2025
Cumberland County Hazard Mitigation Plan

Prepared For:

Cumberland County
Departments of Planning
And Public Safety
310 Allen Road
Carlisle, Pennsylvania 17013

Prepared By:

Michael Baker International, Inc.
4431 N. Front Street, 2nd Floor
Harrisburg, Pennsylvania 17110

Cumberland County Hazard Mitigation Plan

Certification of Annual Review Meetings

The Cumberland County Hazard Mitigation Steering Committee has reviewed this Hazard Mitigation Plan. The director of the Hazard Mitigation Steering Committee hereby certifies the review.

Year	Date Of Meeting	Public Outreach Addressed?*	Signature
2021	N/A	N/A	N/A
2022	2/22/22	No	
2023	7/25/23	No	
2024	See Section 3	See Section 3	
2025	See Section 3	See Section 3	

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

Cumberland County Hazard Mitigation Plan

Record of Changes

Date	Description Of Change Made, Mitigation Action Completed, Or Public Outreach Performed	Change Made By (Print Name)	Change Made By (Signature)
2021-2025	To the best knowledge of the Cumberland County HMSC, no HMP progress reports were submitted from municipalities for the period from 2021 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

Table of Contents

1. Introduction

1.1 Background

Across the United States, natural and human-made disasters have led to increasing levels of deaths, injuries, 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 and private agendas.

Since 1972 there have been 20 Presidential Disaster Declarations and five Presidential Emergency Declarations affecting Cumberland County in addition to 43 Gubernatorial Declarations or Proclamations affecting Cumberland County since 1963.

The emergency management community, citizens, elected officials, and other stakeholders in Cumberland County, Pennsylvania recognize the impact of disasters on their community and support proactive efforts needed to reduce the impact of natural and human-made hazards.

Hazard mitigation describes sustained actions taken to reduce or eliminate long-term risks to life and property from hazards and create successive benefits over time. Mitigation is effective both before and after disaster events. Mitigating in advance of a disaster is preferred to avoid impact. However, mitigation is often implemented after a disaster because that is where it finds its greatest political and community will for implementation. Pre-disaster mitigation actions are taken in advance of a hazard event and are essential to breaking the disaster cycle of damage, reconstruction and repeated damage. Post-disaster mitigation happened during the process of recovery when re-building elevates and otherwise protects people and property from future risk. With careful selection, successful mitigation actions are cost-effective means of reducing risk of loss over the long-term. Mitigation will play a critical role both before and after disaster events as Cumberland County aims to protect communities from current and future risk from climate change (FEMA, 2022b).

Accordingly, the Cumberland County Hazard Mitigation Steering Committee (HMSC), composed of government leaders from Cumberland County, in cooperation with the elected officials of the County and its municipalities, have prepared this Hazard Mitigation Plan (HMP) update. The Plan is the result of work by citizens of the County to develop a pre-disaster multi-hazard mitigation plan that will not only guide the County toward greater disaster resistance but will also respect the character and needs of the community.

1.2 Purpose

The purpose of this HMP is to minimize the effects that natural and human-made hazards can have on the people, property, and livelihood of Cumberland County. This Plan provides background information (including vulnerability analysis and risk assessment) and rationale for the mitigation actions proposed to be implemented across the County.

This Hazard Mitigation Plan was developed for the purpose of:

- Providing a blueprint for reducing property damage and saving lives from the effects of future natural and human-made disasters in Cumberland County;
- Qualifying the County and its 33 municipalities for pre-disaster and post-disaster mitigation assistance funding;
- Complying with state and federal legislative requirements related to local hazard mitigation planning;
- Demonstrating a firm local commitment to hazard mitigation principles; and
- Improving community resiliency following a disaster event.

1.3 Scope

The Cumberland County 2025 Hazard Mitigation Plan has been prepared to meet requirements set forth by the Federal Emergency Management Agency (FEMA) and Pennsylvania Emergency Management Agency (PEMA) in order for the County and its 33 municipalities to be eligible for funding and technical assistance from state and federal hazard mitigation programs. It will be updated and maintained to address both natural and human-made hazards determined to be of significant risk to the County and/or its local municipalities. Updates will take place following significant disasters or at a minimum, every five years.

1.4 Authority and References

Authority for this plan originates from the following federal sources:

- Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C., Section 322, as amended;
- Code of Federal Regulations (CFR), Title 44, Parts 201 and 206;
- Disaster Mitigation Act of 2000, Public Law 106-390, as amended; and
- National Flood Insurance Act of 1968, as amended, 42 U.S.C. 4001 *et seq.*

Authority for this plan originates from the following Commonwealth of Pennsylvania sources:

- Pennsylvania Emergency Management Services Code. Title 35, Pa C.S. Section 101;
- Pennsylvania Municipalities Planning Code of 1968, Act 247 as reenacted and amended by Act 170 of 1988; and
- Pennsylvania Stormwater Management Act of October 4, 1978. P.L. 864, No. 167.

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

- FEMA 386-1: *Getting Started*. September 2002.
- FEMA 386-2: *Understanding Your Risks: Identifying Hazards and Estimating Losses*. August 2001.
- FEMA 386-3: *Developing the Mitigation Plan*. April 2003.
- FEMA 386-4: *Bringing the Plan to Life*. August 2003.
- FEMA 386-5: *Using Benefit-Cost Review in Mitigation Planning*. May 2007.
- FEMA 386-6: *Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning*. May 2005.
- FEMA 386-7: *Integrating Manmade Hazards into Mitigation Planning*. September 2003.
- FEMA 386-8: *Multijurisdictional Mitigation Planning*. August 2006.
- FEMA 386-9: *Using the Hazard Mitigation Plan to Prepare Successful Mitigation Projects*. August 2008.
- FEMA. *Local Mitigation Planning Handbook.* May 2023.
- FEMA: Local Mitigation Planning Policy Guide. April 2023.
- FEMA. *Local Mitigation Plan Review Guide.* October 1, 2011.
- FEMA. *National Fire Incident Reporting System 5.0: Complete Reference Guide*. January, 2015.
- FEMA Hazard Mitigation Assistance Unified Guidance. June 1, 2010.
- FEMA. Integrating Hazard Mitigation Into Local Planning: Case Studies and Tools for
- Community Officials. March 1, 2013
- FEMA. Mitigation Ideas. A Resource for Reducing Risk to Natural Hazards. January 2013.

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

- PEMA. *Hazard Mitigation Planning Made Easy!*
- PEMA Mitigation Ideas: *Potential Mitigation Measures by Hazard Type; A Mitigation Planning Tool for Communities*. March 6, 2009.

- PEMA. Pennsylvania's *Hazard Mitigation Plan Standard Operating Guide*. October 2020.
- 2012 Pennsylvania Threat and Hazard Identification and Risk Assessment. December 2012.
- PEMA. Commonwealth of Pennsylvania 2023 Hazard Mitigation Plan. August 28, 2023.

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.

Please note that hazard mitigation falls within PEMA's Bureau of Recovery and Mitigation (BORM). PEMA's work is both guided and regulated by additional federal and state guidance, including FEMA's Logistics Capability Assessment Tool; FEMA Comprehensive Preparedness Guidance 101; the Federal Critical Infrastructure Protection Act; the Patriot Act; Department of Homeland Security Directives; Presidential Directives 5 and 8; CFR Titles 10, 29, and 49; and the Pennsylvania State Emergency Operations Plan.

2. Community Profile

2.1 Geography and Environment

Cumberland County covers approximately 550 square miles and is in the south-central portion of the Commonwealth of Pennsylvania. It lies within the Cumberland Valley, a wide fertile valley between two chains of the Appalachian Mountain Range running from northeast to southwest across eastern and south-central Pennsylvania. From the Borough of Shippensburg in the west to the Susquehanna River in the east, Cumberland County stretches approximately 42 miles across. It is bordered by Blue Mountain and North Mountain to the north, South Mountain to the south, and the Susquehanna River, which separates the eastern edge of the County from the City of Harrisburg. The western edge of the County has no significant natural border. A map of Cumberland County is provided as Figure 2.1-1.

Two major tributaries to the Susquehanna River, Yellow Breeches Creek and Conodoguinet Creek, traverse the County in an approximately west-to-east direction. A map of major watersheds in the County is provided as Figure 2.1-2. Water bodies make up approximately 0.18 percent of the County's geographic area.

Adjacent counties include Perry County to the north, Dauphin County across the Susquehanna River to the east, Adams and York Counties to the south, and Franklin County, which shares the Borough of Shippensburg, to the west.

