	COMMERCIAL	CONSERVATION	INDUSTRIAL	MINING	MIXED USE	RESIDENTIAL	SPECIAL PURPOSE	TOTAL PER MUNICIPALITY
Butler Township	0	0	0	0	0	0	35	2	37
Conyngham Borough	0	0	0	0	0	0	114	0	114
Conyngham Township	28	2	0	0	0	0	83	0	113
Courtdale Borough	0	0	0	0	0	0	0	0	0
Dallas Borough	0	0	0	0	0	0	0	0	0
Dallas Township	0	0	0	0	0	0	0	0	0
Dennison Township	0	0	0	0	0	0	0	0	0
Dorrance Township	0	0	0	0	0	0	0	0	0
Dupont Borough	0	26	0	0	0	0	200	0	226
Duryea Borough	0	121	0	54	20	0	2,193	0	2,388
Edwardsville Borough	0	0	0	0	0	0	0	0	
Exeter Borough	0	208	32	38	0	0	1,823	0	2,101
Exeter Township	0	0	0	0	0	0	0	0	0
Fairmount Township	0	0	0	0	0	0	0	0	0
Fairview Township	0	58	1	2	0	0	1,073	0	1,134
Forty Fort Borough	0	72	12	7	0	0	1,287	0	1,378
Foster Township	0	0	0	0	0	0	0	0	0
Franklin Township	0	0	0	0	0	0	0	0	0
Freeland Borough	0	0	0	0	0	0	0	0	0
Hanover Township	0	194	25	150	0	12	2,801	0	3,182
Harveys Lake Borough	0	0	0	0	0	0	0	0	0
Hazle Township	0	264	18	179	89	0	1,013	0	1,570

Table 4.3.17-3 Structures Vulnerable to Hazardous Material Sites in Luzerne County (Luzerne County GIS 2024, EPA 2024).

MUNICIPALITY	AGRICULTURE	COMMERCIAL	CONSERVATION	INDUSTRIAL	MINING	MIXED USE	RESIDENTIAL	SPECIAL PURPOSE	TOTAL PER MUNICIPALITY
Hazleton City	0	377	12	154	0	0	2,468	40	3,051
Hollenback Township	0	0	0	0	0	0	0	0	0
Hughestown Borough	0	3	0	2	0	0	7	0	12
Hunlock Township	40	29	17	2	0	0	186	0	274
Huntington Township	0	0	0	0	0	0	0	0	0
Jackson Township	0	0	0	0	0	0	0	0	0
Jeddo Borough	0	0	0	0	0	0	0	0	0
Jenkins Township	0	114	5	143	0	0	1,868	0	2,130
Kingston Borough	0	72	2	0	0	0	852	0	926
Kingston Township	45	0	0	0	1	0	0	0	46
Laflin Borough	0	12	0	22	0	0	578	0	612
Lake Township	0	0	0	0	0	0	0	0	0
Larksville Borough	0	0	0	0	0	0	0	0	0
Laurel Run Borough	0	0	0	0	0	0	0	0	0
Lehman Township	0	0	0	0	0	0	0	0	0
Luzerne Borough	0	1	0	0	0	0	47	0	48
Nanticoke City	0	223	3	35	0	0	3,644	47	3,952
Nescopeck Borough	0	0	0	0	0	0	0	0	0
Nescopeck Township	110	6	0	8			28		152
New Columbus Borough	0	0	0	0	0	0	0	0	0
Newport Township	0	49	20	1	22	0	815		907
Nuangola Borough	0	0	0	0	0	0	0	0	0

Table 4.3.17-3 Structures Vulnerable to Hazardous Material Sites in Luzerne County (Luzerne County GIS 2024, EPA 2024).

MUNICIPALITY	AGRICULTURE	COMMERCIAL	CONSERVATION	INDUSTRIAL	MINING	MIXED USE	RESIDENTIAL	SPECIAL PURPOSE	TOTAL PER MUNICIPALITY
Penn Lake Park Borough	0	0	0	0	0	0	0	0	0
Pittston City	0	229	0	0	0	0	1,562	0	1,791
Pittston Township	0	62	18	136	0	0	791	0	1,007
Plains Township	0	522	279	70	0	0	3,069	0	3,940
Plymouth Borough	0	0	0	0	0	0	0	0	0
Plymouth Township	0	0	0	0	0	0	0	0	0
Pringle Borough	0	0	0	0	0	0	0	0	0
Rice Township	11	0	0	0	0	0	300	0	311
Ross Township	0	0	0	0	0	0	0	0	0
Salem Township	220	155	158	148	0	0	129	0	810
Shickshinny Borough	0	0	0	0	0	0	0	0	0
Slocum Township	0	0	0	0	0	0	0	0	0
Sugar Notch Borough	0	35	3	11	0	0	411	0	460
Sugarloaf Township	107	22	0	2	0	0	182	0	313
Swoyersville Borough	0	69	43	5	0	0	2,514	0	2,631
Union Township	0	0	0	0	0	0	0	0	0
Warrior Run Borough	0	53	0	8	5	0	187	0	253
West Hazleton Borough	0	101	0	76	0	0	905	0	1,082
West Pittston Borough	0	65	6	0	31	0	949	6	1,057
West Wyoming Borough	48	52	0	36	4	0	1,339	0	1,479
White Haven Borough	0	0	0	0	0	0	0	0	0
Wilkes-Barre City	0	663	25	98	0	0	5,288	80	6,154

Table 4.3.17-3 Structures Vulnerable to Hazardous Material Sites in Luzerne County (Luzerne County GIS 2024, EPA 2024).

MUNICIPALITY	AGRICULTURE	COMMERCIAL	CONSERVATION	INDUSTRIAL	MINING	MIXED USE	RESIDENTIAL	SPECIAL PURPOSE	TOTAL PER MUNICIPALITY
Wilkes-Barre Township	0	154	0	10	0	0	33	0	197
Wright Township	0	94	270	82	0	0	1,064	0	1,510
Wyoming Borough	12	195	0	0	2	0	1,333	0	1,542
Yatesville Borough	0	11	3	26	6	0	274	0	320
Total	621	4,553	962	1,527	180	12	43,745	175	51,782

4.3.17.6. Equity in Vulnerable Communities

Marginalized communities, particularly low-income and minority populations, are often located near industrial facilities, waste sites, and transport routes for hazardous materials. These areas are more likely to experience spills, leaks, or accidents involving toxic substances making them more susceptible. Children, the elderly, and people with preexisting health conditions are particularly vulnerable to the effects of hazardous materials. Municipalities with high concentrations of these groups should plan accordingly. In addition, Bear Creek Village Borough, West Hazleton Borough, Hazleton City, Laurel Run Borough, and Black Creek Township have the highest concentration of people without health insurance.

4.3.18. LEVEE FAILURE

4.3.18.1. Location and Extent

A levee is a man-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 reduce the risk from temporary flooding (FEMA, 2016). Breaches of these structures occur when they are overtopped or physically incapable of containing the pressure exerted by the floodwaters. If a levee breaks, many properties may be quickly submerged by floodwater and residents may become trapped by this rapidly rising water. The failure of levees has the potential to result in loss of life, property damage, and substantial economic impacts (for example from damage to infrastructure or agriculture).

According to the USACE National Levee Database (NLD), there are six major levee systems in Luzerne County, excluding the four debris dams and earthen embankments less than 0.1 miles in length (Table 4.3.16-1) (NLD, 2025). They are all located in the northeastern part of the County where the Susquehanna River flows through historically urbanized areas. Levee systems can be Federal or Non-Federal projects. Federal projects are congressionally authorized projects that are generally planned, designed and constructed by USACE and a cost-sharing levee sponsor. Levees require maintenance to continue to provide the level of protection for which they were designed and built. Maintenance and operational responsibilities, referred to as sponsorship, belong to a variety of entities including levee districts, water management districts, local governments, state governments, and tribal governments. Table 4.3.17-1 shows the entity responsible for constructing, operating, and maintaining the major levee systems in Luzerne County. This information was obtained from the NLD. The County has a total of about 18 miles of levee systems, with 16 miles operated and maintained by the Luzerne County Flood Protection Authority (LCFPA) and two miles operated and maintained by local governments. Figure 4.3.16-1 shows the location of the levees and levee-impacted areas.

Table 4.3.18-1 Levee and Floodwall Information for Luzerne County (USACE, 2025)

LEVEE SYSTEM NAME	SPONSOR	LENGTH (MI)	USACE REHABILITATION STATUS*	AUTHORIZATION CATEGORY
Edwardsville to Exeter Borough**	Luzerne County Flood Protection Authority	8.66	Active	USACE Federally constructed, turned over to public sponsor operations and maintenance.
Wilkes-Barre City-Hanover Township**	Luzerne County Flood Protection Authority	5.57	Active	USACE Federally constructed, turned over to public

Table 4.3.18-1 Levee and Floodwall Information for Luzerne County (USACE, 2025)

LEVEE SYSTEM NAME	SPONSOR	LENGTH (MI)	USACE REHABILITATION STATUS*	AUTHORIZATION CATEGORY
				sponsor operations and maintenance
Plymouth**	Luzerne County Flood Protection Authority	1.81	Active	USACE Federally constructed, turned over to public sponsor operations and maintenance.
Duryea Flood Protection Project	Borough of Duryea	1.14	Inactive	Non-Federal Levee, Locally Operated and Maintained
Brookside Levee	City of Wilkes-Barre	0.52	Active	Non-Federal Levee, Locally Operated and Maintained
Wilkes-Barre Left Bank	City of Wilkes-Barre	0.28	Active	Non-Federal Levee, Locally Operated and Maintained

**The USACE Rehabilitation Program (authorized under Public Law 84-99) is a voluntary program that provides for the repair of eligible levees damaged by floods and coastal storms. Only locally operated and maintained levees are eligible. To be active in the program, a levee must remain properly maintained by the local project sponsor.*

***Part of the Wyoming Valley Flood Risk Management Project*

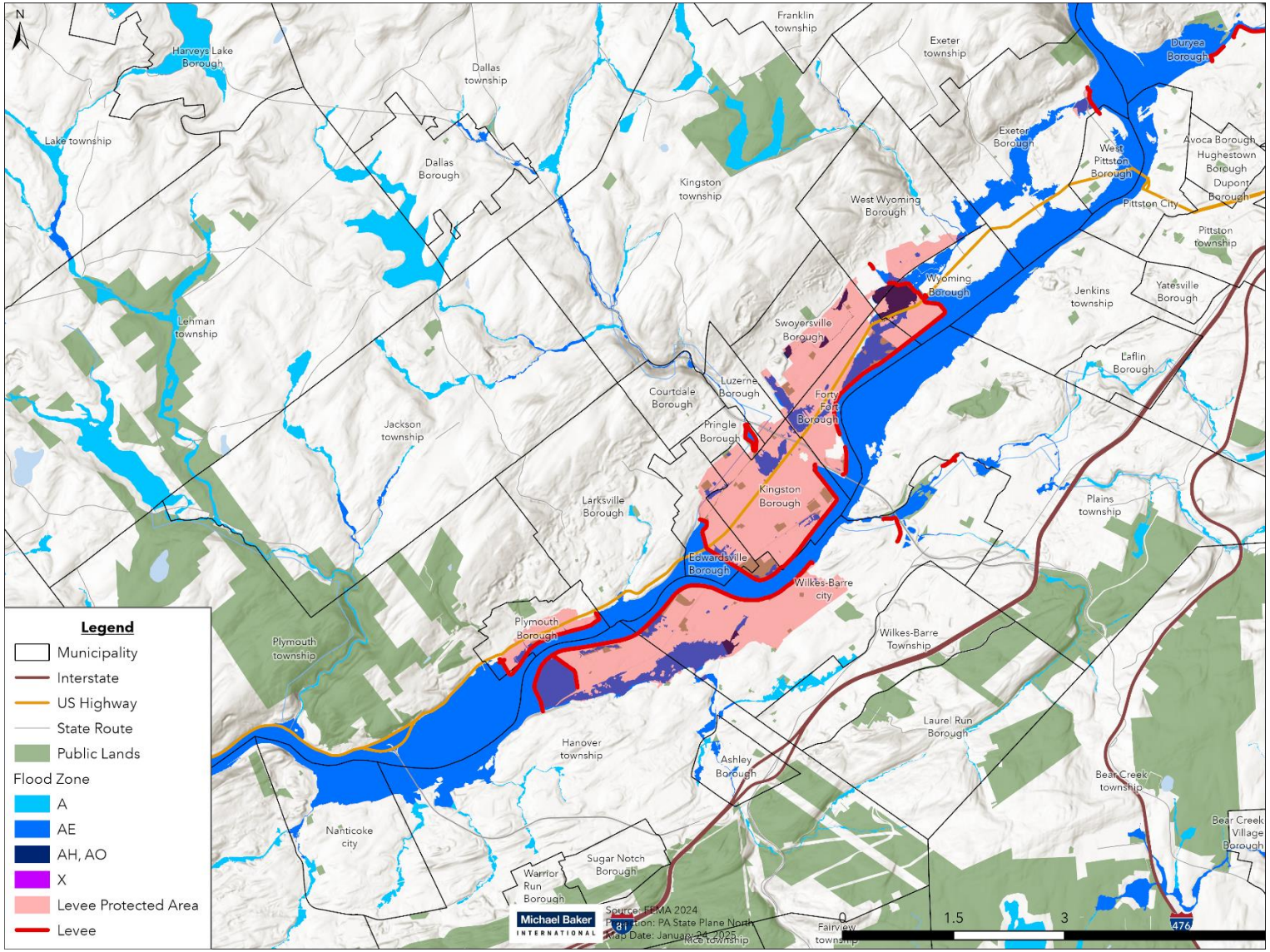
FEMA plays an important role in helping local officials and community members understand the risk of flooding in levee-impacted areas. While levees can reduce the risk of flooding, they do not eliminate it. Levees do not "protect" lives or property from flooding. Rather, they reduce risk. The primary way that FEMA communicates flood risk in levee-impacted areas is through its Flood Insurance Rate Maps (FIRMs). These maps show the areas with low, moderate, and high risk of flooding during a 1-percent-annual-chance flood, or a flood that has a one-percent chance of happening in any given year. The FEMA flood maps for Luzerne County became effective in November 2012 and show flood hazards in levee-impacted areas based on the best available data at that time.

Because conditions change over time, FEMA then engaged in a long-term process of updating the flood maps for levee-impacted areas in Luzerne County. One of the main drivers of this effort was a recent hydrologic study completed by USACE in 2013. After Tropical Storm Lee, the USACE used the latest available data to analyze flood flows along the Susquehanna River and estimate flood elevations for the 1-percent-annual-chance flood. The study found that the flood

elevations calculated using the latest available data are much higher than those shown on the effective FIRM from 2012. Updated flood depths are anywhere from 0.7 to four feet higher than the effective flood depths. Such significant increases in flood risk need to be communicated to residents, especially in levee-impacted areas.

FEMA worked with affected communities and stakeholders to update the flood maps for areas impacted by the six major levee systems in Luzerne County. This process involved re-evaluating the extent of the area that could be flooded, as well as re-evaluating the level of risk reduction provided by each levee system. If a levee system meets certain Federal requirements to show that it is tall enough, strong enough, and properly operated and maintained (those in Code of Federal Regulations, Title 44, Chapter 1, Section 65.10), FEMA will recognize, or "accredit," the levee as reducing the hazard from the 1-percent-annual-chance flood. Although there is still a risk of flooding in the levee-impacted area, FEMA will show the area as moderate risk instead of high risk. An updated effective FIRM was issued for these areas of Luzerne County in June 2024.

Figure 4.3.18-1 Levee Locations and Impact Areas in Luzerne County



4.3.18.2. Range of Magnitude

Flood-related hazards due to levee failures range in magnitude including: overtopping, when the water-level rises over the top of the levee; back-ending, when water flows around the back of the levee, outside of the edge of the levee system; and total failure as seen during Hurricane Katrina. Levees are typically designed with three feet of freeboard to prevent overtopping, but older levees were not built to that standard (FEMA, 2021).

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 the structure is designed and the amount of landward development present. In some instances, the magnitude of flooding could be more severe under a levee failure event compared to a normal flooding event. If an abrupt failure occurs, the rushing waters of a flood wave could result in catastrophic losses.

Properties located in the area of reduced risk landward of a levee system are not subject to the mandatory flood insurance purchase requirement of the National Flood Insurance Program. Thus, regardless of whether a levee is accredited, there is concern that properties in these areas lack flood insurance. In the event of a failure, it is likey that inundated properties will not be insured.

The environmental impacts of a levee failure result in significant water quality and debris disposal issues. Flood waters will back up sanitary sewer systems and inundate wastewater treatment plants, causing raw sewage to contaminate residential and commercial buildings and the flooding waterways. The contents of unsecured containers of oil, fertilizers, pesticides, and other chemicals get added to flood waters. Water supplies and water treatment could be off-line for weeks. After the flood waters subside, contaminated and flood damaged building materials and contents must be properly disposed. Contaminated sediment must be removed from buildings, yards, and properties.

The worst-case levee failure is one which occurs abruptly with little warning and results in deep, fast-moving flood waters through a developed or populated area. The potential for significant impact from a levee failure to occur in Luzerne County is possible because all levees in Luzerne County are located within densely populated areas.

The potential impacts of levee failure on community lifelines are as follows:

Table 4.3.18-2 Most Likely Lifelines Impacted by Levee Failure

LIFELINE	NOTES
Safety and Security	Anticipating both causal, compounding, and cascading impacts where community safety is threatened and government operations and facilities, including police, fire, and search and rescue are involved with response and recovery. Actions to protect communities are focused on proper local planning that manages development near levee systems and educating people on the potential risks.

Table 4.3.18-2 Most Likely Lifelines Impacted by Levee Failure	
LIFELINE	**NOTES**
Food, Hydration, Shelter	Anticipating a causal, compounding, and cascading relationship for the Food, Water, Shelter lifeline in response and recovery. Levee failure events present significant risk to buildings, and the potential compounding and cascading impacts from additional hazards and damage to infrastructure may create issues for food and water access. Ways to mitigate damage to this lifeline are similar to those above and include insurance programs for homes.
Health and Medical	Anticipating a causal, compounding, and cascading relationship for the Hazardous Materials lifeline in response and recovery due to potential contamination because of flood damage to facilities. Mitigation for this should be focused on increasing the resiliency of sites through specific building codes and development regulations that either provide protection or result in hazardous sites being located outside hazard areas.

4.3.18.3. Past Occurrence

The levee systems along the Susquehanna River in Luzerne County were built following several flood events in the late 19th and early 20th century. Severe flood damage led to the 1936 National Flood Control Act, which appropriated $27 million for flood-control projects in Pennsylvania and New York. This funded the $9.1 million levee system in Wilkes-Barre and Kingston, known as the Wyoming Valley Flood Risk Management Project. This was extended to include systems stretching Northwards to West Wyoming – the levee systems in place today.

The levee systems in Luzerne County were first overtopped and breached in 1972 during the Hurricane Agnes flood events. This caused $1 billion in damage (in 1972 dollars). Afterwards, a $147 million project was proposed to increase the levee's height from three to five feet along the 15-mile stretch of levee systems. After two more damaging flood events in 1975 and 1976, it was decided that the project could not be delayed any longer. The levee-raising project was finished in 2003 at the cost of over $250 million. The levees are now designed to protect against an Agnes-level flood, when the Susquehanna River crested at 41 feet.

In 1996, the Luzerne County Flood Protection Authority (LCFPA) was organized to maintain the 16-mile Wyoming Valley Flood Risk Management Project (LCFPA, 2019). The LCFPA has carefully monitored these levee systems since the project was completed. During Tropical Storm Lee, the Susquehanna River flooded but did not overtop the levee systems. The LCFPA cautions that the systems protect against most flood events that are seen on the river, but that a flood higher than 41 feet will overtop the levee.

Levees were erected along the Lackawanna River near the Borough of Duryea by the old Pennsylvania Department of Forests and Waters. A part of this levee was overtopped during the 1972 flood, allowing water to enter a large section of Duryea and causing $2.8 billion in

damages. PADEP completed plans to raise the height of the levee by three feet and borough officials are hoping this will eliminate some of the danger of backwater flooding from the Susquehanna River.

4.3.18.4. Future Occurrence

Given certain circumstances, a levee failure can occur at any time. However, the probability of future occurrence can be reduced through proper design, construction, and maintenance measures. The age of the levee can increase the potential for failures if not maintained. In Pennsylvania, the average age of levee systems is over 50 years, the typical lifespan of a levee (ASCE, 2018).

Most levees are designed to operate safely at specified levels of flooding. While FEMA focuses on mapping levees that will reduce the risk of a 1% annual chance flood, other levees may be designed to protect against smaller or larger floods. Design specifications provide information on the percent-annual-chance flood a structure is expected to withstand, given that it has been adequately constructed and maintained. Levee failure is also influenced by the frequency and severity of flood events. Therefore, potential future changes in climate and weather conditions, such as predicted increases in heavy precipitation events, may impact the future occurrences of levee failure. For more information on the future occurrence of flood events, please see Section 4.3.4. Overall, the probability of future levee failures can be considered *possible* according to the Risk Factor Methodology (See Table 4.4-1).

4.3.18.5. Vulnerability Assessment

Three of six levee systems in Luzerne County have been accredited as providing protection for the 1%-annual-chance event on effective FIRMs. However, non-accredited levees provide some measure of protection during more frequent, less severe flooding events. To account for this fact, the HMP identifies the structures and critical facilities that are either within the Zone X Shaded levee protection area or within 2,000 feet of the identified levee and floodwall systems in Table 4.3.18-3. This should be considered a broad estimate of structures potentially vulnerable to levee failures.

The City of Wilkes-Barre and Kingston Borough have the greatest numbers of structures vulnerable to levee failure (5,528 and 5,062 structures, respectively). Forty Fort Borough and Kingston Borough have the greatest percentages of structures vulnerable to levee failure (99% and 100%, respectively). The City of Wilkes-Barre and Kingston Borough also have the greatest number of critical facilities vulnerable to levee failure (56 and 33 facilities, respectively). Forty Fort Borough, Kingston Borough, Pringle Borough, and Edwardsville Borough have the greatest percentage of critical facilities vulnerable to levee failure (100% for all). The City of Wilkes-Barre and Kingston Borough have the largest population vulnerable to levee failure (19,693 and 13,304 people, respectively). Forty Fort Borough and Kingston Borough also have the greatest percentage of people vulnerable to levee failure (100% of people). Overall, the City of Wilkes-Barre, Kingston Borough, and Forty Fort Borough have the highest vulnerability to damage from

levee failure. Structures, critical facilities, and populations are all susceptible to damage in this type of event.

According to PEMA, Luzerne County has a vulnerable population of over 60,000 in Levee Impact Areas. There are over 23,500 vulnerable buildings in Levee Impact Areas, which represent 16% of the County's building value. These buildings have a value of over $6.5 billion. Luzerne County has been identified as one of the top three counties with the greatest risk of levee failure in Pennsylvania. This is due to the extensive levee systems built in Luzerne County, in addition to the highest risk in terms of number and total value of vulnerable buildings.

In 2003, the Wyoming Valley Flood Risk Management Project was modified to provide Hurricane Agnes level flood risk management. When Tropical Storm Lee in 2011 caused rivers to crest above Hurricane Agnes levels, the system held which prevented potentially more than $2.5 billion in damages.

Some insight into the vulnerability of affected communities to levee failure can also be gathered from the LCFPA Flood Operations Plan for the Wyoming Valley Flood Risk Management System. In addition to documenting the measures that LCFPA will take as the river level (or stage) rises from Action Stage to Major Flood Stage, the Flood Operations Plan documents areas that are likely to flood as the river stage rises. This shows the extent of vulnerability even when the Wyoming Valley Flood Risk Management System performs as designed and high-water maintenance and operation is flawless. The gradient of impacts as the flood level rises emphasizes that levees do not "protect" lives or property from flooding. Rather they reduce risk.

Table 4.3.18-3 Structures, Critical Facilities and Population Vulnerable to Levee Failure in Luzerne County

MUNICIPALITY	TOTAL STRUCTURES IN MUNICIPALITY	TOTAL STRUCTURES VULNERABLE TO LEVEE FAILURE	PERCENT STRUCTURES VULNERABLE TO LEVEE FAILURE	TOTAL CRITICAL FACILITIES IN MUNICIPALITY	TOTAL CRITICAL FACILITIES VULNERABLE TO LEVEE FAILURE	PERCENT CRITICAL FACILITIES VULNERABLE TO LEVEE FAILURE	TOTAL ESTIMATED 2020 POPULATION	ESTIMATED POPULATION VULNERABLE TO LEVEE FAILURE	PERCENT POPULATION VULNERABLE TO LEVEE FAILURE
Ashley Borough	1,281	0	0%	22	0	0%	2,596	0	0%
Avoca Borough	1,294	0	0%	21	0	0%	2,507	0	0%
Bear Creek Village Borough	1,713	0	0%	50	0	0%	2,754	0	0%
Bear Creek Township	179	0	0%	7	0	0%	291	0	0%
Black Creek Township	1,452	0	0%	35	0	0%	1,909		0%
Buck Township	301	0	0%	9	0	0%	379	0	0%
Butler Township	4,499	0	0%	88	0	0%	9,485	0	0%
Conyngham Borough	871	0	0%	8	0	0%	1,825	0	0%
Conyngham Township	919	0	0%	21	0	0%	1,312	0	0%
Courtdale Borough	395	0	0%	5	0	0%	689	0	0%
Dallas Borough	1,209	0	0%	11	0	0%	2,694	0	0%
Dallas Township	3,528	0	0%	60	0	0%	9,099	0	0%
Dennison Township	717	0	0%	30	0	0%	963	0	0%
Dorrance Township	1,564	0	0%	49	0	0%	2,076	0	0%
Dupont Borough	1,463	51	3%	32	0	0%	2,539	83	3%
Duryea Borough	2,496	1,201	48%	17	6	35%	5,036	2,347	47%
Edwardsville Borough	1,521	812	53%	10	10	100%	4,929	2,938	60%
Exeter Borough	2,520	224	9%	14	2	14%	5,514	372	7%
Exeter Township	1,223	0	0%	26	0	0%	2,051	0	0%
Fairmount Township	1,146	0	0%	42	0	0%	1,210	0	0%

Table 4.3.18-3 Structures, Critical Facilities and Population Vulnerable to Levee Failure in Luzerne County

MUNICIPALITY	TOTAL STRUCTURES IN MUNICIPALITY	TOTAL STRUCTURES VULNERABLE TO LEVEE FAILURE	PERCENT STRUCTURES VULNERABLE TO LEVEE FAILURE	TOTAL CRITICAL FACILITIES IN MUNICIPALITY	TOTAL CRITICAL FACILITIES VULNERABLE TO LEVEE FAILURE	PERCENT CRITICAL FACILITIES VULNERABLE TO LEVEE FAILURE	TOTAL ESTIMATED 2020 POPULATION	ESTIMATED POPULATION VULNERABLE TO LEVEE FAILURE	PERCENT POPULATION VULNERABLE TO LEVEE FAILURE
Fairview Township	1,901	0	0%	24	0	0%	4,703	0	0%
Forty Fort Borough	2,201	2,170	99%	19	19	100%	4,239	4,239	100%
Foster Township	2,002	0	0%	30	0	0%	3,408	0	0%
Franklin Township	1,063	0	0%	22	0	0%	1,716	0	0%
Freeland Borough	1,119	0	0%	5	0	0%	3,833	0	0%
Hanover Township	5,005	1,672	33%	95	15	16%	11,445	3,598	31%
Harveys Lake Borough	1,871	0	0%	15	0	0%	2,788	0	0%
Hazle Township	5,022	0	0%	61	0	0%	10,160	0	0%
City of Hazleton	6,310	0	0%	29	0	0%	29,963	0	0%
Hollenback Township	969	0	0%	18	0	0%	1,139	0	0%
Hughestown Borough	706	0	0%	4	0	0%	1,329	0	0%
Hunlock Township	1,503	0	0%	36	0	0%	2,223	0	0%
Huntington Township	1,739	0	0%	54	0	0%	2,053	0	0%
Jackson Township	1,394	0	0%	36	0	0%	4,631	0	0%
Jeddo Borough	36	0	0%	1	0	0%	108	0	0%
Jenkins Township	2,193	0	0%	21	0	0%	4,283	0	0%
Kingston Borough	5,083	5,062	100%	33	33	100%	13,349	13,304	100%
Kingston Township	3,249	0	0%	45	0	0%	7,108	0	0%
Laflin Borough	612	0	0%	13	0	0%	1,451	0	0%
Lake Township	1,331	0	0%	29	0	0%	1,993	0	0%
Larksville Borough	2,126	181	9%	12	2	17%	4,225	274	6%

Table 4.3.18-3 Structures, Critical Facilities and Population Vulnerable to Levee Failure in Luzerne County

MUNICIPALITY	TOTAL STRUCTURES IN MUNICIPALITY	TOTAL STRUCTURES VULNERABLE TO LEVEE FAILURE	PERCENT STRUCTURES VULNERABLE TO LEVEE FAILURE	TOTAL CRITICAL FACILITIES IN MUNICIPALITY	TOTAL CRITICAL FACILITIES VULNERABLE TO LEVEE FAILURE	PERCENT CRITICAL FACILITIES VULNERABLE TO LEVEE FAILURE	TOTAL ESTIMATED 2020 POPULATION	ESTIMATED POPULATION VULNERABLE TO LEVEE FAILURE	PERCENT POPULATION VULNERABLE TO LEVEE FAILURE
Laurel Run Borough	293	0	0%	4	0	0%	558	0	0%
Lehman Township	2,071	0	0%	40	0	0%	3,346	0	0%
Luzerne Borough	1,365	552	40%	12	7	58%	2,711	1,083	40%
Nanticoke City	4,409	0	0%	26	0	0%	10,628	0	0%
Nescopeck Borough	875	0	0%	2	0	0%	1,480	0	0%
Nescopeck Township	975	0	0%	30	0	0%	1,081	0	0%
New Columbus Borough	206	0	0%	9	0	0%	222	0	0%
Newport Township	1,829	0	0%	15	0	0%	4,433	0	0%
Nuangola Borough	402	0	0%	1	0	0%	666	0	0%
Penn Lake Park Borough	232	0	0%	4	0	0%	360	0	0%
City of Pittston	3,056	0	0%	14	0	0%	7,591	0	0%
Pittston Township	1,807	82	5%	38	7	18%	3,186	52	2%
Plains Township	4,771	656	14%	79	11	14%	9,808	1,189	12%
Plymouth Borough	2,394	1,788	75%	17	15	88%	5,763	4,235	73%
Plymouth Township	1,129	74	7%	24	0	0%	1,717	73	4%
Pringle Borough	504	282	56%	9	9	100%	893	452	51%
Rice Township	1,480	0	0%	40	0	0%	3,632	0	0%
Ross Township	2,012	0	0%	53	0	0%	2,726	0	0%
Salem Township	2,613	0	0%	55	0	0%	4,027	0	0%
Shickshinny Borough	327	0	0%	7	0	0%	632	0	0%

Table 4.3.18-3 Structures, Critical Facilities and Population Vulnerable to Levee Failure in Luzerne County

MUNICIPALITY	TOTAL STRUCTURES IN MUNICIPALITY	TOTAL STRUCTURES VULNERABLE TO LEVEE FAILURE	PERCENT STRUCTURES VULNERABLE TO LEVEE FAILURE	TOTAL CRITICAL FACILITIES IN MUNICIPALITY	TOTAL CRITICAL FACILITIES VULNERABLE TO LEVEE FAILURE	PERCENT CRITICAL FACILITIES VULNERABLE TO LEVEE FAILURE	TOTAL ESTIMATED 2020 POPULATION	ESTIMATED POPULATION VULNERABLE TO LEVEE FAILURE	PERCENT POPULATION VULNERABLE TO LEVEE FAILURE
Slocum Township	828	0	0%	13	0	0%	1,054	0	0%
Sugarloaf Township	460	0	0%	5	0	0%	1,001	0	0%
Sugar Notch Borough	2,203	0	0%	45	0	0%	3,869	0	0%
Swoyersville Borough	2,681	2,080	78%	20	13	65%	5,021	4,004	80%
Union Township	1,443	0	0%	32	0	0%	2,035	0	0%
Warrior Run Borough	295	0	0%	2	0	0%	527	0	0%
West Hazleton Borough	1,165	0	0%	13	0	0%	5,163	0	0%
West Pittston Borough	2,122	423	20%	5	1	20%	4,652	1,051	23%
West Wyoming Borough	1,487	419	28%	10	3	30%	2,638	597	23%
White Haven Borough	521	0	0%	15	0	0%	1,166	0	0%
City of Wilkes-Barre	14,135	5,528	39%	104	56	54%	44,328	19,693	44%
Wilkes-Barre Township	1,540	0	0%	33	0	0%	3,213	0	0%
Wright Township	2,609	0	0%	39	0	0%	5,722	0	0%
Wyoming Borough	1,542	270	18%	11	3	27%	3,102	440	14%
Yatesville Borough	320	0	0%	1	0	0%	638	0	0%
Total	**143,827**	**23,527**	**16%**	1,986	212	11%	**325,594**	**60,024**	**18%**

Note: Calculated by selecting the 2020 census block centroids that intersect the levee impact areas. Approximates populations living near the levee impact areas.

Table 4.3.18-4 Structures Vulnerable to Levee Failure by Land Use in Luzerne County

Municipality	Agriculture	Commercial	Conservation	Industrial	Mining	Mixed Use	Residential	Special Purpose	Total per Municipality
Ashley Borough	0	0	0	0	0	0	0	0	0
Avoca Borough	0	0	0	0	0	0	0	0	0
Bear Creek Township	0	0	0	0	0	0	0	0	0
Bear Creek Village Borough	0	0	0	0	0	0	0	0	0
Black Creek Township	0	0	0	0	0	0	0	0	0
Buck Township	0	0	0	0	0	0	0	0	0
Butler Township	0	0	0	0	0	0	0	0	0
Conyngham Borough	0	0	0	0	0	0	0	0	0
Conyngham Township	0	0	0	0	0	0	0	0	0
Courtdale Borough	0	0	0	0	0	0	0	0	0
Dallas Borough	0	0	0	0	0	0	0	0	0
Dallas Township	0	0	0	0	0	0	0	0	0
Dennison Township	0	0	0	0	0	0	0	0	0
Dorrance Township	0	0	0	0	0	0	0	0	0
Dupont Borough	0	0	0	0	0	0	51	0	51
Duryea Borough	0	94	0	16	10	0	1,081	0	1,201
Edwardsville Borough	0	86	7	9	0	0	710	0	812
Exeter Borough	0	26	1	28	0	0	169	0	224
Exeter Township	0	0	0	0	0	0	0	0	0
Fairmount Township	0	0	0	0	0	0	0	0	0
Fairview Township	0	0	0	0	0	0	0	0	0
Forty Fort Borough	0	136	12	52	0	0	1,970	0	2,170
Foster Township	0	0	0	0	0	0	0	0	0

Table 4.3.18-4 Structures Vulnerable to Levee Failure by Land Use in Luzerne County

Municipality	Agriculture	Commercial	Conservation	Industrial	Mining	Mixed Use	Residential	Special Purpose	Total per Municipality
Franklin Township	0	0	0	0	0	0	0	0	0
Freeland Borough	0	0	0	0	0	0	0	0	0
Hanover Township	0	110	6	71	0	0	1,485	0	1,672
Harveys Lake Borough	0	0	0	0	0	0	0	0	0
Hazle Township	0	0	0	0	0	0	0	0	0
Hazleton city	0	0	0	0	0	0	0	0	0
Hollenback Township	0	0	0	0	0	0	0	0	0
Hughestown Borough	0	0	0	0	0	0	0	0	0
Hunlock Township	0	0	0	0	0	0	0	0	0
Huntington Township	0	0	0	0	0	0	0	0	0
Jackson Township	0	0	0	0	0	0	0	0	0
Jeddo Borough	0	0	0	0	0	0	0	0	0
Jenkins Township	0	0	0	0	0	0	0	0	0
Kingston Borough	0	643	2	94	0	0	4,323	0	5,062
Kingston Township	0	0	0	0	0	0	0	0	0
Laflin Borough	0	0	0	0	0	0	0	0	0
Lake Township	0	0	0	0	0	0	0	0	0
Larksville Borough	0	50	0	2	1	0	128	0	181
Laurel Run Borough	0	0	0	0	0	0	0	0	0
Lehman Township	0	0	0	0	0	0	0	0	0
Luzerne Borough	0	131	0	5	0	0	416	0	552
Nanticoke City	0	0	0	0	0	0	0	0	0

Table 4.3.18-4 Structures Vulnerable to Levee Failure by Land Use in Luzerne County

Municipality	Agriculture	Commercial	Conservation	Industrial	Mining	Mixed Use	Residential	Special Purpose	Total per Municipality
Nescopeck Borough	0	0	0	0	0	0	0	0	0
Nescopeck Township	0	0	0	0	0	0	0	0	0
New Columbus Borough	0	0	0	0	0	0	0	0	0
Newport Township	0	0	0	0	0	0	0	0	0
Nuangola Borough	0	0	0	0	0	0	0	0	0
Penn Lake Park Borough	0	0	0	0	0	0	0	0	0
Pittston City	0	0	0	0	0	0	0	0	0
Pittston Township	0	12	0	40	0	0	30	0	82
Plains Township	0	47	37	3	0	0	569	0	656
Plymouth Borough	0	194	14	11	0	0	1,569	0	1,788
Plymouth Township	0	0		0	0	0	74	0	74
Pringle Borough	0	46	2	13	0	0	221	0	282
Rice Township	0	0	0	0	0	0	0	0	0
Ross Township	0	0	0	0	0	0	0	0	0
Salem Township	0	0	0	0	0	0	0	0	0
Shickshinny Borough	0	0	0	0	0	0	0	0	0
Slocum Township	0	0	0	0	0	0	0	0	0
Sugar Notch Borough	0	0	0	0	0	0	0	0	0
Sugarloaf Township	0	0	0	0	0	0	0	0	0
Swoyersville Borough	0	18	35	2	0	0	2,025	0	2,080
Union Township	0	0	0	0	0	0	0	0	0
Warrior Run Borough	0	0	0	0	0	0	0	0	0

Table 4.3.18-4 Structures Vulnerable to Levee Failure by Land Use in Luzerne County

Municipality	Agriculture	Commercial	Conservation	Industrial	Mining	Mixed Use	Residential	Special Purpose	Total per Municipality
West Hazleton Borough	0	0	0	0	0	0	0	0	0
West Pittston Borough	0	15	1	0	23	0	384	0	423
West Wyoming Borough	8	5	0	5	3	0	398	0	419
White Haven Borough	0	0	0	0	0	0	0	0	0
Wilkes-Barre city	0	534	29	123		0	4,655	187	5,528
Wilkes-Barre Township	0	0	0	0	0	0	0		0
Wright Township	0	0	0	0	0	0	0	0	0
Wyoming Borough	6	34	0	0	0	0	230	0	270
Yatesville Borough	0	0	0	0	0	0	0	0	0
Total	14	2,181	146	474	37	0	20,488	187	23,527

** Calculated by overlaying Luzerne County GIS structure data with levee impact area.*

4.3.18.6. Equity in Vulnerable Communities

In terms of equity, residents living within mobile homes or other manufactured homes within levee impact areas may be more likely to experience risks associated with dam failure at a disproportionate rate due to the manufacturing of these homes. People currently experiencing homelessness are highly susceptible to flooding as they lack secure shelter. This means areas of Jenkins Township, Ashley Borough, Dallas Township, Exeter Township, Fairmount Township, Hazle Township, Kingston Township, Laurel Run Borough, Plains Township, and Salem Township may be particularly vulnerable. Communities with an aged housing stock may also be more susceptible due to aged infrastructure and dated building practices. Equitable policies must ensure access to emergency shelters, temporary housing, and long-term housing solutions for people displaced by dam failure. In terms of evacuation, households without vehicles or with people who have disabilities will need assistance.

4.3.19. NUCLEAR INCIDENT

4.3.19.1. Location and Extent

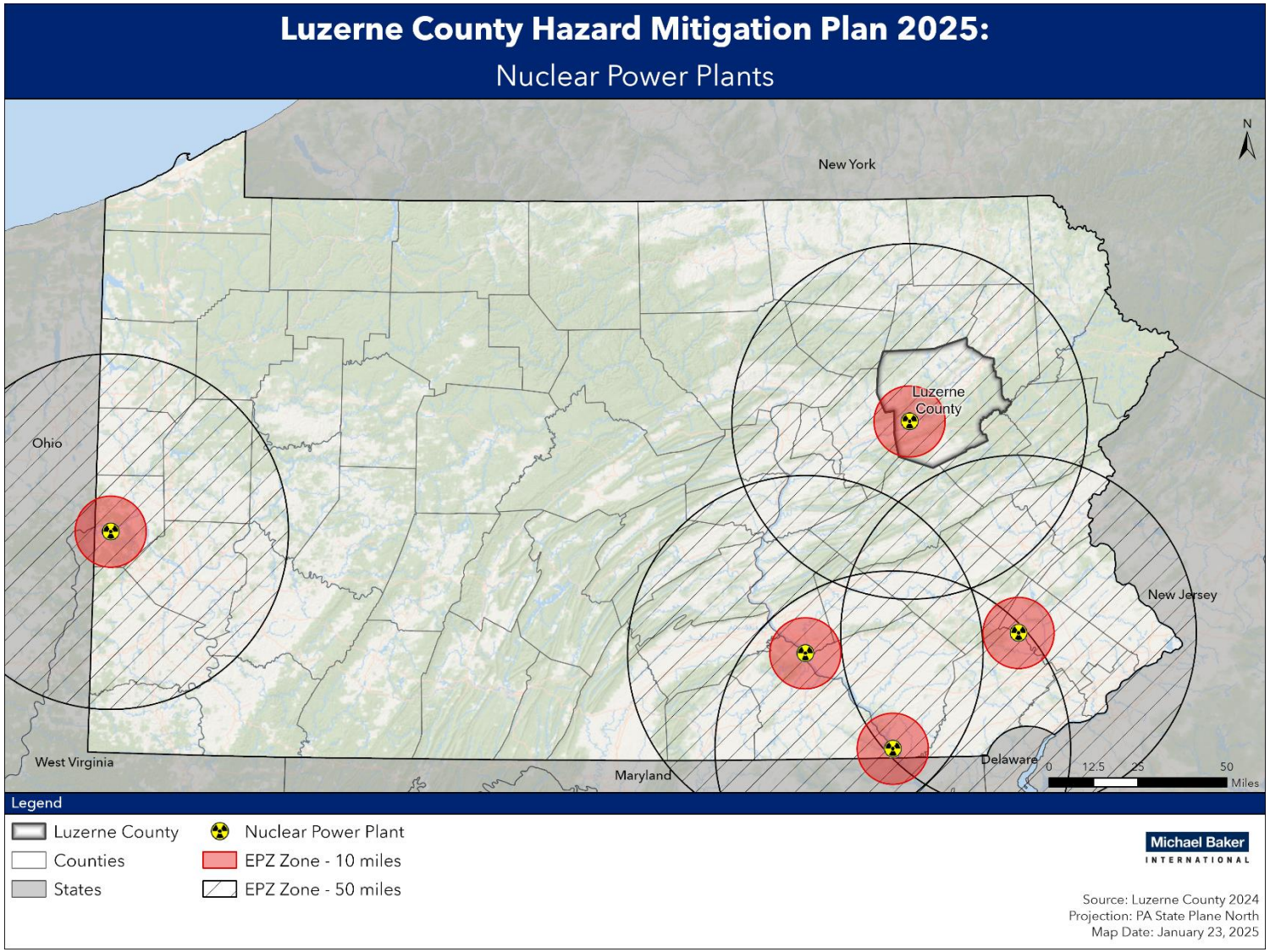
Nuclear incidents generally refer to events involving the release of significant levels of radioactivity or exposure of workers or the general public to radiation. The primary concern following such an incident or accident is the extent of radiation, inhalation, and ingestion of radioactivity isotopes which can cause acute health effects (e.g. death, burns, severe impairment), chronic health effects (e.g. cancer), and psychological effects (US EPA, 2024).

The Nuclear Regulatory Commission encourages the use of Probabilistic Risk Assessments (PRA) to estimate quantitatively the potential risk to public health and safety considering the design, operations and maintenance practices at nuclear power plants. PRAs typically focus on accidents that can severely damage the core and that may challenge containment (USNRC, 2020). FEMA, PEMA and county governments have formulated Radiological Emergency Response Plans that include a Plume Exposure Pathway Emergency Planning Zone (EPZ) with a radius of about ten miles from each nuclear power facility and an Ingestion Exposure Pathway EPZ with a radius of about fifty miles from each facility. The exact size and configuration of the EPZ may vary in relation to local emergency response capabilities, topography, road networks, and political boundaries (USNRC, 2024b).

Luzerne County hosts one nuclear power generating facility in Salem Township called the Susquehanna Steam Electric Station. As seen in Figure 4.3.19-1, the County is located within the ten-mile plume Exposure Pathway EPZ and the fifty-mile Ingestion Exposure Pathway EPZ for this plant. The remaining four nuclear plants in Pennsylvania are more than fifty miles away from Luzerne County. The County is just beyond the fifty-mile Ingestion Exposure Pathway EPZ for the Limerick Generating Station and Three Mile Island nuclear power generating facilities, located in Montgomery County, PA and Dauphin County, PA respectively. This distance exceeds the Plume Exposure and Ingestion Exposure Pathway EPZs for nuclear emergencies; therefore, these facilities are considered a minimal threat to the County. However, in the event of an emergency, evacuees from distant EPZs may seek shelter in Luzerne County.

According to PEMA there are approximately 59,256 people at risk in the Plume Exposure EPZ of the Susquehanna Steam Electric Station. Additionally, there are 1,834,457 people at risk in the Ingestion Exposure EPZ.