Figure 2.1-1: Map of Cumberland County showing municipal boundaries, major roads, and land use. This image is a screen capture from the Cumberland County Hazard Mitigation Plan Map Series. Please hold the CTRL key and select the map below for the Hazard Mitigation Plan Map Series.

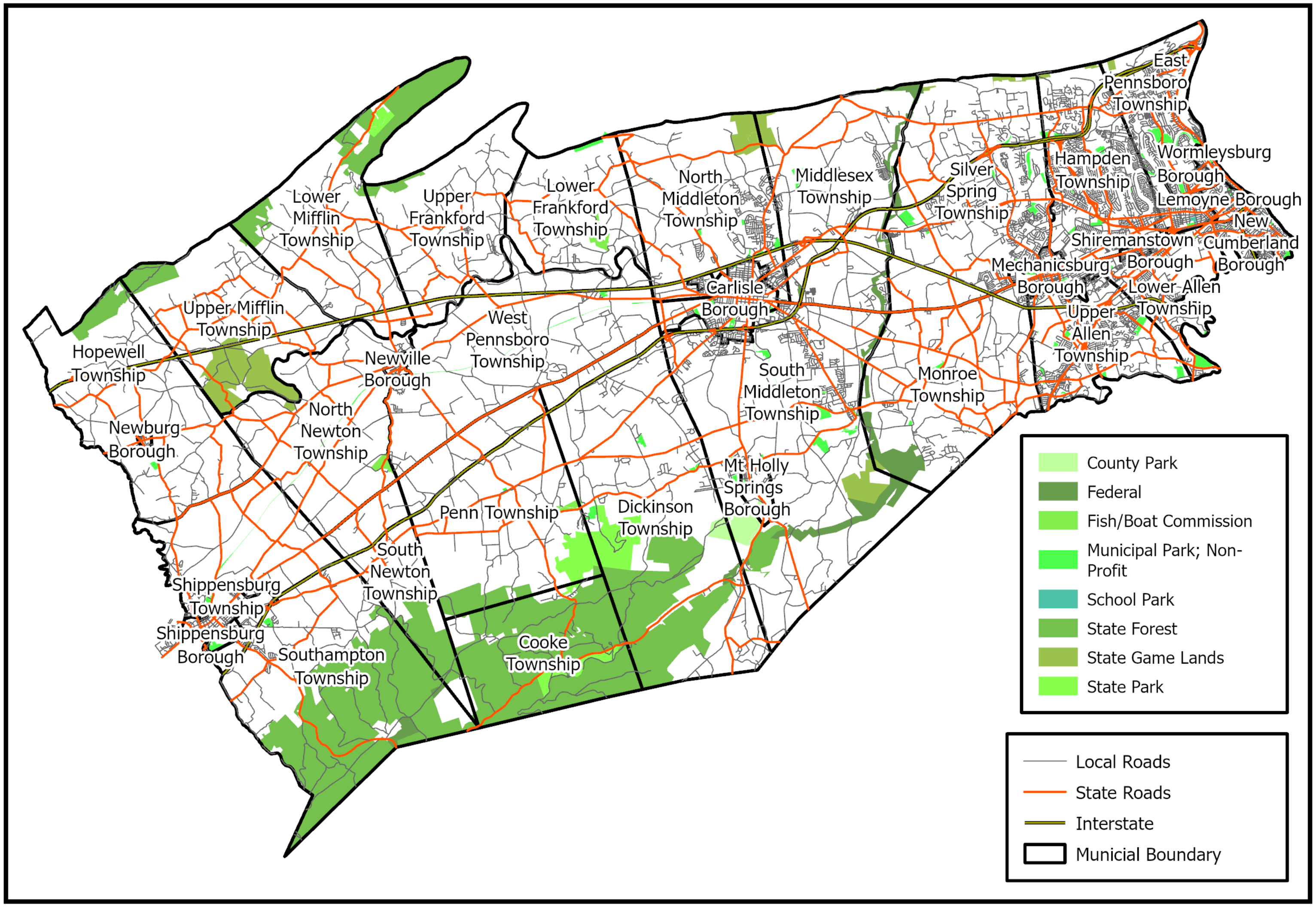
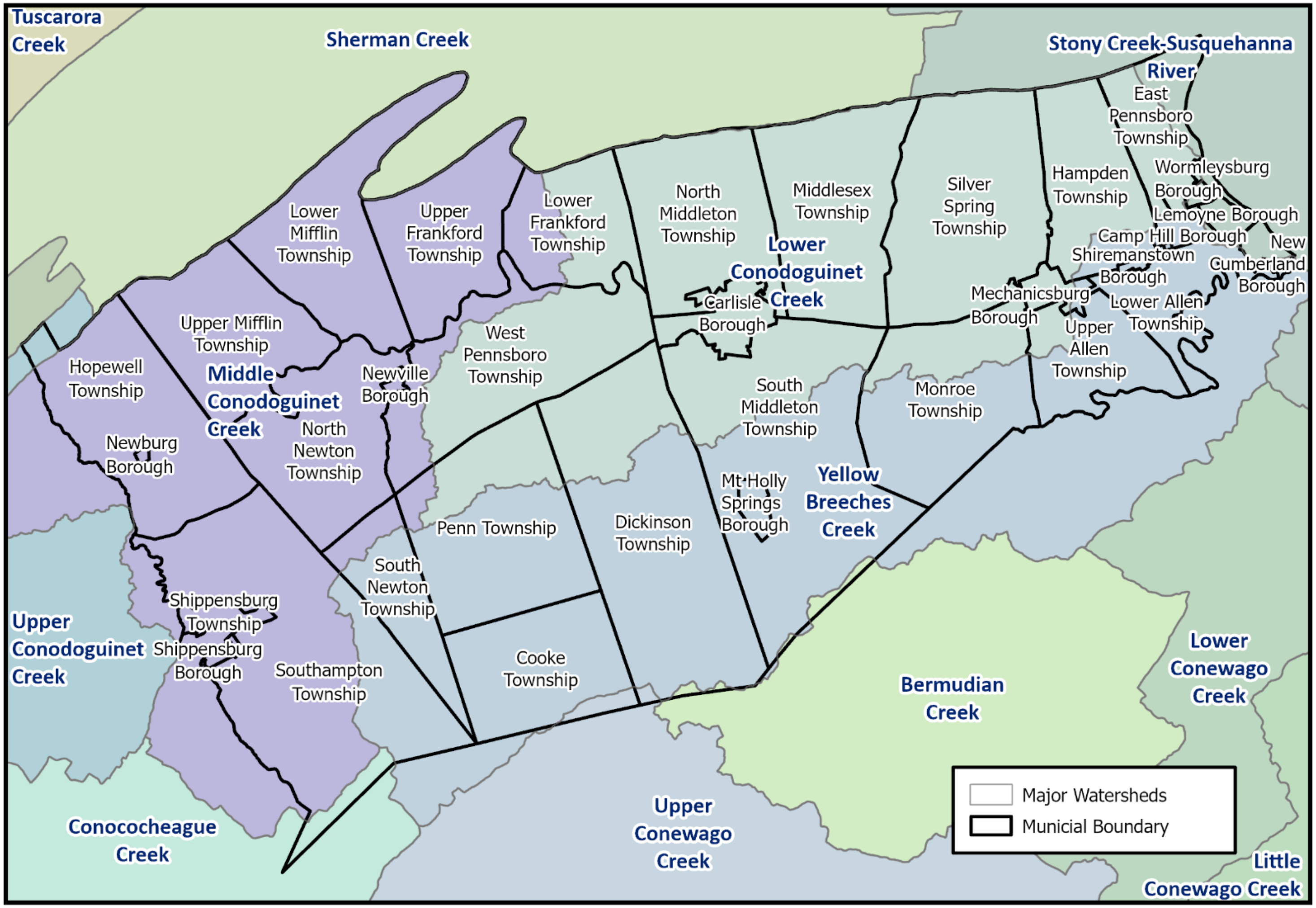


Figure 2.1-2: Major watersheds in Cumberland County. This image is a screen capture from the Cumberland County Hazard Mitigation Plan Map Series. Please hold the CTRL key and select the map below for the Hazard Mitigation Plan Map Series.