Figure 4.3.19-1 Nuclear Power Plants Affecting Luzerne County



4.3.19.2. Range of Magnitude

The magnitude of a nuclear incident differs for those within the Plume Exposure Pathway EPZ and those within the Ingestion Exposure Pathway EPZ. The Plume Exposure Pathway refers to whole-body external exposure to gamma radiation from a radioactive plume and from deposited materials and inhalation exposure from the passing radioactive plume. The duration of primary exposures could range in length from hours to days. The Ingestion Exposure Pathway refers to exposure primarily from ingestion of water or foods such as milk and fresh vegetables that have been contaminated with radiation (USNRC, 2024b). Luzerne County is at risk to the Plume Exposure Pathway EPZ, as the southwest portion of the county is located within 10 miles of the Susquehanna Steam Electric System. Luzerne County is also at risk of impact of the Ingestion Exposure Pathway EPZ.

Nuclear accidents are classified into three categories:

- Criticality accidents: Involves loss of control of nuclear assemblies or power reactors.
- Loss-of-coolant accidents: Occurs whenever a reactor coolant system experiences a break or opening large enough so that the coolant inventory in the system cannot be maintained by the normally operating make-up system (USNRC, 2021a).
- Loss-of-containment accidents: Involves the release of radioactivity from materials such as tritium, fission products, plutonium, and natural, depleted, or enriched uranium. Points of release have been containment vessels at fixed facilities or damaged packages during transportation accidents.

Nuclear facilities must notify the appropriate authorities in the event of an accident. The Nuclear Regulatory Commission uses four classification levels for nuclear incidents (USNRC, 2021b):

- Notification of Unusual Event: A situation is in progress of already completed which could potentially degrade the plant's level of safety or indicate a security threat to the facility. No releases of radioactive material requiring offsite actions are expected unless safety systems degrade further.
- Alert: Events are in progress or have occurred which have (or could) substantially degrade the plant safety; or, a security event that could threaten site personnel or damage to site equipment is in progress. Any offsite releases of radioactive material that could occur are expected to be minimal and far below limits established by the US EPA's protective action guides (PAGs).
- Site Area Emergency: Events are in progress or have occurred which have caused (or likely will cause) major failures of plant functions that protect the public, or involve security events with intentional damage or malicious acts that could lead to the likely failure of (or prevent effective access to) equipment needed to protect the public. Any offsite releases of radioactive material are expected to remain below EPA PAG exposure levels beyond the site boundary.
- General Emergency: Events are in progress or have occurred which: a) have caused (or shortly will cause) substantial reactor core damage, with the potential for uncontrolled

releases of radioactive material; or, b) involve security events that deny plant staff physical control of the facility. Offsite releases can be reasonably expected to exceed EPA PAG exposure levels beyond the site.

The accident at the Three Mile Island Generating Station in March 1979 remains the nation's only nuclear incident at the General Emergency level and remains the worst nuclear incident on record in the Commonwealth and the nation. During this incident, equipment malfunctions, design-related problems, and worker errors led to a partial meltdown of the TMI Unit 2 reactor core at TMI (USNRC, 2024a).

Potential environmental impacts include the long-term effects of radioactive contamination in the environment and, particularly in Pennsylvania, in agricultural products. Spills and releases of radiologically active materials from accidents can result in the contamination of soil and water (CDC, 2024). Areas underlain by limestone and some types of glacial sediments are particularly susceptible to contamination.

After a nuclear incident, another significant impact is the effect of radiation on the health of the population near the incident. The duration of primary exposure could range in length from hours to months depending on the proximity to the point of radioactive release. External radiation and inhalation and ingestion of radioactive isotopes can cause acute health effects (e.g. death, severe health impairment), chronic health effects (e.g. cancers) and psychological effects (EPA, 2024).

The nuclear industry has adopted pre-determined, site-specific Emergency Action Levels (EALs). The EALs provide the framework and guidance to observe, address, and classify the severity of site-specific events and conditions that are communicated to off-site emergency response organizations (USNRC, 2022). There are additional EALs that specifically deal with issues of security, such as threats of airborne attack, hostile action within the facility, or facility attack (Nuclear Energy Institute, 2012). These EALs ensure that appropriate notifications for the security threat are made in a timely manner. Each facility is also equipped with a public alerting system, which includes sirens to alert the public located in the Plume Exposure Pathway EPZ. This alerting system is activated by the counties of each specific EPZ. Emergency notifications and instructions are communicated to the public via the Emergency Alert System as activated by the Commonwealth of Pennsylvania Emergency Operations Center. State officials also have the capability to send emergency messages as text messages to mobile devices.

A worst-case scenario for Luzerne County would be if a General Emergency occurred at the Susquehanna Steam Electric Station that leaked enough radiation to create longer-term damage in the form of contaminated water, soil, and food supplies in the County.

The North Shore Railroad Company runs branch line service along the West shore of the Susquehanna River. This service stops at the Susquehanna Steam Electric Station and other industries along the line. A rail accident or train derailment at this facility could be disastrous for Luzerne County and surrounding areas.

The potential impacts of nuclear incidents on community lifelines are as follows:

Table 4.3.19-1 Most Likely Lifelines Impacted by Nuclear Incidents

LIFELINE	NOTES
Safety and Security	Community safety due to potential harm from radioactivity.
Food, Hydration, Shelter	Potential long-term effects of radioactive contamination for water resources and agricultural operations.
Health and Medical	The immediate impacts on public health and the potential long-term health impacts including cancers and psychological impacts will increase the amount of resources needed at local healthcare facilities.

4.3.19.3. Past Occurrence

There have been no failures at the Susquehanna Steam Electric Station that have resulted in damage, injuries, or fatalities. The 2014 Luzerne County Hazard Mitigation Plan states that the nuclear power generating plant had one 'Alert' declared on March 2, 2006. Alerts are the second lowest of four emergency classifications for nuclear power plants. Alerts are declared when an event has occurred that could reduce the plant's level of safety, but backup plant systems still work.

Nuclear incidents rarely occur, but the incident at Three Mile Island is the worst fixed-nuclear facility accident in US history. The resulting contamination and state of the reactor core led to the development of a fourteen-year cleanup and scientific effort. Additionally, the *Presidents' Commission on the Accident at Three Mile Island* examined the costs of the accident, concluding, "The accident at Three Mile Island on March 28, 1979, generated considerable economic disturbance. Some of the impacts were short term, occurring during the first days of the accident. Many of the impacts were experienced by the local community; others will be felt at the regional and national levels." The report concluded: "It appears clear that the major costs of the TMI Unit 2 accident are associated with the emergency management replacement power and the plant refurbishment or replacement. The minimum cost estimate of nearly $1 billion supports the argument that considerable additional resources can be cost effective if spent to guard against future accidents" (US DHS, 1979).

Despite the severity of the damage, no injuries due to radiation exposure occurred. However, numerous studies were conducted to determine the measurable health effects related to radiation and/or stress. More than a dozen epidemiological and stress related studies conducted to date have found no discernible direct health effects to the population in the vicinity of the plant, but there was evidence of psychological stress in those closest to the site

that persisted over time (USNRC, 2024a; Cleary and Houts, 1984). One study conducted by the DOH's Three Mile Island Health Research Program did find evidence of psychological stress, "lasting in some cases for five to six years." According to the program chief, "the people suffering from stress perceived their health as being poorer than it actually was when the Health Department checked the medical records."

The issue of radiation effects resulting from the accident at TMI will continue to be debated. Radiation science does accept thresholds of expected mortality and morbidity resulting from the exposure to radiation. Administrative standards have been incorporated into plans used by public health officials and emergency planners for the purpose of making protective actions decisions pertaining to sheltering and evacuation.

The accident at Three Mile Island had a profound effect on the residents, emergency management community, government officials and nuclear industry, not only in Pennsylvania, but nationwide. There were minimal requirements for off-site emergency planning for nuclear power stations prior to this accident. Afterwards, comprehensive, coordinated, and exercised plans were developed for the state, counties, school districts, special facilities (hospitals, nursing homes and detention facilities) and municipalities to assure the safety of the population (PA DEP, 2014). Costs associated with an event at one of the Commonwealth's nuclear facilities, be it real or perceived, are significant. The mitigation efforts put in place immediately following the 1979 event continue until today. The Commonwealth Nuclear/Radiological plan which is a successor of the original "Annex E" is a result of the Commonwealth's efforts to address the many components of mitigation planning. The comprehensive planning involved with the five nuclear facilities is an ongoing effort. Plans are reviewed and amended on an annual basis. Recent amendments to various planning documents and station procedures include the efforts to enhance station security measures and the means to bolster communications and response in the event of terrorist activities.

The most recent nuclear incident to occur worldwide was that which involved the Fukushima Daiichi nuclear reactor in Okuma, Fukushima, Japan. This incident occurred on March 11, 2011. An earthquake in the area resulted in a series of equipment failures, nuclear meltdowns, and release of radioactive materials. These failures and releases were largely attributed to the water that penetrated the structures following the tsunami that was generated by the earthquake. The flooding caused the failure of multiple generators meant to keep the systems operating safely after the automatic shutdown. No deaths have been directly attributed to the incidents at the reactor at this time. The World Health Organization completed a report that indicated there were only small proportional increases in the occurrence of certain cancers following the radiation exposure from the plant (WNA, 2020).

Following this incident, the United States Nuclear Regulatory Commission developed a set of recommendations based on the lessons learned from the Fukushima incident. These recommendations are meant to enhance reactor safety for US-based nuclear reactors against a variety of factors. Recommendations included the categories of regulatory framework, ensuring

protection (of the facilities and equipment), enhancing mitigation, strengthening emergency preparedness and improving the efficiency of NRC programs. One of the specific recommendations involved the re-evaluation and upgrade of seismic and flooding protection of structures, systems and components for each reactor. As more information comes out, and more lessons learned are developed, it should only serve to reinforce the protections in place against any type of incident involving nuclear power stations.

4.3.19.4. Future Occurrence

Pennsylvania is home to the only nuclear power plant *General Emergency* in the nation. Since the Three Mile Island incident, nuclear power has become significantly safer and is one of the most heavily regulated industries in the nation. Despite the knowledge gained since then, there is still the potential for a similar accident to occur again at one of the five nuclear generating facilities in the Commonwealth. The Nuclear Energy Agency of the Organization for Economic Co-Operation and Development notes that studies estimate the chance of protective barriers in a modern nuclear facility at less than one in 100,000 per year (NEA, 2005).

Across the United States, several *Unusual Event* and *Alert* classification level events occur each year at the 100+ nuclear facilities that warrant notification of local emergency managers. Of these, *Alert* emergencies occur less frequently. For example, in 1997, there were forty notifications of *Unusual Events* and three *Alert* events nationwide. Based on historical events, *Site Area Emergency* and *General Emergency* incidents are very rare. Therefore, the future occurrence of nuclear incidents that affect Luzerne County can be considered *unlikely* as defined by the Risk Factor methodology probability criteria (see Table 4.4-1).

4.3.19.5. Vulnerability Assessment

Nineteen municipalities in Luzerne County are located within the 10-mile Plume Exposure Pathway EPZ of the Susquehanna Steam Electric Station. These are shown in Table 4.3.19-2. Luzerne County is located entirely within the Ingestion Pathway EPZ of the Susquehanna Steam Electric Station. As a result, the entire County is vulnerable to the contamination effects possible in a nuclear incident.

Table 4.3.19-2 Municipalities located within the 10-mile Plume Exposure Pathway EPZ of the Susquehanna Steam Electric station

Black Creek Township	Huntington Township	Salem Township
Butler Township	Nanticoke City	Shickshinny Borough
Conyngham Borough	Nescopeck Borough	Slocum Township
Conyngham Township	Nescopeck Township	Sugarloaf Township
Dorrance Township	New Columbus Borough	Union Township
Hollenback Township	Newport Township	
Hunlock Township	Nuangola Borough	

As stated above, the County's primary vulnerability to nuclear incidents comes in the form of food, soil, and water contamination. In terms of vulnerable land, 55,162 acres of farmland held in the County's 376 farms are vulnerable to radiological contamination in a nuclear incident. In

2022, the market value of all agricultural products of these farms exceeded $30 million (USDA, 2022). This would also be considered the potential jurisdictional losses in the 50-mile EPZ.

Water contamination is also a concern in nuclear incidents. There are several public water suppliers that operate in Luzerne County or provide water to municipalities. Suppliers include Pennsylvania American Water, Aqua America, Hazleton City Water Department, and Suez Dallas. These water supplies, coupled with the County's 29,411 domestic drinking water wells, are all vulnerable to the effects of a nuclear incident.

The loss experienced by each jurisdiction in the case of a nuclear incident will depend on the magnitude of the event. The example of the Three Mile Island incident gives an indication of local and regional economic losses, though. The President's Commission on the Three Mile Island Incident calculated the economic impact of the accident, looking at direct and indirect losses and other potential growth impacts. Direct impacts to the manufacturing sector were estimated at $6.3 million. These losses occurred within a few days after the accident and quickly subsided thereafter with no evidence of permanent layoffs resulting. Food processors incurred extraordinary expenses of $250,000 with some firms purchasing equipment to detect radiation levels and converting dairy production to powdered milk.

The utility itself incurred significant costs in the areas of emergency management and plant refurbishment and replacement power. Emergency management costs ran into the hundreds of millions of dollars and replacement power for both units at a cost of $24 million a month. The unaffected unit TMI Unit 1 was shut down for 6.5 years. During this time, more than $100 million in plant upgrades and refurbishment took place. Replacement power costs today are estimated at nearly twice the 1979 dollars. The cost of the accident cleanup and placing the facility in monitored storage cost approximately $1 billion.

The impact to tourism was estimated at approximately $6.5 million with lost wages in this sector estimated from $2.8 million to $3.8 million. Losses to the agricultural sector appeared to be minimal due to off-growing season. The Pennsylvania Department of Agriculture indicated that losses were significantly less than $1 million.

Vulnerability was calculated by identifying all census tracts with centers located within 10 miles of a nuclear power station, as defined in the 10-mile Plume Exposure EPZ. Population, buildings counts, and exposed building value were then aggregated to the county scale. Luzerne County has a vulnerable population of approximately 33,049 people in the 10-mile Plume Exposure EPZ. There are approximately 15,614 buildings in these census tracts.

4.3.19.6. Equity in Vulnerable Considerations

Regarding equity and nuclear incidents, marginalized communities often face disproportionate risks due to their proximity to nuclear facilities, limited access to emergency services, and reduced capacity for evacuation and recovery. Hazleton City, Wilkes-Barre City, Pittston Township, Hughestown Borough have the highest concentration of households without a vehicle. In addition, Hazleton City has a high concentration of households with limited English

proficiency. These communities may experience higher exposure to radiation, face barriers to timely medical care, and struggle with long-term recovery issues. Equity considerations involve education on awareness and evacuation.

4.3.20. SUBSTANCE USE DISORDER

4.3.20.1. Location and Extent

Substance use disorder (SUD) is when a person suffers from a medical condition due physical dependence on a drug, either legal or illegal. These disorders are treatable, chronic diseases characterized by a problematic pattern of use of a substance or substances leading to impairments in health, social function, and control over substance use. It is a cluster of cognitive, behavioral, and physiological symptoms indicating that the individual continues using the substance despite harmful consequences. Patterns of symptoms resulting from substance use (drugs or alcohol) can help a doctor diagnose a person with a SUD or SUDs. SUDs can range in severity from mild to severe and can affect people of any race, gender, income level, or social class. The most likely cause are opioids, a class of drugs that reduces pain. "Opioid" is used as 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. According to the Drug Enforcement Administration (DEA) opioids come in various forms: tablets, capsules, skin patches, powder, chunks in various colors from white to shades of brown and black, liquid form for oral use and injection, syrups, suppositories, and lollipops (DEA, 2020).

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. Prescription opioids can be synthetic - methadone, oxycodone (OxyContin), or hydrocodone (Vicodin), or natural, like morphine (CDC, 2017b).
- Fentanyl: A powerful synthetic opioid that is 50 to 100 times more powerful that morphine and used for treating severe pain. Illegally made and distributed fentanyl is becoming more prevalent (CDC, 2022c).
- Heroin: An illegal, highly addictive natural opioid processed from morphine that is also becoming more commonly used in the United States. It is commonly used along with other substances including cocaine and prescription opioids (CDC, 2022d).

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. Addiction to these drugs impacts the entire Commonwealth, and it is listed as the number one public health and safety crisis (Office of the Attorney General, n.d.). Pennsylvania is typically among the hardest hit states from total drug overdose deaths each year, ranking 4th in 2020 behind California, Florida, and New York (CDC, 2022e). The CDC estimates that nearly 42 out of every 100,000 Pennsylvania residents died from drug overdoses in 2021, which ranked 10th in the nation. This data was broken down by different drug classes and it was found that the death rate for opioids was 36 per 100,000 while the rate for stimulants, such as cocaine or methamphetamine, was 21 per 100,000. These ranked 11th and 12th in the nation, respectively, and were each higher than the national average (CDC, 2022e). In Pennsylvania,

overdoses caused by opioids have become the leading cause of accidental death, surpassing automobile accidents (CDC, 2017b).

Xylazine, a powerful animal sedative, has become a growing problem for Pennsylvania in recent years. There were 90 reported overdose deaths due to the drug in 2017, but that number jumped to 575 in 2021. This represents an increase of over 600 percent in just 5 years. Philadelphia reported that 90 percent of opioid samples tested contained xylazine (Governor Josh Shapiro, 2023).

People under the age of 35 have been particularly vulnerable to the opioid virus. According to a joint intelligence report prepared by the DEA Philadelphia Division and the University of Pittsburgh, between 2015 and 2016 in Pennsylvania, fentanyl use increased 380 percent among 15- to 24-year-olds while heroin use increased 970 percent in the 25- to 34-year age range. The report also documented a higher percentage of drug-related deaths attributed to opioid use in Pennsylvania's rural communities at 42 percent, compared to 34 percent in urban communities (DEA Philadelphia Division, 2017).

4.3.20.2. Range of Magnitude

Substance use disorder can lead to overdose, which can be fatal. 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 use during pregnancy can also impact a fetus in the womb. The incidence of this condition, known as neonatal abstinence syndrome, increased from 4.6 per 1,000 births to 6.7 per 1,000 between 2012 and 2016 in the United States, with opioid usage during pregnancy continuing to rise (Anbalagan and Mendez, 2022). There are additional ways substance use disorder can impact more than just those that suffer from it. Those individuals are a part of families, and the impacts of their substance use can disrupt their families across generations. They are also a part of Luzerne County's communities. There may be impacts on the County's educational system, social services such as child welfare, food insecurity, reducing productivity, and more. There are emotional, societal, and fiscal impacts that go beyond the direct effects to individuals, or the economic impacts calculated at the local and state level. This range of impacts suggests that treatments and mitigation measures should consider a more holistic perspective, even pursuing goals around community resilience as compared to targeting individuals.

First responders – paramedics, police officers, and fire fighters – are also affected by Pennsylvania's substance use crisis. In addition to the crisis consuming time and resources, first responders also face exposure risk, particularly to synthetic fentanyl. The most likely method of exposure is skin exposure, which clinical toxicology experts state presents an extremely low risk. Additional methods of exposure are inhalation, ingestion, contact with a mucous membrane, or with a needlestick (North Carolina Department of Health and Human Services, 2017). According to the DEA, it takes two to three milligrams of fentanyl to induce respiratory depression, arrest, and possibly death. 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 (DEA, 2017).

The potential impacts of substance abuse on community lifelines are as follows:

Table 4.3.20-1 Most Likely Lifelines Impacted by Substance Abuse

LIFELINES	NOTES
Safety and Security	Anticipate causal impacts as government services are needed to aid individuals with substance use disorders. First responders may be at risk of exposure for certain substances. Mitigation actions should be aimed at increasing awareness of available services.
Health and Medical	Anticipate a causal and cascading relationship for the Health and Medical lifeline in response and recovery as substance use has negative impacts on public health and may require medical treatment and mental health services. There may be cascading impacts on family and friends, who may require mental health services as well. Mitigation actions for this lifeline may be focused on stockpiling and administering emergency treatments.

4.3.20.3. Past Occurrence

The CDC found that opioids are the main cause of drug-related overdoses and deaths, being responsible for nearly 75% percent of drug-related deaths nationally in 2017. Of the more than 4,600 drug-related deaths in Pennsylvania in 2016, nearly 84 percent were attributed to two or more drugs. Therefore, drug-related overdose and death statistics account for all drug types, however, as noted above, many drug-related deaths involve opioids.

Though the substance use disorder crisis is complex, it is widely acknowledged that the crisis began in the late 1990s when pharmaceutical companies introduced opioid-based pain medication such as OxyContin, Percocet, and Vicodin. As these drugs become more frequently prescribed, misuse and overdose increased, and it became clear that prescription opioids were highly addictive (NIDA, 2020).

In Luzerne County, the number of drug overdose deaths increased from 22 in 2014 to 167 in 2020 (Overdose Free PA, n.d.). Over the same time period, the age-adjusted drug overdose rate per 100,000 people in the County nearly doubled.

Table 4.3.20-2 Drug Overdose Deaths in Luzerne County: Age-adjusted drug overdose death rate per 100,000

2014-2016	2015-2017	2016-2018	2017-2019	2018-2020
25.5	37.7	47.0	50.1	50.0

4.3.20.4. Future Occurrence

Pennsylvania has seen a steady rise in opioid-related deaths over the past several years, with drug-related death rates increasing 102 percent between 2014 and 2017. In 2017, Pennsylvania saw 5,425 overdose-related deaths. In 2020, overdose-related deaths were down to 5,170. 85% of deaths, or 4,398, were opioid-related (PA DOH, 2020).

However, future occurrences of substance abuse disorder, overdose, and fatalities are unclear as the state moves forward with overdose prevention initiatives. In January 2018, Governor Tom Wolf declared Pennsylvania's opioid addictions epidemic a disaster emergency. This declaration should enhance coordination and data collection between state and local responders, improve tools for families and first responders, and expand treatment access. The declaration also improves access to naloxone, a lifesaving drug that temporarily reverses the effects of a drug overdose. However, the need for naloxone in Wilkes-Barre has decreased over the years from 259 doses administered in 2021 to 109 doses in 2024 administered.

Overall, the probability of future substance abuse is likely as defined by the Risk Factor Methodology (see Table 4.4.1).

4.3.20.5. Vulnerability Assessment

County facilities are not at risk to the opioid crisis, but there are some occupation-specific risks that may make some employees more vulnerable. Employees working in direct patient care are vulnerable to fentanyl exposure. Since fentanyl can be ingested orally, inhaled through the nose or mouth, or absorbed through the skin or eyes, any substance suspected to contain fentanyl should be handled with extreme caution. Exposure to a small amount of fentanyl can lead to respiratory depression or death. Fentanyl-related substances have been found in powders, pills, capsules, liquids, and on blotter paper. The DEA recommends that all first responders carry a Personal Protective Equipment (PPE) kit that includes: nitrile gloves, N-95 dust masks, sturdy eye protection, paper coveralls and shoe protection, and naloxone injectors. The DEA also suggests using extreme caution when using police dogs, as they are at serious risks to health complications from inhaling fentanyl and fentanyl-related substances (DEA, 2017).

Additionally, absenteeism from jobs associated with substance use disorder in high-risk areas could lead to economic loss through lost productivity and increased medical costs.

In general, jurisdictions that are more densely populated are more vulnerable to substance use disorder threats as access to drugs increases. However, as stated above, rural communities have experienced larger per-capita opioid-related deaths.

Jurisdictional losses in the substance use disorder crisis stem from lost wages, productivity, and resources rather than losses to buildings or land. Locally, many Pennsylvania counties have seen an increase of time and resources devoted to the opioid epidemic as overdose and response

increases, however there is no comprehensive tracking mechanism to record total local losses associated with the substance use disorder crisis.

Impacts including total costs to jurisdictions are only beginning to be understood, researched, and tracked. There is no comprehensive database currently tracking monetary losses at the local level. However, the American Enterprise Institute (AEI), using national data from the CDC and White House Council of Economic Advisors, calculated a total cost per capita ($1,799), of the opioid epidemic for Pennsylvania. Using this per capita estimate in combination with county population estimates, losses can be estimated for Luzerne County. It is important to note that this methodology assumes equal per capita opioid misuse and fatalities across all counties. However, based on reported drug overdoses and drug related deaths, it is known that some counties are more vulnerable and more likely to experience higher per capita costs while counties in central and north central Pennsylvania tend to be less vulnerable and likely have lesser costs per capita. Another important caveat regarding this methodology is that a portion of the costs will have been state losses rather than those at the county or jurisdictional level, but the ratio of state to local cost burden is unknown at this time. It is estimated that Luzerne County has had a total cost of $588,971,012.

4.3.20.6. Equity in Vulnerable Communities

People of color are more susceptible to drug overdose deaths, most likely due to the barriers that people of color face when attempting to access mental health services and substance use treatment (CDC, 2022f). The CDC also affirms that as county-level income inequality increases, overdose rates increase, especially among Black and Latino groups. This points to the fact that lower-income groups may be more susceptible to drug overdose (CDC, 2022f).

According to the U.S. Department of Labor, individuals with certain underlying conditions and characteristics may be more prone to overdose due to heightened sensitivity to opioid effects. These conditions and characteristics may include advanced age (65+), respiratory conditions, wasting syndrome, and those with impaired energy or strength (Department of Labor, n.d.). Some other groups are at higher risk of drug misuse, which may lead to higher rates of overdose. These groups include younger adults (18-25 years old); those living with mental health disorders including depression, anxiety, and post-traumatic stress disorder; and those with a history of alcohol or other substance abuse (Department of Labor, n.d.).

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 planning area. The RF can also be used to assist local community officials in ranking and prioritizing those hazards that pose the most significant threat to their area based on a variety of factors deemed important by the planning team and other stakeholders involved in the hazard mitigation planning process. The RF system relies mainly on historical data, local knowledge, and 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 20 hazards profiled in the 2025 HMP Update. Those categories include *probability*, *impact*, *spatial extent*, *warning time,* and *duration*. Each degree of risk was assigned a value ranging from 1 to 4. The weighting factor is shown in Table 4.4.-1. To calculate the RF value for a given hazard, the assigned risk value for each category was multiplied by the weighting factor. The sum of all five categories equals the final RF value, as demonstrated in the example equation:

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

Table 4.4.1 summarizes each of the five categories used for calculating a RF for each hazard. According to the weighting scheme applied, the highest possible RF value is 4.0.

Table 4.4-1 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% and 49.9% Annual Probability	2	
	LIKELY	Between 50% and 90% Annual Probability	3	
	HIGHLY LIKELY	Greater Than 90% Annual Probability	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 and 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% and 10.9% of area affected.	2	
	MODERATE	Between 11% and 25% of area affected.	3	
	LARGE	Geater than 25% of area affected.	4	
WARNING TIME *Is there usually some lead time associated with the hazard event? Have warning measures been implemented?*	MORE THAN 24 HRS	Self-defined. *(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 4.4-2 lists the Risk Factor calculated for each of the 20 hazards identified in the 2025 HMP Update. Hazards identified as *high* risk have risk factors of 2.5. or greater. 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 4.4-2 Ranking of Hazard Types Based on Risk Factor Methodology

RISK	NATURAL HAZARD	RISK ASSESSMENT CATEGORY					RISK FACTOR
		PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	
HIGH	Flood, Flash Flood, Ice Jam	4	4	3	3	3	3.6
	Winter Storm	4	3	4	1	2	3.2
	Drought	3	2	4	1	4	2.8
	Extreme Temperatures	2	2	4	3	4	2.7
	Wildfire	3	2	3	3	2	2.6
	Cyber-Terrorism	2	2	4	4	2	2.6
	Hurricane, Tropical Storm, Nor'easter	3	2	3	2	2	2.5
	Pandemic and Infectious Disease	2	2	4	1	2	2.5
MODERATE	Tornado, Windstorm	2	4	1	3	1	2.4
	Coal Mining	2	3	2	4	1	2.4
	Nuclear Incident	1	3	3	3	2	2.3
	Substance Use Disorder	3	2	1	1	4	2.2
	Landslide	1	3	2	4	1	2.1
	Subsidence, Sinkhole	2	3	1	3	1	2.1
	Hailstorm	2	2	2	4	1	2.1
	Earthquake	1	2	3	4	1	2.0
LOW	Dam Failure	1	2	2	4	2	1.9
	Levee Failure	2	2	1	4	2	1.8
	Hazardous Materials Release	2	1	1	4	2	1.7
	Radon Exposure	2	1	1	4	2	1.7

Based on these results, there are eight *high* risk hazards, eight *moderate* risk hazards and four *low* risk hazards in Luzerne County. Mitigation actions were developed for all high, moderate, and low risk hazards (see Section 6.4).

A risk assessment result for the entire county does not mean that each municipality has the same risk to each hazard. Municipalities completed a *Hazard Risk Assessment Survey* during the planning process evaluate their jurisdictional risk to each hazard. Results from these surveys were reassessed by the HMPT, and the update risk assessment was used to complete Table 4.4-3 which shows the different municipalities in Luzerne County and whether their risk is greater than (>), less than (<), or equal to (=) the risk factor assigned to the County as a whole.

Table 4.4-3 Calculated Countywide Risk Factor by Hazard and Comparative Jurisdictional Risk

MUNICIPALITY	IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR																			
	FLOOD, FLASH FLOOD, ICE JAM	WINTER STORM	DROUGHT	EXTREME TEMPERATURE	WILDFIRE	CYBER TERRORISM	HURRICANE, TROPICAL STORM, NOR'EASTER	PANDEMIC AND INFECTIOUS DISEASE	TORNADO, WINDSTORM	COAL MINING	NUCLEAR INCIDENT	SUBSTANCE USE DISORDER	LANDSLIDE	SUBSIDENCE, SINKHOLE	HAILSTORM	EARTHQUAKE	DAM FAILURE	LEVEE FAILURE	HAZARDOUS MATERIALS RELEASE	RADON EXPOSURE
	3.6	3.2	2.8	2.7	2.6	2.6	2.5	2.5	2.4	2.4	2.3	2.2	2.1	2.1	2.1	2	1.8	1.8	1.7	1.7
Ashley Borough	=	>	<	=	<	<	=	=	>	=	=	=	<	>	=	=	<	<	>	=
Avoca Borough	<	<	>	=	>	>	>	>	>	=	>	<	>	>	>	>	>	>	>	>
Bear Creek Village Borough	>	>	>	=	>	>	>	=	<	<	=	>	<	<	=	=	<	<	<	=
Bear Creek Township	>	>	>	>	>	>	>	=	<	=	=	>	<	<	=	=	>	<	=	=
Black Creek Township	>	=	<	<	=	<	>	=	=	=	>	>	>	<	>	>	<	<	=	=
Buck Township	=	>	<	=	>	<	=	=	=	<	=	>	<	<	=	=	>	<	<	=
Butler Township	>	=	>	>	=	>	>	=	<	=	>	>	>	<	>	=	>	<	>	=
Conyngham Borough	<	=	<	<	<	<	<	>	<	<	>	=	>	<	=	=	<	<	>	=
Conyngham Township	>	=	<	=	>	<	>	=	=	=	>	>	<	>	>	<	=	<	=	=
Courtdale Borough	<	>	<	<	=	<	<	=	<	=	=	=	<	<	>	<	<	<	>	=
Dallas Borough	=	>	>	=	=	<	>	>	<	<	=	>	<	<	>	<	=	<	>	=
Dallas Township	>	>	=	>	=	>	=	=	=	<	=	<	>	<	>	=	=	<	>	=
Dennison Township	=	>	>	<	=	<	=	=	>	<	=	>	<	<	>	=	=	<	=	=

Table 4.4-3 Calculated Countywide Risk Factor by Hazard and Comparative Jurisdictional Risk

MUNICIPALITY	IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR																			
	FLOOD, FLASH FLOOD, ICE JAM	WINTER STORM	DROUGHT	EXTREME TEMPERATURE	WILDFIRE	CYBER TERRORISM	HURRICANE, TROPICAL STORM, NOR'EASTER	PANDEMIC AND INFECTIOUS DISEASE	TORNADO, WINDSTORM	COAL MINING	NUCLEAR INCIDENT	SUBSTANCE USE DISORDER	LANDSLIDE	SUBSIDENCE, SINKHOLE	HAILSTORM	EARTHQUAKE	DAM FAILURE	LEVEE FAILURE	HAZARDOUS MATERIALS RELEASE	RADON EXPOSURE
	3.6	3.2	2.8	2.7	2.6	2.6	2.5	2.5	2.4	2.4	2.3	2.2	2.1	2.1	2.1	2	1.8	1.8	1.7	1.7
Dorrance Township	>	=	>	>	=	>	>	=	=	<	>	>	<	<	>	=	=	<	=	=
Dupont Borough	>	>	<	=	<	<	>	=	=	=	=	=	<	>	=	=	<	<	>	=
Duryea Borough	=	>	<	>	<	=	=	=	<	=	=	=	>	>	=	<	=	>	>	=
Edwardsville Borough	=	>	<	>	>	<	=	=	<	=	=	=	>	=	<	<	<	>	>	=
Exeter Borough	>	=	>	=	<	>	=	=	>	>	=	=	<	=	=	<	<	>	>	=
Exeter Township	=	>	<	>	=	<	=	=	<	<	<	=	>	<	>	<	<	<	<	=
Fairmount Township	>	>	<	=	>	<	>	=	=	<	=	>	=	<	>	<	>	<	<	=
Fairview Township	=	>	<	>	=	<	=	=	<	<	=	>	<	<	=	=	=	<	>	=
Forty Fort Borough	>	>	<	=	<	<	>	=	<	<	=	>	>	>	<	=	<	>	>	=
Foster Township	=	=	>	=	=	<	=	=	=	>	=	>	<	<	>	>	=	<	=	=
Franklin Township	<	>	=	=	=	<	<	=	>	<	=	>	<	<	>	<	>	<	<	=
Freeland Borough	<	=	<	>	<	<	<	=	<	=	=	=	<	<	<	=	<	<	>	=
Hanover Township	>	>	=	>	=	>	>	=	<	>	=	=	>	>	=	=	>	>	>	=
Harveys Lake Borough	>	>	<	=	=	<	>	=	=	<	=	>	>	<	>	<	<	<	=	=
Hazle Township	=	=	>	>	>	>	=	=	=	>	=	=	>	<	=	>	>	<	>	=

Table 4.4-3 Calculated Countywide Risk Factor by Hazard and Comparative Jurisdictional Risk

MUNICIPALITY	IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR																			
	FLOOD, FLASH FLOOD, ICE JAM	WINTER STORM	DROUGHT	EXTREME TEMPERATURE	WILDFIRE	CYBER TERRORISM	HURRICANE, TROPICAL STORM, NOR'EASTER	PANDEMIC AND INFECTIOUS DISEASE	TORNADO, WINDSTORM	COAL MINING	NUCLEAR INCIDENT	SUBSTANCE USE DISORDER	LANDSLIDE	SUBSIDENCE, SINKHOLE	HAILSTORM	EARTHQUAKE	DAM FAILURE	LEVEE FAILURE	HAZARDOUS MATERIALS RELEASE	RADON EXPOSURE
	3.6	3.2	2.8	2.7	2.6	2.6	2.5	2.5	2.4	2.4	2.3	2.2	2.1	2.1	2.1	2	1.8	1.8	1.7	1.7
City of Hazleton	<	=	>	>	<	>	<	=	<	=	=	=	<	<	<	>	<	<	>	=
Hollenback Township	>	=	=	>	=	<	>	=	>	<	>	>	<	<	>	=	<	<	<	=
Hughestown Borough	<	>	<	>	<	<	<	=	<	=	=	=	<	=	=	=	<	<	>	=
Hunlock Township	>	>	=	<	>	<	>	=	=	<	>	>	=	<	>	<	=	<	=	=
Huntington Township	>	=	=	=	<	>	>	=	>	<	>	>	<	<	>	<	>	<	<	=
Jackson Township	=	>	>	=	=	<	=	=	>	<	=	=	<	<	>	<	>	<	=	=
Jeddo Borough	<	=	<	>	<	<	<	=	<	=	=	>	<	<	=	=	<	<	>	=
Jenkins Township	<	>	<	=	>	<	=	=	>	>	=	=	>	>	=	=	>	<	>	=
Kingston Borough	<	>	>	=	<	>	<	=	<	<	=	=	<	>	<	=	<	>	>	=
Kingston Township	>	>	<	=	<	<	>	=	=	=	=	=	>	<	>	<	<	<	=	=
Laflin Borough	>	>	<	=	<	<	>	=	<	=	=	=	>	<	=	=	<	<	>	=
Lake Township	=	>	=	=	>	<	=	=	>	<	=	>	<	<	>	<	=	<	=	=
Larksville Borough	<	>	<	=	<	<	<	=	=	>	=	=	<	=	>	<	<	<	>	=
Laurel Run Borough	<	>	<	=	>	<	<	=	>	=	=	>	<	<	=	=	<	<	<	=
Lehman Township	=	>	>	=	>	<	=	=	=	<	=	>	<	<	>	<	>	<	=	=

Table 4.4-3 Calculated Countywide Risk Factor by Hazard and Comparative Jurisdictional Risk

MUNICIPALITY	IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR																			
	FLOOD, FLASH FLOOD, ICE JAM	WINTER STORM	DROUGHT	EXTREME TEMPERATURE	WILDFIRE	CYBER TERRORISM	HURRICANE, TROPICAL STORM, NOR'EASTER	PANDEMIC AND INFECTIOUS DISEASE	TORNADO, WINDSTORM	COAL MINING	NUCLEAR INCIDENT	SUBSTANCE USE DISORDER	LANDSLIDE	SUBSIDENCE, SINKHOLE	HAILSTORM	EARTHQUAKE	DAM FAILURE	LEVEE FAILURE	HAZARDOUS MATERIALS RELEASE	RADON EXPOSURE
	3.6	3.2	2.8	2.7	2.6	2.6	2.5	2.5	2.4	2.4	2.3	2.2	2.1	2.1	2.1	2	1.8	1.8	1.7	1.7
Luzerne Borough	>	>	<	=	<	<	>	=	<	=	=	=	<	=	<	<	<	=	>	=
City of Nanticoke	=	>	<	=	<	<	=	=	<	>	>	=	>	>	<	=	<	<	>	=
Nescopeck Borough	=	=	<	<	<	<	=	=	=	<	>	=	<	>	>	=	<	<	>	=
Nescopeck Township	>	=	=	=	=	<	>	=	=	<	>	>	=	>	>	=	<	<	=	=
New Columbus Borough	>	=	<	>	<	<	>	=	>	<	>	>	<	<	>	<	<	<	<	=
Newport Township	=	>	<	<	>	<	=	=	<	>	>	=	>	>	>	<	<	<	>	=
Nuangola Borough	>	>	<	<	<	<	>	=	<	<	>	>	<	<	=	=	<	<	>	=
Penn Lake Park Borough	>	>	<	=	<	<	>	=	<	<	=	>	<	<	=	=	>	<	<	=
City of Pittston	<	>	=	=	<	<	<	=	<	=	=	=	>	>	<	=	<	<	>	=
Pittston Township	<	>	<	=	>	>	<	=	=	=	=	>	>	=	<	=	<	<	>	=
Plains Township	>	>	<	=	>	>	>	=	=	>	=	=	<	>	<	=	>	=	>	=
Plymouth Borough	<	>	<	=	<	<	<	=	<	=	=	=	>	>	<	<	>	>	>	=
Plymouth Township	>	>	<	=	=	<	>	=	<	>	=	>	>	<	=	<	<	<	>	=
Pringle Borough	<	=	<	=	<	<	<	=	<	<	=	=	>	<	<	<	>	>	>	=
Rice Township	>	>	>	>	>	<	>	=	>	<	=	=	<	<	>	=	>	<	=	=

Table 4.4-3 Calculated Countywide Risk Factor by Hazard and Comparative Jurisdictional Risk

MUNICIPALITY	IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR																			
	FLOOD, FLASH FLOOD, ICE JAM	WINTER STORM	DROUGHT	EXTREME TEMPERATURE	WILDFIRE	CYBER TERRORISM	HURRICANE, TROPICAL STORM, NOR'EASTER	PANDEMIC AND INFECTIOUS DISEASE	TORNADO, WINDSTORM	COAL MINING	NUCLEAR INCIDENT	SUBSTANCE USE DISORDER	LANDSLIDE	SUBSIDENCE, SINKHOLE	HAILSTORM	EARTHQUAKE	DAM FAILURE	LEVEE FAILURE	HAZARDOUS MATERIALS RELEASE	RADON EXPOSURE
	3.6	3.2	2.8	2.7	2.6	2.6	2.5	2.5	2.4	2.4	2.3	2.2	2.1	2.1	2.1	2	1.8	1.8	1.7	1.7
Ross Township	>	>	=	=	=	<	>	=	=	<	=	>	<	<	>	<	>	<	<	=
Salem Township	>	=	>	=	=	>	>	=	=	>	>	>	>	>	>	<	=	<	>	=
Shickshinny Borough	>	=	<	<	=	<	>	=	<	<	>	>	>	<	<	=	<	<	<	=
Slocum Township	<	>	>	>	=	<	=	=	=	<	>	>	<	<	>	=	=	<	=	=
Sugarloaf Township	>	=	>	=	=	>	>	=	<	=	>	>	>	<	>	>	<	<	=	=
Sugar Notch Borough	<	>	<	<	<	<	<	=	<	=	=	=	<	<	=	=	<	<	>	=
Swoyersville Borough	=	>	<	=	<	<	=	=	<	>	=	=	<	=	<	<	<	>	=	=
Union Township	>	=	=	=	>	<	>	=	=	<	>	>	=	<	>	<	>	<	<	=
Warrior Run Borough	<	<	<	<	<	<	<	=	<	=	=	=	<	<	=	=	<	<	>	=
West Hazleton Borough	<	=	<	>	<	<	<	=	<	<	=	=	<	<	=	=	<	<	>	=
West Pittston Borough	>	>	<	=	<	<	>	=	<	=	=	=	<	>	<	=	<	>	>	=
West Wyoming Borough	>	>	<	=	>	<	>	=	<	>	=	=	<	=	<	<	<	>	>	=
White Haven Borough	<	>	<	=	<	<	<	=	>	<	=	>	<	<	<	=	<	<	>	=
City of Wilkes-Barre	>	>	=	>	<	>	>	=	<	>	=	>	>	>	<	=	=	>	>	=
Wilkes-Barre Township	<	>	<	>	>	<	<	=	<	<	=	=	<	=	<	=	=	<	>	=

Table 4.4-3 Calculated Countywide Risk Factor by Hazard and Comparative Jurisdictional Risk

MUNICIPALITY	IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR																			
	FLOOD, FLASH FLOOD, ICE JAM	WINTER STORM	DROUGHT	EXTREME TEMPERATURE	WILDFIRE	CYBER TERRORISM	HURRICANE, TROPICAL STORM, NOR'EASTER	PANDEMIC AND INFECTIOUS DISEASE	TORNADO, WINDSTORM	COAL MINING	NUCLEAR INCIDENT	SUBSTANCE USE DISORDER	LANDSLIDE	SUBSIDENCE, SINKHOLE	HAILSTORM	EARTHQUAKE	DAM FAILURE	LEVEE FAILURE	HAZARDOUS MATERIALS RELEASE	RADON EXPOSURE
	3.6	3.2	2.8	2.7	2.6	2.6	2.5	2.5	2.4	2.4	2.3	2.2	2.1	2.1	2.1	2	1.8	1.8	1.7	1.7
Wright Township	=	>	=	>	=	<	=	=	<	<	=	=	<	<	<	=	=	<	>	>
Wyoming Borough	=	>	<	>	<	<	=	=	<	<	=	=	<	<	<	=	<	=	>	=
Yatesville Borough	<	>	<	>	<	<	<	=	<	<	=	=	<	<	<	=	<	<	>	=

4.4.3. POTENTIAL LOSS ESTIMATES

Based on various kinds of available data, potential loss estimates were established for flood, flash flood, and ice jam. Estimates provided in this section are based on HAZUS version 6.1, 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 economic loss estimates have two basic components, Building-Related Losses and Business Interruption Losses, each of which include sub-categories. Building Losses include:

- Building Loss: Structural and non-structural repair and replacement costs to bring the building to pre-hazard conditions.
- Content Loss: Value of building's contents, typically measured as a percentage of the building replacement value.
- Inventory Loss: The value of the potential inventory for commercial, industrial, and other types of buildings.

Direct economic losses for Business Interruptions include:

- Relocation Loss: The dollar amount representing disruption costs, the cost of shifting and transferring activities, and the rental of temporary space.
- Income Loss: Direct loss of income during recovery period post-hazard.
- Wages Loss: Represents the lost earnings due to disaster-related business closures or disruptions
- Rental Income Loss: The loss that a property owner would receive if the unit was fully occupied but is unable to receive due to the building being damaged.