2.2 Community Facts

Cumberland County was established as a political entity on January 27, 1750, by order of Governor James Hamilton. The County was named in honor of Cumberland, England and at one time covered 35,252 square miles. Other counties were created from the original county territory until its present size was achieved in 1855. Today, the County consists of 22 townships and 11 boroughs which are listed in Table 2.3-1. Several colleges and universities are located in the County, including Central Pennsylvania College, Dickinson College, Messiah University, Penn State Dickinson School of Law, Shippensburg University, and U.S. Army War College. There are nine public school districts throughout the County.

2.3 Population and Demographics

As of the 2020 Decennial Census, the population of Cumberland County was 259,469. Cumberland County has grown at a rate of 10.2% each decennial census since 2000. Table 2.3-1 provides a distribution of County population per municipality.

Table 2.3-1: Decennial Census-County and Municipal Population 2000-2020.

Geography	2000 Census	2010 Census	% growth 2000-2010	2020 Census	% growth 2010-2020	2000-2020 Population Change
Camp Hill	7,636	7,888	3.3%	8,130	3.1%	494
Carlisle	17,970	18,682	4.0%	20,118	7.7%	2,148
Cooke	117	179	53.0%	201	12.3%	84
Dickinson	4,702	5,223	11.1%	5,294	1.4%	592
East Pennsboro	18,254	20,228	10.8%	20,910	3.4%	2,656
Hampden	24,135	28,044	16.2%	32,761	16.8%	8,626
Hopewell	2,096	2,329	11.1%	2,452	5.3%	356
Lemoyne	3,995	4,553	14.0%	4,659	2.3%	664
Lower Allen	17,437	17,980	3.1%	20,099	11.8%	2,662
Lower Frankford	1,823	1,732	-5.0%	1,757	1.4%	(66)
Lower Mifflin	1,620	1,783	10.1%	1,755	-1.6%	135
Mechanicsburg	9,042	8,981	-0.7%	9,311	3.7%	269
Middlesex	6,669	7,040	5.6%	7,021	-0.3%	352
Monroe	5,530	5,823	5.3%	6,230	7.0%	700
Mt Holly Springs	1,925	2,030	5.5%	1,995	-1.7%	70
New Cumberland	7,349	7,277	-1.0%	7,507	3.2%	158
Newburg	372	336	-9.7%	364	8.3%	(8)
Newville	1,367	1,326	-3.0%	1,376	3.8%	9
North Middleton	10,197	11,143	9.3%	12,039	8.0%	1,842
North Newton	2,169	2,430	12.0%	2,546	4.8%	377
Penn	2,807	2,924	4.2%	2,874	-1.7%	67
Shippensburg Borough	4,467	4,416	-1.1%	4,315	-2.3%	(152)
Shippensburg Township	4,504	5,429	20.5%	4,286	-21.1%	(218)
Shiremanstown	1,521	1,569	3.2%	1,634	4.1%	113

Table 2.3-1: Decennial Census-County and Municipal Population 2000-2020.						
Geography	**2000 Census**	**2010 Census**	**% growth 2000-2010**	**2020 Census**	**% growth 2010-2020**	**2000-2020 Population Change**
Silver Spring	10,592	13,657	28.9%	19,557	43.2%	8,965
South Middleton	12,939	14,663	13.3%	16,135	10.0%	3,196
South Newton	1,290	1,383	7.2%	1,371	-0.9%	81
Southampton	4,787	6,359	32.8%	7,504	18.0%	2,717
Upper Allen	15,338	18,059	17.7%	23,183	28.4%	7,845
Upper Frankford	1,807	2,005	11.0%	2,128	6.1%	321
Upper Mifflin	1,347	1,304	-3.2%	1,319	1.2%	(28)
West Pennsboro	5,263	5,561	5.7%	5,595	0.6%	332
Wormleysburg	2,607	3,070	17.8%	3,043	-0.9%	436
Cumberland County	**213,674**	**235,406**	**10.2%**	**259,469**	**10.2%**	**45,795**

The 2000-2020 population change column indicates that significant growth of more than 7,000 residents has occurred in Hampden, Silver Spring and Upper Allen Township. In addition, over 2,500 residents have been added to East Pennsboro, Lower Allen, Southampton and South Middleton Townships.

Aside from natural population growth, the County's population may temporarily increase during large tourism events especially those operated by Carlisle Events. Carlisle Events hosts some of the largest car, truck and motorcycle collector events in the country, at the Carlisle Fairgrounds in Carlisle Borough and North Middleton Township. The eight specialty shows held between April and October can attract 150,000 to 300,000 visitors to the area. Population values used for Carlisle Borough, North Middleton Township and other surrounding municipalities in the hazard assessments included in this HMP do not directly account for the large volume of people attending such events. However, County law enforcement and emergency responders coordinate with Carlisle Events and municipal partners to maintain an enhanced state of readiness during these events.

Population density is highest in the 11 boroughs that have served as population and activity centers since the county's inception. Population density has a strong correlation with hazard vulnerability and loss. For example, more developed areas like the Borough of Carlisle naturally have larger populations and higher numbers of structures; therefore they naturally will experience greater loss during hazard events. The population density for Cumberland County and all the municipalities is shown in table 2.3-2.

Table 2.3-2: 2022 County and Municipal Population Density (US Census).			
Geography	**2022 ACS 5-Year Estimate**	**Land Area (Square Miles)**	**Population Density (Population per square mile)**
Cumberland County	261,305	545.5	479.0
Camp Hill Borough	8,133	2.12	3,836.3
Carlisle Borough	20,846	5.5	3,790.2
Cooke Township	179	19.79	9.0
Dickinson Township	5,325	45.81	116.2
East Pennsboro Township	20,937	10.39	2,015.1
Hampden Township	32,973	17.34	1,901.6
Hopewell Township	2,459	27.67	88.9
Lemoyne Borough	4,663	1.61	2,896.3
Lower Allen Township	20,211	10.13	1,995.2
Lower Frankford Township	2,092	14.68	142.5
Lower Mifflin Township	1,594	23.77	67.1
Mechanicsburg Borough	9,402	2.41	3,901.2
Middlesex Township	7,081	25.69	275.6
Monroe Township	6,328	26.09	242.5
Mt. Holly Springs Borough	2,325	1.36	1,709.6
New Cumberland Borough	7,515	1.67	4,500.0
Newburg Borough	386	0.18	2,144.4
Newville Borough	1,395	0.42	3,321.4
North Middleton Township	12,115	23.19	522.4
North Newton Township	2,559	22.76	112.4
Penn Township	2,895	29.56	97.9
Shippensburg Borough	4,341	1.31	3,313.7
Shippensburg Township	4,355	2.52	1,728.2
Shiremanstown Borough	1,751	0.3	5,836.7
Silver Spring Township	19,652	32.31	608.2
South Middleton Township	16,226	48.71	333.1
South Newton Township	1,162	11.32	102.7
Southampton Township	7,605	51.43	147.9
Upper Allen Township	23,038	13.2	1,745.3
Upper Frankford Township	1,869	19.43	96.2
Upper Mifflin Township	1,228	21.72	56.5
West Pennsboro Township	5,605	30.23	185.4
Wormleysburg Borough	3,060	0.79	3,873.4

The age of populations can also correlate with vulnerability to hazards. Elderly populations and children may be more susceptible to hazards such as extreme temperature and certain pandemics. Table 2.3-3 depicts 2020 age distribution for the elderly and children in each Cumberland County municipality.

Table 2.3-3 2020 Age Distribution (2020 US Census).								
MUNICIPALITY	**<5**	**5-9**	**60-64**	**65-69**	**70-74**	**75-79**	**80-84**	**>85**
Camp Hill Borough	425	475	486	459	396	285	183	207
Carlisle Borough	1,108	1,086	1,079	999	895	629	494	654
Cooke Township	7	7	14	30	9	5	0	4
Dickinson Township	236	272	556	472	303	188	128	88
East Pennsboro Township	1,060	1,135	1,401	1,373	1,147	724	471	416
Hampden Township	1,750	2,148	2,145	1,986	1,661	1,184	733	780
Hopewell Township	209	195	157	137	121	68	46	32
Lemoyne Borough	266	247	347	261	226	138	91	133
Lower Allen Township	836	871	1,240	999	945	688	539	866
Lower Frankford Township	87	102	170	129	103	67	47	16
Lower Mifflin Township	77	120	151	106	85	57	55	26
Mechanicsburg Borough	523	585	561	507	430	265	202	185
Middlesex Township	358	318	589	428	357	243	203	210
Monroe Township	297	337	547	508	424	240	145	109
Mount Holly Springs Borough	129	149	140	116	94	81	36	21
Newburg Borough	26	29	18	22	13	10	3	4
New Cumberland Borough	396	444	530	454	379	208	122	157
Newville Borough	89	100	74	51	62	33	18	19
North Middleton Township	645	758	780	743	630	430	268	287
North Newton Township	201	195	181	145	123	90	43	35
Penn Township	160	171	243	233	182	83	35	36
Shippensburg Borough	282	260	224	193	173	106	73	80
Shippensburg Township	85	89	142	114	105	79	62	98
Shiremanstown Borough	86	97	113	98	81	58	34	38
Silver Spring Township	1,087	1,315	1,414	1,404	1,171	799	463	363
Southampton Township	492	579	454	413	351	234	168	120
South Middleton Township	735	909	1,241	1,106	976	784	546	556
South Newton Township	106	96	95	85	60	42	10	25
Upper Allen Township	1,063	1,338	1,254	1,182	1,038	753	550	725
Upper Frankford Township	97	133	200	175	110	100	45	31
Upper Mifflin Township	77	87	97	71	50	34	28	22
West Pennsboro Township	262	321	406	369	366	270	188	201
Wormleysburg Borough	178	161	161	161	120	97	54	63
Cumberland County	**13,437**	**15,131**	**17,212**	**15,531**	**13,188**	**9,073**	**6,084**	**6,608**

2.4 Land Use and Development

The northern and southern portions of Cumberland County are mountainous and forested with most development occurring in the relatively flat valley between North and South Mountains. The suburbs of Harrisburg extend across the Susquehanna River into the eastern portion of the County. The central and western sections of the County are primarily rural with significant agricultural development.

There are two major (interstate) highways that traverse the County from east to west: I-81 and the Pennsylvania (PA) Turnpike (I-76). Other major highways include I-83, US Routes 11, 15, 11/15, and PA Route 581. The County is part of the Harrisburg metropolitan statistical area, and a significant amount of east-west traffic crosses the Susquehanna River on bridges for the three interstate highways. A map of the County is provided in Figure 2.1-1.

2.5 Data Sources and Limitations

The Cumberland County HMP uses a variety of data sources, each with its own limitations for usage. Further, the HMP uses the data in a variety of ways to assess the County's vulnerability to hazards and the resulting impacts from those hazards. Data sources and associated limitations are discussed below.

The list of critical facilities provided in Appendix E was developed based on information available from the Cumberland County GIS Department and was confirmed by the Cumberland County Planning Department. Information on the location of hazardous material facilities as well as other data sets was provided by the Cumberland County GIS Department.

Cumberland County maintains a GIS dataset representing the addressed structures. This dataset includes the street address, latitude and longitude coordinates, and other information. A tool was developed that cycled through each municipality in the County and selected all addressed structures that were within the preliminary FEMA floodplain dataset. When a structure is visible in orthoimagery, the feature is placed on the structure. If no structure is visible, the feature is placed in the center of the tax parcel. For each municipality, records from the Tax Parcels GIS database were selected that contained address points that were within the preliminary FEMA floodplains dataset. The land, building, and total assessed values for these Tax Parcel records were summed up to create the values shown in Table 4.5.3-1.

Throughout the risk and vulnerability assessment included in Section 4, descriptions of limited data indicate some areas in which the County and municipalities can improve their ability to identify vulnerable structures and improve loss estimates. As the County and municipal governments work to increase their overall technical capacity and implement comprehensive planning goals, they should also attempt to improve their ability to identify areas of increased vulnerability. The County and municipalities would be capable of producing an even more robust vulnerability assessment in future updates to the HMP by taking two actions. First, the County and municipal building permit and data collection systems should be modified to require and keep on file elevation certificates for all new construction, elevated structures, and other substantial improvements within the 1 percent and 0.2 percent-annual-chance flood hazard areas. Secondly, tax and GIS databases should include information on foundation type, construction type, basement presence, and first-floor elevations for all structures. These recommendations are noted under Goal #1, Action 13 in the Mitigation Action Plan (see Section 6.2).

Traffic crash analysis data was provided by the Pennsylvania Department of Transportation (PENNDOT). Population data from the 2020 Census has been obtained from the U.S. Census Bureau (2024).

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 with full references listed in Appendix A. It should be noted that 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 the Pennsylvania State University 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.

In order to assess the vulnerability of different jurisdictions to the hazards, data on past occurrences of damaging hazard events was gathered. For a number of historic natural-hazard events, the National Climatic Data Center (NCDC) database was utilized. NCDC is a division of the US Department of Commerce's National Oceanic and Atmospheric Administration (NOAA). Information on hazard events is compiled by NCDC from data gathered by the National Weather Service (NWS), another division of NOAA. NCDC then presents it on their website in various formats. The data used for this plan came the US 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, 2006).

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 in a couple of different ways. One method for asset identification was through looking at 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

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

This 2025 HMP Update also 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.

3. Planning Process

3.1 Update Process and Participation Summary

Development of the Cumberland County Hazard Mitigation Plan has undergone several phases. A *Hazards/Vulnerability Analysis* was developed in August 1984 by the Cumberland County Office of Emergency Preparedness in cooperation with PEMA. This report provided an analysis of natural and human-made hazards using criteria including history, vulnerability, maximum threat, and probability of occurrence (Cumberland EOP, 1984). Documented previous events and other information considered still-valid from the 1984 assessment are included in the 2010, 2014 and 2020 HMPs.

The Cumberland County HMSC was first formed in 2004 to construct a plan in order to review hazards that affect the County, assess potential damages from those hazard events, select actions to address the County's vulnerability to such hazards, and develop an implementation-strategy action plan in order to mitigate potential losses. The County HMSC met several times from May 2003 to August 2004; all meetings were open to the public.

An update to the 2004 HMP was initiated in August 2009. With funding support from FEMA, PEMA, the 2010 Hazard Mitigation Plan was completed for submission to PEMA and FEMA on December 7, 2009. Based on comments received from communities, PEMA, and FEMA, revisions were made and the plan was re-submitted to PEMA and FEMA on June 14, 2010.

The 2010 HMP followed the Standard Operating Guide and outline (developed by PEMA in 2009), which provide a standardized format for all local hazard mitigation plans in the Commonwealth of Pennsylvania. As a result, the format of the 2010 HMP contrasted significantly with the previous 2004 version.

The 2014 Hazard Mitigation Plan update began in June 2014 and followed the 2013 Pennsylvania Standard Operating Guide and FEMA's 2013 Local Hazard Mitigation Planning guidance. Use of these guidance documents resulted in additional changes to the formatting of the plan as well as increased emphasis on soliciting other stakeholder participation and on plan integration. In addition to Cumberland County, 33 of 33 local municipalities participated in the 2014 plan update. The 2014 Hazard Mitigation Plan was completed for submission to PEMA on October 21, 2014. Based on comments received from PEMA, revisions were made and the plan was submitted to FEMA on November 5, 2014. All 33 municipalities adopted the final plan.

The 2020 Hazard Mitigation Plan update was initiated in August 2017 and follows the 2013 Pennsylvania Standard Operating Guide and FEMA's 2013 Local Hazard Mitigation Planning guidance. The Cumberland County Planning Department, Department of Public Safety and Geographic Information System (GIS) Department completed the 2020 Hazard Mitigation Plan Update with consulting assistance from Michael Baker International and members of the HMSC and other stakeholders. The 2020 HMP utilized Preliminary DFIRMs for all mapping and calculations. In addition to Cumberland County, all 33 local municipalities participated in the 2020 plan update. The 2020 Hazard Mitigation Plan was completed for submission to PEMA on October 13, 2020. Based on comments received from PEMA, revisions were made and the plan was submitted to FEMA on October 19, 2020.

The County's current plan is a product of the 2025 Hazard Mitigation Plan update. This update was initiated in May 2024 and follows the 2020 Pennsylvania Standard Operating Guide and FEMA's 2023 Local Hazard Mitigation Planning guidance. The Cumberland County Planning Department, Department of Public Safety and Geographic Information System (GIS) Department completed the 2025 Hazard Mitigation Plan Update with consulting assistance from Michael Baker International and members of the HMSC and other stakeholders. In addition to Cumberland County, all 33 local municipalities participated in the 2025 plan update (see Appendix C). The 2025 Hazard Mitigation Plan was completed for submission to PEMA on August 21, 2025. The plan was submitted to FEMA for final review and approval-pending-adoption (APA) on November 14, 2025. The Local Mitigation Plan Review Tool is included as Appendix B.