This plan employed an enhanced HAZUS analysis for floods. As opposed to basic analysis using only default data, enhanced analysis incorporates more recent, up-to-date, or specific data for inclusion in the hazard models. The enhanced data incorporated into this plan update include:

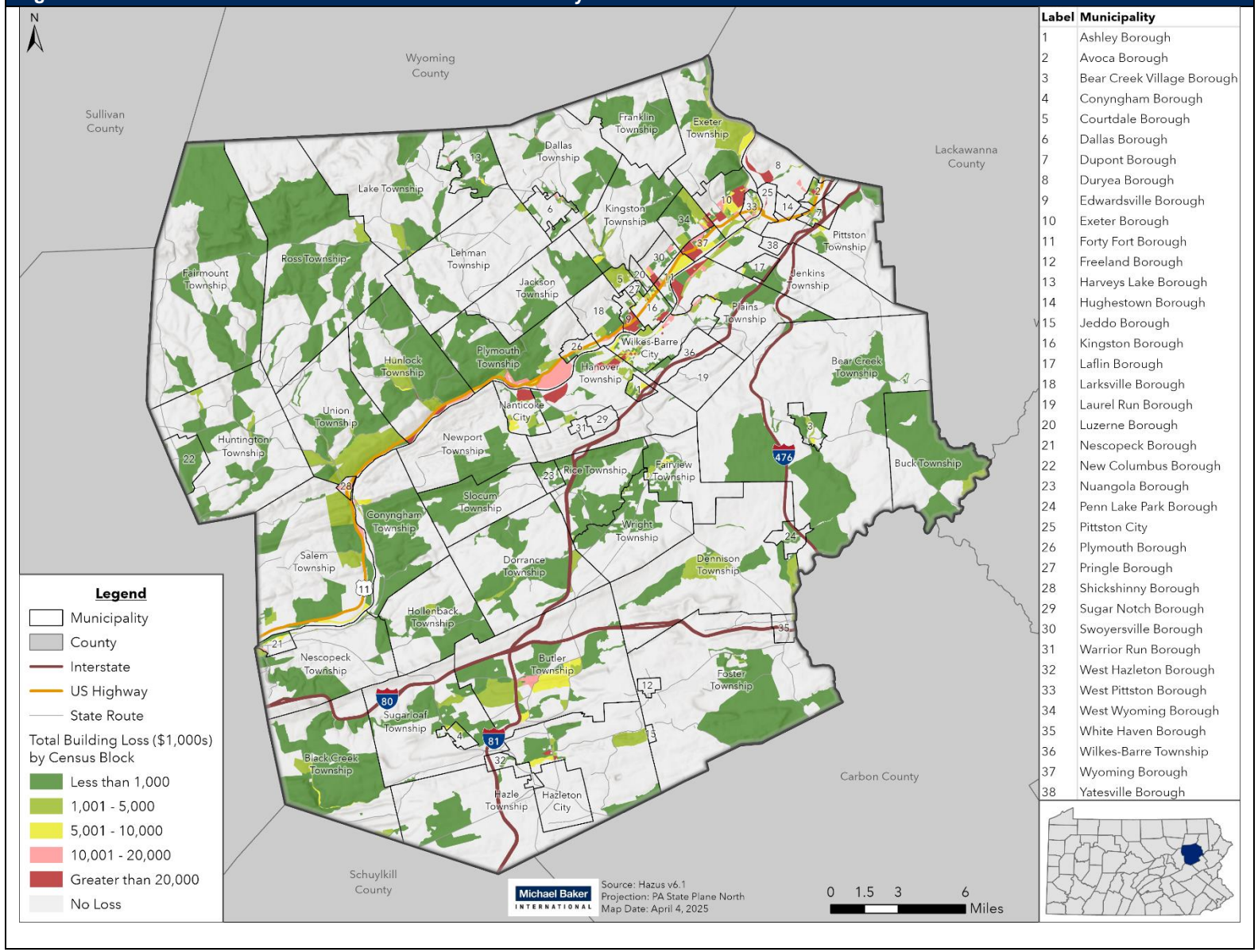
- Updated demographic data from the 2020 Census;
- Updated essential facilities data from the County and other sources

Using these datasets in HAZUS, total building-related losses from a 1%-annual-chance flood in Luzerne County are estimated to be nearly $2.9 billion with business interruptions estimated to be $1.9 billion, or 40% of the total economic loss in the county. Residential occupancies make up nearly 25% of the total estimated loss. Damages would be most significant along the Susquehanna River floodway, where most of the vulnerable buildings are located. Total economic loss, building-related loss and business interruptions, from a countywide 1%-annual-chance flood are estimated to be near $4.9 billion. In this scenario, an expected 2,442 buildings would be at least moderately damaged. In addition, an estimated 3,866 households would be displaced, and 1,882 people would require shelter. Essential facilities would largely remain undamaged in this scenario, but two emergency operation centers, eight fire stations, one

police station, and three schools are estimated to have at least moderate damage. Of these facilities, two emergency operation centers, seven fire stations, one police station, and three schools would experience some loss of use. For more details on the HAZUS methodology used and additional results reports, see Appendix F.

Below, Figure 4.4-1 shows HAZUS modeled potential flood losses in Luzerne County. This model is consistent with other data found for flood risk in the county. The greatest losses are expected to be found in areas along the Susquehanna River, for example Forty Fort Borough, the City of Wilkes-Barre, and Wyoming Borough. However, due to the topography of Luzerne County, flood losses can be expected in almost every municipality.

Figure 4.4-1 Hazus Modeled Flood Loss in Luzerne County



Label	Municipality
1	Ashley Borough
2	Avoca Borough
3	Bear Creek Village Borough
4	Conyngham Borough
5	Courtdale Borough
6	Dallas Borough
7	Dupont Borough
8	Duryea Borough
9	Edwardsville Borough
10	Exeter Borough
11	Forty Fort Borough
12	Freeland Borough
13	Harveys Lake Borough
14	Hughestown Borough
15	Jeddo Borough
16	Kingston Borough
17	Laflin Borough
18	Larksville Borough
19	Laurel Run Borough
20	Luzerne Borough
21	Nescopeck Borough
22	New Columbus Borough
23	Nuangola Borough
24	Penn Lake Park Borough
25	Pittston City
26	Plymouth Borough
27	Pringle Borough
28	Shickshinny Borough
29	Sugar Notch Borough
30	Swoyersville Borough
31	Warrior Run Borough
32	West Hazleton Borough
33	West Pittston Borough
34	West Wyoming Borough
35	White Haven Borough
36	Wilkes-Barre Township
37	Wyoming Borough
38	Yatesville Borough

4.4.4. FUTURE DEVELOPMENT AND VULNERABILITY

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

Population change and the age of the housing stock are main indicators of vulnerability change in Luzerne County. As discussed in Section 2.3, the total population of Luzerne County is estimated to have increased by 2.1% from 2010-2023. Thirty-two municipalities increased in population while 44 decreased in population during this time period. Areas of higher density, in the larger municipalities and growing municipalities, face increased vulnerability and increased exposed structures with most hazard events. Increases in population results in increased vulnerability to hazards such as wildfires, floods, and winter storms as more people will be impacted.

Section 2.3 discusses the projected population change in Luzerne County by 2050. The population of Luzerne County is projected to increase by 3.6% between 2020-2050. Population is expected to increase in the urbanized areas and decrease in the rural areas of the County. Projected increases in the urbanized areas are expected to result in development pressure in Wilkes-Barre, Nanticoke, and Hazleton.

Future Development and the NFIP

The Luzerne County Zoning Officer reports through the Luzerne County Department of Planning and Zoning. The Zoning Officer oversees the administration of zoning matters, including floodplain management duties, for 28 of the County's municipalities for subdivision and land development regulations and 20 of the County's municipalities for zoning regulations. Table 5.2-1 in the Capability Assessment lists these municipalities. Under the Luzerne County Zoning Ordinance developers must first get a permit from the Luzerne County Zoning Office. They are then directed to the local municipality's Flood Plain Administrator for additional flood plain management and building code requirements. Under Section 13 of the Luzerne County Zoning Ordinance, no development is permitted in the Special Flood Hazard Area. This includes encroachments, fill, construction, use, substantial improvements, substantial excavation or grading modification, or any other development. While there are some exceptions, no new construction or development can be located within the area measured fifty feet landward from the top-of-bank of any watercourse within any SFHA.

Current zoning and development regulations dictate how future development should safely occur within the SFHA. However, there are structures within the SFHA that were constructed prior to the first Flood Insurance Rate Maps were available and floodplain management regulations were in effect. This suggests that there is potential for additional loss due to flooding in the future. SFHA development regulations relate to the base flood elevation, which is the estimated level of flooding that has a 1-percent chance of being equaled or exceeded in any

given year. Because the SFHA or floodplain development regulations specify that residential structures must be elevated to or above the base flood elevation and commercial structures must either be elevated or flood-proofed to or above this level, the degree to which future structures are exposed to flood damages should be minimal. However, calculations of base flood elevations are based on models that rely upon data about previous flood events; should future floods be greater than those experienced in the past, the base flood elevation may not provide enough protection.

In addition, remote and sparsely populated municipalities also face higher vulnerability to certain hazards because they may not have as easy access to care facilities or response personnel. For instance, the less populated municipalities such as Bear Creek Village Borough, New Columbus Borough, and Penn Lake Park Borough face increased vulnerability to winter storms due to isolation, access issues, and longer emergency response times.

Based on the 2019-2023 ACS 5-Year Estimates, roughly 20% of Luzerne County's population is over the age of 65. Older residents pose unique challenges when it comes to evacuation and/or mobility during the rescue and recovery processes that typically occur in the case of a hazard event. Officials may consider partnering with human services organizations to specifically plan for this vulnerable population.

The aging housing stock in Luzerne County is another source of current and future vulnerability in many hazard events. As discussed in Section 4.3.13.5, 31.61% of homes in the County were built before 1940. Luzerne County can experience gusts of wind up to 200 miles per hour during windstorms, tornadoes, hurricane, tropical storms, or nor'easters. The structure of these older houses may be more at risk of destruction under these strong wind conditions. These structures may also be at risk during flooding and winter storm events if the materials are either not strong enough to withstand the pressure or weight of the precipitation or are liable to leak, causing further risk of destruction to the house. More than 50% of the housing units in Freeland Borough, Pringle Borough, Sugar Notch Borough, and West Pittston Borough were built before 1940, making these boroughs potentially more vulnerable to windstorms, tornadoes, hurricanes, tropical storms, nor'easters, winter storms, and flooding. Nineteen municipalities in the county have over 40% of housing units built before 1940.

In 2021, Luzerne County adopted a bi-county Regional Plan as the Comprehensive Plan and Long-Range Transportation Plan for the MPO titled *Lackawanna-Luzerne Counties Joint Comprehensive Plan and Long-Range Transportation Plan: Preserving Our Cities, Preserving Our Lands*. The Long-Range Transportation Plan is currently under development and will be adopted in Winter 2026. The 2021 Regional Plan is the current Comprehensive Plan for Luzerne County, and is the policy basis for zoning decisions and other land development policies in the County. Collaboration, preservation, urban revitalization, and growth management are listed as integral parts to the Regional Plan. The Land Use Plan identifies urban centers, primary growth areas (PGAs), secondary growth areas (SGAs), preservation areas, and rural living areas (RLAs) for future County development. Concentrating growth in urban centers and PGAs may help to

reduce isolation-based vulnerability of communities with few access routes, no municipal water supply, and low cell phone reception. On the other hand, higher densities mean that more people are likely to be impacted in a hazard event should it strike those more populated areas.

In 2010, Luzerne County adopted a Stormwater Management Plan and Ordinance, titled the *Luzerne County Stormwater Management Ordinance*. This ordinance states that no regulated activities can begin until a Storm Water Management Plan is written for and approved by the municipality. This ordinance regulates all activities that may affect stormwater runoff, including land development and earth disturbance activity. The purpose of this ordinance is to promote health, safety, and welfare within the municipality and its watershed. Provisions of this ordinance include meeting legal water quality requirements, preserving natural drainage systems, managing stormwater runoff close to the source, maintaining groundwater recharge, and preventing scour and erosion of stream banks and streambeds.

4.4.5. COMMUNITY SURVEY

A community-wide survey was conducted to help understand the on-the-ground conditions and concerns of Luzerne County residents, therefore supporting the assessment of hazard risk and mitigation opportunities in the County. The survey asked respondents two types of questions: mitigation activities completed within the household and hazard concerns. Over 70 county residents took the survey with the largest cohort of respondents coming from those who live within Kingston Township.

Currently, 93% of respondents are homeowners and all have homeowner's insurance. Almost all renters have rental insurance. However, when it comes to ensuring homes against any type of flooding, only 8% of individuals who responded to the survey have flood insurance, despite Luzerne County lying within the Susquehanna River Basin, one of the most flood-prone river basins in the nation. Other household preparedness and mitigation efforts included discussing what to do in the case of an emergency (45%) and preparing a family emergency plan (21%). However, a quarter of respondents reported that they have done nothing to prepare for a potential hazard. This provides a good opportunity for public education training related to risk, mitigation, and preparedness with more than two-thirds of residents reporting they have some level of interest in attending a municipally led hazard mitigation-related event.

Respondents were asked about how informed they are when it comes to the most pressing hazards within Luzerne County, and about half (47%) they are somewhat informed. Many (26%) stated that there is probably a lot they are not aware of, while 19% viewed themselves as very informed. The top reported hazards of concern included winter storms (63%), tornado and windstorm (60%), flooding (59%), hurricanes and tropical storms (54%) and pandemic and infectious disease (54%). For information on preparedness and potential hazard risk, email (newsletter or new blasts) and social media are the most desired.

5. CAPABILITY ASSESSMENT

5.1. UPDATE PROCESS SUMMARY

The purpose of the Capability Assessment is to identify strengths and weaknesses that will affect the ability of the County and participating jurisdictions to implement mitigation actions. It is important to perform a mitigation capability assessment in order to develop a comprehensive and implementable mitigation strategy. Capabilities include a variety of regulations, existing planning mechanisms, and administrative capabilities provided through established agencies or authorities.

The Capability Assessment comprises several main components:

1. Document Review - an inventory of the County's existing planning and regulatory tools and a review and incorporation of existing plans and other technical information as appropriate;
2. Participation in the National Flood Insurance Program; and
3. Municipal Capability Assessment - an analysis of municipal capacity from a planning, policy, staffing, training, outreach, and political standpoint.

Based on these components as well as the vulnerability analysis identified earlier in the plan, Luzerne County can assess its current resources and begin to address the legal, regulatory, administrative, financial, and other capabilities which it currently has at its disposal to address the potential hazards which make the County and its local municipalities vulnerable.

Luzerne 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, financial capabilities, and participation in local, regional, state, and federal programs. The presence of these resources enables community resiliency through actions taken before, during, and after a hazard event. The most important resources which provide the basis for addressing hazard potential and mitigation are the emergency services manpower, equipment, and fiscal resources available within Luzerne County communities.

In 2020, the County, municipalities, and stakeholders, identified the suite of resources available in the County to support hazard mitigation, including regulatory, planning, and administrative resources. It also indicated the presence of local plans, ordinances, and codes in applicable municipalities. Finally, the 2020 Capability Assessment specified the County's staffing and training capabilities. For the 2025 plan, the HMPT updated the 2020 Capability Assessment by distributing a *Capability Assessment Survey* to all 76 municipalities and summarizing responses. In addition, the HMPT provided additional input into the 2025 Capability Assessment through feedback at meetings. An analysis of how municipalities have implemented the NFIP in their communities is also provided.

The 2025 Capability Assessment provides an updated inventory of the most critical local planning and regulatory tools available within each municipality, a summary of the fiscal and technical capabilities available through programs and organizations outside of the County and provides an opportunity to discuss any plan integration opportunities with the hazard mitigation plan. It also identifies emergency management capabilities, and the processes used for implementation of the National Flood Insurance Program.

While the capability assessment serves as a good instrument for identifying local capabilities, 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.

Additionally, a number of documents have been reviewed as part of this Plan Update. While some reviews have been derived from past plan updates and revised where applicable, additional documents have been identified and reviewed for purposes of integration into other local planning mechanisms. Several plans and ordinances at the county and municipal level have been reviewed and a summary with options to integrate the data, information, and hazard mitigation goals and actions into other planning mechanisms are included.

The Mitigation Strategy, including the goals and actions, is incorporated into relevant planning mechanisms based on their pertinence and relevance to specific plans and ordinances. For example, all structural projects should be included in the Capital Improvements Program. Land use and zoning related projects should be incorporated into the next update of the Community's Comprehensive Plan and Zoning Ordinance through collaboration with the Planning and Zoning departments. Likewise, information from relevant planning documents was used to inform and update the Hazard Mitigation Plan. A general list of relevant plans and documents and corresponding areas for incorporation are listed below:

Table 5.1-1 Relevant Departments and Documents

RELEVANT DOCUMENTS	HAZARD MITIGATION PLANNING ELEMENTS
Community Recovery Plans, Comprehensive Plan/Land Use Plan, Zoning/Subdivision Regulations, Floodplain Ordinance	Demographic data, land use, development trends, and floodplain management information
Stormwater Management (SWM) Plan, Sediment and Erosion Control Plan, Culvert and Bridge Maintenance Plans, Long-Range Transportation Plan.	Stormwater management and infrastructure data and projects
Congestion Management Process Plan, Evacuation Plan, Coordinated Public Transit-Human Services Transportation Plan, Emergency Operations/Response Plan, Wyoming Valley Flood Risk Management Project Response Plan	All-hazards information for evacuation, response and recovery

Table 5.1-1 Relevant Departments and Documents

RELEVANT DOCUMENTS	HAZARD MITIGATION PLANNING ELEMENTS
Climate Change Plan, Dam Safety Regulations, Wetland Regulations	Risk and vulnerability data, and storm/floodwater management
2020 Luzerne County Hazard Mitigation Plan, Open Space Plan	Mitigation progress and solutions
Wyoming Valley Flood Risk Management O&M Manuals	Flood control infrastructure maintenance
Public Engagement Plan, Limited-English Proficiency Plan	Demographic data and community engagement information

5.2. CAPABILITY ASSESSMENT FINDINGS

Luzerne County and participating jurisdictions have several plans, tools, and resources in place to support the goals of hazard mitigation planning.

5.2.1. PLANNING AND REGULATORY CAPABILITY

The purpose of a plan/ordinance review as part of this planning process is trifold:

- To identify existing Commonwealth, Regional/County, and Municipal initiatives;
- To provide an inventory and review of sample plans and ordinances and identify sections in these documents that address hazard mitigation-related issues; and
- To provide a platform to integrate plans and other documents so recommendations and strategies are not in contradiction with one another (e.g., between the hazard mitigation plan and comprehensive plan).

A review of updated and existing zoning and subdivision ordinances, comprehensive plans, open space and recreation plans, stormwater management plans, sediment and erosion control plans, and emergency operations plans, among others, are summarized below by level of administration (Commonwealth, Regional/County, and Municipal).

Commonwealth of Pennsylvania Document Review

- The 2023 Update of the **Pennsylvania State All-Hazard Mitigation Plan** contains goals and objectives that are applicable to this Luzerne County Plan Update, including:
    - Protect lives, property, environmental quality, and resources of the Commonwealth, including those at high risk to hazards;
    - Enhance consistent coordination, collaboration, and communications among stakeholders;
    - Provide a framework for active hazard mitigation planning and implementation; and
    - Increase awareness, understanding, and preparedness across all sectors.

  Hazard identification and risk assessment data for Luzerne County has been incorporated into the appropriate sections of this Plan update from the 2023 State All-Hazard Mitigation Plan (PEMA, 2023).

- The Uniform Construction Code (UCC) is the statewide building code (Act 45 of 1999) that took effect in Pennsylvania in April of 2004. The UCC is mandated by the State for all municipalities in Pennsylvania and establishes minimum regulations for most new construction, including additions and renovations to existing structures. All new construction is required to meet the UCC requirements statewide. On October 26, 2022, the Commonwealth Court issued an opinion that ceased enforcement of 2021 accessibility standards, meaning all structures must comply with the 2018 accessibility requirements (Department of Labor & Industry, n.d.). All 76 municipalities in Luzerne County either enforce the 2018 building codes or are covered under a higher level of governance. Residential construction in Luzerne County has also adopted the International Residential Code (IRC), which was most recently updated in 2021. The IRC regulates the construction, alteration, movement, enlargement, replacement, repair, renovation, and demolition of one- or two-family dwellings and townhouses not more than three stories above grade in height. Building codes relate to hazard mitigation through requirements about building materials and methods that have been professionally evaluated for quality and safety, as well as inspection requirements. Municipalities have the option to adopt more stringent requirements that enhance resistant or resilience building design practices.
- The **Commonwealth of Pennsylvania Governor's Executive Order 1999-1 (Land Use Planning)** provides the basis for the requirement to integrate hazard mitigation into comprehensive land use planning. As part of this executive order, the Interagency Land Use Team was established, comprising the following state agencies: Department of Agriculture; Department of Community and Economic Development; Department of Conservation and Natural Resources; Department of Environmental Protection; Governor's Green Government Council; Fish and Boat Commission; Game Commission; Department of Transportation; and the Pennsylvania Emergency Management Agency (Pennsylvania Executive Office, 1999). One of the most significant outcomes of PEMA's participation on the team is the integration of hazard mitigation goals and objectives into the comprehensive land use planning process.
- The **Pennsylvania Erosion and Sediment Control Code** requires all earthmoving projects in the Commonwealth to develop an erosion and sediment pollution control plan to ensure that proper site development practices are employed for land development and implement best management practices for the control of sediment pollution during construction. Pennsylvania DEP requires a National Pollution Discharge Elimination System (NPDES) permit for earthmoving activities exceeding one acre. As well as erosion and sediment pollution control during construction, the permit also addresses post-construction stormwater management (PA DEP, 1972).
- **Act 165: Hazardous Materials Emergency Planning and Response Act**, amended in 2001, established a Statewide hazardous materials safety program. This created the Hazardous Materials Response Fund, county Hazardous Material Emergency Response Accounts, and further provided duties to PEMA and the Pennsylvania Emergency Management Council. This Act requires facilities with extremely hazardous chemicals on

hand to create Off-site Emergency Response Plans, which are then presented to Local Emergency Planning Committees (LCEMA, 2001).

Regional/County Document Review

- The **Lackawanna-Luzerne Joint Comprehensive Plan and Long-Range Transportation Plan** was updated and adopted by Luzerne County in April 2021. A comprehensive plan is a policy document identifying community goals and objectives for future growth and development. In Luzerne County, this is the policy basis for zoning decisions and other land development policies countywide. Long-Range Transportation Plans are used to guide a region's planning for a 20-year horizon. Lackawanna and Luzerne Counties formed the Lackawanna-Luzerne Transportation Study Metropolitan Planning Organization (LLTS) to work on joint planning efforts, as they exist in a highly integrated region. This plan is updated every five years; the next update is underway, with expected adoption in Winter 2026 (LLTS, 2021).
- The **Congestion Management Process (CMP) Plan** was adopted by LLTS in April 2024. This plan provides a framework to evaluate and monitor traffic congestion within the region. It also assists the LLTS in the identification and prioritization of transportation strategies that focus on congestion and travel reliability. A CMP is required in metropolitan areas with a population exceeding 200,000. This report will be updated every four years to coordinate and support the MPO's Long Range Transportation Plan, Transportation Improvement Program and Regional Operations Plan. It is supported by a public survey, GIS mapping files, electronic databases and other coordination and outreach with key partners and stakeholders within the region. (LLTS, 2024a).
- The **Coordinated Public Transit-Human Services Transportation Plan** was updated and adopted by the Lackawanna-Luzerne Transportation Study Metropolitan Planning Organization in April 2024. The Plan explores ways to improve access to human service providers by means of transit and helps projects by area agencies and stakeholders to remain eligible for grant monies that enhance mobility for seniors and individuals with disabilities (LLTS, 2024b).
- **The Open Space, Greenways, and Outdoor Recreation Master Plan for Lackawanna and Luzerne Counties** provides recommendations for achieving a balance between natural resources and the built environment in the bi-county region. This plan looks at land resources and identifies areas offering opportunities for preserving and protecting natural resources (Lackawanna and Luzerne Counties, 2004).
- After FEMA provides a municipality with regulatory flood hazard information, they are required to adopt a **floodplain ordinance** that meets or exceeds the minimum NFIP requirements to participate in the NFIP. The purpose of these overriding regulations is to ensure that participating communities take flood hazard data into account when acting on land management and use. Floodplain ordinances in Luzerne County are included in individual municipalities' zoning ordinances. The required free board is 1.5 feet above base flood elevation, and no building permits are issued for structures in the floodway. Elevation certificates are required by all municipalities for structures in the

floodplain. More on floodplain ordinances administration can be found below in *Section 5.2.1.3*.

- **Zoning and Subdivision regulations** are administered similarly through the **Zoning Ordinance and the Subdivision and Land Development Ordinance (SALDO) of Luzerne County (LCDPZ, 2012).** Communities can elect to opt-in and have the County administer their zoning and subdivision regulations or opt out and develop their own zoning and subdivision ordinances. While the County has no control over the municipalities that have their own zoning ordinances, these municipalities still must meet the Act 247 guidelines – State Municipal Planning Code. The Luzerne County Office of Planning and Zoning oversees the administration of zoning matters for 20 of the County's municipalities and subdivision and land development regulations for 28 of the County's municipalities under the Luzerne County Zoning Ordinance (LCDPZ, 2021). There is some overlap between these two designations. Table 5.2-1 lists these municipalities. In 2023, Luzerne County developed a map of zoning designations for municipalities that are regulated by the county ordinance. The 2023 Zoning Map corresponds to the Luzerne County Zoning Ordinance and Schedule of Fees currently in effect since March 24, 2021 (LCDPZ, 2023).
- **The Luzerne County Act 167 General Stormwater Management Ordinance** is included as an appendix to the County SALDO. The County Stormwater Management Ordinance applies to those municipalities within the County in which subdivision and land development and zoning reviews are administered by the County. All regulated activities must adhere to requirements in the stormwater management ordinance. Watersheds in the county with detailed analyses conducted under past Act 167 Plans have specific regulations for stormwater management. All municipalities are required to adopt the model ordinance or amend existing ordinances to be consistent with the standards and criteria set forth in the Plan. If municipalities do not have the capabilities to review plans for consistency with the standards and criteria set forth in the Plan, they will be responsible to designate a representative organization that can complete the review on the municipalities' behalf (LCDPZ, 2010).

Table 5.2-1 Municipalities under Luzerne County Zoning and Subdivision/Land Use Jurisdiction

ZONING JURISDICTION	SUBDIVISION JURISDICTION
Avoca Borough	Avoca Borough
Conyngham Township	Conyngham Township
Courtdale Borough	Courtdale Borough
Dupont Borough	Dallas Borough
Duryea Borough	Dupont Borough
Fairmount Township	Duryea Borough
Hughestown Borough	Exeter Township
Hunlock Township	Fairmount Township
Huntington Township	Hughestown Borough
Jeddo Borough	Hunlock Township

Table 5.2-1 Municipalities under Luzerne County Zoning and Subdivision/Land Use Jurisdiction

ZONING JURISDICTION	SUBDIVISION JURISDICTION
Laflin Borough	Huntington Township
Lake Township	Jeddo Borough
New Columbus Borough	Laflin Borough
Newport Township	Lake Township
Pringle Borough	Luzerne Borough
Ross Township	New Columbus Borough
Union Township	Newport Township
Warrior Run Borough	Plymouth Borough
West Wyoming Borough	Plymouth Township
Yatesville Borough	Pringle Borough
	Ross Township
	Shickshinny Borough
	Union Township
	Warrior Run Borough
	West Pittston Borough
	West Wyoming Borough
	Wyoming Borough
	Yatesville Borough

- **Sediment and Erosion Control Regulations** is administered by the Luzerne County Conservation District. For those municipalities that have their own subdivision ordinance regulations, the stormwater regulations are included in the subdivision ordinance. The level of enforcement of these regulations varies by municipality and is based on staff availability and technical capability. If a project requires a sediment and erosion control permit, a plan is required to be submitted (PA DEP, 1972).
- The **Luzerne County Emergency Operations Plan** was completed and approved in May 2018. The Luzerne County Emergency Management Agency encourages Emergency Operation Plans be created for daycares, hospitals, municipalities, schools, and senior care facilities. Resources are available to guide individuals in plan writing. Luzerne County operates a separate 911 Center and an Emergency Operations Center (EOC). The 911 Center and the EOC have listings of resources available from County assets as well as resources available from the municipalities via mutual aid agreements for reciprocal emergency assistance as needed. The Emergency Operations Plan (EOP) mentions the most likely and damaging hazards for the County to be flooding, winter storms, and drought. **Emergency Action Plans** have been prepared for high hazard dams located in Luzerne County as well as those for which the inundation area includes part of Luzerne County. Each Emergency Action Plan addresses ways to safeguard lives and reduce property damage within the inundation area; procedures for effective dam surveillance; procedures for prompt notification of emergency management officials;

warning and evacuation procedures; and emergency response actions that will be taken in the event of potential or imminent failure of the dam. Plans are typically prepared by dam owners and are reviewed by Luzerne County officials. Plans are not available to the public due to sensitive information.

- The **Luzerne County EMS System Response Plan** was approved by the Pennsylvania Department of Health in cooperation with Emergency Medical Services of Northeastern Pennsylvania in August of 2016. The goal of the countywide response plan is to expedite responses by eliminating the delay of any agency that has low staffing and who will not be able to crew when being requested by the center for response to a 9-1-1 initiated call received through the Luzerne County Communications Center (LCEMA, 2016).
- **The Susquehanna Steam Electric Station: Emergency Action Plan**, approved 2018, is the current emergency action plan for the Susquehanna Steam Electric Station. This EAP includes definitions of possible emergencies, existing organizational control, and scope of the facility. The plan also includes measures and actions for potential emergencies. There is a section dedicated to emergency preparedness at and around the nuclear facility (SSES, 2018).
- A total of 64 shelters exist within the county that are designated and maintained by the Red Cross. The shelters are widely dispersed throughout the county. All shelters follow the Red Cross guidelines for shelters and shelter management.
- Following Tropical Storm Lee in September 2011, the Boroughs of Duryea and West Pittston and the Townships of Conyngham, Jenkins, and Plains agreed that cooperation was needed to address repetitive flooding. FEMA provided the Wyoming Valley Steering Committee with Long-Term Community Recovery (LTCR) and targeted technical assistance including training, information, and advice regarding recovery planning, facilitation support, and partnership development. The steering committee identified regional recovery projects including cross-municipality cooperation, flood mitigation education, options for acquired property, and business continuity planning which would raise awareness such as employee preparedness and flood insurance. These projects are outlined in the **Wyoming Valley Report**, produced in April 2012.

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- A total of 21 projects were identified as part of the **West Pittston – Long Term Community Recovery Plan June 2012** with the vision of a clean, safe, and progressive community rooted in family values and historic tradition. Each project identified a champion to iron out the project's details, find the funds or necessary resources, attract volunteers and help bring the project to fruition. Some projects needed a great deal of volunteer time while others required millions of dollars in funding and partnerships of Federal, State, County, and local authorities. A wide variety of post-flood solutions for the Borough were discussed and each project included a detailed write-up. In March 2023, the Borough was awarded a grant of $2 million through the American Rescue Plan Act (ARPA) for these projects. Work is expected to begin in 2025 (LCC, 2024).

- The City of Wilkes-Barre Emergency Operations Plan (EOP) was most recently updated in January 2025.
- The West Pittston Borough Emergency Plan was adopted in 2018 in and includes information on evacuations during flooding and other emergencies.
- The **Hanover Area School District All-Hazards Plan** was developed to identify vulnerabilities and mitigation actions along with cataloguing preparedness capabilities and recovery procedures. The document was developed via input from both the school district and community representatives, including the district safety committee. It identifies the ways the district currently operates that help it address hazard events, including mutual aid agreements, existing trainings, and emergency toolkits and checklists. It also includes ways the district can increase mitigation capabilities, which have been integrated into the Mitigation Action Plan for this plan.

5.2.1.2. Community Political Capability

Luzerne County's system of government was comprised of three county commissioners and eleven elected row officers and was established by state law in the County Code, implemented in 1955. Many provisions of the County Code were identical to, or derived from, laws, rules, and procedures which were first adopted by the Pennsylvania Legislature in the 1800s. The provisions of this County Code applied to all similar-sized counties without regard to a county's unique history, geography, demography, political climate, or economic makeup. Over time, as the roles and responsibilities of county government have expanded in scope, expense, and complexity, the County Code has remained largely unchanged. It was thus concluded that Luzerne County's antiquated governmental system was a substantial cause of the problems faced by the county and its residents and that the reforms contained in the Recommended Home Rule Charter would significantly strengthen and improve the professionalism, accountability, efficiency, and integrity of Luzerne County government.

While the original government system involved the unification of county political authority and day-to-day operational control in the county commissioners, it was believed that it was imperative, to the degree possible, to separate politics from the day-to-day decision making of Luzerne County government. The Recommended Home Rule Charter vests the executive power and day-to-day decision-making authority for Luzerne County in an appointed professional county manager. Political authority is vested in an eleven member, part-time, county council, which is the county's legislative and policymaking body. Council members are prohibited by the charter from interfering in day-to-day decision making of the professional managers and staff. This structure is designed to insulate county operations from corrosive political concerns.

The first elections called for under the charter occurred in 2011, and the strengthened government system took effect in Luzerne County on January 2, 2012. After the 2016 election year, the Home Rule Charter was amended to lift a ban requiring county board/authority/commission members to wait one year after leaving their seats to run for county offices, require a majority of council votes to amend the county budget in the years following

council elections, and allow employees of companies with county contracts to serve on authorities at the council's discretion.

5.2.1.3. Participation in the National Flood Insurance Program

The Pennsylvania Floodplain Management Act (Act 166 of 1978) requires every municipality with flood hazard areas identified by the Federal Emergency Management Agency (FEMA) to participate in the NFIP and permits all municipalities to adopt floodplain management regulations. It is in the interest of all property owners in the floodplain to keep development and land usage within the scope of the floodplain regulations for their community. This helps keep insurance rates low and makes sure that the risk of flood damage is not increased by property development.

Of the municipalities in Luzerne County, 75 of 76 participate in the NFIP. Table 5.2-2 shows whether the municipality is participating in NFIP, the date of their current Flood Insurance Rate Map (FIRM), the number of policies they have, their total coverage, and whether the municipality is in good standing. Slocum Township has never participated in the NFIP, and flood studies have never identified a flood hazard area in Slocum Township.

Table 5.2-2 NFIP Participation in Luzerne County (FEMA, 2025).

MUNICIPALITY	FIRM DATE	NUMBER OF POLICIES	TOTAL COVERAGE	IS THE COMMUNITY IN GOOD STANDING?
Ashley Borough	06/20/2024	20	$2,836,000	Yes
Avoca Borough	11/02/2012	12	$1,722,000	Yes
Bear Creek Township	06/20/2024	3	$1,083,000	Yes
Bear Creek Village Borough	11/02/2012	2	$475,000	Yes
Black Creek Township	11/02/2012	7	$502,000	Yes
Buck Township	11/02/2012	2	$191,000	Yes
Butler Township	11/02/2012	39	$7,738,000	Yes
Conyngham Borough	11/02/2012	2	$700,000	Yes
Conyngham Township	06/20/2024	18	$2,215,000	Yes
Courtdale Borough	06/20/2024	1	$652,000	Yes
Dallas Borough	11/02/2012	8	$4,555,000	Yes
Dallas Township	11/02/2012	11	$3,408,000	Yes
Dennison Township	11/02/2012	7	$1,468,000	Yes
Dorrance Township	11/02/2012	4	$1,014,000	Yes
Dupont Borough	11/02/2012	14	$2,296,000	Yes
Duryea Borough	06/20/2024	44	$13,814,000	Yes
Edwardsville Borough	06/20/2024	164	$43,122,000	Yes
Exeter Borough	06/20/2024	185	$34,064,000	Yes
Exeter Township	06/20/2024	19	$4,091,000	Yes
Fairmount Township	11/02/2012	3	$694,000	Yes
Fairview Township	06/20/2024	9	$2,957,000	Yes

Table 5.2-2 NFIP Participation in Luzerne County (FEMA, 2025).

MUNICIPALITY	FIRM DATE	NUMBER OF POLICIES	TOTAL COVERAGE	IS THE COMMUNITY IN GOOD STANDING?
Forty Fort Borough	06/20/2024	495	$146,394,000	Yes
Foster Township	11/02/2012	8	$1,981,000	Yes
Franklin Township	11/02/2012	0	$0	Yes
Freeland Borough	11/02/2012	0	$0	Yes
Hanover Township	06/20/2024	336	$88,627,000	Yes
Harveys Lake Borough	11/02/2012	18	$5,355,000	Yes
Hazle Township	11/02/2012	20	$8,487,000	Yes
City of Hazleton	11/02/2012	1	$350,000	Yes
Hollenback Township	06/20/2024	0	$0	Yes
Hughestown Borough	11/02/2012	0	$0	Yes
Hunlock Township	06/20/2024	27	$4,084,000	Yes
Huntington Township	11/02/2012	6	$1,281,000	Yes
Jackson Township	06/20/2024	7	$1,888,000	Yes
Jeddo Borough	11/02/2012	0	$0	Yes
Jenkins Township	06/20/2024	26	$7,638,000	Yes
Kingston Borough	06/20/2024	1,233	$372,832,000	Yes
Kingston Township	06/20/2024	25	$6,089,000	Yes
Laflin Borough	06/20/2024	4	$872,000	Yes
Lake Township	11/02/2012	2	$511,000	Yes
Larksville Borough	06/20/2024	6	$1,217,000	Yes
Laurel Run Borough	06/20/2024	0	$0	Yes
Lehman Township	11/02/2012	0	$0	Yes
Luzerne Borough	06/20/2024	21	$4,216,000	Yes
City of Nanticoke	06/20/2024	7	$2,151,000	Yes
Nescopeck Borough	06/20/2024	6	$1,715,000	Yes
Nescopeck Township	06/20/2024	7	$714,000	Yes
New Columbus Borough	11/02/2012	0	$0	Yes
Newport Township	06/20/2024	1	$150,000	Yes
Nuangola Borough	11/02/2012	2	$525,000	Yes
Penn Lake Park Borough	11/02/2012	10	$2,680,000	Yes
City of Pittston	06/20/2024	3	$1,131,000	Yes
Pittston Township	06/20/2024	7	$1,622,000	Yes
Plains Township	06/20/2024	39	$13,421,000	Yes
Plymouth Borough	06/20/2024	104	$29,740,000	Yes
Plymouth Township	06/20/2024	17	$3,282,000	Yes
Pringle Borough	06/20/2024	6	$1,225,000	Yes
Rice Township	11/02/2012	6	$2,113,000	Yes
Ross Township	11/02/2012	3	$618,000	Yes
Salem Township	06/20/2024	11	$1,509,000	Yes

Table 5.2-2 NFIP Participation in Luzerne County (FEMA, 2025).

MUNICIPALITY	FIRM DATE	NUMBER OF POLICIES	TOTAL COVERAGE	IS THE COMMUNITY IN GOOD STANDING?
Shickshinny Borough	06/20/2024	28	$4,985,000	Yes
Slocum Township	11/02/2012			
Sugarloaf Township	11/02/2012	4	$1,418,000	Yes
Sugar Notch Borough	06/20/2024	0	$0	Yes
Swoyersville Borough	06/20/2024	321	$87,146,000	Yes
Union Township	06/20/2024	4	$1,041,000	Yes
Warrior Run Borough	06/20/2024	0	$0	Yes
West Hazleton Borough	11/02/2012	0	$0	Yes
West Pittston Borough	06/20/2024	287	$80,147,000	Yes
West Wyoming Borough	06/20/2024	52	$12,079,000	Yes
White Haven Borough	11/02/2012	1	$269,000	Yes
City of Wilkes-Barre	06/20/2024	877	$235,666,000	Yes
Wilkes-Barre Township	06/20/2024	6	$2,782,000	Yes
Wright Township	11/02/2012	15	$4,389,000	Yes
Wyoming Borough	06/20/2024	36	$13,588,000	Yes
Yatesville Borough	11/02/2012	0	$0	Yes
Total		4,669	$1,287,525,000	

Table 5.2-3 shows the change in the number of NFI policies in force for each participating municipality since 2020. Nine municipalities saw the number of policies increase in the last five years, with Exeter Borough experiencing the largest increase (127 policies). There were 47 municipalities that saw a decline in the number of policies, with Kingston Township experiencing the largest decrease (529). The county as a whole experienced a decrease of 1,261 policies. Reliable data for the total coverage in each municipality from 2020 was unavailable, therefore a comparison could not be made. It is unclear if the total coverage has decreased or increased in any of the municipalities. The cause(s) of municipalities and the county experiencing a decline in policies is not known at this time.

Table 5.2-3 Change in Number of NFIP Polices (FEMA, 2025).

MUNICIPALITY	CHANGE IN POLICIES IN FORCE (2020-2025)
Ashley Borough	0
Avoca Borough	-6
Bear Creek Township	-1
Bear Creek Village Borough	-1
Black Creek Township	-1
Buck Township	1
Butler Township	-4

Table 5.2-3 Change in Number of NFIP Polices (FEMA, 2025).

MUNICIPALITY	CHANGE IN POLICIES IN FORCE (2020-2025)
Conyngham Borough	0
Conyngham Township	0
Courtdale Borough	-1
Dallas Borough	-3
Dallas Township	4
Dennison Township	-2
Dorrance Township	0
Dupont Borough	-3
Duryea Borough	-26
Edwardsville Borough	-55
Exeter Borough	127
Exeter Township	-3
Fairmount Township	-4
Fairview Township	1
Forty Fort Borough	-143
Foster Township	-1
Franklin Township	N/A
Freeland Borough	N/A
Hanover Township	-71
Harveys Lake Borough	1
Hazle Township	2
City of Hazleton	-2
Hollenback Township	-1
Hughestown Borough	N/A
Hunlock Township	-2
Huntington Township	-1
Jackson Township	1
Jeddo Borough	N/A
Jenkins Township	N/A
Kingston Borough	0
Kingston Township	-529
Laflin Borough	-6
Lake Township	-1
Larksville Borough	-1
Laurel Run Borough	N/A
Lehman Township	-1
Luzerne Borough	-6
City of Nanticoke	0
Nescopeck Borough	1

Table 5.2-3 Change in Number of NFIP Polices (FEMA, 2025).

MUNICIPALITY	CHANGE IN POLICIES IN FORCE (2020-2025)
Nescopeck Township	-1
New Columbus Borough	-1
Newport Township	0
Nuangola Borough	0
Penn Lake Park Borough	3
City of Pittston	-2
Pittston Township	-3
Plains Township	-12
Plymouth Borough	-44
Plymouth Township	-5
Pringle Borough	-4
Rice Township	-1
Ross Township	-1
Salem Township	-9
Shickshinny Borough	-10
Slocum Township	
Sugarloaf Township	-2
Sugar Notch Borough	N/A
Swoyersville Borough	-118
Union Township	-2
Warrior Run Borough	N/A
West Hazleton Borough	-1
West Pittston Borough	-18
West Wyoming Borough	13
White Haven Borough	0
City of Wilkes-Barre	-296
Wilkes-Barre Township	-1
Wright Township	-7
Wyoming Borough	0
Yatesville Borough	N/A
Total	-1261

For a community to participate in the NFIP, it must adopt and enforce floodplain management regulations that meet or exceed the minimum NFIP standards and requirements. These standards are intended to prevent loss of life and property, as well as economic and social hardships that result from flooding. Once FEMA provides communities with flood hazard information upon which floodplain management regulations are based, the community is

required to adopt a floodplain ordinance that meets or exceeds the minimum NFIP requirements. All NFIP participating communities in Luzerne County have either adopted a stand-alone ordinance or have arranged for County administration of floodplain regulations in 2012 or after an updated FIRM went effective for the County in 2024.

Table 5.2-3 below presents the designated individual or agency responsible for implementing the requirements of the NFIP for each participating municipality.

Table 5.2-4 Floodplain Administrators by Municipality (PA DCED, 2025).

MUNICIPALITY	INDIVIDUAL OR AGENCY
Ashley Borough	Jack Varaly
Avoca Borough	Paul Pasonick - Penn Eastern Engineering
Bear Creek Township	Pennoni Associates
Bear Creek Village Borough	Mike Harostock
Black Creek Township	Brad Kowalski
Buck Township	Buck Township
Butler Township	Ralph Kelchner
Conyngham Borough	RJD Engineering
Conyngham Township	Jason Humenanski
Courtdale Borough	Carl Hodorowski
Dallas Borough	Barry Isett & Associates
Dallas Township	Russell Coolbaugh
Dennison Township	John Varaly
Dorrance Township	Barry Isett & Associates
Dupont Borough	Stanley Knick
Duryea Borough	Carolyn Santee
Edwardsville Borough	David Saraka
Exeter Borough	Amy Huntington
Exeter Township	Daniel Fetch, Jr.
Fairmount Township	Lyle K. Harvey
Fairview Township	Greg Kurtz
Forty Fort Borough	Thomas Craig
Foster Township	Brian Maso
Franklin Township	Barry Isett & Associates
Freeland Borough	Heather Donish
Hanover Township	David M.Lewis
Harveys Lake Borough	BHW
Hazle Township	Scott Kostician
City of Hazleton	Gregg Pavlick
Hollenback Township	Gary Moyer, Jr
Hughestown Borough	Angela Acierno
Hunlock Township	Kimberly Piestrak
Huntington Township	Karen Hilley

Table 5.2-4 Floodplain Administrators by Municipality (PA DCED, 2025).

MUNICIPALITY	INDIVIDUAL OR AGENCY
Jackson Township	Joseph Stager
Jeddo Borough	John Loforte
Jenkins Township	Jason Humanenski
Kingston Borough	N/A
Kingston Township	William Eck
Laflin Borough	Marc Malvizzi
Lake Township	Gerald J Price
Larksville Borough	Larksville Borough
Laurel Run Borough	Carl Alber
Lehman Township	Douglas Ide
Luzerne Borough	Tim Connolly
City of Nanticoke	Pennoni & Associates Inc.
Nescopeck Borough	Larry Frace
Nescopeck Township	Larry Frace
New Columbus Borough	Debbie Fink
Newport Township	Joseph Hillan
Nuangola Borough	Henry Mliczynski
Penn Lake Park Borough	Paul Rogan
City of Pittston	David Hines
Pittston Township	Richard Nesgoda
Plains Township	Karen Rubasky
Plymouth Borough	Jason Humenanski
Plymouth Township	Barry Isett & Associates
Pringle Borough	Karen Butler
Rice Township	Regional Municipal Services, Llc
Ross Township	Miralie Cappucci
Salem Township	Barry Isett & Associates
Shickshinny Borough	Larry C. Frace
Slocum Township	
Sugarloaf Township	Gloria Kijek
Sugar Notch Borough	Wendy Hildebrand
Swoyersville Borough	Raymond Mackiewicz
Union Township	Lori Ann Ragazzo
Warrior Run Borough	John Quinn
West Hazleton Borough	Alfred Benesch & Company
West Pittston Borough	Barry Isett & Associates
West Wyoming Borough	Mike Amato
White Haven Borough	Linda Szoke
City of Wilkes-Barre	Bill Harris
Wilkes-Barre Township	Thomas Zedolik
Wright Township	Tim Dow

Table 5.2-4 Floodplain Administrators by Municipality (PA DCED, 2025).