3.2 The Planning Team

During development of the 2025 Hazard Mitigation Plan Update, the following individuals served as members of the Hazard Mitigation Steering Committee (HMSC).

Table 3.2-1: Participants of the 2025 Cumberland County HMP Hazard Mitigation Steering Committee.

Name	Organization
Kirk Stoner	Cumberland County Planning Department, AICP, County Planning Director
Steve Hoffman	Cumberland County Planning Department, County Planning Manager
Justin Shaulis	Cumberland County Department of Public Safety, Planning Coordinator
Justin Smith	Cumberland County Department of Public Safety, GIS Coordinator
Troy Truax	Michael Baker International, AICP, Project Manager
Angela Bard Welt	Michael Baker International, Lead Planner
Victoria Petrillo	Michael Baker International, Planner

Additionally, the community representatives shown in Table 3.2-2 served on the 2025 countywide planning team and actively participated in the planning process through completion of online surveys, and/or submission of comments. Participants representing multiple jurisdictions are listed more than once.

Table 3.2-2: Participants in the 2025 Cumberland County HMP Update

Municipality	Name	Title
Camp Hill Borough	Sara Gibson	Borough Manager
Camp Hill Borough	Robert Forbes	Emergency Management Coordinator
Camp Hill Borough	Adam Ritchey	EHS Manager
Carlisle Borough	Randy O'Donnell	Emergency Management, Fire Chief
Carlisle Borough	Jeff McKenzie	Water Plant Lead Operator
Cooke Township	Robert Kough	Local Emergency Management Coordinator
Dickinson Township	Glenn Kelso Jr.	Public Works Director
East Pennsboro Township	John Owen	Assistant Township Manager / Chief Planner
Hampden Township	Doug Gochenaur	Emergency Management Coordinator
Hopewell Township	Randall Pryor	EMC
Lemoyne Borough	Trisha Rafferty	Codes Enforcement and Planning and Zoning Officer
Lower Allen Township	Leon Crone	Police Captain
Lower Allen Township	David Holl	Director of Public Safety and EMC
Lower Allen Township	Brian Kauffman	Manager
Lower Frankford Township	Karen Heishman	Manager
Lower Mifflin Township	Brandi Lay	Secretary Treasurer
Mechanicsburg Borough	Layne Thompson	Borough Manager

Middlesex Township	Edwin Beam	Emergency Management Coordinator
Monroe Township	Greg Rogalski	Township Engineer
Mt. Holly Springs	Pamela M Still	Vice Chair Of MHS Planning Commission
New Cumberland Borough	Nate Dysard	Borough Manager
Newburg Borough	ED Chamberlin	Local Emergency Management Coordinator
Newville Borough	Robert Barrick	Local Emergency Management Coordinator
Newville Borough	Robert Sabatini	Borough Manager
North Middleton Township	Taylor Griffiths	Local Emergency Management Coordinator
North Middleton Township	John Epley	Manager
North Newton Township	Bonnie Myers	Secretary/Treasurer
North Newton Township	Mike Gutshall	Supervisor/Roadmaster
Penn Township	Robert Kough	Local Emergency Management Coordinator
Shippensburg Borough	Kevin Plasterer	Manager
Shippensburg Township	John Knutelsky	Supervisor
Shiremanstown Borough	Cindy Watson	Local Emergency Management Coordinator/Shiremanstown Borough Council Member
Silver Spring Township	James Stevens	Manager
Silver Spring Township	William Brown	Director of Public Safety
Silver Spring Township	Jason Smith	Risk Manager
South Middleton Township	Josephine Hall	Authority Manager
South Middleton Township	Kelly Kurtas	Asst. Director Community Development and Planning
South Newton Township	David Durff	Road master
Southampton Township	Larry Hinkle	Zoning Officer
Upper Allen Township	Timothy Wendling	Assistant Manager
Upper Frankford Township	Dawn Armold	Secretary/Treasurer/EMC
Upper Mifflin Township	Robert Shively	Local Emergency Management Coordinator
West Pennsboro Township	Larry Barrick Jr.	Township Manager
Wormleysburg Borough	Lori Schmidt	Borough Manager
Other Stakeholders		
Carlisle Borough, The Giant Company	Wayne Killinger	Safety Specialist
Lower Allen Township, Cargrill Meat Solutions	James Fluck	EHS Manager
Lower Allen Township, Manufacturer – Dairy Farmers of America	Gary Rutz	Environmental, Health & Safety Supervisor
Middlesex Township, Pyrotek Inc.	Heather Stalnaker	USA Safety & Environmental Coordinator
Shippensburg University	Justin Johnson	Environmental Health and Safety Manager
County of Cumberland	Justin Shaulis	Planning Coordinator
Schneider Electric Mechanicsburg Distribution Center	Sarah Ames	Environmental Health and Safety Manager
CCHRA	Mary Kuna	Executive Director
Perry County Emergency Management Agency	Richard Fultz	Director

Naval Support Activity Mechanicsburg	Sam Phillips	Emergency Management Officer
Dauphin County	Lexi Passaro	OEM Planning Specialist
Safe Harbour serves all of Cumberland County	Scott Shewell	President and CEO
Ashcombe Farm & Greenhouses	James Damschroder	Financial Manager/Co-Owner

Invitations to participate in the planning process were also sent to many other stakeholder groups in an effort to assemble a well-rounded planning team. However, not all invitees chose to participate. The stakeholders invited are listed in Table 3.2-3 and detailed in Appendix C.

Table 3.2-3: Stakeholder organizations invited to participate in the 2024 planning process.

Organization	Organization
Cumberland County Conservation District	American Red Cross
Pennsylvania DCNR	Pyrotek Inc.
Carlisle Barracks	PA American Water
Cargill Meat Solutions	PA Department of Environmental Protection
PA Department of Human Services	PA Department of Transportation
Perry County EMA	Susquehanna River Basin Commission
Pennsylvania State Police	Capital Area Intermediate Unit
Big Spring Watershed Association	Carlisle Area School District
Camp Hill School District	Cumberland Perry Vo-Tech
Central Penn College	Dickinson College
Cumberland Valley School District	Mechanicsburg Area School District
East Pennsboro Area School District	Shippensburg Area School District
Shippensburg University	South Middleton School District
West Shore School District	Yellow Breeches Watershed Association
York County	Franklin County
Adams County	Dauphin County

3.3 Meetings and Documentation

The following meetings were held during the plan update process. Invitations, agendas, sign-in sheets, and minutes for these meetings and conversations are included Appendix C.

Table 3.3-1: Meetings Conducted During the Plan Update Process

Date	Organization	Attendance	Purpose
5/13/2024	PEMA, FEMA, HMP Steering Committee	8	This meeting was held virtually via Microsoft Teams to discuss the Cumberland County 2025 Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) Update with PEMA, FEMA, and the HMP Steering Committee all in attendance. Topics revolved around starting the HMP such as the schedule, coordination, surveys, outreach, etc.

Table 3.3-1: Meetings Conducted During the Plan Update Process			
Date	**Organization**	**Attendance**	**Purpose**
6/4/2024	HMP Steering Committee, HMP Planning Team	52	Kick-off Meeting: This meeting was held virtually over Microsoft Teams and in-person. The meeting was attended by the HMP Steering Committee and overall Planning Team with invites sent via email. The meeting 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 Cumberland County municipality, as well as other area stakeholders including neighboring communities and relevant local and regional agencies. The planning team consisted of the key stakeholder groups. Meeting attendees were asked to begin completing project forms, check out the project website and provide photographs of the hazards.
7/22/2024	HMP Steering Committee, HMP Planning Team	58	Risk Assessment and Mitigation Solutions (RAMS) Meeting: This meeting was held virtually over Microsoft Teams and in-person. The meeting was attended by the HMP Steering Committee and overall Planning Team with invites sent via email. The purpose of this meeting was to summarize the information from the kick-off meeting, update the Planning Team on participation regarding the surveys/forms; discuss capability assessment, hazards to be profiled, information to be included in hazard profiles; and discuss and define mitigation measures and mitigation action collection as the next step.
9/9/2024	HMP Steering Committee, HMP Planning Team	58	Mitigation Solutions Meeting: This meeting was held virtually over Microsoft Teams and in-person. The meeting was attended by the HMP Steering Committee and overall Planning Team with invites sent via email. The purpose of this meeting was to summarize the RAMs meeting, provide participation updates for the surveys/forms; discussed mitigation strategy with the Planning Team.
10/8/2024	Mechanicsburg Borough, HMP Steering Committee	7	Mechanicsburg Borough Stakeholder Meeting 1: A virtual meeting was conducted with the Borough of Mechanicsburg to provide a project overview and to discuss risk assessment and mitigation solutions for the Cumberland County Hazard Mitigation Plan (HMP) Update.
10/22/2024	FEMA, HMP Steering Committee	5	HHPD Meeting: This meeting was held virtually via Zoom to discuss High Hazard Potential Dams (HHPD) in the Cumberland County 2025

Table 3.3-1: Meetings Conducted During the Plan Update Process			
Date	**Organization**	**Attendance**	**Purpose**
			Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) Update with FEMA.
10/23/2024	Mechanicsburg Borough, HMP Steering Committee	4	Mechanicsburg Borough Stakeholder Meeting 2: This meeting was held virtually via Microsoft Teams to discuss the required forms and surveys that Mechanicsburg Borough must complete and submit for the HMP update.
7/8/2025	HMP Steering Committee, HMP Planning Team	24	Draft Plan Review Meeting: A public draft planning session was held on July 8, 2025, to review the Draft HMP. This meeting was held virtually over Microsoft Teams and in-person. A public notice announcing this meeting was published in *The Sentinel* one week in advance of the event. An additional public notice was also posted to the project website, added to the County calendar, website homepage, and Facebook page. In addition, an email invitation was sent directly to municipal partners. Attendees were also informed of the opportunity to review the entire draft HMP and provide comments via the project website, Hazard Mitigation Plan | Cumberland County, PA - Official Website

3.4 Public Participation

One of the goals of the 2025 HMP was to gather more input from the public. An online survey was designed for the general public and included as part of the 2025 HMP. This survey was designed to gain information regarding hazards from Cumberland County residents. A link to this survey was distributed via social media and via email to all of the municipalities and stakeholders. 122 residents of Cumberland County completed the survey which can be reviewed in Appendix C. The results are noted throughout the 2025 HMP and used to refine outreach efforts and evaluate the hazards profiled in 2025 HMP. Some of the key results include:

- 93.44% of the respondents either own property or live in the county. 86.89% of the respondents own their residence.
- 88.52% of the respondents have lived in the county for more than 5 years.
- 46.72% of the respondents are not aware of the Hazard Mitigation Plan.
- Only 4.92% of the respondents live in a designated floodplain area and 18.03% are not sure if they live in a floodplain.
- In the event of a natural disaster, only 4.10% of the respondents get their information from the newspaper. Most people get disaster information from internet news (68.85%), text alerts (63.11%) and television (59.84%).

Public comment was encouraged throughout the planning process. A newspaper notice was published in *The Sentinel* on June 26, 2025, to notify the citizens of Cumberland County of the planning session held on July 8, 2025, and the draft plan review. A copy of this notice is shown in Figure 3.4-1. In addition, a second notice was posted to the project website, and added to the County calendar, website homepage, and Facebook page; Figures 3.4-2 to 3.4-4 display these.

Figure 3.4-1: Notice of July 8, 2025, draft plan review meeting published in *The Sentinel*.

PUBLIC NOTICE

Public Notice is hereby given that the Cumberland County Planning Department will hold a public meeting to receive public comment on the County's Draft Five-Year (2026 – 2030) Multijurisdictional Hazard Mitigation Plan, which is the proposed mitigation plan for the County and its 33 municipalities.

The public meeting will be held at the date, time, and locations specified as follows:

Date:	Wednesday, July 8, 2025
Times:	3 – 4 PM
Location:	Cumberland County Planning Department, 310 Allen Road, Carlisle, PA 17013
Virtual:	Join the meeting now ID:295 861 660 473 4 Passcode: 8P8Tt6HL

The Federal Emergency Management Agency (FEMA) requires Cumberland County and its 33 municipalities to have a FEMA-approved hazard mitigation plan. The purpose of the plan is to identify the natural hazards that impact them, to identify actions and activities to reduce any losses from those hazards, and to establish a coordinated process to implement the plan, taking advantage of a wide range of resources. Mitigation plans must be reviewed and updated every five years and formally adopted by each participating jurisdiction's governing body as part of receiving approval. Approved mitigation plans are a requirement for local governments, including special districts, to be eligible for the projects funded under the HMA and other FEMA programs, including the Rehabilitation of High Hazard Potential Dams (HHPD).

Copies of the Draft Five-Year (2026 – 2030) Multijurisdictional Hazard Mitigation Plan are available for public inspection at the Cumberland County Planning Department, 310 Allen Road, Carlisle, PA 17013

The Draft Five-Year (2026 – 2030) Multijurisdictional Hazard Mitigation Plan may also be viewed on the Cumberland County Planning Department's website at: https://www.cumberlandcountypa.gov/4902/Hazard-Mitigation-Plan .

Persons requiring special accommodations should contact Jessica Cohick at 717-240-5362 five business days prior to the public meeting. Telecommunications device for the deaf (TDD) users may contact this number by using the Pennsylvania Relay System at 1-800-654-5894.

Written questions or comments on the Draft Five-Year (2026 – 2030) Multijurisdictional Hazard Mitigation Plan should be addressed to:

Steve Hoffman, Manager
Cumberland County Planning Department
Tel: 717.240.6537
Email: sbhoffman@cumberlandcountypa.gov

6/26 ######

Figure 3.4-2: Notice of July 8, 2025, draft plan review meeting posted to the Cumberland County Facebook.

Figure 3.4-3: Notice of July 8, 2025, draft plan review meeting posted to the Cumberland County main home page.

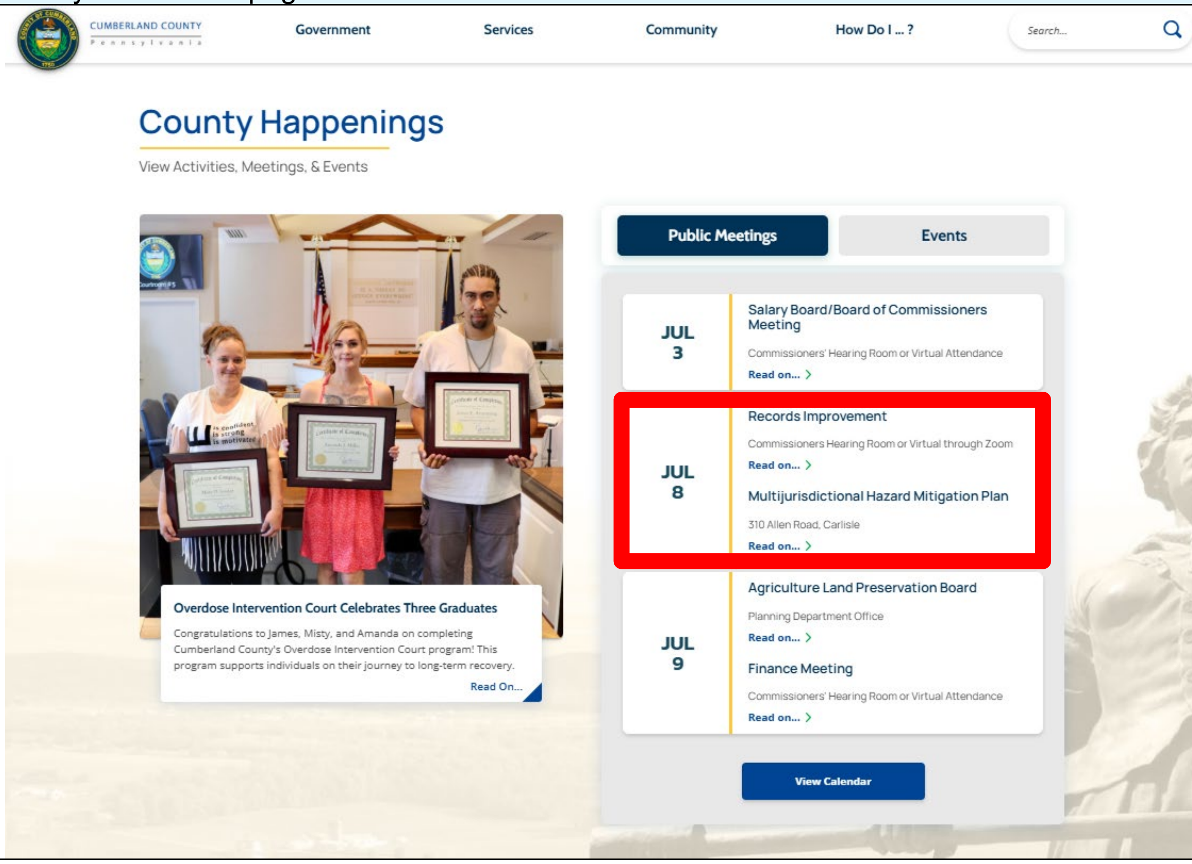


Figure 3.4-4: Notice of July 8, 2025, draft plan review meeting posted to the project website.