MUNICIPALITY	INDIVIDUAL OR AGENCY
Wyoming Borough	Robert Borzell
Yatesville Borough	Joseph Zambetti

The following information is summarized to document how the County currently assists municipalities in addressing NFIP compliance and requirements:

- The County makes FIRMs and FIS Reports available to the public for review at the offices of the Luzerne County Flood Protection Authority. The Authority also serves as the depository for most flood-related information.
- FIRMs will be available in the form of printed copies and with links to the FEMA web site. The FIRMS are available to the public for review at the offices of the Luzerne County Flood Protection Authority.
- Out of 76 total municipalities in the County, there are 20 municipalities that are under the jurisdiction of the Luzerne County Zoning Ordinance and there are 28 municipalities that are under the jurisdiction of the Luzerne County SALDO (See Section 5.2.1.1). Local municipalities, not under the jurisdiction of the County, are responsible for all third party LOMR requests to either be: 1) submitted to FEMA through the local municipality, or 2) provided with evidence that the local municipality has been notified of the LOMR request to FEMA.
- The Luzerne County Flood Protection Authority provides advice and guidance to the public regarding elevation certificates and LOMAs. However, the NFIP is a program administered through FEMA. Through its Flood Hazard Mapping Program, FEMA maintains and updates data through FIRMs. Copies of documents that pertain to changing or correcting FIRMs are available through FEMA and may also be available in the offices of the local municipalities.
- The Luzerne County Flood Protection Authority provides advice and guidance to the public in interpreting the DFIRM and flood studies. However, the decision regarding a specific properties status in the floodplain must be made by the local municipalities where the land improvements are located.
- The Luzerne County Flood Protection Authority conducts monthly public meetings where the business activities of the Authority are discussed. The topics of flood insurance and floodplain management are frequently discussed.
- The Authority collects revenue for its operating expenses for maintenance of its flood protection system through an annual levee fee imposed on residents. In the annual fee statement mailings, a letter is included that describes the fee and the importance of obtaining flood insurance for properties located in the floodplain(s).

The Luzerne County Flood Protection Authority provides advice regarding elevation certificates and LOMAs and assists residents in interpreting the FIRM and flood studies.

The overriding purpose of the minimum floodplain management regulations as outlined by the Code of Federal Regulations (44 CFR) is to ensure that participating communities consider flood hazards, to the extent that they are known, in all official actions relating to land management and use. Municipalities range from "A" to "E" levels of regulation based on their identified flood zones. The levels are defined as follows:

- A: FEMA has not defined a SFHA in the community.
- B: FEMA has provided a Flood Insurance Rate Map (FIRM) with approximate A Zones.
- C: FEMA has provided a FIRM with base flood elevations.
- D: FEMA has provided a FIRM with base flood elevations and a map that shows a floodway.
- E: FEMA has provided a FIRM with coastal high hazard areas and no floodways.
- D&E: FEMA has provided a FIRM with both floodways and coastal high-hazard areas.

In Luzerne County, seven municipalities are Level "A" indicating they have no FEMA identified flood hazard areas, two are Level "B", and 65 are Level "D" indicating that a floodway has been designated for certain flooding sources. The level of regulations for each municipality is included in Table 5.2-4. Regulations become more comprehensive as you move from A to E and are dependent on whether a municipality has identified flood hazard areas, flood elevations, floodways, or coastal high-hazard areas.

Table 5.2-5 Level of Regulations Per Municipality (FEMA, 2025).

MUNICIPALITY	LEVEL OF REGULATION
Ashley Borough	D
Avoca Borough	D
Bear Creek Township	D
Bear Creek Village Borough	D
Black Creek Township	D
Buck Township	D
Butler Township	D
Conyngham Borough	D
Conyngham Township	D
Courtdale Borough	D
Dallas Borough	D
Dallas Township	B
Dennison Township	D
Dorrance Township	D
Dupont Borough	D
Duryea Borough	D
Edwardsville Borough	D
Exeter Borough	D

Table 5.2-5 Level of Regulations Per Municipality (FEMA, 2025).

MUNICIPALITY	LEVEL OF REGULATION
Exeter Township	D
Fairmount Township	D
Fairview Township	C
Forty Fort Borough	D
Foster Township	D
Franklin Township	D
Freeland Borough	A
Hanover Township	D
Harveys Lake Borough	B
Hazle Township	D
City of Hazleton	A
Hollenback Township	D
Hughestown Borough	A
Hunlock Township	D
Huntington Township	D
Jackson Township	D
Jeddo Borough	A
Jenkins Township	B
Kingston Borough	D
Kingston Township	D
Laflin Borough	B
Lake Township	D
Larksville Borough	D
Laurel Run Borough	B
Lehman Township	B
Luzerne Borough	D
City of Nanticoke	D
Nescopeck Borough	D
Nescopeck Township	D
New Columbus Borough	D
Newport Township	D
Nuangola Borough	B
Penn Lake Park Borough	D
City of Pittston	D
Pittston Township	D
Plains Township	D
Plymouth Borough	D
Plymouth Township	D
Pringle Borough	D
Rice Township	D
Ross Township	D

Table 5.2-5 Level of Regulations Per Municipality (FEMA, 2025).

MUNICIPALITY	LEVEL OF REGULATION
Salem Township	D
Shickshinny Borough	D
Slocum Township	B
Sugarloaf Township	D
Sugar Notch Borough	A
Swoyersville Borough	D
Union Township	D
Warrior Run Borough	A
West Hazleton Borough	D
West Pittston Borough	D
West Wyoming Borough	D
White Haven Borough	D
City of Wilkes-Barre	D
Wilkes-Barre Township	B
Wright Township	D
Wyoming Borough	D
Yatesville Borough	A

Many of the above stated higher standards adopted by municipalities such as freeboard requirements and addressing repetitive loss properties could be eligible for credit under the Community Rating System (CRS). The NFIP's 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 damage 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 CRS in the NFIP and 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 CRS, 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:

- Reduce flood losses
- Reduce damage to property
- Protect public health and safety
- Prevent increases in flood damage from new construction
- Reduce the risk of erosion damage
- Protect natural and beneficial floodplain functions
- Facilitate accurate insurance rating
- Promote the awareness of flood insurance

There are 10 CRS classes that provide varied reductions in insurance premiums. 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 percent for Class 9 communities up to 45 percent for Class 1 communities. The CRS recognizes 18 creditable activities that are organized under four categories: Public Information, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness.

CRS Communities

These communities have exceeded minimum floodplain management standards and in turn receive discounts on flood insurance premiums for residents!

City of Wilkes-Barre
Class 6
20% Discount

West Pittston Borough
Class 7
15% Discount

Borough of Kingston
Class 7
15% Discount

Township of Hanover
Class 8
10% Discount

Township of Kingston
Class 10
0% Discount

The Township of Kingston (Class 10), Township of Hanover (CRS Class 8), Borough of Kingston (CRS Class 8), Borough of West Pittston (CRS Class 7), and City of Wilkes-Barre (CRS Class 6) are the municipalities in Luzerne County participating in this program. Class 9 results in a 5% discount on flood insurance while Class 6 results in a 20% discount on flood insurance. These municipalities have received CRS points for the following: elevation certificates, higher regulatory floodplain management standards, stormwater management, flood map information, outreach projects, and open space preservation.

For communities that participate in the NFIP, substantial damage determinations are required by local floodplain management ordinances. These rules must be in place for residents of a community to purchase flood insurance through the NFIP. The decision about a structure being "substantially damaged" is made at the local government level, generally by a building official or floodplain manager. Substantial damage applies to a structure in the SFHA for which the total cost of repairs is 50 percent or more of the structure's market value before the disaster occurred, regardless of the cause of damage. This percentage could vary among jurisdictions but must not be below NFIP standards. Preliminary damage assessments conducted by Luzerne County after a disaster (as discussed in Section 5.2.1.1) can be used when making substantial damage determinations. If a building within the floodplain is determined to be substantially damaged after a disaster, it will need to be brought into compliance through methods such as elevating the structure and floodproofing utilities. This should be monitored by the local community to stay in compliance with the NFIP.

5.2.2. ADMINISTRATIVE AND TECHNICAL CAPABILITY

A variety of administrative capabilities are established in Luzerne County and its jurisdictions. These capabilities can support the implementation of mitigation actions that are proposed in this plan. These capabilities are:

- The Luzerne County Engineering Department is no longer active and has been replaced by **Operations Project Managers.** These managers are now responsible for the technical review and administrative aspects of county projects, design and construction of road and bridge projects, contract administration for county projects, and maintenance of real property owned or occupied by the county. They may also provide technical advisory to the county's Emergency Response team. While the Department of Planning and Zoning primarily reviews subdivision and land development plans, minor subdivision plans and those that do not require a stormwater management review are typically routed to the Operations Project Managers. Land development and major subdivision plans are forwarded to one of three third-party engineering companies with which the County has an MOUs. Those municipalities that are administered by the County are required to incorporate comments received. Other municipalities that are not administered by the County can use the County comments at their discretion.
- **The Luzerne County Department of Planning and Zoning** makes recommendations to the governing body on multiple issues, including zoning, subdivision/land development and comprehensive planning. The Department administers a zoning ordinance for 20

municipalities within the county and administers the subdivision/land development ordinance for 28 municipalities and reviews subdivision/land development plans for all municipalities within the County, including those over which the County does not have control.

- The Planning Commission administers the stormwater management ordinance for land development and is the funding mechanism for the **Luzerne County Farmland Preservation Program (LCFPP)**, and through the Department of Planning and Zoning, provides funding for the purchase of easements and associated incidental costs (State Farmland Preservation Board funding). The Luzerne County Conservation District administers LCFPP.
- The Planning Commission is involved in transportation planning via the **Luzerne Lackawanna Transportation Study Metropolitan Planning Organization (LLTS)**. This organization decides how Federal and State transportation funds will be allocated in the two-county region. Two Department of Planning and Zoning staff are also full time LLTS staff.
- **The Luzerne County Emergency Management Agency** is responsible for protection of the County's public health, safety and environment, and management through and recovery from natural disasters, emergencies or threats to security. The EMA also contains a **Local Emergency Planning Committee (LEPC)** which is responsible for overseeing the Hazardous Materials Response Account and approving Off-site Emergency Response Plans. The LEPC is comprised of the County emergency management coordinator, a county council member, local government representative, law enforcement official, firefighter, and emergency management personnel, among others.
- **The Luzerne County Office of Community Development** is entrusted with the provision of decent housing, a suitable living environment, and expanded economic opportunities that will improve the quality of life of County residents. The Office of Community Development administers three Federally funded Housing and Urban Development (HUD) programs:
    - **Community Development Block Grant Program (CDBG)** - community development activities directed toward revitalizing neighborhoods, economic development, and providing improved community facilities and services. CDBG funds may be used for activities such as acquisition of real property; relocation and demolition; rehabilitation of residential and non-residential structures; and construction of public facilities and improvements to facilities such as water, sewer, and streets.
    - **Emergency Solutions Grants Program (ESG)** provides funding to engage homeless individuals and families living on the street; improve the number and quality of emergency shelters for homeless individuals and families, help operate these shelters, provide essential services to shelter residents, rapidly re-house homeless individuals and families, and prevent families and individuals from becoming homeless. ESG funds may be used for these five program

components: street outreach, emergency shelter, homelessness prevention, rapid re-housing assistance, Homeless Management Information System (HMIS), as well as up to 7.5% of a recipient's allocation can be used for administrative activities.

  - **HOME Investment Partnerships Program (HOME)** provides formula grants to states and localities that communities use - often in partnership with local nonprofit groups - to fund a wide range of activities including building, buying, and/or rehabilitating affordable housing for rent or homeownership or providing direct rental assistance to low-income people.

- **The Luzerne County Redevelopment Authority's** mission is to work with Luzerne County and its municipalities to assist in improving the quality of life and property for residents through eminent domain, the administration of grant programs, tax abatement programs, delinquent tax buyback programs, and the acquisition of the short line railroad that serves Luzerne County, and a portion of Lackawanna County. Redevelopment Authority staff are experienced in grant writing and administration and have assisted communities in the County who have received grants from various government and not-for-profit agencies. Staff can meet with communities and organizations about project needs and will then explore the potential for various grants.
- **The Luzerne Conservation District** strives to conserve natural resources in Luzerne County through public awareness, technical assistance, and encouraging regulatory compliance. It works closely with property owners, public and private organizations and citizens to increase their responsibility to the natural environment.
- The **Luzerne County Department of Roads and Bridges** maintains county roads and bridges. State highways are maintained by PennDOT and local roads are maintained by individual municipalities (roads bridges, culverts, pipes, inlets, etc.).
- Flood control facility maintenance falls under the auspices of the **Luzerne County Flood Protection Authority (LCFPA)** by contractual agreement with the Army Corps of Engineers. The LCFPA oversees the **Wyoming Valley Flood Risk Management Project (WVFRMP)**. The 16-mile-long project helps protect the communities of Edwardsville Borough, Exeter Borough, Forty Fort Borough, Hanover Township, Municipality of Kingston, Luzerne Borough, Plymouth Borough, Pringle Borough, Swoyersville Borough, West Wyoming Borough, Wyoming Borough and the City of Wilkes-Barre. The Susquehanna River is one of the most flood prone waterways in the United States. Locally, since 1865 the river has exceeded the natural flood stage of 22 feet, seventy-seven (77) times or about once every 2 years. Consequently, the existing flood protection system is one of the largest systems in the nation. For river flooding and major events (above 30 feet) the Luzerne County Flood Protection Authority (LCFPA) serves as the technical arm for the EMA and prepares maps and detailed information on limits of flooding based on a projected crest, list of impacted communities, name/address and impacted infrastructure (which roads need to be closed, etc.). This information is used by the EMA to issue notifications. LCFPA developed and maintains the Wyoming Valley

Flood Operations Plan which depicts flood stages and corresponding impacts as well as necessary response activities.

- The **Susquehanna River Basin Commission** works to enhance public welfare through comprehensive planning, water supply allocation, and management of the water resources of the Susquehanna River Basin. To accomplish this mission, the Commission works to reduce damage caused by floods; provide for the reasonable and sustained development and use of surface and ground water for municipal, agricultural, recreational, commercial and industrial purposes; protect and restore fisheries, wetlands and aquatic habitat; protect water quality and instream uses; and ensure future availability of flows to the Chesapeake Bay.
- The **Northeastern Pennsylvania Alliance (NEPA)**, a regional community and economic development agency, serves the seven counties of Northeastern Pennsylvania including Carbon, Lackawanna, Luzerne, Monroe, Pike, Schuylkill and Wayne. NEPA Alliance services include business financing, government contracting assistance, international trade assistance, non-profit assistance, transportation planning, research and information, and local government services.
- **Mountain Council of Governments (MCOG)** consists of over 20 municipalities, school districts and authorities in the Greater Hazleton area, as well as the Greater Hazleton Civic Partnership and the Chamber of Commerce. MCOG works to build on the collective strengths and resources between communities such as shared road services and equipment, beautification projects, assistance in developing Rails to Trails, and provides information on grant writing.
- **Lower South Valley Council of Governments (LSVCOG)** is comprised of representatives from the City of Nanticoke; the boroughs of Ashley, Plymouth, and Sugar Notch; the townships of Hanover, Newport, and Plymouth; the Wyoming Valley Sanitary Authority; Luzerne County Community College; and the Earth Conservancy. LSVCOG was formed in 2016 to promote collaboration and cost savings for member municipalities on capital projects.
- **North Branch Land Trust:** North Branch Land Trust conserves the natural, working, and scenic landscapes in Northeastern Pennsylvania. As an accredited non-profit land conservation organization, NBLT strives to conserve important natural assets by fostering sustainable communities that can maintain a healthy environment and a vibrant economy. Some core values include creating a sustainable balance between economic growth and the healthy natural surroundings and preserving the beauty and environmental health of Pennsylvania.
- **Northeast PA Regional Counter-Terrorism Task Force:** One of nine Regional Homeland Security Task Forces in PA, the Northeast PA Regional Task Force has three Hazmat Teams, three Bomb Disposal Teams, two Urban Search and Rescue teams, and eight SWAT teams. Luzerne County joined the Northeast PA Regional Task Force on January 1, 2020. The Task Force provides "All Hazards" planning, mitigation, response, and recovery services to citizens in the following Pennsylvania counties: Carbon,

Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Pike, Susquehanna and Wayne Counties.

- In June 2007, Luzerne County was certified as a **StormReady Community** by the National Weather Service and the Pennsylvania Eastern Region Storm Ready Advisory Board. The County was recertified in 2019. The Storm Ready program was established to help local governments improve the timeliness and effectiveness of hazardous weather-related warnings for the public. By participating in this program, local agencies can earn recognition for their jurisdiction by meeting the guidelines established by the National Weather Service in partnership with Federal, State, and local emergency management professionals. The certification also makes Luzerne County and its municipalities eligible for 25 points in the Community Rating System, awarded to local governments that meet the flood threat recognition system.
- The **Pennsylvania State Association of Township Supervisors (PSATS)** strives to preserve and strengthen township government and to improve involvement for townships in the state. PSATS sponsors training opportunities to provide township officials with the information and skills they need to meet the challenges of township office.
- The City of Wilkes-Barre is a Class 2 Community in the Public Protection Classification (PPC) program. This program evaluates municipal fire-protection efforts in communities throughout the United States. A community's investment in fire mitigation is a proven and reliable predictor of future fire losses. So, insurance companies use PPC information to help establish fair premiums for fire insurance – generally offering lower premiums in communities with better protection. Many communities use the PPC as a benchmark for measuring the effectiveness of their fire-protection services. The PPC program is also a tool that helps communities plan for, budget, and justify improvements. The improvements and dedication of the Wilkes-Barre City Fire Department, Emergency Communications, and the resilience and continued investment of the PA American Water system infrastructure have all contributed to the City of Wilkes-Barre remaining a community in the top one percent of fire-protection services in Pennsylvania.

Based on assessment results, municipalities in Luzerne County have moderate to limited administrative and technical staff needed to conduct hazard mitigation-activities. The municipalities vary in staff size, resource availability, fiscal status, service provision, population, overall size, and vulnerability to the profiled hazards. The 11 municipalities that returned assessment forms were more likely to rate their administrative capabilities as limited or moderate, with only one rating them as high. Each municipality carries out its own daily operations and provides various community services according to their local needs and limitations. Some of these municipalities have formed cooperative agreements and work jointly with their neighboring municipalities to provide such services as police protection, fire and emergency medical response, solid waste disposal, recreational opportunities, wastewater treatment, water supply management and infrastructure maintenance. Much of the planning, engineering, and land surveying capabilities are provided by consulting firms. All municipalities

in the County have an identified emergency management coordinator, although some of these coordinators are responsible for more than one jurisdiction. The current administrative and technical capabilities may create a challenge for some municipalities to expand or improve their current overall capabilities.

State agencies can provide technical assistance for mitigation activities. State agencies that can provide hazard assistance include, but are not limited to:

- Pennsylvania Department of Community and Economic Development;
- Pennsylvania Department of Conservation and Natural Resources;
- Pennsylvania Department of Environmental Protection;
- Pennsylvania Department of Health; and
- Pennsylvania Department of Transportation.

Luzerne County can also partner with Federal agencies for technical assistance on mitigation activities. These agencies include but are not limited to:

- Federal Emergency Management Agency;
- United States Army Corp of Engineers;
- Department of Housing and Urban Development;
- United States Department of Agriculture;
- Economic Development Administration;
- FEMA's Emergency Management Institute;
- United States Environmental Protect Agency; and
- Small Business Administration.

5.2.3. FINANCIAL CAPABILITY

A critical part of the implementation of any plan is the financial resources to accomplish the priority projects identified. The implementation of mitigation actions requires time and fiscal 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 the *Capability Assessment Survey* results received, most municipalities within the County perceive fiscal capability to be limited; two communities listed their capability to be moderate.

The key factor in determining fiscal capability is to analyze how tight these constraints are. This could involve a detailed auditing process to tally all revenues and expenditures or could involve an assessment of existing financial ratings as identified and reported by the DCED. These ratings can be used as a base indicator of fiscal capability at the municipal level. The

Pennsylvania Municipalities Financial Recovery Act (Act 47 of 1987) identified fiscally distressed municipalities based on established criteria. Analysis of the Act 47 fiscally distressed municipality list indicated that none of Luzerne County's municipalities are currently identified as being fiscally distressed according to the established rating criteria. Previously, four communities have been designated: West Hazleton Borough (designated in 2003, rescinded in 2014); the City of Nanticoke (designated in 2006, rescinded in 2015); Plymouth Township (designated in 2004, rescinded in 2016); and the City of Hazleton (designated in 2017, rescinded in 2023). These successes illustrate the expansion of financial capabilities for the mentioned communities (DCED, 2025).

Though the smaller, less populous municipalities do not have sufficient budgets to do costly mitigation projects without financial assistance, this does not preclude these municipalities from participating in hazard mitigation activities. Cooperative arrangements, coordinated efforts, and resource efficiency may serve as effective avenues for overcoming fiscal constraints and accomplishing hazard mitigation objectives at the local level. Jackson Township has identified a gap in financial capabilities to implement certain mitigation activities.

There are also partnering opportunities at the local level. These would include Councils of Government such as LSVCOG and MCOG. These councils are described above.

Support for mitigation planning actions is most often provided by the Commonwealth of Pennsylvania and the Federal Government. Programs that complement Luzerne County mitigation planning initiatives include the following state and federal programs.

- Pennsylvania administered programs including:
    - **Municipal Assistance Program (MAP)**, which provides grant funds to implement a variety of services and improvements to manage development with intergovernmental strategies.
    - **Land Use Planning and Technical Assistance Program**, which provides grant funds for the preparation of community comprehensive plans and ordinances to implement them.
    - **Flood Mitigation Program (FMP)**, which provides grants and technical assistance for projects that address flood mitigation.
    - The **Growing Green Plus Grants Program** is an extension to the Growing Greener Grant Program administered by the PA DEP. Programs covered with these funds are: Growing Greener Watershed Restoration and Protection, Surface Mining Conservation and Reclamation Act Bond Forfeiture, and Abandoned Mine Drainage Set-Aside Grants.
    - The **Environmental Education grant** administered by the **PA DEP** was established by the Environmental Education Act of 1993, which mandates that five percent of all pollution fines and penalties collected annually be set aside for environmental education.

- The **Alternative Fuels Incentive Grant (AFIG) Program** was established by the **PA DEP** in 1992 under Act 166. This program provides funding to create new markets for alternative fuels in Pennsylvania. Municipalities and agencies are eligible to apply for grant funding for alternative fuels through this grant program.
- **Pennsylvania Infrastructure Investment Authority (PennVEST)** administers a low interest loan and grant program for new construction or improvements to publicly or privately-owned drinking water, storm water, or sewage treatment facilities, as well as non-point source pollution prevention best management practices (BMPs).
- **DCNR** administers **Community Conservation Partnerships Program Grants**. This program is funded with a variety of state and federal funding sources, including the Keystone Recreation, Park and Conservation Fund (Key 93) which encompasses several environmental and conservation related funds.
- **DCED** manages the **PA Small Water and Sewer Grant** which funds small water, sewer, storm sewer, and flood control infrastructure projects. Funding is made available by the Commonwealth Financing Authority.
- The Pennsylvania Department of Human Services operates a **Human Services Development Fund** to provide funding for a variety of county programs such as: adult day care, counseling, employment, housing, life skills education, and transportation services.
  - The **Commission on Economic Opportunity (CEO)** leverages this fund to support their Home Delivered Meals and Housing services.
  - The **Family Service Association of NEPA** leverages this fund for Information and Referral services.
  - The **Volunteers of America – Pennsylvania (VOA)** leverages this fund to support their Hi-Rise-Outreach work.

- Federal Government programs including the:
  - **Hazard Mitigation Assistance Programs**, which provide grants for cost-effective mitigation projects either in the absence of a disaster or after a disaster declaration has occurred:
    - Flood Mitigation Assistance Program (FMA)
    - Hazard Mitigation Grant Program (HMGP)

      The following is a sampling of projects for which FEMA has awarded Hazard Mitigation Assistance grants in Luzerne County:

      - Plymouth Township - Poplar & Canal Street Acquisitions
      - West Pittston Substantial Damage Acquisition
      - Harvey's Creek and Canal Street Wastewater Pumping Stations
      - Flood Protection Project on Mill Creek - Avoca

        - Wyoming Valley Sanitary Pump Station
        - Woodcrest Development Property Acquisition and Clearance Project
        - Shickshinny Borough Substantially Damaged Acquisition Project
        - Plainsville Acquisition and Clearance Project
        - Hunlock Gardens Property Acquisition
        - Pine Creek Wastewater Pumping Stations
    - **Community Development Block Grants (CDBG)**, which provides funds to address a wide range of community development needs, including community development activities directed toward revitalizing neighborhoods, economic development, and providing improved community facilities and services. CDBG funds may be used for activities such as acquisition of real property; relocation and demolition; rehabilitation of residential and non-residential structures; and construction of public facilities and improvements to facilities such as water, sewer, and streets. There is an extra CDBG fund set aside for post-disaster recovery costs. **CBDG Mitigation Funds (CBDG-MIT)** may also be used in areas impacted by disasters to mitigate future risks and reduce losses.
    - **Weatherization Assistance Program**, which enables low-income households to make their homes more energy efficient.
    - **The Emergency Watershed Protection (EWP) Program** is administered by the USDA Natural Resources Conservation Services to help communities quickly address serious and long-lasting damage to infrastructure and the environment. These funds are allocated soon after disasters to assist with immediate recovery needs.
    - The **Homeland Security Grant Program (HSPG)** assists communities in implementing the National Preparedness System by supporting the building, sustainment, and delivery of core capabilities essential to achieving the National Preparedness Goal of a secure and resilient Nation. The HSGP's allowable costs support efforts to build and sustain core capabilities across the prevention, protection, mitigation, response, and recovery, including priorities towards preventing terrorism and enhancing state and major urban area fusion centers.
    - The **Assistance to Firefighters Grant (AFG)** administered by **FEMA** provides funds to help firefighters and other first responders obtain essential resources to protect the public and emergency responders in hazard events.

5.2.4. EDUCATION AND OUTREACH

Education and outreach programs and methods are used to implement mitigation activities and communicate hazard-related information. Examples include fire safety programs that fire departments deliver to students at local schools; participation in community programs, such as Firewise Communities Certification or StormReady Certification; and activities conducted as part of hazard awareness campaigns, such as Hurricane Preparedness Week. Some

communities have their own public information or communications office to handle outreach initiatives.

Reported education and outreach activities in Luzerne County are summarized as follows:

- Luzerne County disseminates critical information via the CodeRED™ Mass Notification System. This system is a high-speed, Web-based mass notification app that has been in use since 1998 and is used by more than 3,000 state and local government entities across the United States and Canada. CodeRED gives Luzerne County EMA and local municipalities the ability to send critical communications via telephone calls, text messages, and emails to registered participants. Residents can download an app or register a cellular phone number online.
- Luzerne County has and continues to host training courses for its staff to achieve certification through the following programs offered by Texas A&M University:
    - **The Infrastructure Protection Certificate Program** consists of five courses providing an in-depth examination of key concepts and practices in capabilities-based and community-focused planning, integrated risk management, private-public partnerships, and whole community resilience strategies.
    - **The Infrastructure Disaster Management Certificate Program** consists of four courses that provide training to enhance planning for protecting critical infrastructure (CI) from potential and actual threats.
    - **The Community Disaster Preparedness for Healthcare Certificate Program** enhances planning for healthcare and public health disasters.
    - **The Critical Infrastructure Certificate Program** instructs on identifying and prioritizing critical assets to protect.
    - Additional training courses in the following areas: Continuity Planning, Critical Infrastructure Security and Resilience Awareness, Cybersecurity Risk Awareness, Rail Car Incident Response, School-Based Incidents, Pipeline Security, Campus Emergencies, Understanding and Planning for School Bombing Incidents.
- Luzerne County sponsored the Eastern Pennsylvania Election Security Seminar presented by the Cybersecurity & Infrastructure Security Agency (CISA).
- Luzerne County officials attend annual conferences for the Association of Public-Safety Communications Officials (APCO), Keystone Emergency Management Association (KEMA), Voluntary Organizations Active in Disaster (VOAD) and National Health Service Corps (NHSC). These events provide opportunities for the county to learn about new tools and techniques for expanding its capabilities, as well as developing partnerships for hazard mitigation.

- The Luzerne County Office of Human Services conducts educational programs in schools about drug and alcohol use. The office also supports food pantries in communities throughout the county.

- LLTS developed a **Public Participation Plan**, which was updated in 2024. The plan includes a description of public participation to date and a large section describing participation tools and techniques that can help with transportation planning (LLTS, 2024d). Additionally, LLTS developed a **Limited English Proficiency (LEP)** Plan that was also updated in 2024. This plan assesses the need for language services in engagement and outreach activities and provides resources for reaching audiences who speak a language other than English (LLTS, 2024c). Together, these two plans demonstrate the ongoing efforts of LLTS to provide timely and meaningful opportunities for public involvement in the transportation planning and decision-making process. Strategies and techniques from these plans may be implemented throughout the hazard mitigation planning process as well.

- Susquehanna Nuclear Power Plant Emergency Information – Columbia and Luzerne Counties provide an emergency guide with information and instructions about what may be asked of residents in case a serious emergency occurs at the Susquehanna Nuclear Power Plant in Salem Township in Luzerne County. The protective actions described in this document follow protocol set out by state, county, and municipal emergency plans to provide a coordinated public response in case of emergency. Additionally, the community has access to Talen Energy: 2025 Emergency Preparedness Guide. This is an emergency preparedness guide written by Talen Energy, the owner of the Susquehanna Nuclear Power Station. This guide includes information for the public about how to recognize an emergency and what steps to follow. Emergency information includes school pickup locations, evacuation routes and reception centers, pre-emergency and emergency checklists, and evacuation maps. This is an important document for spreading information about nuclear hazard response to the public

5.2.5. SOCIALLY VULNERABLE OR UNDERSERVED COMMUNITIES

To understand capabilities of service and assistance to socially vulnerable and underserved communities, meetings were held with the organizations and county agencies that work directly with communities. This section provides an overview of their work and any capabilities that may be leveraged to mitigate the impacts of hazards discussed in this plan.

The Luzerne County Office of Human Services (OHS) provides support for residents across five agencies:

- **The Area Agency on Aging** is a county agency serving the needs of the residents of Luzerne and Wyoming Counties, Pennsylvania. The organization is responsible for planning and coordinating a comprehensive system of social services for the older residents of the community. The Agency acts as an advocate and speaks out on all issues related to the well-being and needs of older persons. The Area Agency on Aging is

funded by the Pennsylvania Department of Aging and the Pennsylvania Department of Public Welfare.

- **Luzerne County Children, Youth, and Families** promotes the safety, well-being, and permanency of all children in Luzerne County through collaboration with families and the community.
- **The Luzerne / Wyoming Counties Drug and Alcohol Program** has been designated by the Pennsylvania Department of Drug and Alcohol Programs as the Single County Authority (SCA) for drug and alcohol services in Luzerne and Wyoming Counties. The SCA is responsible for planning, designing, and implementing a comprehensive array of services covering the full continuum of care to the residents of both Luzerne and Wyoming Counties in the areas of Prevention, Intervention, Treatment, and Treatment Related Services.
- Assisted by the Mental Health and Developmental Services Advisory Board, the bi-county **Mental Health and Developmental Services Office** provides a full range of mental health and intellectual disability services responsive to individual and community needs.
- **The Luzerne County Veteran Affairs Office** serves veterans and their families by providing services such as disability compensation, medical coverage, tax exemptions, temporary assistance, burial benefits, and housing assistance.

The **Commission on Economic Opportunity (CEO)** is a regional community action agency to alleviate poverty. This multi-service nonprofit organization operates more than 70 programs with a staff of 145 full and part-time employees. CEO is a participating agency of the United Way of Wyoming Valley, United Way of Hazleton, and the Wyoming County United Fund. Several notable organizations serving low-income residents of Northeast Pennsylvania originated in CEO, which often serves as an "incubator," spinning off programs when they reach a point of organizational readiness. These include Luzerne County Head Start, the Child Development Council of NEPA, Rural Health Corporation of NEPA, and Maternal and Family Services of NEPA (CEO, 2025). A critical service of CEO is provision of food. Previously, this service has been mobilized in emergency situations.

Volunteers of America (VOA) is a national, nonprofit, spiritually based organization providing local human service programs and opportunities for individual and community involvement. In Pennsylvania, the organization focuses on providing affordable housing for veterans and their families, seniors, and people with disabilities. VOA's operations in Pennsylvania are split into four regions; Luzerne County is in the Northeast region, which is headquartered in Wilkes-Barre.

Through their Give Hope Street Outreach service, VOA engages populations who reside in encampments or are homeless to mitigate health and safety risks. During the COVID-19 pandemic, VOA's outreach team distributed educational materials, PPE, and updates on government orders to the community. Another component of these activities involves the monitoring of flood gauges, and coordination to support populations who are in areas of high flood risk. During incidents of large-scale fire or building condemnations, VOA has coordinated

with its Dial-a-Driver transportation service to move individuals to safe locations. The Give Hope Street Outreach team services all communities in Luzerne County.

VOA also operates Ruth's Place, a shelter for women with capacity to house 25-30 individuals in emergency situations. VOA also operates Transitional and Supportive Housing programs, which may be leveraged to rehouse community members who are affected by disasters. In addition, VOA coordinates with medical clinics throughout the county to provide care for participants in their programs. Other services provided by VOA include pregnancy counseling, childcare, elderly transportation, and limited volunteer programs (VOA, 2025).

Willow Foundation provides services to individuals and families experiencing homelessness, housing insecurity and/or food insecurity. The organization also operates a day shelter in Hazleton.

OHS collaborates with these organizations, and several others, to deliver services through the following programs:

- Homeless Assistance Services
    - Bridge Housing – Domestic Violence Service Center, VOA
    - Case Management – CEO, Willow Foundation
    - Rental Assistance – CEO
    - Emergency Shelter – Catholic Social Service, VOA
- Human Services Development Fund
    - Home Delivered Meals – CEO
    - Housing – CEO
    - Information & Referral – Family Service Association of NEPA
    - Ni-Rise-Outreach - VOA

5.2.6. PLAN INTEGRATION

Plan integration ensures that hazard mitigation planning is woven into each municipality's planning and regulatory documents. These include plans, policies, codes, and programs that guide land use and development. Effective integration of hazard mitigation occurs when the planning framework fosters development that does not increase risks from known hazards or leads to redevelopment that reduces risk from known hazards. For information on how the last plan was integrated into planning mechanisms across the county, please refer to Section 6.1.3.

While not all regulatory tools are relevant to every municipality in Luzerne County, each municipality should evaluate what tools are available to them related to their vulnerability identified in this HMP. Communities should continue to review and revise building codes, zoning ordinances, floodplain ordinances, and subdivision and land development ordinances with respect to the findings in the 2025 HMP risk assessment. For example, a municipality could revise its zoning ordinance to restrict the density of new development in hazard-prone areas or guide development away from these areas. Some tools may also be useful for addressing multiple hazards in these municipalities; for example, the presence of a stormwater

management plan would greatly enhance mitigation capabilities needed to address both flood and transportation hazards.

As mentioned above, Luzerne County initially adopted its Comprehensive Plan in May 2011. The most recent update of this plan was adopted in April 2021. The "Plan Interrelationships" section discusses Hazard Mitigation Plans for Lackawanna and Luzerne Counties that were developed in conjunction with this Regional Plan and states that "A concerted and combined strategy for the entire region will create an advanced outlook to carry the region into a prosperous future, while also making sure it addresses the distinct needs of today." It is unique for all three planning emphasis areas – the Comprehensive Plan, Long-Range Transportation Plan, and Hazard Mitigation Plan – to be addressed concurrently for two counties in Pennsylvania. As future updates are made to this plan, the Counties should consider including hazard mitigation as an element.

Hazard mitigation planning can be integrated into Luzerne County's Stormwater Management Regulations. The municipalities that are regulated by the County's stormwater management requirements in its SALDO could also opt to develop their own, more stringent stormwater management ordinances. Municipalities can provide recommendations for proper long-term operation and maintenance of stormwater management facilities within the land development subdivision ordinances, work closely with the County to assure that stormwater facilities are maintained over the long-term, and can ensure any new hydrology studies are adopted upon completion.

Specific language in the Luzerne County Zoning Ordinance that relates directly to hazard mitigation is documented below. Whether the County is administering the zoning ordinance for municipalities, or the municipality maintains administration, the following guidelines from Luzerne County's Zoning Ordinance can be enforced through the lens of mitigating each municipality's hazards:

- No new construction or development shall be located within the area measured fifty (50) feet landward from the top-of-bank of any watercourse.
- No encroachment, alteration, or improvement of any kind shall be made to any watercourse unless it can be shown that the activity will not reduce or impede the flood carrying capacity of the watercourse in any way
- Any new construction, development, uses or activities allowed within any identified flood plain area shall be undertaken in strict compliance with the provisions contained in this Article and any other applicable codes, ordinances and regulations.

Luzerne County's Open Space, Greenways and Outdoor Recreation Master Plans' goals are to preserve high-quality open space, establish and expand greenway and multi-modal trail systems, increase riparian buffers, improve access and connection to the Susquehanna River, conserve the county's natural resources, and facilitate healthy lifestyles. The purpose of the plan is to establish specific priorities for conserving open spaces such as farms, forests, community parks and waterbodies and for creating future greenway corridors. The Plan recommends

several different approaches that should be pursued by county and local governments, landowners, conservation groups, not-for-profit organizations and other interested parties, to protect, conserve or acquire the recommended conservation lands.

The Luzerne County Emergency Operations Plan embraces an "all-hazards" principle. Most emergency response functions are similar, regardless of the hazard, and the EMC is required to mobilize functions and personnel as required by the emergency. This plan mentions that mitigation opportunities will be considered throughout disaster operations. Implementation includes a combination of conservation tools including land management plans and easements; regulatory methods like density transfers, zoning overlays, buffer zones, and subdivision exactions, and land acquisition made possible through donation, purchase, and purchase of development rights. These principles must be encouraged.

Based on the capability assessment results and information from the Luzerne County Department of Planning and Zoning, all of Luzerne County's jurisdictions have some form of local land use controls. As is discussed in Section 6.1, upon review of the 2020 mitigation actions, it was determined that several municipalities completed mitigation actions that achieve plan integration by furthering hazard mitigation goals through various land development regulations.

Some other land use tools in municipalities have not been updated recently. As municipalities work to update comprehensive plans and land use ordinances, local governments can go further to use land use regulations to direct development away from hazard-prone areas.

A barrier to plan integration is often the lack of resources to accomplish activities that integration requires. Several municipalities noted on the *Capability Assessment Surveys* that lack of financial resources precludes development of some planning tools. The Self-Assessment portion of the survey provided each municipality with an opportunity to conduct its own self-assessment of its capability to effectively implement hazard mitigation activities. As part of this process, County and municipal officials were encouraged to consider the barriers to implementing proposed mitigation strategies in addition to the mechanisms that could enhance or further such strategies. In response to the survey questionnaire, local officials classified each of the capabilities as either "limited," "moderate," or "high." Table 5.2-6 lists the results for each municipality while Table 5.2-7 summarizes the results of the self-assessment survey as a percentage of responses received. With available resources being limited and stretched into the foreseeable future, plan integration is extremely relevant and will help leverage existing resources to the maximum extent possible.

Table 5.2-6 Municipal Responses to Capability Questionnaire

MUNICIPALITY	PLANNING & REGULATORY	ADMINISTRATIVE & TECHNICAL	FINANCIAL
Ashley Borough	N/A	N/A	N/A
Avoca Borough	N/A	N/A	N/A
Bear Creek Township	N/A	N/A	N/A

Table 5.2-6 Municipal Responses to Capability Questionnaire

MUNICIPALITY	PLANNING & REGULATORY	ADMINISTRATIVE & TECHNICAL	FINANCIAL
Bear Creek Village Borough	N/A	N/A	N/A
Black Creek Township	High	High	Limited
Buck Township	N/A	N/A	N/A
Butler Township	Moderate	Moderate	Moderate
Conyngham Borough	N/A	N/A	N/A
Conyngham Township	N/A	N/A	N/A
Courtdale Borough	N/A	N/A	N/A
Dallas Borough	Limited	Moderate	Limited
Dallas Township	N/A	N/A	N/A
Dennison Township	N/A	N/A	N/A
Dorrance Township	N/A	N/A	N/A
Dupont Borough	Limited	Limited	Limited
Duryea Borough	Limited	Limited	Limited
Edwardsville Borough	N/A	N/A	N/A
Exeter Borough	N/A	N/A	N/A
Exeter Township	N/A	N/A	N/A
Fairmount Township	N/A	N/A	N/A
Fairview Township	N/A	N/A	N/A
Forty Fort Borough	N/A	N/A	N/A
Foster Township	N/A	N/A	N/A
Franklin Township	Limited	Moderate	Limited
Freeland Borough	N/A	N/A	N/A
Hanover Township	N/A	N/A	N/A
Harveys Lake Borough	Limited	Limited	Limited
Hazle Township	N/A	N/A	N/A
City of Hazleton	N/A	N/A	N/A
Hollenback Township	N/A	N/A	N/A
Hughestown Borough	N/A	N/A	N/A
Hunlock Township	N/A	N/A	N/A
Huntington Township	N/A	N/A	N/A
Jackson Township	Moderate	Limited	Limited
Jeddo Borough	N/A	N/A	N/A
Jenkins Township	N/A	N/A	N/A
Kingston Borough	N/A	N/A	N/A
Kingston Township	N/A	N/A	N/A
Laflin Borough	N/A	N/A	N/A
Lake Township	N/A	N/A	N/A
Larksville Borough	N/A	N/A	N/A
Laurel Run Borough	N/A	N/A	N/A
Lehman Township	N/A	N/A	N/A

Table 5.2-6 Municipal Responses to Capability Questionnaire

MUNICIPALITY	PLANNING & REGULATORY	ADMINISTRATIVE & TECHNICAL	FINANCIAL
Luzerne Borough	N/A	N/A	N/A
City of Nanticoke	N/A	N/A	N/A
Nescopeck Borough	Moderate	Moderate	Moderate
Nescopeck Township	N/A	N/A	N/A
New Columbus Borough	N/A	N/A	N/A
Newport Township	N/A	N/A	N/A
Nuangola Borough	N/A	N/A	N/A
Penn Lake Park Borough	N/A	N/A	N/A
City of Pittston	N/A	N/A	N/A
Pittston Township	High	Moderate	Moderate
Plains Township	N/A	N/A	N/A
Plymouth Borough	N/A	N/A	N/A
Plymouth Township	N/A	N/A	N/A
Pringle Borough	N/A	N/A	N/A
Rice Township	N/A	N/A	N/A
Ross Township	N/A	N/A	N/A
Salem Township	Moderate	High	High
Shickshinny Borough	N/A	N/A	N/A
Slocum Township	N/A	N/A	N/A
Sugarloaf Township	N/A	N/A	N/A
Sugar Notch Borough	N/A	N/A	N/A
Swoyersville Borough	N/A	N/A	N/A
Union Township	Moderate	Moderate	Limited
Warrior Run Borough	N/A	N/A	N/A
West Hazleton Borough	N/A	N/A	N/A
West Pittston Borough	N/A	N/A	N/A
West Wyoming Borough	N/A	N/A	N/A
White Haven Borough	Moderate	Moderate	Limited
City of Wilkes-Barre	High	High	Moderate
Wilkes-Barre Township	N/A	N/A	N/A
Wright Township	N/A	N/A	N/A
Wyoming Borough	N/A	N/A	N/A
Yatesville Borough	N/A	N/A	N/A

Table 5.2-7 Summary of self-assessment capability responses expressed as a percentage of responses received.

CAPABILITY CATEGORY	LIMITED	MODERATE	HIGH
Planning & Regulatory	36%	43%	21%
Administrative & Technical	36%	43%	21%
Financial	64%	29%	7%

6. MITIGATION STRATEGY

6.1. UPDATE PROCESS SUMMARY

The mitigation strategy serves as the long-term road map to reduce the potential losses, vulnerabilities, and shortcomings identified in the Hazard Identification and Risk Assessment section. A typical mitigation strategy includes a list of goals and objectives, with mitigation actions to address the goals and objectives, that are then prioritized, based on the community's need.

- ✓ **Goals** are long-term aspirations about the resiliency of the community given the potential effects of hazards.
- ✓ **Objectives** are measurable strategies that the Luzerne County community has determined will be necessary to move closer to attaining each goal.
- ✓ **Actions** are the tasks that are proposed for realizing each objective.

6.1.1. MITIGATION GOAL AND OBJECTIVE REVIEW

There were 5 goals and 21 objectives identified in the 2020 Luzerne County Hazard Mitigation Plan Update. The Steering Committee reviewed goals and objectives during a Steering Committee Review Meeting on March 10, 2025. The review of the goals and objectives is summarized below in Table 6.1-1. Goals and objectives from the 2020 Plan remain relevant and were largely carried over to the 2025 HMP.