Public Notice
Cumberland County Multijurisdictional Hazard Mitigation Plan

Public Notice is hereby given that the Cumberland County Planning Department will hold a public meeting to receive public comment on the County's Draft Five-Year (2026 - 2030) Multijurisdictional Hazard Mitigation Plan, which is the proposed mitigation plan for the County and its 33 municipalities.

The public meeting will be held at the date, time, and locations specified as follows:

Date:	Tuesday, July 8, 2025
Times:	3 – 4 PM
Location:	Cumberland County Planning Department, 310 Allen Road, Carlisle, PA 17013
Virtual:	Join the meeting now ID:295 861 660 473 4 Passcode: 8P8Tt6HL

The Federal Emergency Management Agency (FEMA) requires Cumberland County and its 33 municipalities to have a FEMA-approved hazard mitigation plan. The purpose of the plan is to identify the natural hazards that impact them, to identify actions and activities to reduce any losses from those hazards, and to establish a coordinated process to implement the plan, taking advantage of a wide range of resources. Mitigation plans must be reviewed and updated every five years and formally adopted by each participating jurisdiction's governing body as part of receiving approval. Approved mitigation plans are a requirement for local governments, including special districts, to be eligible for the projects funded under the HMA and other FEMA programs, including the Rehabilitation of High Hazard Potential Dams (HHPD).

Copies of the Draft Five-Year (2026 - 2030) Multijurisdictional Hazard Mitigation Plan are available for public inspection at the Cumberland County Planning Department, 310 Allen Road, Carlisle, PA 17013

The Draft Five-Year (2026 - 2030) Multijurisdictional Hazard Mitigation Plan may also be viewed on the Cumberland County Planning Department's website at: https://www.cumberlandcountypa.gov/4902/Hazard-Mitigation-Plan.

Persons requiring special accommodations should contact Jessica Cohick at 717-240-5362 five business days prior to the public meeting. Telecommunications device for the deaf (TDD) users may contact this number by using the Pennsylvania Relay System at 1-800-654-5894.

Written questions or comments on the Draft Five-Year (2026 - 2030) Multijurisdictional Hazard Mitigation Plan should be addressed to:

Steve Hoffman, Manager
Cumberland County Planning Department
Tel: 717.240.6537
Email: sbhoffman@cumberlandcountypa.gov

3.5 Multi-Jurisdictional Participation

This hazard mitigation plan was developed using a multi-jurisdictional approach. With funding support from PEMA, County level departments had resources such as technical expertise and data which some local jurisdictions lacked. To undertake such a regional planning effort, the County depended on involvement from local municipalities. This involvement was critical to the collection of local knowledge related to hazard events. Local municipalities also have the legal authority to enforce compliance with land use planning and development issues. The County undertook an intensive effort to involve all 22 townships and 11 boroughs in the planning process. In addition, adjacent county representatives, stakeholders, critical facility managers, school districts, conservation groups and others were included in the planning process.

Each municipality was given multiple opportunities to participate in the HMP update process through invitations to meetings, an online survey, review of risk assessment results and mitigation actions, and completion of worksheets and surveys. All participants were also given the opportunity to review and comment on the draft HMP. The six tools listed below were posted to the project website, sent by online survey or distributed via live meetings and email to solicit data, information, and comments from all 33 local municipalities in Cumberland County. Responses to these worksheets and surveys, which were largely received via email, meeting participation and online survey responses are included in Appendix C.

1) ***Community Lifelines Form (SurveyMonkey)***: Collects information on “lifelines” that enable the continuous operation of critical government and business functions and are essential to human health and safety or economic security. This worksheet was converted into an online survey that was completed by 33 out of 33 municipalities. The results of the survey can be reviewed in Appendix C.
2) ***Evaluation of Identified Hazards and Risk Worksheet / Jurisdictional Hazard Risk Ranking Form (SurveyMonkey)***: The Evaluation of Identified Hazards and Risk Worksheet was re-created using an online survey platform called SurveyMonkey and was combined with the Jurisdictional Hazard Risk Ranking Form. The Evaluation of Identified Hazards and Risks collects information on changes to the frequency of occurrence, magnitude of impact, or geographic extent of hazards identified in the 2020 Plan. In addition, the form asks for identification of any additional hazards that stakeholders believe should be considered in the 2025 Plan. The Jurisdictional Hazard Risk Ranking 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 combined survey was completed by 33 out of 33 municipalities. The results of the survey can be reviewed in Appendix C.
3) ***Capability Assessment Worksheet***: Collects information on municipal planning and regulatory, administrative and technical, fiscal, and education and outreach capabilities that can be included in the countywide mitigation strategy. This form was distributed via email to all 33 municipalities for completion. The results are included in Appendix C.
4) ***National Flood Insurance Program (NFIP) Worksheet***: **Collects** information on each municipality’s participation in and continued compliance with the NFIP and identifies areas for improvement that could be potential mitigation actions. This form was distributed via email to all 33 municipalities for completion. The results are included in Appendix C.
5) ***Action and Goal Progress Worksheet***: Evaluates previous mitigation goals, objectives, actions, and projects for the purpose of determining whether they should be continued, modified, or removed from updated plan. This worksheet also aims to record progress made on actions contained in the 2020 HMP and to suggest new actions for inclusion in the 2025 plan. This was completed by Cumberland County officials and is included in Appendix C.
6) **New Mitigation Action Form:** Requests information for proposed new mitigation actions and flood mitigation projects. Requests for new mitigation actions were made throughout the HMP update process. Requests were made at the HMSC meetings and via email invitations. See Appendix C.

Figure 3.5-1: Municipal and Stakeholder Meeting for the 2025 HMP Update (Photograph courtesy of Michael Baker International, 2024).

The project website was discussed at the HMSC meetings. The website includes a project schedule with meeting information and other project milestones; and a library with the 2025 surveys, NFIP forms and Capability Assessment. In addition, the website contains the 2020 HMP (The draft 2025 HMP was added in early June 2025). The website also includes an email for the Cumberland County Planning Department Manager, Steven Hoffman, who is able to answer questions about the 2025 HMP. This website is available at https://www.cumberlandcountypa.gov/4902/Hazard-Mitigation-Plan.

A participation matrix is provided in Appendix C, which documents community presence at the meetings, through an online survey described in Section 3.5 and other involvement from each jurisdiction throughout the planning process. In addition to Cumberland County, 33 of 33 local municipalities participated in the 2025 plan update.

Note that part of Shippensburg Borough is in Franklin County. This plan only addresses the risks to Cumberland County residents. Shippensburg Borough should adopt both the Cumberland County and Franklin County Hazard Mitigation Plans.

4. Risk Assessment

4.1 Update Process Summary

This risk assessment provides a factual basis for activities proposed by the County in their mitigation strategy. Hazards that may affect Cumberland County are identified and defined in terms of location, geographic extent, magnitude of impact, previous events and likelihood of future occurrence.

The HMSC and municipal stakeholders identified natural and human-made hazards that have the potential to impact Cumberland County. These parties were invited via email to complete the *Evaluation of Identified Hazards and Risk Worksheet & Jurisdictional Hazard Risk Ranking Form* survey on SurveyMonkey following the HMSC meeting held on June 4, 2024. The survey results are included in Appendix C. Most respondents indicated “no change” to the risk levels of most hazards profiled in the 2020 HMP, but 35.71% of the responses indicated “increased” risk level for drought, 28.81% for flood/flash flood/ice jam and transportation accidents, and 27.12% for tornado/windstorm hazards. Furthermore, more than 70% of the responses indicated “no change” risk level for earthquake, environmental hazards, hurricane/tropical storm/ nor’easter, and subsidence/sinkholes. Additionally, the worksheet provided the opportunity to comment on whether any hazards not previously profiled in the HMP have the potential to affect the community significantly. Hazards receiving the largest number of responses included cybersecurity. Cybersecurity is briefly touched upon in Section 4.3.15 Terrorism. However, the County has elected not to add additional hazard profiles to the HMP at this time, in order to focus mitigation efforts on the most pressing issues.