Table 6.2-1 in Section 6.2 2025 Mitigation Goals and Objectives lists the 2025 mitigation goals and objectives. This table shows that a new goal was added to address High Hazard Potential Dams. Objective 1.9 has been moved under this new goal. Also, two new objectives were added. One objective addressing socially vulnerable and underserved communities was added under Goal 1. One objective addressing climate change risk was added under Goal 3.

Table 6.1-1 List and review summary of 2020 mitigation strategy goals and objectives.

GOAL 1	PROTECT LIVES, PROPERTY, AND RESOURCES IN LUZERNE COUNTY.	CONTINUED TO 2025 HMP.
Objective 1.1	Protect existing structures in the Special Flood Hazard Area.	Continued to 2025 HMP.
Objective 1.2	Encourage high construction standards on all structural projects to reduce risk from all natural and man-made hazards.	Continued to 2025 HMP.
Objective 1.3	Develop a comprehensive approach for reducing the possibility of damage to and loss of function at critical facilities located in High-Hazard Areas.	Continued to 2025 HMP.
Objective 1.4	Continue to monitor low risk hazards based on Risk Factor (RF) Methodology and modify the plan if risk should change before the plan needs to be updated.	Continued to 2025 HMP.

Table 6.1-1 List and review summary of 2020 mitigation strategy goals and objectives.		
Objective 1.5	Develop and distribute public awareness materials about natural hazard risks, preparedness, and mitigation.	Moved under goal 3.
Objective 1.6	Target owners of properties within identified hazard areas for additional outreach regarding mitigation and disaster preparedness.	Continued to 2025 HMP.
Objective 1.7	Promote hazard mitigation as a public value in recognition of its importance to the health, safety, and welfare of the population.	Moved under goal 3.
Objective 1.8	Coordinate with High Hazard Potential Dam owners and affected officials on dam rehabilitation and funding.	Moved under new HHPD Goal.
GOAL 2	**PROMOTE SUSTAINABLE DEVELOPMENT TO IMPROVE THE QUALITY OF LIFE IN LUZERNE COUNTY.**	**CONTINUED TO 2025 HMP.**
Objective 2.1	Ensure that existing drainage systems (pipes, culverts and channels) are adequate and function properly through regular maintenance or upgrades.	Continued to 2025 HMP.
Objective 2.2	Protect natural resources and open space including parks and wetlands within the floodplain and watersheds.	Continued to 2025 HMP.
GOAL 3	**PROMOTE PUBLIC UNDERSTANDING, SUPPORT AND INVOLVEMENT IN MITIGATION RELATED ACTIVITIES.**	**CONTINUED TO 2025 HMP.**
Objective 3.1	Work with television, radio and newspaper partners to promote public awareness on the potential impacts of natural hazards and actions to reduce those impacts.	Continued to 2025 HMP.
Objective 3.2	Consider education campaigns and workshops to promote 'safe' development and other hazard mitigation principles.	Continued to 2025 HMP.
GOAL 4	**ENSURE ADEQUACY AND CONTINUITY OF EMERGENCY MANAGEMENT SERVICES DURING HAZARD EVENTS.**	**CONTINUED TO 2025 HMP.**
Objective 4.1	Ensure that hazards do not interrupt emergency response services and critical functions.	Continued to 2025 HMP.
Objective 4.2	Continue to provide residents with adequate warning of potential hazards.	Continued to 2025 HMP.
Objective 4.3	Identify safe and efficient evacuation routes during hazard events to ensure continued service.	Continued to 2025 HMP.

Table 6.1-1 List and review summary of 2020 mitigation strategy goals and objectives.		
Objective 4.4	Provide for adequate shelters during hazard events.	Continued to 2025 HMP.
GOAL 5	**ENSURE HAZARD MITIGATION GOALS AND OBJECTIVES ARE CONSISTENT WITH GOALS OF OTHER PLANS AND ORDINANCES IN THE COUNTIES AND MUNICIPALITIES.**	**CONTINUED TO 2025 HMP.**
Objective 5.1	Promote responsible growth and development via proper enforcement and through the incorporation of hazard mitigation principles in municipal plans, and zoning, subdivision and land development, stormwater ordinances, and floodplain ordinances, as appropriate.	Continued to 2025 HMP.
Objective 5.2	Incorporate hazard mitigation planning projects into capital improvement plans.	Continued to 2025 HMP.
Objective 5.3	Continue to regulate development in conservation areas and within floodplains to prevent flood damage.	Continued to 2025 HMP.
Objective 5.4	Work with municipalities to continue to be compliant with the National Flood Insurance Program (NFIP) through periodic training of municipal officials. Encourage further participation by educating municipal officials on the benefits of the Community Rating System.	Continued to 2025 HMP.
Objective 5.5	Better integrate plans and ordinances to ensure concurrency and harmony between them.	Continued to 2025 HMP.

6.1.2. MITIGATION ACTION REVIEW

Mitigation actions have been carried over and developed for the County as well as for each participating jurisdiction. Some actions may be more general in nature and could apply to more than one jurisdiction, and some actions are specific to individual jurisdictions. The mitigation actions that were developed were based on the following: issues identified in the Hazard Identification and Risk Assessment, gaps identified in the mitigation capability analysis, input from the HMPT, and feedback from the Capability Assessment and Mitigation Strategy Workshop held March 10 and March 13, 2025. These mitigation actions may be implemented through a variety of local tools such as: changes in ordinances and policies, inclusion into capital improvements budgets, and grant funding.

County and Municipal actions in the 2020 Plan were distributed at the March workshops for review and update. Each action has been assigned one of the following categories:

- "Completed" – Actions that were completed since the adoption of the 2020 Plan
- "Cancelled" – Actions that were terminated.
- "Deferred" – Actions that had not been initiated since the adoption of the 2020 Plan
- "On-Going" – Actions that are performed on a regular and continuous basis by the department

The majority of existing mitigation actions have been carried over into the 2025 Hazard Mitigation Plan as they are continuous actions or actions that were not completed. A list of these actions as well as their status is included in Table 6.1-2. Actions were evaluated by the HMPT and municipal officials with the intent of producing a usable mitigation action plan in 2025 with actions and projects that could be completed over the next five years. Appendix C contains a summary of responses provided by municipalities to the *Mitigation Action Progress Report Form*.

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
1	Continue to work with the Red Cross to conduct an annual assessment of existing shelters in the county to determine their condition and adequacy with respect to beds, etc. and determine which ones would need to be retrofitted. Identify additional locations that could be equipped and identified as shelters based on the needs and the population centers in the county.	Luzerne County				X
2	Include the following language in the new county zoning ordinance to: 1) concur with the Model Floodplain Ordinance and/or regulations and the Subdivision/Land development Ordinance (SALDO) with respect to what is allowed in the floodplain; and 2) for all development to construct first floors above the base flood elevation for areas that are protected by the levee systems.	Luzerne County				X
3	Encourage the municipalities to come under the control of the County Zoning & Subdivision/Land Development ordinances.	Luzerne County				X
4	Promote and share information about available training and webinars (provided by ASFPM, PAFPM, FEMA, DEP, etc.) with local floodplain management officials.	Luzerne County				X
5	Work with the following four municipalities to encourage them to issue building permits and perform UCC functions including inspections: Jeddo, New Columbus, and Warrior Run Boroughs and Ross Township.	Luzerne County				X
6	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes).	Luzerne County				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
7	Work with municipalities, particularly those along the Susquehanna River and large streams, to join the CRS by educating them on the benefits of CRS and also providing them with technical assistance; work with municipalities to adopt and enforce the requirements of the Countywide ACT 167 plan.	Luzerne County				X
8	Develop a Source Water Protection Plan to properly utilize and protect ground water resources in the two counties.	Luzerne County				X
9	Encourage the county to include in their zoning ordinance, measures to: enhance the concept of defensible space practice; and discourage development on permeable soils to reduce the impacts of drought.	Luzerne County			X	
10	Encourage the individual municipalities to be firmly committed to continued compliance with the NFIP by regulating development and redevelopment through the adoptions of provisions that exceed the minimum NFIP requirements. Work with communities to ensure that there are no deficiencies when the Community Assistance Visits are conducted to ensure continued compliance.	Luzerne County				X
11	Work with each municipality to identify a point of contact to perform an annual review of the mitigation actions for their municipality from this Hazard Mitigation Plan.	Luzerne County				X
12	Initiate a research and education program with local universities to map the extents of the mine pools in the Lackawanna and Susquehanna River valleys. Because earthquakes will have the greatest effect in areas of abandoned mine lands, this program will seek to quantify the effects of earthquakes on destabilized earth, such as that over flooded mine pools.	Luzerne County				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
13	Coordinate efforts between the Joint-County Comprehensive Plan and the countywide Act 167 Stormwater Management Plan to identify groundwater recharge areas and sensitive groundwater areas such as mine lands. Work closely with the municipalities to enforce infiltration and groundwater recharge requirements in these areas to reduce the impacts of drought.	Luzerne County				X
14	For those parties not interested in acquisition or where acquisition is not feasible, continue to work with municipalities to advise homeowners with a preferred mitigation alternative such as elevation or flood proofing.	Luzerne County				X
15	Work with Duryea Borough and DEP to conduct annual inspections of the structures that discharge stormwater and groundwater from the flooded mine pool and identify any structural repairs needed.	Luzerne County				X
16	Encourage municipalities to reduce the vulnerability of critical facilities to wildfires by: increasing buffers and introducing defensible spaces; identifying farm roads, service roads, and other private access corridors in high hazard areas that could be used as fire breaks; and providing assistance to the County Emergency Management to identify vulnerable structures (firewise communities).	Luzerne County				X
17	Work with FEMA to conduct detailed studies for Abrahams Creek of Forty Fort, Big Wapwallopen Creek, Lackawanna River, Nescopeck Creek, Solomon Creek, and Toby Creek as identified in the FEMA Region III Post-Flood Community Flood Risk Evaluation for Luzerne County.	Luzerne County				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
18	Designate specific locations throughout the County such as the Emergency Management Agency, Planning & Zoning Department, municipal libraries, and events such as fairs to provide information to the public on flooding and other hazards. Encourage these locations to stock a variety of FEMA publications on various natural and human caused hazards and the most recent FIRMs; also include information on the County's website.	Luzerne County				X
19	Conduct an educational campaign and develop brochures on topics such as: the impacts of drought, proper sediment and erosion control, and dangers of developing on old mines and dumps.	Luzerne County				X
20	Stay closely involved with the activities of the Delaware Regional Basin Commission, Susquehanna River Basin Commission, Water Board, and other water planning organizations by encouraging a staff member from the County Planning Commission to be present at their meetings depending on their availability.	Luzerne County				X
21	Work with State agencies, professional organizations, and non-government organizations to conduct an annual workshop at a key location in each county for private developers to involve them in hazard mitigation activities and educate them on 'safe' development principles that can be incorporated into their development proposals.	Luzerne County				X
22	Continue to provide inquirers with technical advice and information from the community's FIRM and FEMA's website on a property's location in a Special Flood Hazard Area, zone, and its base flood elevation if data is available.	Luzerne County				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
23	Work with real estate agents throughout the county and encourage them to advise prospective property purchasers in flood prone and land subsidence areas to obtain flood or land subsidence insurance in municipalities over which the County has jurisdiction.	Luzerne County	X			
24	Continue to perform regular inspections of the Wyoming Valley Flood Risk Management Project as outlined in the Project Cooperation Agreement between the federal government and LCFPA.	Luzerne County				X
25	Monitor and evaluate mitigation actions annually and update the hazard mitigation plan every five years to reflect changes in development after a major hazard event and provide technical assistance to municipalities in implementing individual hazard mitigation actions.	Luzerne County				X
26	Continue to maintain and update threat protection program software	Luzerne County				X
27	Provide annual cyber-security and awareness training to all County staff to reduce risk and occurrence of phishing and malware attacks	Luzerne County				X
28	Provide notice of funding opportunities and supporting documentation from the county HMP to EMCs of municipalities with High Hazard Potential Dams to promote rehabilitation and safety in Luzerne County.	Luzerne County				X
29	Each spring, post a link on the County website banner with hailstorm safety information.	Luzerne County				X
30	Identify hazardous materials sites, including TRI facilities and oil and gas wells, that are in or near flood zones and develop strategies to reduce potential damage.	Luzerne County			X	

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
31	Identify opportunities to upgrade or bury power lines during new development or redevelopment.	Luzerne County		X		
32	Maintain regular contact with the Pennsylvania Department of Conservation and Natural Resources to ensure that County information about the potential for landslides is current.	Luzerne County			X	
33	Continue to work with the USACE to implement the National Levee Safety Program and refine an inventory of all levees in the County.	Luzerne County				X
34	Develop nuclear mitigation actions work group.	Luzerne County				X
35	Work with the Wilkes-Barre City Health Department and the PA Health Department to make the public aware of the availability of a Covid-19 vaccine, once a vaccine has been developed.	Luzerne County	X			
36	Work with other County Departments to incorporate hazard mitigation actions and planning into other plan updates, including Emergency Operations Plan updates.	Luzerne County				X
37	Work with the Pennsylvania Department of Health to increase awareness about treating and preventing opioid addiction.	Luzerne County				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
38	Encourage homeowners to install appropriate devices to monitor and reduce radon exposure in homes.	Luzerne County				X
39	After an event, provide information on alternatives to reconstruction of structures that sustain damages more than or equal to 50% of value to property owners.	Luzerne County				X
40	Work with PEMA to transition evacuation planning for the Susquehanna Steam Electric Station to the new "keyhole" approach	Luzerne County				X
41	Coordinate with PEMA and Talen Energy on updated public information materials and a public information campaign to inform people in the 10-mile EPZ about the new evacuation plan.	Luzerne County				X
42	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes).	Ashley Borough				X
43	Identify mitigation options to address the flooding of Mill Creek on the 700 block of Grove Street. Use FEMA publication 551, Selecting Appropriate Mitigation Measures for Flood Prone Structures, which provides guidance on determining appropriate mitigation measures.	Avoca Borough				X
44	Identify measures to prevent/remove ice buildup in the Mill Creek channel during winter months.	Avoca Borough				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
45	Improve drainage structures and storm sewers throughout the Borough, which are undersized and cause roadway flooding.	Avoca Borough				X
46	Separate combined sanitary and storm sewers in the 3rd Ward.	Avoca Borough				X
47	Make municipal buildings accessible to residents to do business without having to come in direct contact with township employees. Outfit front door with an intercom that would allow visitors to be buzzed into the building and place hand sanitizing stations throughout.	Bear Creek Township				X
48	Consider adding walls to Falls Creek.	Black Creek Township				X
49	Improve access for snow removal on certain roads with snowplow truck operation.	Bear Creek Village Borough				X
50	Engineering study to assess feasibility and cost, and title search cost estimate, of project to channelize/dredge the Bear Creek South of SR 115 in the Borough.	Bear Creek Village Borough				X
51	Identify specific mitigation actions for the structures on Wilkes Barre and Easton Roads that are vulnerable to flooding.	Buck Township				X
52	Identify mitigation options to address the flooding action on Nescopeck Creek and St. Johns Road and State Route 222. Use FEMA publication 551, Selecting Appropriate Mitigation Measures for Flood Prone Structures, which provides guidance on determining appropriate mitigation measures.	Butler Township				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
53	The urbanization of the Borough without stormwater management controls has led to flooding issues from stormwater run-off upstream of the Borough. Develop a plan to implement stormwater management features in the Borough. Pursue recommendations identified in the Act 167 Plan and consider sewer pump retrofit.	Conyngham Borough				X
54	Ensure integration of vulnerabilities into local, regional, and countywide comprehensive planning processes.	Conyngham Borough				X
55	Work with the County to develop a procedure to issue building permits and perform UCC functions including inspections.	Conyngham Township				X
56	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes).	Courtdale Borough				X
57	Conduct an engineering study to identify the most appropriate mitigation measures for the Borough's Government Building and the Police Department on Main Street.	Dallas Borough		X		
58	Conduct an engineering study to identify the most appropriate mitigation measure for heavy rain - flooding in the area of Columbia Avenue, American Legion Post and Leggio's Restaurant.	Dallas Borough				X
59	Conduct an inspection and provide engineering recommendation for the Toby Creek culvert which runs underneath Fino's Pharmacy, Citizens Bank and their respective parking lots.	Dallas Borough				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
60	Creek bank restoration and sedimentation clean out around culvert area in tributary to Toby creek. This will mitigate storm water flooding in area near Foster St/Wood Lawn Ave.	Dallas Borough				X
61	Conduct a study to identify ways (e.g., property acquisitions and stream widening) to mitigate the continual flooding of properties at the confluence of Toby's Creek and Trout Run (Fernbrook Corners).	Dallas Township				X
62	Flooding along Leonard's Creek has caused severe damage to two bridges and channel improvements. FEMA funding has been secured to rebuild one bridge and wall improvements. Identify additional actions that should be taken at the Kunkle/Leonard's and Shady Side Creek area.	Dallas Township				X
63	Conduct a study to identify stream bed improvements along public roads which continue to be heavily flooded.	Dallas Township				X
64	Conduct a study to identify the need for retaining structures with creek bed improvements at Toby Creek from Offset Paperback and Route 309 to the Dallas Township - Kingston Township municipal boundary.	Dallas Township				X
65	Conduct an engineering study to identify the most appropriate mitigation measure for the multiple structures in the Special Flood Hazard Area throughout the Township.	Dennison Township				X
66	Conduct a study to identify solutions to mitigating regular flooding at the intersection of Stairville Road and St. Mary's Road.	Dorrance Township				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
67	Conduct a study to identify problems on Dupont Creek (Lidy, Collins, Mill) and Mill Creek.	Dupont Borough				X
68	The Lower Lackawanna Sewer Authority placed a valve in their Diversion Chamber to help alleviate the sewage from backing up into the homes on Chittenden Street. LLVSA inspects and maintains the valve but does not determine when the valve should be opened or closed. Duryea Borough Sewer Authority is interested in the placement of check valves for sanitary laterals on individual homes located on Chittenden Street.	Duryea Borough				X
69	Purchase portable pumps along with discharge hoses for pumping of landside water in the event the flap gates are closed, and interior flooding of streets occurs on the landside of the levee.	Duryea Borough				X
70	Raise Levee/Dike System in Duryea Borough.	Duryea Borough				X
71	Identify specific mitigation for the structures on Hillside Avenue, Elm, Green, and Cherry Streets that are vulnerable to mine subsidence.	Edwardsville Borough				X
72	Move the EOC out of flood waters. Maintenance of the underground Floodway interceptor.	Edwardsville Borough				X
73	Conduct a feasibility study for floodwall protection improvements required for the problem areas of Susquehanna Avenue and Grant Street.	Exeter Borough				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
74	Continue to perform creek and riverbank maintenance and stabilization activities along strategic areas of the Susquehanna River and Hicks Creek.	Exeter Borough				X
75	Post a digital version of the DFIRM and the availability of flood protection guidance documents on the Borough website.	Exeter Borough				X
76	Use the Exeter Borough website to update residents on hazard mitigation related activities.	Exeter Borough				X
77	Adopt a resolution to ensure Real Estate Disclosure of properties in the floodplain to potential residents interested in these properties.	Exeter Borough				X
78	Pursue the recommendations for culvert removal/replacement along the Hicks Creek, and pump station upgrades made in the 2006-2007 Hicks Creek and Abrahams Creek Flood Study. Continue to work with the Luzerne County Flood Protection Authority during the Detailed Feasibility Assessment of Hicks Creek concerning the construction of a pressure conduit, pump station, levee culvert modifications, or combination of these solutions.	Exeter Borough				X
79	Consider elevation of houses and/or utilities along Susquehanna Avenue	Exeter Borough				X
80	Conduct a feasibility study to determine improvements for the problem areas along Route 92, Dymund Creek, Sutton Creek and Appletree Road.	Exeter Township				X
81	Identify creek and riverbank maintenance and stabilization activities along strategic areas of the Susquehanna River and the Township's tributary creeks.	Exeter Township				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
82	Develop a website for the Township and post access to the FIRM and availability of flood protection guidance documents.	Exeter Township				X
83	Adopt a resolution to ensure Real Estate Disclosure of properties in the floodplain to potential residents interested in these properties.	Exeter Township				X
84	An Emergency Action Plan for Lake Jean was adopted in 2006. Continue annual inspection of the dam and perform updates of the EAP as necessary.	Fairmount Township				X
85	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes).	Fairview Township				X
86	Conduct a study to correct combined stormwater and sewer overflows.	Forty Fort Borough				X
87	Identify specific mitigation actions for the structures on Shadetree Drive, Brookside Drive, and Tannery Road that are vulnerable to flooding.	Foster Township				X
88	Identify mitigation options to reduce flooding on Municipal Road and Valley View Road.	Franklin Township				X
89	Make repairs to the dam on Flat Rock Road.	Franklin Township				X
90	Make repairs to the existing high hazard dam on Lake Louise.	Franklin Township				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
91	Conduct a survey of structures in the Central Business District to address areas structural remediation is necessary.	Freeland Borough				X
92	Adopt a resolution to ensure Real Estate Disclosure of properties in the floodplain to potential residents interested in these properties.	Hanover Township				X
93	Conduct public outreach to better educate residents to become better prepared to face hazards.	Hanover Township	X			
94	Repair storm water joins on Kniffer Street and Lyndwood Avenue. The joints are loose, causing sink holes	Hanover Township				X
95	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes).	Harveys Lake Borough				X
96	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes).	Hazle Township				X
97	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes).	City of Hazleton				X
98	Conduct public outreach to better educate residents to become better prepared to face hazards.	City of Hazleton				X
99	Develop a sewer maintenance program.	City of Hazleton				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
100	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes).	Hollenback Township				X
101	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes).	Hughestown Borough				X
102	Acquire and demolish/elevate residential structures located on Garden Drive and within the Susquehanna River's flood hazard area.	Hunlock Township	X			
103	The UGI propane tank storage facility lies along State Route 11. Construct guardrails alongside the road to protect the roadway for motorists.	Hunlock Township	X			
104	Ground stabilization, planting and building a barrier along routes to prevent roadway blockage caused by erosion and landslides.	Hunlock Township				X
105	Add piping and drains in Main Road 4016. The existing two drains are not capable of handling stormwater during heavy rainfall, causing ponding and flooding of homes.	Hunlock Township				X
106	Florkowski, Daro, Hubbard Flaps Roads and State Route 239 close during storm events as the Huntingdon Creek overtops roadway. Replace culverts at these locations.	Huntington Township				X
107	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes).	Jackson Township				X
108	Work with the County to develop a procedure to issue building permits and perform UCC functions including inspections.	Jeddo Borough				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
109	Acquire and demolish/elevate residential structures located along River Road, Tennant Street, Miller Road, lots on Paradise TP and within the Susquehanna River's Special Flood Hazard Area.	Jenkins Township				X
110	Conduct an engineering study to identify the most appropriate land subsidence mitigation measure for the Government Building and Police Department on Wyoming Avenue.	Kingston Borough				X
111	Conduct an engineering study to identify the most appropriate land subsidence mitigation measure for the Chester Street Elementary School and Wyoming Valley West Middle School on Chester Street.	Kingston Borough				X
112	Identify the most appropriate mitigation measures for the Dallas Area Municipal Authority and the PA Water Treatment plant. Use FEMA publication 551, Selecting Appropriate Mitigation Measures for Flood Prone Structures, which provides guidance on determining appropriate mitigation measures.	Kingston Township				X
113	Conduct a study to identify the most appropriate mitigation measure for the 2 small dams located in the southwestern portion of the Township that are located near historic farming operations. Since Hillside Farms is private property, owners should be contacted.	Kingston Township				X
114	Investigate solutions to the flooding issues along Gardner Creek.	Laflin Borough				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
115	Identify measures to address power outages due to a single source of electric power to the Borough, and which impact communication services in hazard events.	Laflin Borough				X
116	Identify measures to prevent/respond to train derailments in the Borough, which could impact evacuation procedures during hazard events.	Laflin Borough				X
117	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes).	Lake Township				X
118	Provide watertight seals for manholes impacted by flooding on the Susquehanna River.	Larksville Borough				X
119	Identify clearing and dredging activities for Boston Creek upstream of US 11 in order to maintain its flood carrying and storage and capacity.	Larksville Borough				X
120	Provide dry floodproofing measures for metal doors/windows for structures within the Susquehanna River's Special Flood Hazard Area.	Larksville Borough				X
121	Conduct an engineering study to identify the most appropriate mitigation measure for the Government Building on Dupont Drive.	Laurel Run Borough				X
122	The dam on Harvey's Creek has recently been classified as a high-risk dam. Develop a program to conduct regular maintenance of this dam.	Lehman Township				X
123	Conduct an engineering study to identify the most appropriate mitigation measure for the Luzerne Borough Volunteer Fire Department on Academy Street.	Luzerne Borough				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
124	Conduct an engineering study to identify the most appropriate mitigation measure to address land subsidence for the Luzerne County Community College on South Prospect Street.	City of Nanticoke				X
125	Pursue property acquisition for properties along Newport Creek which are flooded by Susquehanna River backwater.	City of Nanticoke				X
126	Identify emergency management duties to protect residents north and south of the railroad tracks (which divide the borough) in the event of train derailment.	Nescopeck Borough				X
127	Continue to pursue measures to protect the wastewater treatment plant's essential facilities which cannot be elevated above, or relocated out of, the floodplain.	Nescopeck Borough				X
128	Continue to acquire and demolish/elevate residential structures located along River Road and within the Susquehanna River's Special Flood Hazard Area.	Nescopeck Township				X
129	Continue to pursue measures to protect the wastewater treatment plant's essential facilities which cannot be elevated above, or relocated out of, the floodplain.	Nescopeck Township				X
130	Work with the County to develop a procedure to issue building permits and perform UCC functions including inspections.	New Columbus Borough				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
131	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes).	Newport Township				X
132	Purchase a generator to assist the Borough during power outages.	Nuangola Borough				X
133	Conduct a study to identify flooding problems at North End Road.	Nuangola Borough				X
134	Examine development in sensitive areas such as Lake Nuangola, wetlands, flood prone areas to ensure it complies with the local code/ordinance.	Nuangola Borough				X
135	An Emergency Action Plan for Penn Lake was adopted in 2008. Continue annual inspection of the dam and perform updates of the EAP as necessary.	Penn Lake Park Borough				X
136	Conduct an engineering study to identify the most appropriate mitigation measure to address mine subsidence for the Intake Dam, Mill Creek, on Armstrong Road.	Pittston Township				X
137	Conduct an engineering study to identify the most appropriate mitigation measure to address mine subsidence for the Pittston Township Police Department on Broad Street.	Pittston Township				X
138	Evaluate storm drainage needs and sewer system improvements required for problem areas of Benedict Street, Towpath Court, KOZ area and New Street.	City of Pittston				X
139	Establish a Pittston City Newsletter for hazard mitigation information updates.	City of Pittston				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
140	Continue to identify and restore channels that are damaged/clogged causing flooding in the Township's residential areas .Most of the problematic channels have been addressed; the Township is pursuing some additional actions to restore the remainder of the channels in the Township.	Plains Township				X
141	Continue to acquire and demolish/elevate residential structures located along Gallagher Drive, McCullough Street, North River Road, North River Street, South River Street, Mitchell Street, Courtright Street, Reese Street, and Roberts Street that lie within the Susquehanna River's Special Flood Hazard Area.	Plains Township				X
142	Pursue measures to minimize the potential for a train derailment caused by flooding where the Mill Creek meets the Gardners Creek at Union Street.	Plains Township				X
143	Conduct an engineering study to identify the most appropriate mitigation measure to address mine subsidence for the following three dams: Brown Creek Dam on Cherry Street, Wadham Creek Dam on Shawnee Street, and Duffy's Run Dam on 1st Street.	Plymouth Borough				X
144	Develop mitigation measures including an implementation strategy for the fire station and water treatment plant that are located in the floodplain. Use FEMA publication 551, Selecting Appropriate Mitigation Measures for Flood Prone Structures, which provides guidance on determining appropriate mitigation measures.	Plymouth Township				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
145	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes).	Pringle Borough				X
146	Purchase a generator for the fire company to serve as back-up during power outages.	Rice Township	X			
147	Purchase a generator for the Ross Township Building to serve as a back-up power source during power outages.	Ross Township				X
148	Since the nuclear material transported to and from the Susquehanna Steam Electric Nuclear Facility could pose a threat to the Township, educate residents of the procedures to follow after a hazardous materials incident. Develop a brochure on what to do when an incident occurs.	Salem Township	X			
149	Identify options to address the flooding of Mud Swamp Creek unto Sonny Drive.	Salem Township				X
150	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes).	Slocum Township				X
151	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes).	Sugar Notch Borough				X
152	Identify measures to prevent sanitary sewer backups during rainfall and flooding events.	Sugar Notch Borough				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
153	Improve drainage structures and storm sewers throughout the Borough, which are undersized and cause roadway flooding.	Sugar Notch Borough				X
154	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes).	Sugarloaf Township				X
155	Work with a consultant to determine the causes of, and investigate solutions to, the three flooding issues along Main Street.	Swoyersville Borough				X
156	Conduct public outreach to better educate residents to become better prepared to face hazards.	Swoyersville Borough				X
157	Clean culverts in the township to prevent streams from flooding or damming up.	Union Township				X
158	Work with the County to develop a procedure to issue building permits and perform UCC functions including inspections.	Warrior Run Borough				X
159	Improve drainage structures and storm sewers throughout the Borough, which are inadequate and cause flooding.	Warrior Run Borough				X
160	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes).	West Hazleton Borough				X
161	Since the hazardous materials from the Humboldt and Valmont industrial parks could pose a threat to the Borough, make residents aware of the procedures to follow after a hazardous materials incident. Develop a brochure on what to do when an incident occurs.	West Hazleton Borough				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
162	Identify structural solutions to stormwater ponding and sewer back-ups area in the Borough that had been subject to mine subsidence.	West Pittston Borough				X
163	Offer a cost-sharing program for residents affected by sewage back-up damage and publicize use of backflow valves within the community to residents subject to sewer backups and associated damages.	West Pittston Borough				X
164	Include information in the Borough newsletter on the availability of flood insurance, basement back-up insurance, and mine subsidence insurance.	West Pittston Borough				X
165	Purchase a portable generator to power heating systems at shelter locations.	West Pittston Borough				X
166	Pursue the recommendations for culvert removal/replacement along the Abrahams Creek made in the 2006-2007 Hicks Creek and Abrahams Creek Flood Study. The undersized structures are the Upper 8th Street bridge and the Erie-Lackawanna Railroad bridge.	West Wyoming Borough				X
167	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes).	White Haven Borough				X
168	Continue to work with the Luzerne County Flood Protection Authority and the City of Wilkes-Barre to finalize a solution to the flooding issues along Coal Brook.	Wilkes-Barre Township				X
169	Conduct a study to identify the most appropriate mitigation measure for the Geisinger South hospital, which is located near historic mining operations and floodplains.	City of Wilkes-Barre				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
170	Consider the stabilization of Laurel Run Creek and Mill Creeks.	City of Wilkes-Barre				X
171	Restore the wall along Solomon Creek.	City of Wilkes-Barre				X
172	Continue to work with the Luzerne County Flood Protection Authority and Wilkes-Barre Township to finalize a solution to the flooding issues along Coal Brook.	City of Wilkes-Barre				X
173	Improve snow removal activities throughout the city during winter weather events.	City of Wilkes-Barre				X
174	Establish programs and facilities to prevent, reduce, and/or eliminate the impact of opioid addiction affecting vulnerable residents of the City of Wilkes-Barre.	City of Wilkes-Barre				X
175	Obtain FEMA accreditation for the Wilkes-Barre City-Hanover Township Levee System.	City of Wilkes-Barre	X			
176	Obtain FEMA accreditation for the Brookside Levee System.	City of Wilkes-Barre				X
177	Obtain FEMA accreditation for the Mill Creek Left Bank Upstream Levee System.	City of Wilkes-Barre				X
178	Obtain FEMA accreditation for the Laurel Run Levee System.	City of Wilkes-Barre				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
179	Rehabilitate/modify bridges over streams vulnerable to flooding including Strass Lane Bridge over Solomon Creek.	City of Wilkes-Barre	X			
180	Rehabilitate/modify bridges over streams vulnerable to flooding including Blackman Street Bridge over Bowman Spring Creek.	City of Wilkes-Barre				X
181	Relocate the Emergency Response Center outside of the flood hazard area. Convert 4,249 square feet of existing storage space on the second floor of the city-owned Department of Public Works building into an Emergency Response Center.	City of Wilkes-Barre	X			
182	Construct a storage/maintenance facility for LCFPA's Market Street Bridge Flood Closure Structures.	City of Wilkes-Barre	X			
183	Improve drainage at the creek at Glendale Drive, Laurel Drive, and Terrace Drive to prevent them from flooding.	Wright Township			X	
184	Develop informational materials to educate and assist homeowners near wildfire prone areas of firewise concepts including safe zones and defensible spaces.	Wright Township				X
185	Educate the public on potential hazards and provide emergency contact information for the public via the web. Focus on high pressure gas line and Crystal Lake dam warnings, and other common hazards like wildfires and downed phone lines.	Wright Township				X
186	Hire third party code enforcement to enforce local safety and nuisance ordinances.	Wright Township				X
187	Purchase a new leaf machine to remove leaves from swales to mitigate flood issues throughout the Township.	Wright Township				X

Table 6.1-2 2020 Mitigation Action Review

#	2020 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
188	Remove dead and downed trees/lumber throughout the Township to mitigate wildfire hazard.	Wright Township				X
189	Pursue the recommendations along the Abrahams Creek made in the Hicks Creek and Abrahams Creek Detailed Feasibility Study, to address flooding issues on Eight Street, Swetland Lane.	Wyoming Borough				X
190	Identify flood protection measures, or pursue property acquisition, for properties along Susquehanna Avenue between 4th and 8th Streets which are affected by flooding from the Susquehanna River.	Wyoming Borough				X
191	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes).	Yatesville Borough				X

6.1.3. MITIGATION SUCCESS

A great deal of mitigation progress has been made on hazard mitigation projects and actions in the last five years. Details on numerous actions marked as "Completed" since the 2020 plan update are summarized below:

Structure and Infrastructure

- The City of Wilkes Barre rehabilitated the Strass Lane Bridge over Solomon Creek.
- The City of Wilkes Barre's Emergency Response Center was relocated outside of the flood hazard area and was built at the Toyota Sportsplex. It was built as a state of the art EOC.
- Hunlock Township acquired residential structures located on Garden Drive and within the Susquehanna River's flood hazard area. The township worked with residents of these areas to collaboratively craft a strategy for their voluntary relocation.
- Hunlock Township built guardrails alongside the road of the UGI propane tank storage facility on State Road 11. This helps protect the roadway for motorists.
- A storage and maintenance facility was constructed for LCFPA's Market Street Bridge Flood Closure Structures.
- Luzerne County received $813,900 from FEMA to improve their flood protection system along the Wyoming Valley Levee. Four closures along the levee were eliminated and three were modified.
- The Brookside Levee Rehabilitation project in the City of Wilkes-Barre underway and is about 75% complete. 280 residents will be protected from these efforts. This project is being funded as follows:
    - LCFPA - $666,000.
    - Local Share Account Grant (LSA) - $400,000.
    - City of Wilkes-Barre - $91,245.
- The City of Wilkes Barre allocated $1 million on improvements to Solomon's Creek Levee. Through this effort the city was able to firm up and restore the levee's walls.
- The City of Wilkes-Barre completed a portion of the Laurel Run Creek Project, costing $2.5 million. To complete the whole reach, it will cost $10 to 15 million.
- The City of Wilkes-Barre completed a pump station project costing $5 million.
- The City of Wilkes-Barre and LCFPA partnered to create the Flood Protection Building. This was installed in Kirby Park.
- West Pittston Borough has completed the separation of combined sewer and storm projects and is currently conducting a Borough sewer separation project funded by an ARPA Grant and a H2O grant.
- Multiple communities in Luzerne County have been focused on prioritizing property acquisition after Hurricane Lee. Below is a list of total acquisitions by grant funding type and municipality.

Table 6.1-3 Property acquisitions in response to Hurricane Lee (as of 2023)

MUNICIPALITY	HMGP	CDBG-DR	LCFPA	TOTAL
Conyngham Township	25	40	4	69
Exeter Township	5	0	0	5
Hunlock Township	1	3	0	4
Jenkins Township	50	10	2	62
Nanticoke City	3	0	0	3
Nescopeck Borough	2	7	0	9
Nescopeck Township	3	5	0	8
Pittston City	0	5	0	5
Plains Township	17	15	2	34
Plymouth Township	61	4	4	69
Shickshinny Borough	33	32	14	79
West Pittston Borough	14	14	0	28
Total	**214**	**135**	**26**	**375**

Local Plans and Regulations

- The City of Wilkes-Barre completed an engineering study to protect Geisinger Hospital.
- The City of Wilkes-Barre increased levee freeboard requirements to deal with impacts of future conditions.
- West Pittston Borough completed a Feasibility Study by Borton-Lawson and Reilly Associates in 2020 to conduct a study for a Non-Federal Damage Reduction Project. The study was funded by a CDBG-DR Planning Grant.

Natural Systems Protection

- The City of Wilkes-Barre regularly conducts debris and vegetation removal of city streams.

Education and Awareness

- Luzerne County has worked with real estate agents throughout the county to encourage them to advise prospective property purchasers in flood prone and land subsidence areas to obtain flood or land subsidence insurance in municipalities over which the County has jurisdiction.
- Luzerne County worked with the Wilkes-Barre City Health Department and the Pennsylvania Health Department to make the public aware of the COVID-19 vaccine in response to the COVID-19 Pandemic.
- West Pittston Borough continually updates residents through the W.P. Website with information on FIRM, NFIP and the Borough's CRS program.

Figure 6.1-1 Wilkes-Barre City Fire Fighters and Department of Public Works Workers Erect the Portable Section of the Brookside Levee Over North Washington Street

6.2. MITIGATION GOALS AND OBJECTIVES

Based on results of the review of the 2020 HMP mitigation goals and objectives established, a new set of goals and objectives were developed in 2025. Tables 6.1-1 explains how goals and objectives were updated and revised. Table 6.2-1 lists the mitigation goals and objectives established for the 2025 plan. There are 6 goals, and 24 objectives identified.

Table 6.2-1 List of 2025 mitigation strategy goals and objectives.

GOAL 1	PROTECT LIVES, PROPERTY, AND RESOURCES IN LUZERNE COUNTY.
Objective 1A	Protect existing structures in the Special Flood Hazard Area.
Objective 1B	Encourage high construction standards on all structural projects to reduce risk from all natural and man-made hazards.
Objective 1C	Develop a comprehensive approach for reducing the possibility of damage to and loss of function at critical facilities located in High-Hazard Area.

Table 6.2-1 List of 2025 mitigation strategy goals and objectives.	
Objective 1D	Continue to monitor low risk hazards based on Risk Factor (RF) Methodology and modify the plan if risk should change before the plan needs to be updated.
Objective 1E	Target owners of properties within identified hazard areas for additional outreach regarding mitigation and disaster preparedness.
Objective 1F	Reduce the risk of natural hazards for socially vulnerable populations and underserved communities.
GOAL 2	**PROMOTE SUSTAINABLE DEVELOPMENT TO IMPROVE THE QUALITY OF LIFE IN LUZERNE COUNTY.**
Objective 2A	Ensure that existing drainage systems (pipes, culverts and channels) are adequate and function properly through regular maintenance or upgrades.
Objective 2B	Protect natural resources and open space including parks and wetlands within the floodplain and watersheds.
GOAL 3	**PROMOTE PUBLIC UNDERSTANDING, SUPPORT, AND IMPLEMENTATION IN MITIGATION-RELATED ACTIVITIES.**
Objective 3A	Work with television, radio and newspaper partners to promote public awareness on the potential impacts of natural hazards and actions to reduce those impacts.
Objective 3B	Consider education campaigns and workshops to promote 'safe' development and other hazard mitigation principles.
Objective 3C	Develop and distribute public awareness materials about natural hazard risks, preparedness, and mitigation.
Objective 3D	Promote hazard mitigation as a public value in recognition of its importance to the health, safety, and welfare of the population.
Objective 3E	Develop an understanding of increased risk from climate change impacts to natural hazards and promote education on potential impacts from increased risk.
GOAL 4	**ENSURE ADEQUACY AND CONTINUITY OF EMERGENCY MANAGEMENT SERVICES DURING HAZARD EVENTS.**
Objective 4A	Ensure that hazards do not interrupt emergency response services and critical functions.
Objective 4B	Continue to provide residents with adequate warning of potential hazards.
Objective 4C	Identify safe and efficient evacuation routes during hazard events to ensure continued service.
Objective 4D	Provide for adequate shelters during hazard events.
GOAL 5	**ENSURE HAZARD MITIGATION GOALS AND OBJECTIVES ARE CONSISTENT WITH GOALS OF OTHER PLANS AND ORDINANCES IN THE COUNTIES AND MUNICIPALITIES.**
Objective 5A	Promote responsible growth and development via proper enforcement and through the incorporation of hazard mitigation principles in municipal plans, and zoning, subdivision and land development, stormwater ordinances, and floodplain ordinances, as appropriate.

Table 6.2-1 List of 2025 mitigation strategy goals and objectives.	
Objective 5B	Incorporate hazard mitigation planning projects into capital improvement plans.
Objective 5C	Continue to regulate development in conservation areas and within floodplains to prevent flood damage.
Objective 5D	Work with municipalities to continue to be compliant with the National Flood Insurance Program (NFIP) through periodic training of municipal officials. Encourage further participation by educating municipal officials on the benefits of the Community Rating System.
Objective 5E	Better integrate plans and ordinances to ensure concurrency and harmony between them.
GOAL 6	**PROTECT PEOPLE AND ASSETS FROM THE POTENTIAL IMPACTS OF HIGH HAZARD POTENTIAL DAMS.**
Objective 6A	Coordinate with High Hazard Potential Dam owners and affected officials on dam rehabilitation and funding.
Objective 6B	Ensure High Hazard Potential Dams are mediated to decrease potential hazard risks.

6.3. IDENTIFICATION AND ANALYSIS OF MITIGATION TECHNIQUES

The mitigation strategy in the updated Hazard Vulnerability Assessment and Mitigation Plan Update should include analysis of a comprehensive range of specific techniques or actions. FEMA, through the March 2023 Local Mitigation Handbook, and PEMA, through the 2020 Standard Operating Guide (SOG), identify four categories of hazard mitigation techniques.

- **Local plans and regulations:** Government authorities, policies, or codes that influence the way land and buildings are developed and built. Examples include, but are not limited to, comprehensive plans, subdivision regulations, building codes and enforcement, and NFIP and CRS.
- **Structure and infrastructure:** Modifying existing structures and infrastructure or constructing new structures to reduce hazard vulnerability. Examples include, but are not limited to, acquisition and elevation of structures in flood prone areas, utility undergrounding, structural retrofits, floodwalls and retaining walls, detention and retention structures, and culverts.
- **Natural systems protection:** Actions that minimize damage and losses and preserve or restore the functions of natural systems. Examples include, but are not limited to, sediment and erosion control, stream corridor restoration, forest management, conservation easements, and wetland restoration and preservation.
- **Education and awareness:** Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate the hazards and may also include participation in national programs. Examples include, but are not limited to, radio or television spots, websites with maps and information, provide information and training, NFIP outreach, StormReady, and Firewise Communities.

The HMPT reviewed the four types of mitigation techniques and examples of actions at the Risk Assessment and Mitigation Solutions Workshop and ensured that all mitigation technique types were applied across hazards. The specific actions associated with these techniques are included in Table 6.4-1. Table 6.3-1 provides a matrix identifying the mitigation techniques used for the hazards identified in the Risk Assessment. The specific actions associated with these techniques are included in Table 6.4-1 in the next section.

Table 6.3-1 Mitigation techniques for all hazards in Luzerne County

HAZARD *(IN ORDER OF RISK FACTOR RANKING)*	MITIGATION TECHNIQUE			
	PLANS AND REGULATIONS	STRUCTURE AND INFRASTRUCTURE	NATURAL SYSTEMS PROTECTION	EDUCATION AND AWARENESS
Flood, Flash Flood, Ice Jam (N)	X	X	X	X
Winter Storm (N)	X	X		X
Drought (N)	X	X	X	X
Extreme Temperature (N)	X	X		X
Wildfire (N)	X	X		X
Cyber-Terrorism (M)	X	X		X
Hurricane, Tropical Storm, Nor'easter (N)	X	X		X
Pandemic (N)	X	X		X
Tornado, Windstorm (N)	X	X		X
Coal Mining (M)	X	X		X
Nuclear Incident (N)	X	X		X
Substance Use Disorder (M)	X	X		X
Landslide (N)	X	X		X
Subsidence, Sinkhole (N)	X	X		X
Hailstorm (N)	X	X		X
Earthquake (N)	X	X		X
Dam Failure (M)	X	X		X
Levee Failure (M)	X	X		X
Hazardous Materials Release (M)	X	X		X
Radon Exposure (N)	X	X		X

Table 6.3-2 provides a matrix identifying which municipalities have mitigation actions for each of hazards identified in the Risk Assessment. Each municipality has one action for all high-risk hazards, and for all medium and low risk hazards that they have identified as impacting them. This is identified in table 4.4-3. Table 4.4-3 shows the different municipalities in Luzerne County and whether their risk is greater than (>), less than (<), or equal to (=) the risk factor assigned to the County as a whole. Each municipality has a mitigation action for any hazards identified as greater than or equal to the risk factor of the County. The specific actions associated with these techniques are included in Table 6.4-1 in the next section.

Table 6.3-2 Mitigation actions per hazard for each municipality

MUNICIPALITY	FLOOD, FLASH FLOOD, ICE JAM (N)	WINTE STORM (N)	DROUGHT (N)	EXTREME TEMPERATURES (N)	WILDFIRE (N)	CYBER-TERRORISM (M)	HURRICANE, TROPICAL STORM, NOR' EASTER (N)	PANDEMIC AND INFECTIOUS DISEASE (N)	TORNADO, WINDSTORM (N)	EH - COAL MINING (M)	NUCLEAR INCIDENT (M)	SUBSTANCE USE DISORDER (M)	LANDSLIDE (N)	SUBSIDENCE, SINKHOLE (N)	HAILSTORM (N)	EARTHQUAKE (N)	DAM FAILURE (M)	LEVEE FAILURE (M)	EH - HAZARDOUS MATERIALS RELEASE (M)	RADON EXPOSURE (N)
Ashley Borough	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X			X	X
Avoca Borough	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
Bear Creek Village Borough	X	X	X	X	X	X	X	X			X	X			X	X				X
Bear Creek Township	X	X	X	X	X	X	X	X		X	X	X			X	X	X		X	X
Black Creek Township	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X			X	X

Table 6.3-2 Mitigation actions per hazard for each municipality

MUNICIPALITY	FLOOD, FLASH FLOOD, ICE JAM (N)	WINTE STORM (N)	DROUGHT (N)	EXTREME TEMPERATURES (N)	WILDFIRE (N)	CYBER-TERRORISM (M)	HURRICANE, TROPICAL STORM, NOR' EASTER (N)	PANDEMIC AND INFECTIOUS DISEASE (N)	TORNADO, WINDSTORM (N)	EH - COAL MINING (M)	NUCLEAR INCIDENT (M)	SUBSTANCE USE DISORDER (M)	LANDSLIDE (N)	SUBSIDENCE, SINKHOLE (N)	HAILSTORM (N)	EARTHQUAKE (N)	DAM FAILURE (M)	LEVEE FAILURE (M)	EH - HAZARDOUS MATERIALS RELEASE (M)	RADON EXPOSURE (N)
Buck Township	X	X	X	X	X	X	X	X	X		X	X			X	X	X			X
Butler Township	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X		X	X
Conyngham Borough	X	X	X	X	X	X	X	X			X	X	X		X	X			X	X
Conyngham Township	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X		X	X
Courtdale Borough	X	X	X	X	X	X	X	X		X	X	X			X				X	X
Dallas Borough	X	X	X	X	X	X	X	X			X	X			X		X		X	X
Dallas Township	X	X	X	X	X	X	X	X	X		X		X		X	X	X		X	X
Dennison Township	X	X	X	X	X	X	X	X	X		X	X			X	X	X		X	X
Dorrance Township	X	X	X	X	X	X	X	X	X		X	X			X	X	X		X	X
Dupont Borough	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X			X	X
Duryea Borough	X	X	X	X	X	X	X	X		X	X	X	X	X	X		X	X	X	X

Table 6.3-2 Mitigation actions per hazard for each municipality

MUNICIPALITY	FLOOD, FLASH FLOOD, ICE JAM (N)	WINTE STORM (N)	DROUGHT (N)	EXTREME TEMPERATURES (N)	WILDFIRE (N)	CYBER-TERRORISM (M)	HURRICANE, TROPICAL STORM, NOR' EASTER (N)	PANDEMIC AND INFECTIOUS DISEASE (N)	TORNADO, WINDSTORM (N)	EH - COAL MINING (M)	NUCLEAR INCIDENT (M)	SUBSTANCE USE DISORDER (M)	LANDSLIDE (N)	SUBSIDENCE, SINKHOLE (N)	HAILSTORM (N)	EARTHQUAKE (N)	DAM FAILURE (M)	LEVEE FAILURE (M)	EH - HAZARDOUS MATERIALS RELEASE (M)	RADON EXPOSURE (N)
Edwardsville Borough	X	X	X	X	X	X	X	X		X	X	X	X	X				X	X	X
Exeter Borough	X	X	X	X	X	X	X	X	X	X	X	X		X	X			X	X	X
Exeter Township	X	X	X	X	X	X	X	X				X	X		X					X
Fairmount Township	X	X	X	X	X	X	X	X	X		X	X	X		X		X			X
Fairview Township	X	X	X	X	X	X	X	X			X	X			X	X	X		X	X
Forty Fort Borough	X	X	X	X	X	X	X	X			X	X	X	X		X		X	X	X
Foster Township	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X		X	X
Franklin Township	X	X	X	X	X	X	X	X	X		X	X			X		X			X
Freeland Borough	X	X	X	X	X	X	X	X		X	X	X				X			X	X
Hanover Township	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X
Harveys Lake Borough	X	X	X	X	X	X	X	X	X		X	X	X		X				X	X

Table 6.3-2 Mitigation actions per hazard for each municipality

MUNICIPALITY	FLOOD, FLASH FLOOD, ICE JAM (N)	WINTE STORM (N)	DROUGHT (N)	EXTREME TEMPERATURES (N)	WILDFIRE (N)	CYBER-TERRORISM (M)	HURRICANE, TROPICAL STORM, NOR' EASTER (N)	PANDEMIC AND INFECTIOUS DISEASE (N)	TORNADO, WINDSTORM (N)	EH - COAL MINING (M)	NUCLEAR INCIDENT (M)	SUBSTANCE USE DISORDER (M)	LANDSLIDE (N)	SUBSIDENCE, SINKHOLE (N)	HAILSTORM (N)	EARTHQUAKE (N)	DAM FAILURE (M)	LEVEE FAILURE (M)	EH - HAZARDOUS MATERIALS RELEASE (M)	RADON EXPOSURE (N)
Hazle Township	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		X	X
Hazleton City	X	X	X	X	X	X	X	X		X	X	X				X			X	X
Hollenback Township	X	X	X	X	X	X	X	X	X		X	X			X	X				X
Hughestown Borough	X	X	X	X	X	X	X	X		X	X	X		X	X	X			X	X
Hunlock Township	X	X	X	X	X	X	X	X	X		X	X	X		X		X		X	X
Huntington Township	X	X	X	X	X	X	X	X	X		X	X			X		X			X
Jackson Township	X	X	X	X	X	X	X	X	X		X	X			X		X		X	X
Jeddo Borough	X	X	X	X	X	X	X	X		X	X	X			X	X			X	X
Jenkins Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Kingston Borough	X	X	X	X	X	X	X	X			X	X		X		X		X	X	X
Kingston Township	X	X	X	X	X	X	X	X	X	X	X	X	X		X				X	X

Table 6.3-2 Mitigation actions per hazard for each municipality

MUNICIPALITY	FLOOD, FLASH FLOOD, ICE JAM (N)	WINTE STORM (N)	DROUGHT (N)	EXTREME TEMPERATURES (N)	WILDFIRE (N)	CYBER-TERRORISM (M)	HURRICANE, TROPICAL STORM, NOR' EASTER (N)	PANDEMIC AND INFECTIOUS DISEASE (N)	TORNADO, WINDSTORM (N)	EH - COAL MINING (M)	NUCLEAR INCIDENT (M)	SUBSTANCE USE DISORDER (M)	LANDSLIDE (N)	SUBSIDENCE, SINKHOLE (N)	HAILSTORM (N)	EARTHQUAKE (N)	DAM FAILURE (M)	LEVEE FAILURE (M)	EH - HAZARDOUS MATERIALS RELEASE (M)	RADON EXPOSURE (N)
Laflin Borough	X	X	X	X	X	X	X	X		X	X	X	X		X	X			X	X
Lake Township	X	X	X	X	X	X	X	X	X		X	X			X		X		X	X
Larksville Borough	X	X	X	X	X	X	X	X	X	X	X	X		X	X				X	X
Laurel Run Borough	X	X	X	X	X	X	X	X	X	X	X	X			X	X				X
Lehman Township	X	X	X	X	X	X	X	X	X		X	X			X		X		X	X
Luzerne Borough	X	X	X	X	X	X	X	X		X	X	X		X				X	X	X
Nanticoke City	X	X	X	X	X	X	X	X		X	X	X	X	X		X			X	X
Nescopeck Borough	X	X	X	X	X	X	X	X	X		X	X		X	X	X			X	X
Nescopeck Township	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X			X	X
New Columbus Borough	X	X	X	X	X	X	X	X	X		X	X			X					X
Newport Township	X	X	X	X	X	X	X	X		X	X	X	X	X	X				X	X

Table 6.3-2 Mitigation actions per hazard for each municipality

MUNICIPALITY	FLOOD, FLASH FLOOD, ICE JAM (N)	WINTE STORM (N)	DROUGHT (N)	EXTREME TEMPERATURES (N)	WILDFIRE (N)	CYBER-TERRORISM (M)	HURRICANE, TROPICAL STORM, NOR' EASTER (N)	PANDEMIC AND INFECTIOUS DISEASE (N)	TORNADO, WINDSTORM (N)	EH - COAL MINING (M)	NUCLEAR INCIDENT (M)	SUBSTANCE USE DISORDER (M)	LANDSLIDE (N)	SUBSIDENCE, SINKHOLE (N)	HAILSTORM (N)	EARTHQUAKE (N)	DAM FAILURE (M)	LEVEE FAILURE (M)	EH - HAZARDOUS MATERIALS RELEASE (M)	RADON EXPOSURE (N)
Nuangola Borough	X	X	X	X	X	X	X	X			X	X			X	X			X	X
Penn Lake Park Borough	X	X	X	X	X	X	X	X			X	X			X	X	X			X
Pittston City	X	X	X	X	X	X	X	X		X	X	X	X	X		X			X	X
Pittston Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X			X	X
Plains Township	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X	X	X	X
Plymouth Borough	X	X	X	X	X	X	X	X		X	X	X	X	X			X	X	X	X
Plymouth Township	X	X	X	X	X	X	X	X		X	X	X	X		X				X	X
Pringle Borough	X	X	X	X	X	X	X	X			X	X	X				X	X	X	X
Rice Township	X	X	X	X	X	X	X	X	X		X	X			X	X	X		X	X
Ross Township	X	X	X	X	X	X	X	X	X		X	X			X		X			X
Salem Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X

Table 6.3-2 Mitigation actions per hazard for each municipality

MUNICIPALITY	FLOOD, FLASH FLOOD, ICE JAM (N)	WINTE STORM (N)	DROUGHT (N)	EXTREME TEMPERATURES (N)	WILDFIRE (N)	CYBER-TERRORISM (M)	HURRICANE, TROPICAL STORM, NOR' EASTER (N)	PANDEMIC AND INFECTIOUS DISEASE (N)	TORNADO, WINDSTORM (N)	EH - COAL MINING (M)	NUCLEAR INCIDENT (M)	SUBSTANCE USE DISORDER (M)	LANDSLIDE (N)	SUBSIDENCE, SINKHOLE (N)	HAILSTORM (N)	EARTHQUAKE (N)	DAM FAILURE (M)	LEVEE FAILURE (M)	EH - HAZARDOUS MATERIALS RELEASE (M)	RADON EXPOSURE (N)
Shickshinny Borough	X	X	X	X	X	X	X	X			X	X	X			X				X
Slocum Township	X	X	X	X	X	X	X	X	X		X	X			X	X	X		X	X
Sugar Notch Borough	X	X	X	X	X	X	X	X		X	X	X	X		X	X			X	X
Sugarloaf Township	X	X	X	X	X	X	X	X		X	X	X			X	X			X	X
Swoyersville Borough	X	X	X	X	X	X	X	X		X	X	X		X				X	X	X
Union Township	X	X	X	X	X	X	X	X	X		X	X	X		X		X			X
Warrior Run Borough	X	X	X	X	X	X	X	X		X	X	X			X	X			X	X
West Hazleton Borough	X	X	X	X	X	X	X	X			X	X			X	X			X	X
West Pittston Borough	X	X	X	X	X	X	X	X		X	X	X		X		X		X	X	X
West Wyoming Borough	X	X	X	X	X	X	X	X		X	X	X		X				X	X	X
White Haven Borough	X	X	X	X	X	X	X	X	X		X	X				X			X	X

Table 6.3-2 Mitigation actions per hazard for each municipality

MUNICIPALITY	FLOOD, FLASH FLOOD, ICE JAM (N)	WINTE STORM (N)	DROUGHT (N)	EXTREME TEMPERATURES (N)	WILDFIRE (N)	CYBER-TERRORISM (M)	HURRICANE, TROPICAL STORM, NOR' EASTER (N)	PANDEMIC AND INFECTIOUS DISEASE (N)	TORNADO, WINDSTORM (N)	EH - COAL MINING (M)	NUCLEAR INCIDENT (M)	SUBSTANCE USE DISORDER (M)	LANDSLIDE (N)	SUBSIDENCE, SINKHOLE (N)	HAILSTORM (N)	EARTHQUAKE (N)	DAM FAILURE (M)	LEVEE FAILURE (M)	EH - HAZARDOUS MATERIALS RELEASE (M)	RADON EXPOSURE (N)
Wilkes Barre City	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X	X
Wilkes Barre Township	X	X	X	X	X	X	X	X			X	X		X		X	X		X	X
Wright Township	X	X	X	X	X	X	X	X			X	X				X	X		X	X
Wyoming Borough	X	X	X	X	X	X	X	X			X	X				X		X	X	X
Yatesville Borough	X	X	X	X	X	X	X	X			X	X				X			X	X

6.4. MITIGATION ACTION PLAN

Mitigation actions have been carried over from the 2020 Plan and have been newly developed for the County and participating jurisdictions. While some actions are more general in nature and could apply to more than one jurisdiction, other actions are specific to individual projects or jurisdictions. Mitigation actions were developed based on the following: issues identified in the Risk Assessment, gaps identified in the mitigation capability analysis, input from HMSC, and feedback from the HMPT.

During the Capability Assessment and Mitigation Strategy Workshops held on March 10 and 13, 2025, mitigation techniques and actions were discussed. After the meeting, municipalities were provided with their Mitigation Action Progress Form, which listed their actions and projects from the 2020 HMP for review and update as described in Section 6.1. Actions that have been deferred or ongoing have been carried over to the 2025 Action Plan and are again proposed for implementation.

In addition, each participating jurisdiction was given New Mitigation Action Forms to provide any new actions or projects to be included in the plan update. New Mitigation Action Forms were also posted to the project website and set out via email. Meeting participants who were not affiliated with a municipality, organization or agency that had any actions identified in the 2020 plan were provided with New Mitigation Action Forms to include new actions in the 2025 Plan if they wished.

The final list of 192 mitigation actions is described in Table 6.4-1 below. This table provides an overview of the strategy that will be utilized in order to implement each of the proposed mitigation actions. For each action listed in the table, the associated strategy identifies the agency or job title that will be responsible for initiating the work and potential sources of funding for the work. Each strategy also indicates a timeframe for when the action will happen. At least one mitigation action was established for each hazard in Luzerne County. More than one action is identified for several hazards. Every participating jurisdiction has at least one mitigation action for each hazard they have identified as being a risk (see Table 6.3-2).

Many of these mitigation actions will require substantial time commitments from staff at the County and local municipalities. While all these activities will be pursued over the next five years, the reality of limited time and resources requires the identification of the feasibility and priority level of mitigation actions. Prioritization allows the individuals and organizations involved to focus their energies and ensure progress on mitigation activities.

Table 6.4-1 2025 Luzerne County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
GOAL 1 PROTECT LIVES, PROPERTY, AND RESOURCES IN LUZERNE COUNTY.							
1.1	Develop and distribute materials to educate residents on water-saving measures, such as low-flow showerheads and toilets, monitoring water flow while cleaning, and routinely checking for leaks in plumbing.	All Municipalities	Education and Awareness	Drought	Local Planning Agencies	1-2 Years	Staff Time, BRIC
1.2	Retrofit public buildings and Critical Facilities to reduce future wind and earthquake damage.	All Municipalities	Structure and Infrastructure	Earthquake; Hurricanes; Tornado / Wind	Local Planning Agencies	Five Years	HMGP; BRIC
1.3	Enhance radon testing capabilities to assist homeowners, renters, or businessowners in analyzing their risk	All Municipalities	Plans and Regulations	Radon Exposure	Local Emergency Services	Ongoing	Staff Time, Emergency Services Budget
1.4	Obtain grant funding to acquire, demolish, relocate, and/or elevate structures that are vulnerable to flooding.	All Municipalities	Structure and Infrastructure	Dam Failure; Flood, Flash Flood, & Ice Jam; Levee Failure	Luzerne County EMA in coordination with Local Emergency Services	Ongoing	HMGP
1.5	Make municipal buildings accessible to residents to do business without having to come in direct contact with township employees. Outfit front door with an intercom that would allow visitors be buzzed into the building and place hand sanitizing stations throughout.	Bear Creek Township	Structure and Infrastructure	Pandemic and Infectious Disease	Local Public Works Department	1 year	Township Annual Budget

Table 6.4-1 2025 Luzerne County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
1.6	Consider adding walls to Falls Creek.	Black Creek Township	Structure and Infrastructure	Landslide	Local Engineering Department	3-5 Years	Township Annual Budget
1.7	Identify specific mitigation actions for the structures on Wilkes Barre and Easton Roads that are vulnerable to flooding.	Buck Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local EMA, Local Engineering Department, Public Works	1-2 Years	Township Annual Budget
1.8	Identify structural solutions to stormwater ponding and sewer back-ups area in the Borough that had been subject to mine subsidence.	Buck Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam; Subsidence, Sinkhole	Local Engineering Department	2-3 Years	Borough Annual Budget
1.9	Identify mitigation options to address the flooding action on Nescopeck Creek and St. Johns Road and State Route 222. Use FEMA publication 551, Selecting Appropriate Mitigation Measures for Flood Prone Structures, which provides guidance on determining appropriate mitigation measures.	Butler Township	Local Plans and Regulations, Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local EMA, Local Engineering Department, Public Works	1-2 Years	Township Annual Budget

Table 6.4-1 2025 Luzerne County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
1.10	Offer a cost-sharing program for residents affected by sewage back-up damage and publicize use of backflow valves within the community to residents subject to sewer backups and associated damages. Ensure that all outreach is conducted in all languages relevant to the community, and that outreach materials are provided both online and in a physical format to ensure accessibility for residents who may have low or no internet access.	Butler Township	Education and Awareness	Flood, Flash Flood, & Ice Jam	Local Public Works	2-3 Years	Borough Annual Budget
1.11	Conduct an engineering study to identify the most appropriate mitigation measure to address land subsidence for the Luzerne County Community College on South Prospect Street.	City of Nanticoke	Local Plans and Regulations, Structure and Infrastructure	Flood, Flash Flood, & Ice Jam; Subsidence, Sinkhole	Local Engineering Department	2-3 Years	City Annual Budget
1.12	Pursue property acquisition for properties along Newport Creek which are flooded by Susquehanna River backwater. Work with residents of these areas to collaboratively craft a strategy for their voluntary relocation. Keep in mind that people of color and low-income households are more likely to be located within floodplains and may not have the resources to relocate.	City of Nanticoke	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Planning and Zoning Department, Local Community Development Department	Ongoing	City Annual Budget

Table 6.4-1 2025 Luzerne County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	Investigate the feasibility of providing grants or additional funding to disadvantaged community members who wish to relocate to less hazardous areas.						
1.13	Work with the County to develop a procedure to issue building permits and perform UCC functions including inspections.	Conyngham Township	Local Plans and Regulations	All Hazards	Local Planning & Zoning Department	1-2 Years	Township Annual Budget
1.14	Conduct an engineering study to identify the most appropriate mitigation measure for heavy rain - flooding in the area of Columbia Avenue, American Legion Post and Leggio's Restaurant.	Dallas Borough	Local Plans and Regulations, Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Engineering Department, Local EMA, PADEP, Luzerne County Conservation District, PennDOT, Dallas Township	3-5 Years	Borough Annual Budget
1.15	Creek bank restoration and sedimentation clean out around culvert area in tributary to Toby creek. This will mitigate storm water flooding in area near Foster St/Woodlawn Ave.	Dallas Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Engineering Department, Public Works, and private property owners	2-4 Years	Borough Annual Budget

Table 6.4-1 2025 Luzerne County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
1.16	Purchase a portable generator to power heating systems at shelter locations.	Dallas Borough	Structure and Infrastructure	All Hazards	Local EMA	1-2 Years	Borough Annual Budget
1.17	Conduct a study to identify ways (e.g., property acquisitions and stream widening) to mitigate the continual flooding of properties at the confluence of Toby's Creek and Trout Run (Fernbrook Corners). If pursuing property acquisitions, make sure to consider the needs of low-income homeowners and renters.	Dallas Township	Local Plans and Regulations, Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Engineering Department	2-3 Years	Township Annual Budget
1.18	Flooding along Leonard's Creek has caused severe damage to two bridges and channel improvements. FEMA funding has been secured to rebuild one bridge and wall improvements. Identify additional actions that should be taken at the Kunkle/Leonard's and Shady Side Creek area.	Dallas Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Engineering Department, Local EMA	1-2 Years	Township Annual Budget
1.19	Conduct a study to identify stream bed improvements along public roads which continue to be heavily flooded.	Dallas Township	Natural Systems Protection	Flood, Flash Flood, & Ice Jam	Local Engineering Department in coordination with LCFPA, Local Streets Department	1-2 Years	Township Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
1.20	Conduct a study to identify the need for retaining structures with creek bed improvements at Toby Creek from Offset Paperback and Route 309 to the Dallas Township - Kingston Township municipal boundary.	Dallas Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Engineering Department, Local Streets Department	2-3 Years	Township Annual Budget
1.21	Conduct an engineering study to identify the most appropriate mitigation measure for the multiple structures in the Special Flood Hazard Area throughout the Township.	Dennison Township	Structure and Infrastructure	All Hazards	Local Engineering Department in coordination with LCFPA	2-3 Years	Township Annual Budget
1.22	Conduct a study to identify the most appropriate mitigation measure for the Geisinger South hospital, which is located near historic mining operations and floodplains.	Dennison Township	Structure and Infrastructure	All Hazards	City Engineering Department	1-2 Years	City Annual Budget
1.23	Conduct a study to identify problems on Dupont Creek (Lidy, Collins, Mill) and Mill Creek.	Dupont Borough	Natural Systems Protection	Flood, Flash Flood, & Ice Jam	Local Engineering Department in coordination with LCFPA	2-3 Years	Borough Annual Budget
1.24	Purchase portable pumps along with discharge hoses for pumping of landside water in the event the flap gates are closed, and interior flooding of streets occurs on the landside of the levee.	Duryea Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam; Levee Failure	Local Public Works, Local Streets Department	Completed	Borough Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
1.25	Raise Levee/Dike System in Duryea Borough.	Duryea Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam; Levee Failure	DEP; USACE	Ongoing	Municipal Annual Budget, HMGP
1.26	Identify specific mitigation for the structures on Hillside Avenue, Elm, Green, and Cherry Streets that are vulnerable to mine subsidence.	Edwardsville Borough	Structure and Infrastructure , Nature Systems Protection	Subsidence, Sinkhole	Local Engineering Department	2-3 Years	Borough Annual Budget
1.27	Move the EOC out of flood waters and maintain underground Floodway interceptor.	Edwardsville Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	EMA Director	5 Years	Borough Annual Budget
1.28	Conduct a feasibility study for floodwall protection improvements required for the problem areas of Susquehanna Avenue and Grant Street.	Exeter Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Engineering Department, Local Public Works, Floodwall Owner	2-3 Years	Borough Annual Budget
1.29	Continue to perform creek and riverbank maintenance and stabilization activities along strategic areas of the Susquehanna River and Hicks Creek.	Exeter Borough	Natural Systems Protection	Flood, Flash Flood, & Ice Jam	Local Public Works Department	3-5 Years	Borough Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
1.30	Consider elevation of houses and/or utilities along Susquehanna Avenue. Provide affected residents with information about funding, feasibility, and risks. Consider a program to provide funding assistance to low-income residents pursuing elevations.	Exeter Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Planning and Zoning Department	3-5 Years	Borough Annual Budget
1.31	Conduct a feasibility study to determine improvements for the problem areas along Route 92, Dymund Creek, Sutton Creek and Appletree Road.	Exeter Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Engineering Department	2-3 Years	Township Annual Budget
1.32	Identify creek and riverbank maintenance and stabilization activities along strategic areas of the Susquehanna River and the Township's tributary creeks.	Exeter Township	Natural Systems Protection	Flood, Flash Flood, & Ice Jam	Local Engineering Department, Local Public Works Department in coordination with LCFPA	2-3 Years	Township Annual Budget
1.33	Improve snow removal activities throughout the city during winter weather events.	Fairmount Township	Structure and Infrastructure	Winter Storm	City Public Works/Streets Department	2-3 Years	City Annual Budget
1.34	Establish programs and facilities to prevent, reduce, and/or eliminate the impact of opioid addiction affecting vulnerable residents of the City of Wilkes-Barre. Work with healthcare organizations, medical facilities,	Fairview Township	Structure and Infrastructure , Education and Awareness	Substance Use Disorder	City of Wilkes-Barre Department of Health, City of Wilkes-Barre	1-2 Years	City Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	houseless outreach and shelter services, social services organizations, and other entities who serve vulnerable populations to receive their input and expertise.				EMA Coordinator		
1.35	Identify specific mitigation actions for the structures on Shadetree Drive, Brookside Drive, and Tannery Road that are vulnerable to flooding.	Foster Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local EMA, Local Engineering Department	1-2 Years	Township Annual Budget
1.36	Identify mitigation options to reduce flooding on Municipal Road and Valley View Road.	Franklin Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local EMA, Local Engineering Department	1-2 Years	Township Annual Budget
1.37	Rehabilitate/modify bridges over streams vulnerable to flooding including Blackman Street Bridge over Bowman Spring Creek.	Franklin Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	City of Wilkes-Barre Operations Department	2-3 Years	City Annual Budget
1.38	Conduct a survey of structures in the Central Business District to address areas structural remediation is necessary.	Freeland Borough	Structure and Infrastructure	Subsidence, Sinkhole	Local Community Development Department	2-3 Years	Borough Annual Budget
1.39	Acquire funding to dredge Solomon Creek to minimize flooding and damage to the 7 out of 8 Township repetitive loss properties in this area.	Hanover Township	Natural Systems Protection	Flood, Flash Flood, & Ice Jam	Local Stormwater Management Department/Public Works		Township Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
1.40	Ground stabilization, planting and building a barrier along routes to prevent roadway blockage caused by erosion and landslides.	Hunlock Township	Structure and Infrastructure	Landslide	PennDOT	5-7 Years	Township Annual Budget
1.41	Identify and address trees and other vegetation that require routine maintenance or removal	Jackson Township	Natural Systems Protection	Hurricane, Tropical Storm, Nor'easter; Tornado, Windstorm; Winter Storm	Jackson Township	5 Years	Staff Time, Utility Companies, and Local Property Owners
1.42	Acquire and demolish/elevate residential structures located along River Road, Tennant Street, Miller Road, lots on Paradise TP and within the Susquehanna River's Special Flood Hazard Area. Work with residents of these areas to collaboratively craft a strategy for their voluntary relocation. Keep in mind that people of color and low-income households are more likely to be located within floodplains and may not have the resources to relocate. Investigate the feasibility of providing grants or additional funding to disadvantaged community members who wish to relocate to less hazardous areas.	Jenkins Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Planning & Zoning Department, Local Community Development Department	Ongoing	Township Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
1.43	Conduct an engineering study to identify the most appropriate land subsidence mitigation measure for the Government Building and Police Department on Wyoming Avenue.	Kingston Borough	Local Plans and Regulations, Structure and Infrastructure	Subsidence, Sinkhole	Local Engineering Department, Local EMA	2-3 Years	Borough Annual Budget
1.44	Conduct an engineering study to identify the most appropriate land subsidence mitigation measure for the Chester Street Elementary School and Wyoming Valley West Middle School on Chester Street. Work with the Chester Street Elementary School and Wyoming Valley West Middle School on Chester Street to determine their priorities and preferences.	Kingston Borough	Local Plans and Regulations, Structure and Infrastructure	Subsidence, Sinkhole	Local Engineering Department	2-3 Years	Borough Annual Budget
1.45	Investigate solutions to the flooding issues along Gardner Creek.	Laflin Borough	Local Plans and Regulations, Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local EMA, Local Planning & Zoning Department in coordination with LCFPA	1-2 Years	Borough Annual Budget
1.46	Provide watertight seals for manholes impacted by flooding on the Susquehanna River.	Larksville Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Department of Public Works	2-4 Years	Borough Annual Budget
1.47	Identify clearing and dredging activities for Boston Creek upstream of US 11 in	Larksville Borough	Natural Systems Protection	Flood, Flash Flood, & Ice Jam	Department of Public Works	1-2 Years	Borough Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	order to maintain its flood carrying and storage and capacity.						
1.48	Provide dry floodproofing measures for metal doors/windows for structures within the Susquehanna River's Special Flood Hazard Area.	Larksville Borough	Education and Awareness	Flood, Flash Flood, & Ice Jam	Department of Public Works	2-4 Years	Borough Annual Budget
1.49	Conduct an engineering study to identify the most appropriate mitigation measure for the Government Building on Dupont Drive.	Laurel Run Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local EMA, Local Engineering Department	2-3 Years	Borough Annual Budget
1.50	Conduct an engineering study to identify the most appropriate mitigation measure for the Luzerne Borough Volunteer Fire Department on Academy Street.	Luzerne Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local EMA, Local Engineering Department	2-3 Years	Borough Annual Budget
1.51	Work with Union Township to encourage them to issue building permits and perform UCC functions including inspections.	Luzerne County	Local Plans and Regulations	All Hazards	County Planning Commission	1-2 Years	LUPTAP
1.52	Work with each municipality to identify a point of contact to perform an annual review of the mitigation actions for their municipality from this Hazard Mitigation Plan.	Luzerne County	Local Plans and Regulations	All Hazards	County Planning Commission	1-2 Years	BRIC
1.53	For those parties not interested in acquisition or where acquisition is not feasible, continue to work with municipalities to advise homeowners	Luzerne County	Education and Awareness	Flood, Flash Flood, & Ice Jam	LCFPA, County Engineers Office	3-5 Years	FMA, BRIC, HMGP, RFC, Wyoming Valley Levee-

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	and renters with a preferred mitigation alternative such as elevation or flood proofing. Provide pathways to funding for low-income homeowners to make needed retrofits. Provide renters with appropriate advice to reduce their risk in case of a flood event.						Raising Project Mitigation Funds
1.54	Designate specific locations throughout the County such as the Emergency Management Agency, Planning & Zoning Department, municipal libraries, and events such as fairs to provide information to the public on flooding and other hazards. Encourage these locations to stock a variety of FEMA publications on various natural and human caused hazards and the most recent FIRMs; also include information on the County's website.	Luzerne County	Education and Awareness	All Hazards	County Planning Commission, Public Information Office	1-2 Years	BRIC
1.55	Conduct an educational campaign and develop brochures on topics such as: the impacts of drought, proper sediment and erosion control, and dangers of developing on old mines and dumps.	Luzerne County	Education and Awareness	All Hazards	Public Information Office, PA DEP	1-2 Years	BRIC
1.56	Stay closely involved with the activities of the Delaware Regional Basin Commission, Susquehanna River Basin	Luzerne County	Plans and Regulations	Flood, Flash Flood, & Ice Jam	County Planning Commission	1-2 Years	LUPTAP

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	Commission, Water Board, and other water planning organizations by encouraging a staff member from the County Planning Commission to be present at their meetings depending on their availability.						
1.57	Continue to provide inquirers with technical advice and information from the community's FIRM and FEMA's website on a property's location in a Special Flood Hazard Area, zone, and its base flood elevation if data is available.	Luzerne County	Education and Awareness	Flood, Flash Flood, & Ice Jam	County Planning Commission	Ongoing	BRIC
1.58	Each spring, post a link on the County website banner with hailstorm safety information. Post hailstorm safety information in other locations accessible to the general public, including bus shelters, libraries, and schools. Make sure to provide this information in all languages relevant to the County's residents.	Luzerne County	Education and Awareness	Hailstorm	Luzerne EMA	Ongoing	Staff Time
1.59	Maintain regular contact with Pennsylvania Department of Conservation and Natural Resources to ensure that County information about the potential for landslides is current. Inform residents who may be impacted	Luzerne County	Local Plans and Regulations	Landslide	Luzerne County EMA	Ongoing; Annually	County Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	by landslides of their risk and provide strategies to mitigate that risk.						
1.60	Continue to work with the USACE to implement the National Levee Safety Program and refine an inventory of all levees in the County. Provide supplemental materials to inform residents at risk of levee failure impacts of potential risks and options for mitigating those risks.	Luzerne County	Structure and Infrastructure	Levee Failure; Flood, Flash Flood, & Ice Jam	LCFPA	Ongoing	LCFPA Annual Budget, PADEP
1.61	Encourage homeowners and renters to install appropriate devices to monitor and reduce radon exposure in homes. Provide free or low-cost options for low- to moderate- income households.	Luzerne County	Education and Awareness	Radon Exposure	Luzerne County Planning Commission, Luzerne County Office of Community Development	Ongoing	HMGP, County Annual Budget
1.62	Develop and maintain stockpiles of PPE. Coordinate on distribution of PPE to communities as needed.	Luzerne County, All Municipalities	Structure and Infrastructure	Pandemic and Infectious Disease	Luzerne EMA, Local Emergency Services	Ongoing	Staff Time, Act 315
1.63	Continue to acquire and demolish/elevate residential structures located along River Road and within the Susquehanna River's Special Flood Hazard Area. Work with residents of these areas to collaboratively craft a	Nescopeck Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Planning and Zoning Department	Ongoing	Township Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	strategy for their voluntary relocation. Keep in mind that people of color and low-income households are more likely to be located within floodplains and may not have the resources to relocate. Investigate the feasibility of providing grants or additional funding to disadvantaged community members who wish to relocate to less hazardous areas. Provide technical and financial assistance to low-income homeowners who may want to elevate their homes.						
1.64	Purchase a generator to assist the Borough during power outages.	Nuangola Borough	Structure and Infrastructure	All Hazards	Local EMA	1-2 Years	Borough Annual Budget
1.65	Remove dead and downed trees/lumber throughout the Township to mitigate wildfire hazard.	Penn Lake Park Borough	Structure and Infrastructure	Wildfire	Fire Department, Department of Public Works, Township Administration	Ongoing	Township Annual Budget
1.66	Conduct an engineering study to identify the most appropriate mitigation measure to address mine subsidence for the Pittston Township Police Department on Broad Street.	Pittston Township	Local Plans and Regulations, Structure and Infrastructure	Subsidence, Sinkhole; Coal Mining	Local Engineering Department	Completed	Township Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
1.67	Continue to identify and restore channels that are damaged/clogged causing flooding in the Township's residential areas. Most of the problematic channels have been addressed; the Township is pursuing some additional actions to restore the remainder of the channels in the Township.	Plains Township	Natural Systems Protection	Flood, Flash Flood, & Ice Jam	Local Engineering Department in coordination with LCFPA	Ongoing	Township Annual Budget
1.68	Continue to acquire and demolish/elevate residential structures located along Gallagher Drive, McCullough Street, North River Road, North River Street, South River Street, Mitchell Street, Courtright Street, Reese Street, and Roberts Street that lie within the Susquehanna River's Special Flood Hazard Area. Work with residents of these areas to collaboratively craft a strategy for their voluntary relocation. Keep in mind that people of color and low-income households are more likely to be located within floodplains and may not have the resources to relocate. Investigate the feasibility of providing grants or additional funding to disadvantaged community members who wish to relocate to less hazardous	Plains Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Planning & Zoning Department in coordination with LCFPA	Ongoing	Township Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	areas. Provide technical and financial assistance to low-income homeowners who may want to elevate their homes.						
1.69	Pursue measures to minimize the potential for a train derailment caused by flooding where the Mill Creek meets the Gardners Creek at Union Street.	Plains Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam; Hazardous Materials Release	Local Engineering Department, Local Public Works/Streets Department	Ongoing	Township Annual Budget
1.70	Pursue the recommendations along the Abrahams Creek made in the Hicks Creek and Abrahams Creek Detailed Feasibility Study, to address flooding issues on Eight Street, Swetland Lane.	Plains Township	Natural Systems Protection	Flood, Flash Flood, & Ice Jam	Local Engineering Department, Local Planning and Zoning Department	2-3 Years	Borough Annual Budget
1.71	Identify flood protection measures, or pursue property acquisition, for properties along Susquehanna Avenue between 4th and 8th Streets which are affected by flooding from the Susquehanna River. Keep in mind that people of color and low-income households are more likely to be located within floodplains and may not have the resources to relocate. Investigate the feasibility of providing grants or additional funding to disadvantaged community members	Plymouth Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Planning & Zoning Department	Ongoing	Borough Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	who wish to relocate to less hazardous areas. Provide technical and financial assistance to low-income homeowners who may want to pursue flood protection measures for their properties.						
1.72	Develop mitigation measures including an implementation strategy for the fire station and water treatment plant that are located in the floodplain. Use FEMA publication 551, Selecting Appropriate Mitigation Measures for Flood Prone Structures, which provides guidance on determining appropriate mitigation measures.	Plymouth Township	Local Plans and Regulations, Structure and Infrastructure	All Hazards	Local EMA	1-2 Years	Township Annual Budget
1.73	Continue to pursue measures to protect the wastewater treatment plant's essential facilities which cannot be elevated above, or relocated out of, the floodplain.	Rice Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Public Works	3-5 Years	Borough Annual Budget
1.74	Purchase a generator for the Ross Township Building to serve as a back-up power source during power outages.	Ross Township	Structure and Infrastructure	All Hazards	Local EMA	1-2 Years	Township Annual Budget
1.75	Identify options to address the flooding of Mud Swamp Creek unto Sonny Drive.	Salem Township	Local Plans and Regulations, Structure	Flood, Flash Flood, & Ice Jam	Local Engineering Department, Local Public	2-3 Years	Township Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
			and Infrastructure		Works Department, in coordination with LCFPA		
1.76	Annually distribute flood protection safety materials to educate residents on the dangers of flooding, property-level mitigation methods, and funding availability to mitigate potential flooding on their property. Consider the needs of low-income residents and other socially vulnerable groups.	Wright Township	Education and Awareness	Dam Failure; Flood, Flash Flood, & Ice Jam; Levee Failure	Luzerne County Planning, Local Planning Agencies	Ongoing	Staff Time
1.77	Perform inspections for schools in the Hanover Area School District for structural and nonstructural vulnerabilities. Structural evaluations will be conducted by qualified contractors and engineers and will ensure building have been constructed to code.	Hanover Area School District	Structure and Infrastructure	All Hazards	Hanover Area School District	5 Years	School Budget, Non-Disaster Funds
1.78	Develop procedures for each district school to test alarms monthly to ensure operability and personnel familiarity.	Hanover Area School District	Education and Awareness	All Hazards	Hanover Area School District	Ongoing	Staff Time
1.79	Have the district safety committee conduct a target hardening assessment of each facility in conjunction with state and local authorities, making on-going	Hanover Area School District	Structure and Infrastructure	All Hazards	Hanover Area School District	5 Years	School Budget, Non-Disaster Funds

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	changes as appropriate based on recommendations.						
1.80	Address streambank erosion along the DiPasquale Shickshinny Creek.	Union Township	Structure and Infrastructure , Natural Systems Protection	Flood, Flash Flood, & Ice Jam	Luzerne Conservation District, Luzerne County Planning & Zoning	5 years	Non-Disaster Funds
1.81	Address debris build up along Nescopeck Creek.	Nescopeck Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Luzerne Conservation District, Luzerne County Planning & Zoning	5 years	Non-Disaster Funds
1.82	Address flow constrictions, streambank erosion, and other flood related issues along Toby Creek.	Dallas Township, Kingston Township	Structure and Infrastructure , Natural Systems Protection	Flood, Flash Flood, & Ice Jam	Luzerne Conservation District, Luzerne County Planning & Zoning	5 years	Non-Disaster Funds
1.83	Conduct a study to identify ways to mitigate property flooding (yards and structures) from stormwater in the area of Park Street and Jackson Street.	Dallas Borough	Local Plans and Regulations	Flood, Flash Flood, & Ice Jam	Dallas Borough	2-3 years	Non-Disaster Funds

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
1.84	Demolition of 211 N. Main St. structure in flood prone area.	Kingston Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Kingston Township	1-2 years	Non-Disaster Funds
1.85	Streambank restoration and flood mitigation measures for N. Main St and Toby's Creek	Kingston Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Kingston Township	2-3 years	Non-Disaster Funds
1.86	Implement flood mitigation to address flooding issues along W. Franklin St., and Shavertown shopping center parking lot; SR309 corridor areas.	Kingston Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Kingston Township	2-3 years	Non-Disaster Funds
GOAL 2 PROMOTE SUSTAINABLE DEVELOPMENT TO IMPROVE THE QUALITY OF LIFE IN LUZERNE COUNTY.							
2.1	Reclaim and revegetate abandoned mine land.	Ashley Borough, Avoca Borough, Bear Creek Township, Black Creek Township, Butler Township, Conyngham Township, Courtdale Borough, Dupont Borough, Duryea Borough, Edwardsville	Natural Systems Protection	Coal Mining	Luzerne County Planning, Local Planning Agencies	Ongoing	PA DCNR

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
2.1	Reclaim and revegetate abandoned mine land.	Borough, Exeter Borough, Foster Township, Freeland Borough, Hanover Township, Hazle Township, City of Hazleton, Hughestown Borough, Jeddo Borough, Jenkins Township, Kingston Township, Laflin Borough, Larksville Borough, Laurel Run Borough, Luzerne Borough, City of Nanticoke, Newport Township, City of Pittston, Pittston Township, Plains Township, Plymouth Borough, Plymouth					

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
2.1	Reclaim and revegetate abandoned mine land.	Township, Salem Township, Sugarloaf Township, Sugar Notch Borough, Swoyersville Borough, Warrior Run Borough, West Pittston Borough, West Wyoming Borough, City of Wilkes-Barre					
2.2	Improve drainage structures and storm sewers throughout the Borough, which are undersized and cause roadway flooding.	Avoca Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Engineering Department	3-5 Years	Borough Annual Budget
2.3	Separate combined sanitary and storm sewers in the 3rd Ward.	Avoca Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Engineering Department, Local Public Works Department	3-5 Years	Borough Annual Budget
2.4	Develop a priority list of areas with steep slopes near critical facilities or roadways that may benefit from ground	Avoca Borough, Black Creek Township, Butler Township, Conyngham Borough, Dallas Township,	Structure and Infrastructure	Landslide	Local Public Works Department; Local Planning Department;	1-3 Years	Municipal Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	stabilization planting and/or barrier installation.	Duryea Borough, Edwardsville Borough, Exeter Township, Fairmount Township, Forty Fort Borough, Hanover Township, Harveys Lake Borough, Hazle Township, Hunlock Township, Jenkins Township, Kingston Township, Laflin Borough, City of Nanticoke, Nescopeck Township, Newport Township, City of Pittston, Pittston Township, Plymouth Borough, Plymouth Township, Pringle Borough, Salem Township, Shickshinny Borough, Sugarloaf Township, Union Township, City of Wilkes-Barre			Local Engineering Department		
2.4	Develop a priority list of areas with steep slopes near critical facilities or roadways that may benefit from ground stabilization planting and/or barrier installation.						

Table 6.4-1 2025 Luzerne County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
2.5	Supply soil stabilization measures, such as planting soil stabilizing vegetation on steep, publicly owned slopes.	Avoca Borough, Black Creek Township, Butler Township, Conyngham Borough, Dallas Township, Duryea Borough, Edwardsville Borough, Exeter Township, Fairmount Township, Forty Fort Borough, Hanover Township, Harveys Lake Borough, Hazle Township, Hunlock Township, Jenkins Township, Kingston Township, Laflin Borough, City of Nanticoke, Nescopeck Township, Newport Township, City of Pittston, Pittston Township, Plymouth Borough, Plymouth Township, Pringle Borough, Salem Township, Shickshinny Borough,	Structure and Infrastructure	Landslide	Local Public Works Department	3-5 Years	Municipal Annual Budget
2.5	Supply soil stabilization measures, such as planting soil stabilizing vegetation on steep, publicly owned slopes.						

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
		Sugarloaf Township, Union Township, City of Wilkes-Barre					
2.6	Conduct an engineering study to assess feasibility and cost, and title search cost estimate, of project to channelize/dredge the Bear Creek South of SR 115 in the Borough.	Bear Creek Village Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local EMA, Local Engineering Department, Public Works	1-2 Years	HMGP
2.7	Evaluate storm drainage needs and sewer system improvements required for problem areas of Benedict Street, Towpath Court, KOZ area and New Street.	City of Pittston	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Public Works	1-2 Years	City Annual Budget
2.8	Improve flood drainage areas identified by the Amry Corps of Engineers.	City of Wilkes-Barre	Natural Systems Protection	Flood, Flash Flood, & Ice Jam	City of Wilkes-Barre		PEMA, FEMA
2.9	The urbanization of the Borough without stormwater management controls has led to flooding issues from stormwater run-off upstream of the Borough. Develop a plan to implement stormwater management features in the Borough. Prioritize areas with socially vulnerable populations who may be most at risk of adverse flooding impacts. Pursue recommendations identified in the Act 167 Plan and consider sewer pump retrofit.	Conyngham Borough	Local Plans and Regulations	Flood, Flash Flood, & Ice Jam	Local Engineering Department, Public Works	1-2 Years	Borough Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
2.10	Conduct an inspection and provide engineering recommendations for the Toby Creek culvert which runs underneath State Route 0415 and 1045, Fino's Pharmacy, Citizens Bank and their respective parking lots.	Dallas Borough	Natural Systems Protection	Flood, Flash Flood, & Ice Jam	Dallas Borough, PennDOT, and private property owners	1-2 Years	Borough Annual Budget
2.11	Pursue the recommendations for culvert removal/replacement along the Abrahams Creek made in the 2006-2007 Hicks Creek and Abrahams Creek Flood Study. The undersized structures are the Upper 8th Street bridge and the Erie-Lackawanna Railroad bridge.	Dallas Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Engineering Department	Ongoing	Borough Annual Budget
2.12	Conduct a study to identify solutions to mitigating regular flooding at the intersection of Stairville Road and St. Mary's Road.	Dorrance Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Engineering Department, Local Streets Department	2-3 Years	Township Annual Budget
2.13	Consider the stabilization of Laurel Run Creek and Mill Creeks.	Dorrance Township	Natural Systems Protection	Flood, Flash Flood, & Ice Jam	City Engineering Department in coordination with LCFPA	2-3 Years	City Annual Budget
2.14	The Lower Lackawanna Sewer Authority placed a valve in their Diversion Chamber to help alleviate the sewage from backing up into the homes on Chittenden Street. LLVSA inspects and	Duryea Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Lower Lackawanna Sewer Authority	Completed	Borough Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	maintains the valve but does not determine when the valve should be opened or closed. Duryea Borough Sewer Authority is interested in the placement of check valves for sanitary laterals on individual homes located on Chittenden Street. Make sure that outreach to affected households is conducted in all languages relevant to affected residents and that residents receive training on how to monitor the check valves, as well as information on what to do in the event of a sewer backup.						
2.15	Restore the wall along Solomon Creek.	Duryea Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	City Engineering Department in coordination with LCFPA	2-4 Years	City Annual Budget
2.16	Pursue the recommendations for culvert removal/replacement along the Hicks Creek, and pump station upgrades made in the 2006-2007 Hicks Creek and Abrahams Creek Flood Study. Continue to work with the Luzerne County Flood Protection Authority during the Detailed Feasibility Assessment of Hicks Creek concerning	Exeter Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam; Levee Failure	Local Engineering Department, Local Public Works Department in coordination with LCFPA	2-4 Years	Borough Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	the construction of a pressure conduit, pump station, levee culvert modifications, or combination of these solutions.						
2.17	Conduct a study to correct combined stormwater and sewer overflows.	Forty Fort Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Department of Public Works	Completed	Borough Annual Budget
2.18	Repair storm water joins on Kniffer Street and Lyndwood Avenue. The joints are loose, causing sink holes	Hanover Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam; Subsidence, Sinkhole	Local Stormwater Management Department/Public Works	Ongoing	Township Annual Budget
2.19	Add piping and drains in Main Road 4016. The existing two drains are not capable of handling stormwater during heavy rainfall, causing ponding and flooding of homes. Communicate construction plans to affected residents well ahead of time. Make sure to provide communications in all languages relevant to the community.	Hunlock Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Commonwealth of PA, PennDOT	2-3 Years	Township Annual Budget
2.20	Obtain FEMA accreditation for the Brookside Levee System, the Laurel Run Levee System and the Mill Creek Left Bank Upstream Levee System.	Hunlock Township	Structure and Infrastructure	Levee Failure; Flood, Flash Flood, & Ice Jam	City of Wilkes-Barre Operations Department	5 Years	City Annual Budget
2.21	Ftorkowski, Daro, Hubbards Flats Roads and State Route 239 close during storm events as the Huntington Creek	Huntington Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Streets Department in	3-5 Years	Township Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	overtops roadway. Replace culverts at these locations.				coordination with PennDOT		
2.22	Improve drainage at the creek at Glendale Drive, Laurel Drive, and Terrace Drive to prevent them from flooding.	Huntington Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Wright Township Emergency Management.	Deferred	Township Annual Budget
2.23	Review and update existing land use ordinances and development strategies to ensure development is limited or regulated to limit the impact on environmentally sensitive areas.	Jackson Township	Plans and Regulations	All Hazards	Jackson Township	5 Years	Staff Time, PA DCED
2.24	Purchase a new leaf machine to remove leaves from swales to mitigate flood issues throughout the Township.	Lehman Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Department of Public Works	Completed	Township Annual Budget
2.25	Work with Duryea Borough and DEP to conduct annual inspections of the structures that discharge stormwater and groundwater from the flooded mine pool and identify any structural repairs needed.	Luzerne County	Structure and Infrastructure	Subsidence, Sinkhole; Flood, Flash Flood, & Ice Jam	PA DEP	1-2 Years	Growing Greener (DEP), CDBG
2.26	Identify hazardous materials sites, including TRI facilities and oil and gas wells, that are in or near flood zones and develop strategies to reduce potential damage. Inform residents in danger of hazardous materials exposure of their risk and provide	Luzerne County	Structure and Infrastructure	Hazardous Materials Release; Flood, Flash Flood, and Ice Jam	Luzerne EMA in cooperation with Zoning and Building Officials of each Municipality	2-3 Years	County, Municipal Annual Budgets

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	strategies to mitigate that risk at the household level.						
2.27	Conduct a study to identify flooding problems at North End Road.	Nuangola Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Engineering Department	2-3 Years	Borough Annual Budget
2.28	Examine development in sensitive areas such as Lake Nuangola, wetlands, flood prone areas to ensure it complies with the local code/ordinance.	Nuangola Borough	Local Plans and Regulations	Flood, Flash Flood, & Ice Jam	Local Planning and Zoning Department	3-5 Years	Borough Annual Budget
2.29	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes) while making sure that such developments have options available for low-to moderate-income households.	Salem Township	Local Plans and Regulations	All Hazards	Local Planning and Zoning Department, County Planning Commission	Ongoing	LUPTAP
2.30	Identify measures to prevent sanitary sewer backups during rainfall and flooding events.	Sugar Notch Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Public Works	1-2 Years	Borough Annual Budget
2.31	Improve drainage structures and storm sewers throughout the Borough, which are undersized and cause roadway flooding.	Sugar Notch Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Public Works	2-3 Years	Borough Annual Budget
2.32	Work with a consultant to determine the causes of, and investigate solutions to,	Swoyersville Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local EMA	Ongoing	Borough Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	the three flooding issues along Main Street.						
2.33	Clean culverts in township to prevent streams from flooding or damming up.	Union Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Emergency Manager	Ongoing	Township Annual Budget
2.34	Improve drainage structures and storm sewers throughout the Borough, which are inadequate and cause flooding.	Warrior Run Borough	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Public Works	2-3 Years	Borough Annual Budget
GOAL 3 PROMOTE PUBLIC UNDERSTANDING, SUPPORT, AND IMPLEMENTATION IN MITIGATION RELATED ACTIVITIES.							
3.1	Produce and distribute information for homeowners and renters on how to properly winterize their dwellings to deal with winter storms and extreme cold temperatures.	All Municipalities	Education and Awareness	Extreme Temperature; Winter Storm	Local Code Officials, Local Emergency Services	Ongoing	Staff Time
3.2	Work with the County and Pennsylvania Department of Health to increase awareness about treating and preventing substance use disorder.	All Municipalities	Education and Awareness	Substance Use Disorder	Local Emergency Services	Ongoing	Staff Time, PA DOH
3.3	Produce and distribute family and traveler emergency preparedness information about severe winter weather hazards.	All Municipalities	Education and Awareness	Winter Storm	Luzerne County EMA; Local Emergency Services	Ongoing	Staff Time
3.4	Post warning signage at local parks, county fairs, and other outdoor venues.	Ashley Borough, Avoca Borough, Bear Creek Village Borough, Bear Creek Township, Black	Education and Awareness	Hailstorm	Local Emergency Services	Ongoing	Municipal Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
3.4	Post warning signage at local parks, county fairs, and other outdoor venues.	Creek Township, Buck Township, Butler Township, Conyngham Borough, Conyngham Township, Courtdale Borough, Dallas Borough, Dallas Township, Dennison Township, Dorrance Township, Dupont Borough, Duryea Borough, Exeter Borough, Exeter Township, Fairmount Township, Fairview Township, Foster Township, Franklin Township, Hanover Township, Harveys Lake Borough, Hazle Township, Hollenback Township, Hughestown Borough, Hunlock Township, Huntington Township, Jackson Township, Jeddo					

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
3.4	Post warning signage at local parks, county fairs, and other outdoor venues.	Borough, Jenkins Township, Kingston Township, Laflin Borough, Lake Township, Larksville Borough, Laurel Run Borough, Lehman Township, Nescopeck Borough, Nescopeck Township, New Columbus Borough, Newport Township, Nuangola Borough, Penn Lake Park Borough, Plymouth Township, Rice Township, Ross Township, Salem Township, Slocum Township, Sugarloaf Township, Sugar Notch Borough, Union Township, Warrior Run Borough, West Hazleton Borough					

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
3.5	Provide public education and resources to homeowners and developers for developing in known sinkhole or subsidence prone areas, including how to identify and report sinkholes or subsidence.	Ashley Borough, Avoca Borough, Conyngham Township, Dupont Borough, Duryea Borough, Edwardsville Borough, Exeter Borough, Forty Fort Borough, Hanover Township, Hughestown Borough, Jenkins Township, Kingston Borough, Larksville Borough, Luzerne Borough, City of Nanticoke, Nescopeck Borough, Nescopeck Township, Newport Township, City of Pittston, Pittston Township, Plains Township, Plymouth Borough, Salem Township, Swoyersville Borough, West Pittston	Education and Awareness	Subsidence, Sinkhole	Local Community Development Department; Luzerne County Planning		Staff Time, HMGP

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
		Borough, West Wyoming Borough, City of Wilkes-Barre, Wilkes-Barre Township					
3.6	Since the hazardous materials from the Humboldt and Valmont industrial parks could pose a threat to the Borough, make residents aware of the procedures to follow after a hazardous materials incident. Develop a brochure on what to do when an incident occurs. Ensure that all outreach is conducted in all languages relevant to the community, and that outreach materials are provided both online and in a physical format to ensure accessibility for residents who may have low or no internet access.	Bear Creek Township	Education and Awareness	Hazardous Materials Release	Local EMA, Local Community Development Department	1-2 Years	Borough Annual Budget
3.7	Establish a Pittston City Newsletter for hazard mitigation information updates. Ensure that newsletters are written in languages relevant to the community, and that materials are provided both online and in a physical format to ensure accessibility for residents who may have low or no internet access.	City of Pittston	Education and Awareness	All Hazards	Local EMA, Local Community Development Department	1-2 Years	City Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
3.8	Include information in the Borough newsletter on the availability of flood insurance, basement back-up insurance, and mine subsidence insurance. Ensure that newsletters are written in languages relevant to the community, and that materials are provided both online and in a physical format to ensure accessibility for residents who may have low or no internet access.	Conyngham Township	Education and Awareness	Flood, Flash Flood, & Ice Jam; Subsidence, Sinkhole	Local Community Development Department	1-2 Years	Borough Annual Budget
3.9	Post a digital version of the DFIRM and the availability of flood protection guidance documents on the Borough website, social media sites, and through utility bill mailing inserts. Provide this information in all languages relevant to Borough residents.	Exeter Borough	Education and Awareness	Flood, Flash Flood, & Ice Jam	Local EMA, Local Planning and Zoning Department	1-2 Years	Borough Annual Budget
3.10	Use the Exeter Borough website to update residents on hazard mitigation related activities. Also distribute this information on social media sites and through utility bill mailing inserts. Provide this information in all languages relevant to Borough residents.	Exeter Borough	Education and Awareness	All Hazards	Local EMA	1-2 Years	Borough Annual Budget
3.11	Develop a website for the Township and post access to the FIRM and availability of flood protection guidance	Exeter Township	Education and Awareness	Flood, Flash Flood, & Ice Jam	Local EMA, Local Community	1-2 Years	Township Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	documents. Also distribute this information on social media sites and through utility bill mailing inserts. Provide this information in all languages relevant to Township residents.				Development Department		
3.12	Develop informational materials to educate and assist homeowners and renters near wildfire prone areas of FireWise concepts including safe zones and defensible spaces. Ensure that all outreach is conducted in all languages relevant to the community, and that outreach materials are provided both online and in a physical format to ensure accessibility for residents who may have low or no internet access. Investigate the feasibility of providing grants or additional funding to disadvantaged community members who wish to implement wildfire mitigation measures on their properties.	Jackson Township, Wright Township	Education and Awareness	Wildfire	Local EMA, Local Community Development Department	Ongoing	Township Annual Budget
3.13	Educate the public on potential hazards and provide emergency contact information for the public both online and via physical outreach materials. Focus on high pressure gas line and Crystal Lake dam warnings, and other	Jenkins Township	Education and Awareness	All Hazards	Township Secretary, Township Fire Department	Ongoing	Township Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	common hazards like wildfires and downed phone lines. Ensure that all outreach is conducted in all languages relevant to the community, and that outreach materials are provided both online and in a physical format to ensure accessibility for residents who may have low or no internet access.						
3.14	Identify measures to address power outages due to a single source of electric power to the Borough, and which impact communication services in hazard events. Develop alternative communications channels in the event of a power outage, specifically regarding communications with socially vulnerable groups and those who may have special needs during a hazard event, including children, older adults, residents with disabilities and medical needs, and residents who may not speak English fluently.	Laflin Borough	Structure and Infrastructure	All Hazards	Local EMA, Local Utilities Department	1-2 Years	Borough Annual Budget
3.15	Identify measures to prevent/respond to train derailments in the Borough, which could impact evacuation procedures during hazard events. Make sure to include considerations for those who may have special needs during an	Laflin Borough	Local Plans and Regulations, Structure and Infrastructure	All Hazards	Local EMA, Railroad Owner	1-2 Years	Borough Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	evacuation, including children, older adults, residents with disabilities and medical needs, and residents who may not speak English fluently.						
3.16	Promote and share information about available trainings and webinars (provided by ASFPM, PAFPM, FEMA, DEP, etc.) with local floodplain management officials, community leaders, and interested residents while making sure to highlight trainings and webinars that are available in languages relevant to the community.	Luzerne County	Education and Awareness	Flood, Flash Flood, & Ice Jam	LCFPA, County Office of Emergency Management	Ongoing	County Staff Time, Web Administration
3.17	Initiate a research and education program with local universities to map the extents of the mine pools in the Lackawanna and Susquehanna River valleys. Encourage university partners to engage with affected community members, including those from socially vulnerable and/or historically marginalized groups. Because earthquakes will have the greatest effect in areas of abandoned mine lands, this program will seek to quantify the effects of earthquakes on destabilized earth, such as that over flooded mine pools. Develop an	Luzerne County	Education and Awareness	Earthquake; Subsidence, Sinkhole; Coal Mining	PA DEP	6-10 Years	DEP

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	outreach program to inform at-risk residents of earthquake safety practices.						
3.18	Work with State agencies, professional organizations, and non-government organizations to conduct an annual workshop at a key location in each county for private developers to involve them in hazard mitigation activities and educate them on 'safe' development principles that can be incorporated into their development proposals. Make sure to provide an emphasis on environmental equity and how best to keep the needs of underserved groups and socially vulnerable populations in mind during the development process.	Luzerne County	Education and Awareness	All Hazards	PA DCED, PATS	1-2 Years	FMA, BRIC
3.19	Develop nuclear mitigation actions work group. Make sure to include members of organizations who serve socially vulnerable groups and underserved populations to ensure that those residents' needs regarding evacuation and other hazard mitigation measures are met.	Luzerne County	Education and Awareness; Plans and Regulations	Nuclear Incident	Luzerne County EMA	Ongoing	County Annual Budget
3.20	Work with the Pennsylvania Department of Health to increase awareness about treating and preventing substance use	Luzerne County	Education and Awareness	Opioid Addiction	Luzerne County Drug and Alcohol in	Ongoing	County Annual Budget; DOH

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	disorder. Make sure to target outreach efforts to populations most affected by substance abuse disorder as outlined in the Risk Assessment section of this document.				coordination with PADOH		
3.21	Coordinate with PEMA and Talen Energy on updated public information materials and a public information campaign to inform people in the 10-mile EPZ about the new evacuation plan. Make sure to provide materials in all languages relevant to County residents who live within the evacuation zone.	Luzerne County; All Municipalities	Education and Awareness	Nuclear Incident	PEMA, Talen Energy	1 Year	County Annual Budget
3.22	Identify emergency management duties to protect residents north and south of the railroad tracks (which divide the borough) in the event of a train derailment. Make sure to include considerations for those who may have special needs during an evacuation, including children, older adults, residents with disabilities and medical needs, and residents who may not speak English fluently.	Nescopeck Borough	Local Plans and Regulations, Education and Awareness	All Hazards	Local EMA	1-2 Years	Borough Annual Budget
3.23	Adopt a resolution to ensure Real Estate Disclosure of properties in the	Slocum Township	Local Plans and Regulations	Flood, Flash Flood, & Ice Jam	Council, Local EMA, Local Department of	1-2 Years	Municipal Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	floodplain to potential residents interested in these properties.				Planning and Zoning		
3.24	Conduct public outreach to better educate residents to become better prepared to face hazards.	Wilkes-Barre Township	Education and Awareness	All Hazards	Local Department of Community Development	Ongoing	Municipal Annual Budget
3.25	Work with local fire departments to conduct fire prevention seminars for school district staff each year. Topics include the proper use of fire extinguishers, fire evacuation procedures, common fire code violations, and specific concerns for cafeteria personnel.	Hanover Area School District	Education and Awareness	Wildfire	Hanover Area School District	Ongoing	Staff Time
GOAL 4 ENSURE ADEQUACY AND CONTINUITY OF EMERGENCY MANAGEMENT SERVICES DURING HAZARD EVENTS.							
4.1	Ensure municipal staff complete annual cyber-security and awareness training to reduce risk and occurrence of phishing and malware attacks.	All Municipalities	Education and Awareness	Cyber-Terrorism	Local Emergency Services	Ongoing	Municipal Annual Budget
4.2	Identify designated locations to go for code blue and extreme heat days	All Municipalities	Plans and Regulations	Extreme Temperatures	Local Emergency Services	Ongoing	PA DCED
4.3	Improve access for snow removal on certain roads with snowplow truck operation. Use GIS to determine where	Bear Creek Village Borough	Structure and Infrastructure	Winter Storm	Council Road Master	Ongoing	Borough Annual Budget

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	residents with access and functional needs live and where public transit routes are most essential and prioritize snow-clearing efforts in those areas.						
4.4	Restore evacuation sirens to working conditions to warn residents of hazards.	City of Wilkes-Barre	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	City of Wilkes-Barre		PEMA, FEMA
4.5	Continue to work with the Red Cross to conduct an annual assessment of existing shelters in the county. This assessment will determine whether each shelter has enough capacity to meet demand; whether the shelters are in good condition with regards to safety, building code adherence, and cleanliness; and whether the shelters are ADA-compliant and meet the needs of community members with disabilities. Retrofit and update facilities that do not meet these criteria. Identify additional locations that could be equipped and retrofitted to be shelters based on an analysis of population density, facility accessibility, facility proximity to public transit, and the number of unhoused individuals within each community.	Luzerne County	Plans and Regulations, Structure and Infrastructure	All Hazards	County Office of Emergency Management	Ongoing	HMGP

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
4.6	Continue to maintain and update threat protection program software.	Luzerne County	Structure and Infrastructure	Cyber-Terrorism	Department of Information Technology	Ongoing	Annual County Budget
4.7	Provide annual cyber-security and awareness training to all County staff to reduce the risk and occurrence of phishing and malware attacks.	Luzerne County	Education and Awareness	Cyber-Terrorism	Department of Information Technology	Ongoing	Annual County Budget
4.8	Work with PEMA to transition evacuation planning for the Susquehanna Steam Electric Station to the "keyhole" approach. When developing the evacuation plan, make sure to include the needs of those with access and functional needs, older adults, children, residents who may not speak English, and other socially vulnerable groups.	Luzerne County	Local Plans and Regulations	Nuclear Incident	PEMA, Talen Energy	3-5 Years	County Annual Budget, Staff Time
4.9	Improve coordination to reduce risk from hazardous material incidents and conduct information sessions and training to educate and prepare local officials and first responders.	Luzerne County, Ashley Borough, Avoca Borough, Bear Creek Township, Black Creek Township, Butler Township, Conyngham Borough, Conyngham Township, Courtdale Borough, Dallas	Education and Awareness	Hazardous Materials Release	Luzerne EMA in cooperation with Local Officials and EMAs of each Municipality	Ongoing	Luzerne County Emergency Services Budget, Staff Time, PEMA

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
		Borough, Dallas Township, Dennison Township, Dorrance Township, Dupont Borough, Duryea Borough, Edwardsville Borough, Exeter Borough, Fairview Township, Forty Fort Borough, Foster Township, Freeland Borough, Hanover Township, Harveys Lake Borough, Hazle Township, City of Hazleton, Hughestown Borough, Hunlock Township, Jackson Township, Jeddo Borough, Jenkins Township, Kingston Borough, Kingston Township, Laflin Borough, Lake Township, Larksville Borough, Lehman					

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#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
4.9	Improve coordination to reduce risk from hazardous material incidents and conduct information sessions and training to educate and prepare local officials and first responders.	Township, Luzerne Borough, City of Nanticoke, Nescopeck Borough, Nescopeck Township, Newport Township, Nuangola Borough, City of Pittston, Pittston Township, Plains Township, Plymouth Borough, Plymouth Township, Pringle Borough, Rice Township, Salem Township, Slocum Township, Sugarloaf Township, Sugar Notch Borough, Swoyersville Borough, Warrior Run Borough, West Hazleton Borough, West Pittston Borough, West Wyoming Borough, White Haven Borough, City of Wilkes-Barre, Wilkes-Barre					
4.9	Improve coordination to reduce risk from hazardous material incidents and conduct information sessions and training to educate and prepare local officials and first responders.						

Table 6.4-1 2025 Luzerne County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
		Township, Wright Township, Wyoming Borough, Yatesville Borough					
4.10	Encourage municipalities to reduce the vulnerability of critical facilities to wildfires by: increasing buffers and introducing defensible spaces; identifying farm roads, service roads, and other private access corridors in high hazard areas that could be used as fire breaks; and providing assistance to the County Emergency Management to identify vulnerable structures (firewise communities). In addition to traditional critical facilities such as fire stations and law enforcement offices, encourage municipalities to consider critical facilities that serve socially vulnerable populations such as elder care facilities and retirement homes, schools, youth and adult correctional facilities, hospitals, mental health treatment facilities, shelters, and youth and adult daycare facilities.	Luzerne County; All Municipalities	Structure and Infrastructure	Wildfire	PA DEP - Bureau of Forestry	3-5 Years	Staff Time, BRIC, HMGP
4.11	Evaluate network for Township building and upgrade computers if needed. Continue with routine maintenance	Rice Township	Structure and Infrastructure	Cyber-Terrorism	Local EMA	1-2 Years	Municipal Annual Budget

Table 6.4-1 2025 Luzerne County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
4.12	Ensure emergency responders are provided with up-to-date facility information, including the locations of utility shut offs, building diagrams, storage of hazardous materials and other information as requested so they are not only aware but can provide feedback on procedures.	Hanover Area School District	Education and Awareness	All Hazards	Hanover Area School District	Ongoing	Staff Time
4.13	Take steps to properly secure all computers against unauthorized access.	Hanover Area School District	Structure and Infrastructure	Cyber-Terrorism	Hanover Area School District	Ongoing	School Budget
GOAL 5 ENSURE HAZARD MITIGATION GOALS AND OBJECTIVES ARE CONSISTENT WITH GOALS OF OTHER PLANS AND ORDINANCES IN THE COUNTIES AND MUNICIPALITIES.							
5.1	Identify mitigation options to address the flooding of Mill Creek on the 700 block of Grove Street. Use FEMA publication 551, Selecting Appropriate Mitigation Measures for Flood Prone Structures, which provides guidance on determining appropriate mitigation measures.	Avoca Borough	Local Plans and Regulations	Flood, Flash Flood, & Ice Jam	Local EMA in coordination with LCFPA	1-2 Years	Borough Annual Budget
5.2	Identify measures to prevent/remove ice buildup in the Mill Creek channel during winter months.	Avoca Borough	Local Plans and Regulations, Natural Systems Protection	Flood, Flash Flood, & Ice Jam	Local EMA	1-2 Years	Borough Annual Budget

Table 6.4-1 2025 Luzerne County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
5.3	Develop a sewer maintenance program.	City of Hazleton	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Department of Public Works	1-2 Years	City Annual Budget
5.4	Ensure integration of vulnerabilities into local, regional, and countywide comprehensive planning processes.	Conyngham Borough	Local Plans and Regulations	All Hazards	Local Emergency Manager	Ongoing	Borough Annual Budget
5.5	Identify the most appropriate mitigation measures for the Dallas Area Municipal Authority and the PA Water Treatment plant. Use FEMA publication 551, Selecting Appropriate Mitigation Measures for Flood Prone Structures, which provides guidance on determining appropriate mitigation measures.	Kingston Township	Local Plans and Regulations, Structure and Infrastructure	All Hazards	Local EMA, Dallas Area Municipal Authority, PA Water Treatment Plant	1-2 Years	Township Annual Budget
5.6	Hire third party code enforcement to enforce local safety and nuisance ordinances.	Lake Township	Local Plans and Regulations	Wildfire	Code Official	Completed	Township Annual Budget
5.7	Include the following language in the new county zoning ordinance to: 1) concur with the Model Floodplain Ordinance and/or regulations and the Subdivision/Land development Ordinance (SALDO) with respect to what is allowed in the floodplain; and 2) for all development to construct first floors above the base flood elevation	Luzerne County	Plans and Regulations	Flood, Flash Flood, & Ice Jam	County Planning Commission, County Engineers Office, LCFPA	1-2 Years	LUTAP

Table 6.4-1 2025 Luzerne County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	for areas that are protected by the levee systems.						
5.8	Encourage the municipalities to come under the control of the County Zoning & Subdivision/Land Development ordinances.	Luzerne County	Plans and Regulations	All Hazards	County Planning Commission	1-2 Years	LUTAP, BRIC
5.9	Work with municipalities, particularly those along the Susquehanna River and large streams, to join the CRS by educating them on the benefits of CRS and also providing them with technical assistance; work with municipalities to adopt and enforce the requirements of the Countywide ACT 167 plan.	Luzerne County	Local Plans and Regulations	Flood, Flash Flood, & Ice Jam; Drought	LCFPA, County Engineers Office	6-10 Years	DEP , BRIC, FMA, HMGP
5.10	Develop a Source Water Protection Plan to properly utilize and protect ground water resources in the county.	Luzerne County	Local Plans and Regulations	Drought	DEP	3-5 Years	DEP
5.11	Encourage the county to include in their zoning ordinance, measures to: enhance the concept of defensible space practice; and discourage development on permeable soils to reduce the impacts of drought.	Luzerne County	Local Plans and Regulations	Wildfire, Drought	County Planning Commission	1-2 Years	LUPTAP
5.12	Encourage the individual municipalities to be firmly committed to continued compliance with the NFIP by regulating development and redevelopment through the adoptions of provisions	Luzerne County	Local Plans and Regulations	Flood, Flash Flood, & Ice Jam	LCFPA	1-2 Years	BRIC, FMA, HMGP, FLUAP

Table 6.4-1 2025 Luzerne County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	that exceed the minimum NFIP requirements. Work with communities to ensure that there are no deficiencies when the Community Assistance Visits are conducted to ensure continued compliance.						
5.13	Coordinate efforts between the Joint-County Comprehensive Plan and the countywide Act 167 Stormwater Management Plan to identify groundwater recharge areas and sensitive groundwater areas such as mine lands. Work closely with the municipalities to enforce infiltration and groundwater recharge requirements in these areas to reduce the impacts of drought.	Luzerne County	Natural Systems Protection	Drought	LCFPA, County Engineers Office	1-2 Years	DEP
5.14	Work with FEMA to conduct detailed studies for Abrahams Creek of Forty Fort, Big Wapwallopen Creek, Lackawanna River, Nescopeck Creek, Solomon Creek, and Toby Creek as identified in the FEMA Region III Post-Flood Community Flood Risk Evaluation for Luzerne County.	Luzerne County	Plans and Regulations, Natural Resources Protection	Flood, Flash Flood, & Ice Jam	FEMA, County Engineers Office, LCFPA	6-10 Years	BRIC, HMGP
5.15	Continue to perform regular inspections of the Wyoming Valley Flood Risk Management Project as	Luzerne County	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	LCFPA	Ongoing	Levee Fee

Table 6.4-1 2025 Luzerne County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	outlined in the Project Cooperation Agreement between the federal government and LCFPA.						
5.16	Monitor and evaluate mitigation actions annually and update the hazard mitigation plan every five years to reflect changes in development after a major hazard event and provide technical assistance to municipalities in implementing individual hazard mitigation actions. Analyze the social vulnerability and hazard risk exposure of each community to prioritize technical assistance efforts based on highest need.	Luzerne County	Local Plans and Regulations	All Hazards	Luzerne EMA, LCFPA, County Planning Commission	Ongoing	BRIC, HMGP
5.17	Work with other County Departments to incorporate hazard mitigation actions and planning into other plan updates, including Emergency Operations Plan updates.	Luzerne County	Local Plans and Regulations	All Hazards	Luzerne EMA, Luzerne County Planning Commission, LCFPA in coordination with local emergency and planning departments	Ongoing	County and Municipal Annual Budgets

Table 6.4-1 2025 Luzerne County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
5.18	After an event, provide information on alternatives to reconstruction to property owners who own structures that sustained damages more than or equal to 50% of their value.	Luzerne County	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam; Tornado & Windstorm, Winter Storm; Hurricane, Tropical Storm, and Nor'easter; Wildfire	Luzerne County Planning Commission, LCFPA	5 Years	HMGP, County Annual Budget
5.19	Work with the County to develop a procedure to issue building permits and perform UCC functions including inspections.	Pringle Borough	Local Plans and Regulations	All Hazards	Local Planning & Zoning Department	1-2 Years	Borough Annual Budget
5.20	Continue to work with the Luzerne County Flood Protection Authority to finalize a solution to the flooding issues along Coal Brook.	Ross Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Local Engineering Department in coordination with LCFPA	2-3 Years	Township Annual Budget
5.21	Work with FEMA Region 3 to deliver substantial improvement/substantial damage (SI/SD) training with information on participant-specific provisions to communities participating in the NFIP.	Luzerne County	Education and Awareness	Flood, Flash Flood, & Ice Jam	Luzerne EMA, Luzerne County Planning Commission, LCFPA in coordination with local emergency	2-3 Years	Township Annual Budget

Table 6.4-1 2025 Luzerne County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
					and planning departments		
5.22	Identify or hire a safety design designee to evaluate all building construction and renovation plans early in the design process and make recommendations to enhance the level of safety through qualified board approved professionals.	Hanover Area School District	Local Plans and Regulations	All Hazards	Hanover Area School District	5 Years	School Budget
5.23	Work with municipal emergency management, fire departments, and law enforcement officials to develop a procedure where they have an opportunity to review building construction and renovation plans to provide feedback on safety and emergency management concerns	Hanover Area School District	Local Plans and Regulations	All Hazards	Hanover Area School District	5 Years	Staff Time
GOAL 6 PROTECT PEOPLE AND ASSETS FROM THE POTENTIAL IMPACTS OF HIGH HAZARD POTENTIAL DAMS.							
6.1	Build partnerships with dam owners. For dams with poor condition assessments, work with dam owners to identify and prioritize repairs needed to bring the dams into compliance with dam safety standards.	Avoca Borough, Bear Creek Township, Buck Township, Butler Township, Conyngham Township, Dallas Borough, Dallas Township, Dennison Township, Dorrance Township, Duryea	Plans and Regulations; Education and Awareness	Dam Failure	Local Planning Departments, Local Emergency Services, Dam Owners	Ongoing	Staff Time

Table 6.4-1 2025 Luzerne County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
6.1	Build partnerships with dam owners. For dams with poor condition assessments, work with dam owners to identify and prioritize repairs needed to bring the dams into compliance with dam safety standards.	Borough, Fairmount Township, Fairview Township, Foster Township, Franklin Township, Hanover Township, Hazle Township, Hunlock Township, Huntington Township, Jackson Township, Jenkins Township, Lake Township, Lehman Township, Penn Lake Park Borough, Plains Township, Plymouth Borough, Pringle Borough, Rice Township, Ross Township, Salem Township, Slocum Township, Union Township, City of Wilkes-Barre, Wilkes-Barre Township, Wright Township					
6.2	Make repairs to the dam on Flat Rock Road.	Franklin Township	Structure and Infrastructure	Dam Failure	Dam Owner	3-5 Years	Township Annual

Table 6.4-1 2025 Luzerne County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
							Budget; HHPD Grant Program
6.3	Conduct a study to identify the most appropriate mitigation measures for the dams located in the Township and inform and contact the appropriate individuals and owners. There are 4: (1) at Hillside Farms, (2) off of W. 8th St., (3) Green Pond Dam off Green Rd., and (4) Frances Slocum Dam which is State owned.	Kingston Township	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam; Dam Failure	Local EMA, Local Planning & Zoning Department in coordination with LCFPA	2-3 Years	Township Annual Budget
6.4	The dam on Harvey's Creek has recently been classified as a high-risk dam. Develop a program to conduct regular maintenance of this dam. Reach out to residents who live downstream from the dam to inform them of hazard risks and mitigation measures they can take. Ensure that all outreach is conducted in languages relevant to the community, and that outreach materials are provided both online and in a physical format to ensure accessibility for residents who may have low or no internet access.	Lehman Township	Local Plans and Regulations	Flood, Flash Flood, & Ice Jam; Dam Failure	Dam Owner	1-2 Years	Township Annual Budget
6.5	Provide notice of funding opportunities and supporting documentation from the county HMP to EMCs of	Luzerne County	Education and Awareness	Dam Failure	Luzerne EMA, LCFPA	Annually by December (grant	Staff time

Table 6.4-1 2025 Luzerne County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	municipalities with High Hazard Potential Dams to promote rehabilitation and safety in Luzerne County. Provide supplemental materials to inform residents at risk of dam failure impacts of potential risks and options for mitigating those risks.					applications due June each year)	
6.6	Create a dam inundation layer.	Luzerne County GIS	Plans and Regulations	Dam Failure	Luzerne County GIS	1 Year	Staff Time
6.7	Conduct an engineering study to identify the most appropriate mitigation measure to address mine subsidence for the Intake Dam, Mill Creek, on Armstrong Road.	Pittston Township	Local Plans and Regulations, Structure and Infrastructure	Subsidence, Sinkhole; Coal Mining; Dam Failure	Local Engineering Department	Completed	Township Annual Budget
6.8	Conduct an engineering study to identify the most appropriate mitigation measure to address mine subsidence for the following three dams: Brown Creek Dam on Cherry Street, Wadham Creek Dam on Shawnee Street, and Duffy's Run Dam on 1st Street.	Plymouth Borough	Structure and Infrastructure	Subsidence, Sinkhole; Dam Failure	Local Engineering Department	Ongoing	Borough Annual Budget
6.9	Continue annual dam inspections of the dam in the community and perform updates of the EAP as necessary.	Union Township	Local Plans and Regulations; Structure and Infrastructure	Dam Failure	Local EMA, Local Engineering Department, Dam Owner	Ongoing	Municipal Annual Budget

Table 6.4-1 2025 Luzerne County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
6.10	Once dam hazard areas are identified from inundation mapping, communities can consider updating land use ordinances. Consider the implications of recognizing dam inundation areas as sensitive areas in zoning ordinances.	Avoca Borough, Bear Creek Township, Buck Township, Butler Township, Conyngham Township, Dallas Borough, Dallas Township, Dennison Township, Dorrance Township, Duryea Borough, Fairmount Township, Fairview Township, Foster Township, Franklin Township, Hanover Township, Hazle Township, Hunlock Township, Huntington Township, Jackson Township, Jenkins Township, Lake Township, Lehman Township, Penn Lake Park Borough, Plains Township, Plymouth Borough, Pringle Borough, Rice Township, Ross	Plans and Regulations	Dam Failure	Local Planning and Zoning Departments	Ongoing	Staff Time

Table 6.4-1 2025 Luzerne County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
		Township, Salem Township, Slocum Township, Union Township, Wilkes-Barre Township, Wright Township					
6.11	Once structures in dam hazard areas are identified, support mitigation projects that will result in the projection of public and private property from floods of specific magnitudes. Eligible projects include but are not limited to: 1) acquisition of hazard-prone structures 2. Elevation of flood-prone structures. 3. Minor structural flood control projects 4. Relocation of structures from hazard-prone areas 5. Retrofitting of existing buildings, facilities, and infrastructure	Luzerne County, Avoca Borough, Bear Creek Township, Buck Township, Butler Township, Conyngham Township, Dallas Borough, Dallas Township, Dennison Township, Dorrance Township, Duryea Borough, Fairmount Township, Fairview Township, Foster Township, Franklin Township, Hanover Township, Hazle Township, Hunlock Township, Huntington Township, Jackson Township, Jenkins Township, Lake	Structure and Infrastructure	Dam Failure	Luzerne EMA, LCFPA, Local Planning & Zoning Departments	Ongoing	FEMA HHPD, PA DCED PDFAP, Private Funding

Table 6.4-1 2025 Luzerne County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD(S)	LEAD AGENCY / DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
		Township, Lehman Township, Penn Lake Park Borough, Plains Township, Plymouth Borough, Pringle Borough, Rice Township, Ross Township, Salem Township, Slocum Township, Union Township, Wilkes-Barre Township, Wright Township					

Evaluating mitigation actions involves judging each action against certain criteria to determine its feasibility and potential impact. Actions evaluated and prioritized by applying the Multi-Objective Mitigation Action Prioritization criteria. This method includes considerations for cost vs benefit as the efficiency metric addresses costs while the other four metric analyze the benefits for each action. For each action, scores were assigned to each criterion using the following weighted, multi-objective mitigation action prioritization criteria.

- Effectiveness (weight: 20% of score): The extent to which an action reduces the vulnerability of people and property.
- Efficiency (weight: 30% of score): The extent to which time, effort, and cost is well used as a means of reducing vulnerability.
- Multi-Hazard Mitigation (weight: 20% of score): The action reduces vulnerability for more than one hazard.
- Addresses High Risk Hazard (weight: 15% of score): The action reduces vulnerability for people and property from a hazard(s) identified as high risk.
- Addresses Critical Communications/Critical Infrastructure (weight: 15% of score): The action pertains to the maintenance of critical functions and structures such as transportation, supply chain management, data circuits, etc.

Scores of 1, 2, or 3 were assigned for each multi-objective mitigation action prioritization criterion where 1 is a low score and 3 is a high score. The Efficiency criterion, which considers the cost and effort of each action versus its overall vulnerability reduction benefit, is the most highly weighted criterion as part of the total prioritization score. Actions were prioritized using the cumulative score assigned to each. Each mitigation action was then given a priority ranking (Low, Medium, and High) based on the following:

- Low Priority: 1.0 – 1.8
- Medium Priority: 1.9 – 2.4
- High Priority: 2.5 – 3.0

Table 6.4-2 presents the cumulative results of the prioritization of mitigation actions. 32 actions were ranked High Priority, 62 are ranked Medium Priority, with the remaining 98 ranked as Low Priority.

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
1.1	Develop and distribute materials to educate residents on water-saving measures, such as low-flow showerheads and toilets, monitoring water flow while cleaning, and routinely checking for leaks in plumbing.	2	2	1	3	2	2.0
1.2	Retrofit public buildings and Critical Facilities to reduce future wind and earthquake damage.	3	2	3	1.5	3	2.5
1.3	Enhance radon testing capabilities to assist homeowners, renters, or businessowners in analyzing their risk	2	2	1	1	1	1.5
1.4	Obtain grant funding to acquire, demolish, relocate, and/or elevate structures that are vulnerable to flooding.	3	2	2	3	1	2.2
1.5	Make municipal buildings accessible to residents to do business without having to come in direct contact with township employees. Outfit front door with an intercom that would allow visitors be buzzed into the building and place hand sanitizing stations throughout.	1.5	1.5	2	2	1.5	1.7
1.6	Consider adding walls to Falls Creek.	1.2	1.2	1.5	2	2	1.5
1.7	Identify specific mitigation actions for the structures on Wilkes Barre and Easton Roads that are vulnerable to flooding.	1.5	2	1.5	2	2	1.8
1.8	Identify structural solutions to stormwater ponding and sewer back-ups area in the Borough that had been subject to mine subsidence.	1	1	1.5	1.5	1.5	1.3

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
1.9	Identify mitigation options to address the flooding action on Nescopeck Creek and St. Johns Road and State Route 222. Use FEMA publication 551, Selecting Appropriate Mitigation Measures for Flood Prone Structures, which provides guidance on determining appropriate mitigation measures.	2	2	2	2	2.25	2.0
1.10	Offer a cost-sharing program for residents affected by sewage back-up damage and publicize use of backflow valves within the community to residents subject to sewer backups and associated damages. Ensure that all outreach is conducted in all languages relevant to the community, and that outreach materials are provided both online and in a physical format to ensure accessibility for residents who may have low or no internet access.	1	1	1.5	1.5	1.5	1.3
1.11	Conduct an engineering study to identify the most appropriate mitigation measure to address land subsidence for the Luzerne County Community College on South Prospect Street.	1.5	1.5	2	2.25	2	1.8
1.12	Pursue property acquisition for properties along Newport Creek which are flooded by Susquehanna River backwater. Work with residents of these areas to collaboratively craft a strategy for their voluntary relocation. Keep in mind that people of color and low-income households are more likely to be located within floodplains and may not have the resources to relocate. Investigate the feasibility of providing grants or additional funding to	1.5	1.5	2	2.5	2.5	1.9

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
	disadvantaged community members who wish to relocate to less hazardous areas.						
1.13	Work with the County to develop a procedure to issue building permits and perform UCC functions including inspections.	1.5	1	2.5	2.5	2	1.8
1.14	Conduct an engineering study to identify the most appropriate mitigation measure for heavy rain - flooding in the area of Columbia Avenue, American Legion Post and Leggio's Restaurant.	1.5	1.5	1	2	1.5	1.5
1.15	Creek bank restoration and sedimentation clean out around culvert area in tributary to Toby creek. This will mitigate storm water flooding in area near Foster St/Woodlawn Ave.	2	2	1.5	2	2	1.9
1.16	Purchase a portable generator to power heating systems at shelter locations.	1	1	1.5	1.5	1.5	1.3
1.17	Conduct a study to identify ways (e.g., property acquisitions and stream widening) to mitigate the continual flooding of properties at the confluence of Toby's Creek and Trout Run (Fernbrook Corners). If pursuing property acquisitions, make sure to consider the needs of low-income homeowners and renters.	2	2	1.5	2.5	2.5	2.1
1.18	Flooding along Leonard's Creek has caused severe damage to two bridges and channel improvements. FEMA funding has been secured to rebuild	2.5	2.5	2	3	3	2.6

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
	one bridge and wall improvements. Identify additional actions that should be taken at the Kunkle/Leonard's and Shady Side Creek area.						
1.19	Conduct a study to identify stream bed improvements along public roads which continue to be heavily flooded.	1.5	1	2.5	2.5	2	1.8
1.20	Conduct a study to identify the need for retaining structures with creek bed improvements at Toby Creek from Offset Paperback and Route 309 to the Dallas Township - Kingston Township municipal boundary.	2.5	2.5	2	3	3	2.6
1.21	Conduct an engineering study to identify the most appropriate mitigation measure for the multiple structures in the Special Flood Hazard Area throughout the Township.	1	1	2	2	2	1.5
1.22	Conduct a study to identify the most appropriate mitigation measure for the Geisinger South hospital, which is located near historic mining operations and floodplains.	1	1	2	2	1.5	1.4
1.23	Conduct a study to identify problems on Dupont Creek (Lidy, Collins, Mill) and Mill Creek.	2.5	2.5	2.5	3	3	2.7
1.24	Purchase portable pumps along with discharge hoses for pumping of landside water in the event the flap gates are closed, and interior flooding of streets occurs on the landside of the levee.	1.5	1	1.5	2	2	1.5

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
1.25	Raise Levee/Dike System in Duryea Borough.	1	1	1.5	2	2	1.4
1.26	Identify specific mitigation for the structures on Hillside Avenue, Elm, Green, and Cherry Streets that are vulnerable to mine subsidence.	1	1	1.5	2	2	1.4
1.27	Move the EOC out of flood waters and maintain underground Floodway interceptor.	3	3	2.5	2.75	2.75	2.8
1.28	Conduct a feasibility study for floodwall protection improvements required for the problem areas of Susquehanna Avenue and Grant Street.	1.5	1	1.5	2	2	1.5
1.29	Continue to perform creek and riverbank maintenance and stabilization activities along strategic areas of the Susquehanna River and Hicks Creek.	1.5	1	1.5	2	2	1.5
1.30	Consider elevation of houses and/or utilities along Susquehanna Avenue. Provide affected residents with information about funding, feasibility, and risks. Consider a program to provide funding assistance to low-income residents pursuing elevations.	2.5	2.5	3	3	3	2.8
1.31	Conduct a feasibility study to determine improvements for the problem areas along Route 92, Dymund Creek, Sutton Creek and Appletree Road.	1.5	1.5	1.5	2	2	1.7
1.32	Identify creek and riverbank maintenance and stabilization activities along strategic areas of the Susquehanna River and the Township's tributary creeks.	2	2	1.5	2	2	1.9

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
1.33	Improve snow removal activities throughout the city during winter weather events.	1.5	1	2.5	2.5	2	1.8
1.34	Establish programs and facilities to prevent, reduce, and/or eliminate the impact of opioid addiction affecting vulnerable residents of the City of Wilkes-Barre. Work with healthcare organizations, medical facilities, houseless outreach and shelter services, social services organizations, and other entities who serve vulnerable populations to receive their input and expertise.	1.5	1	2.5	2.5	2	1.8
1.35	Identify specific mitigation actions for the structures on Shadetree Drive, Brookside Drive, and Tannery Road that are vulnerable to flooding.	1.5	1	1.5	2	2	1.5
1.36	Identify mitigation options to reduce flooding on Municipal Road and Valley View Road.	1.5	1	1.5	2	2	1.5
1.37	Rehabilitate/modify bridges over streams vulnerable to flooding including Blackman Street Bridge over Bowman Spring Creek.	1.5	1.5	3	1.5	1.5	1.8
1.38	Conduct a survey of structures in the Central Business District to address areas structural remediation is necessary.	1.5	1	1.5	2	2	1.5
1.39	Acquire funding to dredge Solomon Creek to minimize flooding and damage to the 7 out of 8 Township repetitive loss properties in this area.	2	2	1	3	1	1.8

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
1.40	Ground stabilization, planting and building a barrier along routes to prevent roadway blockage caused by erosion and landslides.	1.5	1.5	2	1	2	1.6
1.41	Identify and address trees and other vegetation that require routine maintenance or removal	3	1	2	2	1	1.8
1.42	Acquire and demolish/elevate residential structures located along River Road, Tennant Street, Miller Road, lots on Paradise TP and within the Susquehanna River's Special Flood Hazard Area. Work with residents of these areas to collaboratively craft a strategy for their voluntary relocation. Keep in mind that people of color and low-income households are more likely to be located within floodplains, and may not have the resources to relocate. Investigate the feasibility of providing grants or additional funding to disadvantaged community members who wish to relocate to less hazardous areas.	2.5	2.5	3	3	3	2.8
1.43	Conduct an engineering study to identify the most appropriate land subsidence mitigation measure for the Government Building and Police Department on Wyoming Avenue.	1.5	1.5	2	1	2	1.6
1.44	Conduct an engineering study to identify the most appropriate land subsidence mitigation measure for the Chester Street Elementary School and Wyoming Valley West Middle School on Chester Street. Work with the	1.5	1.5	2	1	2	1.6

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
	Chester Street Elementary School and Wyoming Valley West Middle School on Chester Street to determine their priorities and preferences.						
1.45	Investigate solutions to the flooding issues along Gardner Creek.	1.5	1.5	2	1	2	1.6
1.46	Provide watertight seals for manholes impacted by flooding on the Susquehanna River.	1.5	1.5	2	2	2	1.8
1.47	Identify clearing and dredging activities for Boston Creek upstream of US 11 in order to maintain its flood carrying and storage and capacity.	1.5	1.5	2	2	2	1.8
1.48	Provide dry floodproofing measures for metal doors/windows for structures within the Susquehanna River's Special Flood Hazard Area.	1.5	1.5	2	2	2	1.8
1.49	Conduct an engineering study to identify the most appropriate mitigation measure for the Government Building on Dupont Drive.	1.5	1.5	2	2	2	1.8
1.50	Conduct an engineering study to identify the most appropriate mitigation measure for the Luzerne Borough Volunteer Fire Department on Academy Street.	1.5	1.5	2	2	2	1.8
1.51	Work with Union Township to encourage them to issue building permits and perform UCC functions including inspections.	2	3	1.5	3	2	2.4

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
1.52	Work with each municipality to identify a point of contact to perform an annual review of the mitigation actions for their municipality from this Hazard Mitigation Plan.	2.5	2.5	3	3	2.5	2.7
1.53	For those parties not interested in acquisition or where acquisition is not feasible, continue to work with municipalities to advise homeowners and renters with a preferred mitigation alternative such as elevation or flood proofing. Provide pathways to funding for low-income homeowners to make needed retrofits. Provide renters with appropriate advice to reduce their risk in case of a flood event.	1.5	2	1.5	3	2	2.0
1.54	Designate specific locations throughout the County such as the Emergency Management Agency, Planning & Zoning Department, municipal libraries, and events such as fairs to provide information to the public on flooding and other hazards. Encourage these locations to stock a variety of FEMA publications on various natural and human caused hazards and the most recent FIRMs; also include information on the County's website.	2	2	1.5	3	2	2.1
1.55	Conduct an educational campaign and develop brochures on topics such as: the impacts of drought, proper sediment and erosion control, and dangers of developing on old mines and dumps.	2	2	3	2	2	2.2

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
1.56	Stay closely involved with the activities of the Delaware Regional Basin Commission, Susquehanna River Basin Commission, Water Board, and other water planning organizations by encouraging a staff member from the County Planning Commission to be present at their meetings depending on their availability.	2	3	1.5	3	2	2.4
1.57	Continue to provide inquirers with technical advice and information from the community's FIRM and FEMA's website on a property's location in a Special Flood Hazard Area, zone, and its base flood elevation if data is available.	2	2	1.5	3	2	2.1
1.58	Each spring, post a link on the County website banner with hailstorm safety information. Post hailstorm safety information in other locations accessible to the general public, including bus shelters, libraries, and schools. Make sure to provide this information in all languages relevant to the County's residents.	1.5	1.5	1.5	1	2	1.5
1.59	Maintain regular contact with Pennsylvania Department of Conservation and Natural Resources to ensure that County information about the potential for landslides is current. Inform residents who may be impacted by landslides of their risk and provide strategies to mitigate that risk.	2	3	1.5	3	2	2.4

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
1.60	Continue to work with the USACE to implement the National Levee Safety Program and refine an inventory of all levees in the County. Provide supplemental materials to inform residents at risk of levee failure impacts of potential risks and options for mitigating those risks.	1.5	1.5	1.5	3	3	2.0
1.61	Encourage homeowners and renters to install appropriate devices to monitor and reduce radon exposure in homes. Provide free or low-cost options for low- to moderate- income households.	2	2	1.5	1	2	1.8
1.62	Develop and maintain stockpiles of PPE. Coordinate on distribution of PPE to communities as needed.	1	2	1	3	1	1.6
1.63	Continue to acquire and demolish/elevate residential structures located along River Road and within the Susquehanna River's Special Flood Hazard Area. Work with residents of these areas to collaboratively craft a strategy for their voluntary relocation. Keep in mind that people of color and low-income households are more likely to be located within floodplains and may not have the resources to relocate. Investigate the feasibility of providing grants or additional funding to disadvantaged community members who wish to relocate to less hazardous areas. Provide technical and financial assistance to low-income homeowners who may want to elevate their homes.	2	2.5	3	3	3	2.7

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
1.64	Purchase a generator to assist the Borough during power outages.	1.5	1.5	1	2	2	1.6
1.65	Remove dead and downed trees/lumber throughout the Township to mitigate wildfire hazard.	1	1	1	1.5	1	1.1
1.66	Conduct an engineering study to identify the most appropriate mitigation measure to address mine subsidence for the Pittston Township Police Department on Broad Street.	1.5	1.5	1	2	2	1.6
1.67	Continue to identify and restore channels that are damaged/clogged causing flooding in the Township's residential areas. Most of the problematic channels have been addressed; the Township is pursuing some additional actions to restore the remainder of the channels in the Township.	1.5	1.5	1	2	2	1.6
1.68	Continue to acquire and demolish/elevate residential structures located along Gallagher Drive, McCullough Street, North River Road, North River Street, South River Street, Mitchell Street, Courtright Street, Reese Street, and Roberts Street that lie within the Susquehanna River's Special Flood Hazard Area. Work with residents of these areas to collaboratively craft a strategy for their voluntary relocation. Keep in mind that people of color and low-income households are more likely to be located within floodplains and may not have the resources to relocate. Investigate the	2	2.5	3	3	3	2.7

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
	feasibility of providing grants or additional funding to disadvantaged community members who wish to relocate to less hazardous areas. Provide technical and financial assistance to low-income homeowners who may want to elevate their homes.						
1.69	Pursue measures to minimize the potential for a train derailment caused by flooding where the Mill Creek meets the Gardners Creek at Union Street.	2	2.5	2	2	3	2.3
1.70	Pursue the recommendations along the Abrahams Creek made in the Hicks Creek and Abrahams Creek Detailed Feasibility Study, to address flooding issues on Eight Street, Swetland Lane.	1.5	1	2.5	2	2	1.7
1.71	Identify flood protection measures, or pursue property acquisition, for properties along Susquehanna Avenue between 4th and 8th Streets which are affected by flooding from the Susquehanna River. Keep in mind that people of color and low-income households are more likely to be located within floodplains, and may not have the resources to relocate. Investigate the feasibility of providing grants or additional funding to disadvantaged community members who wish to relocate to less hazardous areas. Provide technical and financial assistance to low-income homeowners who may want to pursue flood protection measures for their properties.	1.5	1	2	2.5	2	1.7

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
1.72	Develop mitigation measures including an implementation strategy for the fire station and water treatment plant that are located in the floodplain. Use FEMA publication 551, Selecting Appropriate Mitigation Measures for Flood Prone Structures, which provides guidance on determining appropriate mitigation measures.	2	3	3	3	3	2.8
1.73	Continue to pursue measures to protect the wastewater treatment plant's essential facilities which cannot be elevated above, or relocated out of, the floodplain.	2	2.5	3	3	3	2.7
1.74	Purchase a generator for the Ross Township Building to serve as a back-up power source during power outages.	1.5	1.5	1	2	2	1.6
1.75	Identify options to address the flooding of Mud Swamp Creek unto Sonny Drive.	1.5	1.5	1	2	2	1.6
1.76	Annually distribute flood protection safety materials to educate residents on the dangers of flooding, property-level mitigation methods, and funding availability to mitigate potential flooding on their property. Consider the needs of low-income residents and other socially vulnerable groups.	2.5	2.5	2	3	1	2.3
1.77	Perform inspections for schools in the Hanover Area School District for structural and nonstructural vulnerabilities. Structural evaluations will be	2.5	1.5	3	3	3	2.5

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
	conducted by qualified contractors and engineers and will ensure buildings have been constructed to code.						
1.78	Develop procedures for each district school to test alarms monthly to ensure operability and personnel familiarity.	1.5	1.5	2	2	2	1.8
1.79	Have the district safety committee conduct a target hardening assessment of each facility in conjunction with state and local authorities, making on-going changes as appropriate based on recommendations.	2.5	1.5	3	3	3	2.5
1.80	Address streambank erosion along the DiPasquale Shickshinny Creek.	2	2.5	2	2	3	2.3
1.81	Address debris build up along Nescopeck Creek.	2	2.5	2	2	3	2.3
1.82	Address flow constrictions, streambank erosion, and other flood related issues along Toby Creek.	2	2.5	2	2	3	2.3
1.83	Conduct a study to identify ways to mitigate property flooding (yards and structures) from stormwater in the area of Park Street and Jackson Street.	2	2	1.5	2	2	1.9
1.84	Demolition of 211 N. Main St. structure in flood prone area.	2	3	1	2	2	2.1
1.85	Streambank restoration and flood mitigation measures for N. Main St and Toby's Creek	2	2	1	3	2	2.0
1.86	Implement flood mitigation to address flooding issues along W. Franklin St., and Shavertown shopping center parking lot; SR309 corridor areas.	2	2	1	3	2	2.0

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
2.1	Reclaim and revegetate abandoned mine land.	2	1	1	1	2	1.4
2.2	Improve drainage structures and storm sewers throughout the Borough, which are undersized and cause roadway flooding.	2	2	1.75	2.5	2.25	2.1
2.3	Separate combined sanitary and storm sewers in the 3rd Ward.	2.5	2.5	2	2.5	3	2.5
2.4	Develop a priority list of areas with steep slopes near critical facilities or roadways that may benefit from ground stabilization planting and/or barrier installation.	2	1	1	1	2	1.4
2.5	Apply soil stabilization measures, such as planting soil stabilizing vegetation on steep, publicly owned slopes.	2	1	1	1	1.5	1.3
2.6	Conduct an engineering study to assess feasibility and cost, and title search cost estimate, of project to channelize/dredge the Bear Creek South of SR 115 in the Borough.	1	1.5	1	1	1	1.2
2.7	Evaluate storm drainage needs and sewer system improvements required for problem areas of Benedict Street, Towpath Court, KOZ area and New Street.	1.5	1.5	1	2	2	1.6
2.8	Improve flood drainage areas identified by the Amry Corps of Engineers.	3	2	1	3	1.5	2.1
2.9	The urbanization of the Borough without stormwater management controls has led to flooding issues from stormwater run-off upstream of the	2	1	1.5	2	2	1.6

Table 6.4-2 Mitigation action prioritization

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		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
	Borough. Develop a plan to implement stormwater management features in the Borough. Prioritize areas with socially vulnerable populations who may be most at risk of adverse flooding impacts. Pursue recommendations identified in the Act 167 Plan and consider sewer pump retrofit.						
2.10	Conduct an inspection and provide engineering recommendations for the Toby Creek culvert which runs underneath State Route 0415 and 1045, Fino's Pharmacy, Citizens Bank and their respective parking lots.	1.5	1.5	1	2	1.5	1.5
2.11	Pursue the recommendations for culvert removal/replacement along the Abrahams Creek made in the 2006-2007 Hicks Creek and Abrahams Creek Flood Study. The undersized structures are the Upper 8th Street bridge and the Erie-Lackawanna Railroad bridge.	2	2.5	3	3	3	2.7
2.12	Conduct a study to identify solutions to mitigating regular flooding at the intersection of Stairville Road and St. Mary's Road.	1	1	2	2	2	1.5
2.13	Consider the stabilization of Laurel Run Creek and Mill Creeks.	1	1	2	2	1.5	1.4
2.14	The Lower Lackawanna Sewer Authority placed a valve in their Diversion Chamber to help alleviate the sewage from backing up into the homes on Chittenden Street. LLVSA inspects and maintains the valve but does not determine when the valve should be opened or closed. Duryea Borough Sewer Authority is interested in the placement of check valves for sanitary	3	3	2.5	3	3	2.9

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
	laterals on individual homes located on Chittenden Street. Make sure that outreach to affected households is conducted in all languages relevant to affected residents and that residents receive training on how to monitor the check valves, as well as information on what to do in the event of a sewer backup.						
2.15	Restore the wall along Solomon Creek.	1	1	2	2	1.5	1.4
2.16	Pursue the recommendations for culvert removal/replacement along the Hicks Creek, and pump station upgrades made in the 2006-2007 Hicks Creek and Abrahams Creek Flood Study. Continue to work with the Luzerne County Flood Protection Authority during the Detailed Feasibility Assessment of Hicks Creek concerning the construction of a pressure conduit, pump station, levee culvert modifications, or combination of these solutions.	2.5	2.5	2.5	3	3	2.7
2.17	Conduct a study to correct combined stormwater and sewer overflows.	2	2	1.5	2	2	1.9
2.18	Repair storm water joins on Kniffer Street and Lyndwood Avenue. The joints are loose, causing sink holes	1.5	1.5	1.5	2	2.5	1.7
2.19	Add piping and drains in Main Road 4016. The existing two drains are not capable of handling stormwater during heavy rainfall, causing ponding and flooding of homes. Communicate construction plans to affected residents	1.5	1.5	1	1	2	1.4

Table 6.4-2 Mitigation action prioritization

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		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
	well ahead of time. Make sure to provide communications in all languages relevant to the community.						
2.20	Obtain FEMA accreditation for the Brookside Levee System, the Laurel Run Levee System and the Mill Creek Left Bank Upstream Levee System.	1.5	1.5	1.5	3	3	2.0
2.21	Ftorkowski, Daro, Hubbards Flats Roads and State Route 239 close during storm events as the Huntington Creek overtops roadway. Replace culverts at these locations.	1.5	2	2	2	2	1.9
2.22	Improve drainage at the creek at Glendale Drive, Laurel Drive, and Terrace Drive to prevent them from flooding.	1.5	1	2.5	2.5	2	1.8
2.23	Review and update existing land use ordinances and development strategies to ensure development is limited or regulated to limit the impact on environmentally sensitive areas.	3	2	3	2	2	2.4
2.24	Purchase a new leaf machine to remove leaves from swales to mitigate flood issues throughout the Township.	1	1	1	1	1	1.0
2.25	Work with Duryea Borough and DEP to conduct annual inspections of the structures that discharge stormwater and groundwater from the flooded mine pool and identify any structural repairs needed.	2	1.5	1.5	3	2	1.9

Table 6.4-2 Mitigation action prioritization

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		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
2.26	Identify hazardous materials sites, including TRI facilities and oil and gas wells, that are in or near flood zones and develop strategies to reduce potential damage. Inform residents in danger of hazardous materials exposure of their risk and provide strategies to mitigate that risk at the household level.	1	1	1.5	2	2	1.4
2.27	Conduct a study to identify flooding problems at North End Road.	1.5	1.5	1	2	2	1.6
2.28	Examine development in sensitive areas such as Lake Nuangola, wetlands, flood prone areas to ensure it complies with the local code/ordinance.	1.5	2	2	2.25	2	1.9
2.29	Promote denser development (small lot single family development) or cluster development to preserve environmentally sensitive areas (i.e., woodlands, wetlands, floodplains, or severely steep slopes) while making sure that such developments have options available for low-to moderate-income households.	1.5	1.5	2	2	1.5	1.7
2.30	Identify measures to prevent sanitary sewer backups during rainfall and flooding events.	2	2.5	3	3	3	2.7
2.31	Improve drainage structures and storm sewers throughout the Borough, which are undersized and cause roadway flooding.	2	2.5	2.5	2.5	2.5	2.4
2.32	Work with a consultant to determine the causes of, and investigate solutions to, the three flooding issues along Main Street.	1	1	1.5	1.5	1.5	1.3

Table 6.4-2 Mitigation action prioritization

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		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
2.33	Clean culverts in township to prevent streams from flooding or damming up.	2	2.5	2	2.5	2.5	2.3
2.34	Improve drainage structures and storm sewers throughout the Borough, which are inadequate and cause flooding.	2.5	2.5	2	2.5	2.5	2.4
3.1	Produce and distribute information for homeowners and renters on how to properly winterize their dwellings to deal with winter storms and extreme cold temperatures.	2	2	1	3	2	2.0
3.2	Work with the County and Pennsylvania Department of Health to increase awareness about treating and preventing substance use disorder.	1	2	1	2	2	1.6
3.3	Produce and distribute family and traveler emergency preparedness information about severe winter weather hazards.	2	2	1	3	2	2.0
3.4	Post warning signage at local parks, county fairs, and other outdoor venues.	1.5	1.5	1.5	1	2	1.5
3.5	Provide public education and resources to homeowners and developers for developing in known sinkhole or subsidence prone areas, including how to identify and report sinkholes or subsidence.	2	3	1	2	2	2.1
3.6	Since the hazardous materials from the Humboldt and Valmont industrial parks could pose a threat to the Borough, make residents aware of the procedures to follow after a hazardous materials incident. Develop a	1.5	2	2	2	1.5	1.8

Table 6.4-2 Mitigation action prioritization

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		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
	brochure on what to do when an incident occurs. Ensure that all outreach is conducted in all languages relevant to the community, and that outreach materials are provided both online and in a physical format to ensure accessibility for residents who may have low or no internet access.						
3.7	Establish a Pittston City Newsletter for hazard mitigation information updates. Ensure that newsletters are written in languages relevant to the community, and that materials are provided both online and in a physical format to ensure accessibility for residents who may have low or no internet access.	1.5	1.5	2	2.5	2	1.8
3.8	Include information in the Borough newsletter on the availability of flood insurance, basement back-up insurance, and mine subsidence insurance. Ensure that newsletters are written in languages relevant to the community, and that materials are provided both online and in a physical format to ensure accessibility for residents who may have low or no internet access.	1	1	1.5	1.5	1.5	1.3
3.9	Post a digital version of the DFIRM and the availability of flood protection guidance documents on the Borough website, social media sites, and through utility bill mailing inserts. Provide this information in all languages relevant to Borough residents.	2	2	1	1.5	1.5	1.7

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
3.10	Use the Exeter Borough website to update residents on hazard mitigation related activities. Also distribute this information on social media sites and through utility bill mailing inserts. Provide this information in all languages relevant to Borough residents.	2	2	1	1.5	1.5	1.7
3.11	Develop a website for the Township and post access to the FIRM and availability of flood protection guidance documents. Also distribute this information on social media sites and through utility bill mailing inserts. Provide this information in all languages relevant to Township residents.	2	2	1	1.5	1.5	1.7
3.12	Develop informational materials to educate and assist homeowners and renters near wildfire prone areas of FireWise concepts including safe zones and defensible spaces. Ensure that all outreach is conducted in all languages relevant to the community, and that outreach materials are provided both online and in a physical format to ensure accessibility for residents who may have low or no internet access. Investigate the feasibility of providing grants or additional funding to disadvantaged community members who wish to implement wildfire mitigation measures on their properties.	1.5	1	2	1.5	2	1.5
3.13	Educate the public on potential hazards and provide emergency contact information for the public both online and via physical outreach materials.	1.5	1	2.5	2.5	2	1.8

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
	Focus on high pressure gas line and Crystal Lake dam warnings, and other common hazards like wildfires and downed phone lines. Ensure that all outreach is conducted in all languages relevant to the community, and that outreach materials are provided both online and in a physical format to ensure accessibility for residents who may have low or no internet access.						
3.14	Identify measures to address power outages due to a single source of electric power to the Borough, and which impact communication services in hazard events. Develop alternative communications channels in the event of a power outage, specifically regarding communications with socially vulnerable groups and those who may have special needs during a hazard event, including children, older adults, residents with disabilities and medical needs, and residents who may not speak English fluently.	1.75	1.75	2	2	2.5	2.0
3.15	Identify measures to prevent/respond to train derailments in the Borough, which could impact evacuation procedures during hazard events. Make sure to include considerations for those who may have special needs during an evacuation, including children, older adults, residents with disabilities and medical needs, and residents who may not speak English fluently.	1.75	1.75	2	2	2.5	2.0

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
3.16	Promote and share information about available trainings and webinars (provided by ASFPM, PAFPM, FEMA, DEP, etc.) with local floodplain management officials, community leaders, and interested residents while making sure to highlight trainings and webinars that are available in languages relevant to the community.	1.5	1	2.5	2.5	2	1.8
3.17	Initiate a research and education program with local universities to map the extents of the mine pools in the Lackawanna and Susquehanna River valleys. Encourage university partners to engage with affected community members, including those from socially vulnerable and/or historically marginalized groups. Because earthquakes will have the greatest effect in areas of abandoned mine lands, this program will seek to quantify the effects of earthquakes on destabilized earth, such as that over flooded mine pools. Develop an outreach program to inform at-risk residents of earthquake safety practices.	2	2	1.5	2	2	1.9
3.18	Work with State agencies, professional organizations, and non-government organizations to conduct an annual workshop at a key location in each county for private developers to involve them in hazard mitigation activities and educate them on 'safe' development principles that can be incorporated into their development proposals. Make sure to provide an	1.5	1.5	2	2	2	1.8

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
	emphasis on environmental equity and how best to keep the needs of underserved groups and socially vulnerable populations in mind during the development process.						
3.19	Develop nuclear mitigation actions work group. Make sure to include members of organizations who serve socially vulnerable groups and underserved populations to ensure that those residents' needs regarding evacuation and other hazard mitigation measures are met.	2	2	1.5	2	2	1.9
3.20	Work with the Pennsylvania Department of Health to increase awareness about treating and preventing substance use disorder. Make sure to target outreach efforts to populations most affected by substance abuse disorder as outlined in the Risk Assessment section of this document.	2	3	1.5	2	2	2.2
3.21	Coordinate with PEMA and Talen Energy on updated public information materials and a public information campaign to inform people in the 10-mile EPZ about the new evacuation plan. Make sure to provide materials in all languages relevant to County residents who live within the evacuation zone.	2	2	1	2	3	2.0
3.22	Identify emergency management duties to protect residents north and south of the railroad tracks (which divide the borough) in the event of a train derailment. Make sure to include considerations for those who may	1.5	1.5	2	2.5	2.5	1.9

Table 6.4-2 Mitigation action prioritization

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		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
	have special needs during an evacuation, including children, older adults, residents with disabilities and medical needs, and residents who may not speak English fluently.						
3.23	Adopt a resolution to ensure Real Estate Disclosure of properties in the floodplain to potential residents interested in these properties.	1.5	1	1	2	2	1.4
3.24	Conduct public outreach to better educate residents to become better prepared to face hazards.	1.5	1	1.5	2	2	1.5
3.25	Work with local fire departments to conduct fire prevention seminars for school district staff each year. Topics include the proper use of fire extinguishers, fire evacuation procedures, common fire code violations, and specific concerns for cafeteria personnel.	2	2	1	1.5	2.5	1.8
4.1	Ensure municipal staff complete annual cyber-security and awareness training to reduce risk and occurrence of phishing and malware attacks.	3	3	1	2	3	2.5
4.2	Identify designated locations to go for code blue and extreme heat days	2	2	1	2	1	1.7
4.3	Improve access for snow removal on certain roads with snowplow truck operation. Use GIS to determine where residents with access and functional needs live and where public transit routes are most essential, and prioritize snow-clearing efforts in those areas.	1	1.5	1	2	2	1.5

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
4.4	Restore evacuation sirens to working condition to warn residents of hazards.	3	2	3	2	1	2.3
4.5	Continue to work with the Red Cross to conduct an annual assessment of existing shelters in the county. This assessment will determine whether each shelter has enough capacity to meet demand; whether the shelters are in good condition with regards to safety, building code adherence, and cleanliness; and whether the shelters are ADA-compliant and meet the needs of community members with disabilities. Retrofit and update facilities that do not meet these criteria. Identify additional locations that could be equipped and retrofitted to be shelters based on an analysis of population density, facility accessibility, facility proximity to public transit, and the number of unhoused individuals within each community.	1.5	1	2.5	2.5	2	1.8
4.6	Continue to maintain and update threat protection program software.	3	3	3	3	3	3.0
4.7	Provide annual cyber-security and awareness training to all County staff to reduce the risk and occurrence of phishing and malware attacks.	3	3	1	2	3	2.5
4.8	Work with PEMA to transition evacuation planning for the Susquehanna Steam Electric Station to the "keyhole" approach. When developing the evacuation plan, make sure to include the needs of those with access and	2	2	1	2	3	2.0

Table 6.4-2 Mitigation action prioritization

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		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
	functional needs, older adults, children, residents who may not speak English, and other socially vulnerable groups.						
4.9	Improve coordination to reduce risk from hazardous material incidents and conduct information sessions and trainings to educate and prepare local officials and first responders.	1	2	1	2	2	1.6
4.10	Encourage municipalities to reduce the vulnerability of critical facilities to wildfires by: increasing buffers and introducing defensible spaces; identifying farm roads, service roads, and other private access corridors in high hazard areas that could be used as fire breaks; and providing assistance to the County Emergency Management to identify vulnerable structures (firewise communities). In addition to traditional critical facilities such as fire stations and law enforcement offices, encourage municipalities to consider critical facilities that serve socially vulnerable populations such as elder care facilities and retirement homes, schools, youth and adult correctional facilities, hospitals, mental health treatment facilities, shelters, and youth and adult daycare facilities.	1.5	1.5	1.5	2	2	1.7
4.11	Evaluate network for Township building and upgrade computers if needed. Continue with routine maintenance	3	3	1	2	3	2.5

Table 6.4-2 Mitigation action prioritization

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		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
4.12	Ensure emergency responders are provided with up-to-date facility information, including the locations of utility shut offs, building diagrams, storage of hazardous materials and other information as requested so they are not only aware but can provide feedback on procedures.	1.5	2	3	2	2	2.1
4.13	Take steps to properly secure all computers against unauthorized access.	3	3	1	2	3	2.5
5.1	Identify mitigation options to address the flooding of Mill Creek on the 700 block of Grove Street. Use FEMA publication 551, Selecting Appropriate Mitigation Measures for Flood Prone Structures, which provides guidance on determining appropriate mitigation measures.	3	2.5	2.5	3	2.5	2.7
5.2	Identify measures to prevent/remove ice buildup in the Mill Creek channel during winter months.	2	2	2	2	3	2.2
5.3	Develop a sewer maintenance program.	1.75	1.5	1.5	2	2	1.7
5.4	Ensure integration of vulnerabilities into local, regional, and countywide comprehensive planning processes.	2	2	3	3	3	2.5
5.5	Identify the most appropriate mitigation measures for the Dallas Area Municipal Authority and the PA Water Treatment plant. Use FEMA publication 551, Selecting Appropriate Mitigation Measures for Flood Prone Structures, which provides guidance on determining appropriate mitigation measures.	2	2.5	3	3	3	2.7

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
5.6	Hire third party code enforcement to enforce local safety and nuisance ordinances.	1	1	2	2	2	1.5
5.7	Include the following language in the new county zoning ordinance to: 1) concur with the Model Floodplain Ordinance and/or regulations and the Subdivision/Land development Ordinance (SALDO) with respect to what is allowed in the floodplain; and 2) for all development to construct first floors above the base flood elevation for areas that are protected by the levee systems.	2	3	1.5	3	2	2.4
5.8	Encourage the municipalities to come under the control of the County Zoning & Subdivision/Land Development ordinances.	1	2	2.5	1	1	1.6
5.9	Work with municipalities, particularly those along the Susquehanna River and large streams, to join the CRS by educating them on the benefits of CRS and also providing them with technical assistance; work with municipalities to adopt and enforce the requirements of the Countywide ACT 167 plan.	2	3	1.5	3	2	2.4
5.10	Develop a Source Water Protection Plan to properly utilize and protect ground water resources in the county.	1.5	1.5	2	3	2	1.9

Table 6.4-2 Mitigation action prioritization

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		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
5.11	Encourage the county to include in their zoning ordinance, measures to: enhance the concept of defensible space practice; and discourage development on permeable soils to reduce the impacts of drought.	2	2	1.5	3	2	2.1
5.12	Encourage the individual municipalities to be firmly committed to continued compliance with the NFIP by regulating development and redevelopment through the adoptions of provisions that exceed the minimum NFIP requirements. Work with communities to ensure that there are no deficiencies when the Community Assistance Visits are conducted to ensure continued compliance.	2	3	2	3	2	2.5
5.13	Coordinate efforts between the Joint-County Comprehensive Plan and the countywide Act 167 Stormwater Management Plan to identify groundwater recharge areas and sensitive groundwater areas such as mine lands. Work closely with the municipalities to enforce infiltration and groundwater recharge requirements in these areas to reduce the impacts of drought.	2	2	2	3	2	2.2
5.14	Work with FEMA to conduct detailed studies for Abrahams Creek of Forty Fort, Big Wapwallopen Creek, Lackawanna River, Nescopeck Creek, Solomon Creek, and Toby Creek as identified in the FEMA Region III Post-Flood Community Flood Risk Evaluation for Luzerne County.	2	3	1.5	3	2	2.4

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
5.15	Continue to perform regular inspections of the Wyoming Valley Flood Risk Management Project as outlined in the Project Cooperation Agreement between the federal government and LCFPA.	3	2	2	3	3	2.5
5.16	Monitor and evaluate mitigation actions annually and update the hazard mitigation plan every five years to reflect changes in development after a major hazard event and provide technical assistance to municipalities in implementing individual hazard mitigation actions. Analyze the social vulnerability and hazard risk exposure of each community to prioritize technical assistance efforts based on highest need.	3	3	3	3	3	3.0
5.17	Work with other County Departments to incorporate hazard mitigation actions and planning into other plan updates, including Emergency Operations Plan updates.	2	3	1.5	3	2	2.4
5.18	After an event, provide information on alternatives to reconstruction to property owners who own structures that sustained damages more than or equal to 50% of their value.	2	1.5	3	3	3	2.4
5.19	Work with the County to develop a procedure to issue building permits and perform UCC functions including inspections.	1.5	1.5	2	1	2	1.6
5.20	Continue to work with the Luzerne County Flood Protection Authority to finalize a solution to the flooding issues along Coal Brook.	2	2.5	3	3	3	2.7

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
5.21	Work with FEMA Region 3 to deliver substantial improvement/substantial damage (SI/SD) training with information on participant-specific provisions to communities participating in the NFIP.	2	3	1	2	2	2.1
5.22	Identify or hire a safety design designee to evaluate all building construction and renovation plans early in the design process and make recommendations to enhance the level of safety through qualified board approved professionals.	2	2	3	2.5	3	2.4
5.23	Work with municipal emergency management, fire departments, and law enforcement officials to develop a procedure where they have an opportunity to review building construction and renovation plans to provide feedback on safety and emergency management concerns.	2	2	3	2.5	3	2.4
6.1	Build partnerships with dam owners. For dams with poor condition assessments, work with dam owners to identify and prioritize repairs needed to bring the dams into compliance with dam safety standards.	2	2	1	1	3	1.8
6.2	Make repairs to the dam on Flat Rock Road.	1.5	1	1.5	2	2	1.5
6.3	Conduct a study to identify the most appropriate mitigation measures for the dams located in the Township and inform and contact the appropriate individuals and owners. There are 4: (1) at Hillside Farms, (2) off of W. 8th	1.5	1.5	2	1	2	1.6

Table 6.4-2 Mitigation action prioritization

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		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
	St., (3) Green Pond Dam off Green Rd., and (4) Frances Slocum Dam which is State owned.						
6.4	The dam on Harvey's Creek has recently been classified as a high-risk dam. Develop a program to conduct regular maintenance of this dam. Reach out to residents who live downstream from the dam to inform them of hazard risks and mitigation measures they can take. Ensure that all outreach is conducted in languages relevant to the community, and that outreach materials are provided both online and in a physical format to ensure accessibility for residents who may have low or no internet access.	1.5	1.5	2	2	2	1.8
6.5	Provide notice of funding opportunities and supporting documentation from the county HMP to EMCs of municipalities with High Hazard Potential Dams to promote rehabilitation and safety in Luzerne County. Provide supplemental materials to inform residents at risk of dam failure impacts of potential risks and options for mitigating those risks.	1.5	1.5	1.5	1	2	1.5
6.6	Create a dam inundation layer.	2	1	2	3	3	2.0
6.7	Conduct an engineering study to identify the most appropriate mitigation measure to address mine subsidence for the Intake Dam, Mill Creek, on Armstrong Road.	1.5	1.5	1	2	2	1.6

Table 6.4-2 Mitigation action prioritization

#	MITIGATION ACTION	MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH =2.5-3.0	
		EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
6.8	Conduct an engineering study to identify the most appropriate mitigation measure to address mine subsidence for the following three dams: Brown Creek Dam on Cherry Street, Wadham Creek Dam on Shawnee Street, and Duffy's Run Dam on 1st Street.	1.5	1.5	1	2	2	1.6
6.9	Continue annual dam inspections of the dam in the community and perform updates of the EAP as necessary.	1.5	1.5	1.5	2	2	1.7
6.10	Once dam hazard areas are identified from inundation mapping, communities can consider updating land use ordinances. Consider the implications of recognizing dam inundation areas as sensitive areas in zoning ordinances.	1.5	1.5	1.5	2	2	1.7
6.11	Once structures in dam hazard areas are identified, support mitigation projects that will result in the projection of public and private property from floods of specific magnitudes. Eligible projects include but are not limited to: 1) acquisition of hazard-prone structures 2. Elevation of flood-prone structures. 3. Minor structural flood control projects 4. Relocation of structures from hazard-prone areas 5. Retrofitting of existing buildings, facilities, and infrastructure	2.5	2	2	2	3	2.3

6.5. MITIGATION STRATEGY EQUITY REVIEW

To ensure that mitigation actions and strategies in this plan serve the whole community, a robust equity review was conducted. This review identified ways that the plan can best serve socially vulnerable groups and underserved populations. Some methods identified include:

- Ensuring that outreach and engagement efforts are conducted in a variety of formats and in all languages relevant to each community participating in the plan. This will help residents who may have limited or no internet or computer access; those with limited or no access to transportation; community members who may have access and functional needs, including people with disabilities and people who may not speak English well or at all; and houseless residents.
- Keeping the needs of all community members at the forefront of mitigation action development. For example, an action such as "Develop brochures to communicate hazard risk to homeowners," could be updated to "Develop outreach and engagement materials in a variety of formats to communicate hazard risks to homeowners, renters, seasonal workers, visitors, and houseless individuals. Formats may include radio, social media, mailing inserts in utility bills, bus stop poster advertisements, and the jurisdiction's website. Make sure to develop all materials and communications in all languages relevant to the community." Making sure that the needs of socially vulnerable groups and underserved populations are met can improve risk reduction outcomes for the entire community.
- Expanding the definition of critical facilities to include facilities which serve vulnerable populations, such as schools, prisons, elder care facilities, hospitals, and homeless shelters. This will help to make sure facilities which serve the most vulnerable community members do not experience a gap in service delivery due to hazard events.
- Communicating early and often with residents in high-hazard areas such as floodplains, subsidence zones, and urban heat islands to empower community members with information needed to make informed decisions about lowering their hazard risk.
- Acknowledging the structural systems in place which have historically impacted, and which continue to impact, marginalized groups and socially vulnerable populations. By tailoring mitigation strategies in a way that acknowledges historical and ongoing systems of oppression, the plan can help to make sure vulnerable residents feel heard and seen. This could include transforming actions like, "Acquire and demolish private residences in floodplains," to "Consult with community members about their needs and limitations regarding community-driven relocation. Prioritize technical and financial assistance to low-income residents, people of color, people with disabilities, older adults, families with children, those living in group quarters, and residents who may not speak English. Residents within floodplains are more likely to belong to underserved groups and socially vulnerable populations, so acknowledging their needs will encourage buy-in to planned community-driven relocation initiatives while supporting more equitable relocation outcomes." Doing so helps to ensure that actions are equitable and spur positive outcomes for affected residents of all backgrounds, needs, and demographics.

7. PLAN MAINTENANCE

7.1. UPDATE PROCESS SUMMARY

Once this plan has received approval from PEMA and FEMA, the plan will be adopted by the Luzerne County Council and all participating jurisdictions. This HMP Update is intended to be a 'living document'. Plan adoption is not considered the final step in the planning process, but rather as a first step to implementation. The plan monitoring and maintenance schedule is a cycle of events that involve periodic review, adjustments, and improvement. Plan monitoring also provides an opportunity to recognize other planning initiatives within the county that may benefit from the incorporation of risk and/or mitigation objectives detailed in this HMP. This section establishes a method to monitor how the plan will be evaluated and maintained.

7.2. MONITORING, EVALUATING, AND UPDATING THE PLAN

Monitoring, evaluating, and updating this plan is critical to maintaining its value and success in Luzerne County's hazard mitigation efforts. Ensuring effective implementation of mitigation activities paves the way for continued momentum in the planning process and gives direction for the future. This section explains who will be responsible for maintenance activities and what those responsibilities entail. It also provides a methodology and schedule of maintenance activities including a description of how the public will be involved on a continued basis. The HMSC elected to keep the methodology and schedule similar to what is outlined in the 2020 HMP and will continue to put more emphasis on integrating the mitigation goals, objectives, and actions identified in the Mitigation Strategy into the other ongoing planning efforts to ensure implementation and tracking of actions throughout the five-year plan maintenance process.

In order to ensure that the Plan continues to provide a framework of reducing risk in Luzerne County, the Planning and Zoning Department will take responsibility in overseeing the progress made on the implementation of the plan at least annually, but also as deemed necessary based on the occurrence of a disaster or another occasion that necessitates the review of the HMP. The Department of Emergency Services will provide strong support. Evaluation of the 2025 HMP will not only include an investigation of whether mitigation actions were completed, but also an assessment of how effective those actions were in mitigating losses. A review of the qualitative and quantitative benefits (or avoided losses) of mitigation activities will support this assessment. The results of the evaluation will then be compared to the goals and objectives established in the plan and decisions will be made regarding whether actions should be discontinued or modified in any way considering new developments in the community. Progress will be documented by Planning and Zoning and the Department of Emergency Services for use in the next HMP Update.

Each municipality will designate a community representative to monitor mitigation activities and hazard events within their respective communities. The local emergency management coordinator would be suitable for this role. This individual will be asked to work with Planning

and Zoning and Emergency Services to provide updates on applicable mitigation actions and feedback on changing hazard vulnerabilities within their community.

The municipal monitor will also be responsible for reviewing the planning and land use regulatory element of the municipality's capability assessment to identify potential opportunities for continued incorporation of the HMP into local planning mechanisms and will also identify locally generated plans, information, reports, etc. that may be capable of being incorporated into the update of the 2025 HMP.

In addition to conducting an annual review of the Plan, the HMSC will review the Plan within 30 days of a disaster. The Risk Assessment and Mitigation Strategy will be evaluated and any changes to community priorities or status will be documented. The HMP will receive a full, detailed update every five years, as required to reflect the current risk, vulnerabilities, development trends and as mitigation actions are implemented. While an annual report will be completed each year, any state and Federal mandates from PEMA and FEMA respectively, will be addressed in the five-year update. The municipalities will not be responsible for making any changes to the HMP document as part of annual reviews; their role will be to document information and report that back to the County. A copy of each Annual Plan Review will be provided to PEMA and FEMA and included as official documentation in the next 5-year HMP update.

The 2025 HMP will be updated by the FEMA approved five-year anniversary date, as required by the Disaster Mitigation Act of 2000, or following a disaster event. This update will include working with both PEMA and FEMA on the development of a Scope of Work. Future plan updates will account for any new hazard vulnerabilities, special circumstances, or new information that becomes available. This may include additional data that can make hazard vulnerability analysis more detailed, leading to a better understanding of risk and how to both identify and prioritize mitigation actions. During the five-year review process, the following questions will be considered as criteria for assessing the effectiveness of the Luzerne County HMP:

- Has the nature or magnitude of hazards affecting the county changed?
- Are there new hazards that have the potential to impact the county?
- Is there updated, or more quantitative, risk assessment data available related to the identified hazards in the plan? Can this data be integrated into the analysis to better assess the vulnerability, and depict the risk, of communities to the hazards?
- Do the identified goals and actions address current and expected conditions?
- Have mitigation actions been implemented or completed?
- Has the implementation of identified mitigation actions resulted in expected outcomes?
- Are current resources adequate to implement the plan?
- Should additional local resources be committed to address identified hazards?
- Are there current or upcoming planning mechanisms or initiatives in which the mitigation strategy should be considered for integration?

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

7.3. CONTINUED PUBLIC INVOLVEMENT

As was done during development of the 2020 HMP, the HMSC will involve the public during annual review periods by providing an opportunity to review and submit feedback. The public will have access to the current HMP through their local municipal office or on the Luzerne County government website. Responses from the community hazard mitigation survey revealed that the best way for the public to receive information about risk and preparedness would be through the municipal or county website, or via email/newsletter. The plan will also be an agenda item at one Luzerne County Council Meeting open to the public each year. Information on upcoming events related to the HMP or solicitation for comments will be announced via newsletters, social media, and the county website. The public is encouraged to submit comments on the HMP at any time. The HMSC will incorporate all relevant comments during the next update of the hazard mitigation plan.

The Comprehensive Plan; Capital Improvements Program; Building Code, Municipal Floodplain Management Regulations, Emergency Operations Plan, and Zoning Ordinance are identified for incorporation of hazard mitigation actions once the Plan is adopted. Each of these mechanisms will continue to be used to meet the intent of this Plan, as appropriate. Likewise, as these planning mechanisms are updated, they will be considered for incorporation into the HMP during the annual review process and/or the five-year cycle update.

The County and participating jurisdictions may propose additional mitigation actions for inclusion throughout the five-year cycle but must submit new mitigation actions through the Planning and Zoning Department which will request an HMP amendment by contacting the PEMA State Hazard Mitigation Planner. FEMA Region 3 must officially approve all additions and will amend the HMP by issuing an HMP Amendment Approval letter.

8. PLAN ADOPTION

The Plan was submitted to the Pennsylvania State Hazard Mitigation Planner on May 28, 2025. The Plan was forwarded to FEMA for final review and approval-pending-adoption on June 3, 2025. FEMA granted approval-pending-adoption on July 31, 2025. Full approval from FEMA was received after each jurisdiction adopted the plan.

This section of the plan includes copies of the local adoption resolutions passed by Luzerne County and its municipal governments. Adoption resolution templates are provided to assist the County and municipal governments with recommended language for future adoption of the HMP. The completed Local Mitigation Plan Review Crosswalk is included as an appendix to this plan.

Luzerne County 2025 Hazard Mitigation Plan

County Adoption Resolution

Resolution No. _____

Luzerne County, Pennsylvania

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

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

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

WHEREAS, the Luzerne County 2025 Hazard Mitigation Plan has been developed by the Luzerne County Department of Planning & Zoning in cooperation with Luzerne Department of Emergency Services, other county departments, local municipal officials, institutional stakeholders, and the citizens of Luzerne County, and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted to develop the Luzerne County 2020 Hazard Mitigation Plan, and

WHEREAS, the Luzerne County 2020 Hazard Mitigation Plan recommends mitigation activities that will reduce losses to life and property affected by both natural and human-caused hazards that face the County and its municipal governments,

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

- The Luzerne County 2025 Hazard Mitigation Plan is hereby adopted as the official Hazard Mitigation Plan of the County, and
- The respective officials and agencies identified in the implementation strategy of the Luzerne County 2025 Hazard Mitigation Plan are hereby directed to implement the recommended activities assigned to them.

ADOPTED, this _____ day of _____, 2025

ATTEST: **LUZERNE COUNTY COUNCIL**

_____ By _____

By _____

By _____

Luzerne County 2025 Hazard Mitigation Plan

Municipal Adoption Resolution

Resolution No. _____

< *Municipality Name*>, Luzerne County, Pennsylvania

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

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

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

WHEREAS, the Luzerne County 2025 Hazard Mitigation Plan has been developed by the Luzerne County Department of Planning & Zoning in cooperation with Luzerne County Department of Emergency Services, other county departments, local municipal officials, institutional stakeholders, and the citizens of Luzerne County, and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted to develop the Luzerne County 2020 Hazard Mitigation Plan, and

WHEREAS, the Luzerne County 2025 Hazard Mitigation Plan recommends mitigation activities that will reduce losses to life and property affected by both natural and human-caused hazards that face the County and its municipal governments,

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

- The Luzerne County 2025 Hazard Mitigation Plan is hereby adopted as the official Hazard Mitigation Plan of the *<Borough/Township/City>*, and
- The respective officials and agencies identified in the implementation strategy of the Luzerne County 2025 Hazard Mitigation Plan are hereby directed to implement the recommended activities assigned to them.

ADOPTED, this _____ day of _____, 2025

ATTEST: **< MUNICIPALITY NAME>**

_____ By _____

By _____

By _____