The occurrence of a past hazard event in the County provided an indication of future possible incidence, but the fact that a hazard event has not previously occurred did not exclude the hazard from further investigation. Hazard profiles have been developed in order to define the characteristics of the hazard as it applies to Cumberland County.

Furthermore, municipalities were invited to assess the level of risk for each hazard with the same online survey that was sent out to municipalities on June 4, 2024. The results of the survey are included in Appendix C; these results also contributed to the development of the Risk Factor Rankings, seen in Table 4.5.2-1. Per the 2020 Standard Operating Guide, a jurisdictional risk comparison matrix has been added to the 2025 HMP as Table 4.5.2-2 to indicate whether each municipality’s level of risk for each hazard is greater than, less than, or equal to the County’s risk factor.

Finally, a vulnerability assessment was performed to identify the impact of natural or human-caused hazard events on people, buildings, infrastructure, and the community. Each natural and human-made hazard is discussed in terms of its potential impact on individual communities in Cumberland County, including the types of structures, 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 that 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 and the nature of the hazard, assessment results may include an inventory of vulnerable structures, facilities, or populations.

Section 4.2 provides an updated summary of previous disaster declarations affecting Cumberland County as well as a review of hazards identified as having the potential to impact the County in 2024. Landslide and levee failure, are not profiled in the 2025 HMP. Landslides were not profiled due to a lack of occurrence and loss as a result of landslides. Only one occurrence of a rockslide was recorded in Cumberland County in 2009. No other significant events have been recorded. Levees were not profiled because there are no occurrences of a functioning levee in Cumberland County. Only the most current and credible sources were used to complete the hazard profiles included in Section 4.3. In some instances, sources providing improved information have superseded those used in 2004, 2010, 2014, and 2020 HMP; see citations and Appendix A for source details.

The property values for each municipality were obtained using records from the Cumberland County Tax Assessment office and include assessed values of land, building, and total assessed values shown in Table 4.5.3-1. These differences are a result of more recent structure inventory data and values as noted in Section 2.5.

The 2025 HMP includes High Hazard Potential Dam (HHPD) information. This information can be found in Appendix F in the Dam Failure Profile. Data from the Pennsylvania Dam Safety data was used for this profile.

Other additions to the risk assessment in 2020 include photographs illustrating past hazard events in Cumberland County, a discussion of environmental impacts caused by relevant hazards, supplemental mapping, and additional tables to indicate the number of structures and critical facilities vulnerable to each hazard. As well as a more in-depth analysis of climate change, as discussed in 4.2.3.

4.2 Hazard Identification

4.2.1. Table of Presidential Disaster Declarations

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. Table 4.2-1 identifies Presidential Disaster and Emergency Declarations issued between 1955 and 2025 that have affected Cumberland County as listed on the FEMA website at: https://www.fema.gov/data-visualization/disaster-declarations-states-and-counties

Table 4.2-2 lists Gubernatorial Disaster Declarations or Proclamations that have been issued for Cumberland County between 1954 and 2025 as noted on the Commonwealth of Pennsylvania website at: https://www.pa.gov/agencies/pema/resources/emergency-proclamations.html. Both Presidential and Gubernatorial actions provide preliminary information on previous hazard events.

Table 4.2-1: Presidential Disaster and Emergency Declarations affecting Cumberland County (FEMA, 2024)		
Declaration Number	**Date**	**Event**
4506	March 30, 2020	Covid-19 Pandemic
4267	January 2016	Severe Winter Storm
3356*	October-November, 2012	Hurricane Sandy
3340*	September-October, 2011	Remnants of Tropical Storm Lee
4030	September-October, 2011	Tropical Storm Lee
1898	February, 2010	Severe Winter Storms and Snowstorms
1649	June, 2006	Severe Storms, Flooding, Mudslides
3235*	September, 2005	Hurricane Katrina Evacuee Assistance
1557	September, 2004	Tropical Depression Ivan
1497	September, 2003	Tropical Storms Henri & Isabel
3180*	February, 2003	Severe Winter Storm
1294	September, 1999	Hurricane Floyd
1138	September, 1996	Hurricane Fran
1085	January, 1996	Severe Winter Storm
1093	January, 1996	Flooding
1015	January, 1994	Severe Winter Storm
3105*	March, 1993	Severe Winter Storm
523	October, 1976	Severe Storms, Flooding
485	September, 1975	Hurricane Eloise
340	June, 1972	Hurricane Agnes
* Presidential Emergency Declaration		

Table 4.2-2: Gubernatorial Disaster Declarations or Proclamations affecting Cumberland County (Commonwealth of PA, 2024)	
Date	**Event**
August 2024	Tropical Storm Debby
August 2021	Hurricane Ida
April 2021	Civil Disturbance
February 2021	COVID-19 Pandemic (Renewal)
February 2021	Opioid Crisis (Renewal)
February 2021	Winter Weather
December 2020	Winter Weather
June 2020	COVID-19 Pandemic (Renewal)
May 2020	Civil Disturbance
May 2020	Opioid Crisis (Renewal)
March 2020	COVID-19 Pandemic
February 2020	Opioid Crisis (Renewal)
December 2019	Opioid Crisis (Renewal)
September 2019	Opioid Crisis (Renewal)
June 2019	Opioid Crisis (Renewal)

Table 4.2-2: Gubernatorial Disaster Declarations or Proclamations affecting Cumberland County (Commonwealth of PA, 2024)	
Date	**Event**
March 2019	Opioid Crisis (Renewal)
January 2019	Severe Winter Storm
September 2018	Opioid Crisis (Renewal)
August 2018	Potential Flooding
June 2018	Opioid Crisis (Renewal)
April 2018	Opioid Crisis (Renewal)
January 2018	Opioid Crisis
March 2017	Severe Winter Storm
January 2016	Severe Winter Storm
August 2015	Severe Storms and Flooding
January 2015	Severe Winter Storm
September 2014	Public Safety Threat (State Police Ambush)
February 2014	Prolonged Severe Winter Weather
January-February 2014	Winter Fuel Delivery (Extreme Cold)
May 2013	Dauphin County Bridge (Transportation Accident)
April 2012	Severe Winter Storm
January 2011	Severe Winter Storm
April 2007	Severe Winter Storm
February 2007	Winter Fuel Delivery (Extreme Cold)
September 2006	Tropical Depression Ernesto
February 2003	Severe Winter Storm
February 2002	Drought
July 1999	Drought
July 1991	Drought
November 1980	Drought
February 1978	Severe Winter Storm
January 1978	Severe Winter Storm
September 1963	Drought

Since 1955, declarations have been issued for various hazard events including hurricanes or tropical storms, severe summer and winter storms, flooding, and drought. A unique Presidential Emergency Declaration was issued in September 2005. Through Emergency Declaration 3235, President George W. Bush declared that a state of emergency existed in the Commonwealth of Pennsylvania and ordered federal aid to supplement Commonwealth and local response efforts to help people evacuated from their homes due to Hurricane Katrina. All counties within the Commonwealth, including Cumberland County, were indirectly affected by Hurricane Katrina as a result of evacuee assistance.

In May 2013 a unique Gubernatorial Disaster was declared when a tanker truck carrying about 7,500 gallons of diesel fuel overturned on the ramp and highway bridge that carries two lanes of traffic over Interstate Route 81 North to US Route 22/322 westbound in Dauphin County. The massive fire that resulted caused damage to the surface of the bridge and also to the highway bridge above the scene of the fire. The disaster resulted in closure of Interstate 81 and US Route 22/322 westbound during the demolition and replacement of damaged components, causing a severe disruption to transportation in the Capitol Region, including Cumberland County. Additionally, on September 12, 2014, two state troopers were shot at the PA State Police Barracks in Blooming Grove Township, triggering a statewide manhunt for the suspect and a Gubernatorial Disaster Declaration to assist with law enforcement resource deployment (PEMA, 2018).

In more recent times, disaster declarations were issued for the COVID-19 pandemic and a state proclamation regarding civil disobedience. While civil disobedience has not impacted Cumberland County, a disaster declaration for the COVID-19 pandemic remained in effect from March 2020 to June 2021. In Cumberland County, the virus has infected over 64,028 residents and led to 985 deaths as of July 2023 (PA DOH, 2023).

Furthermore, the most recent emergency proclamations from the Governor was in August 2024 due to Tropical Storm Debby. This tropical storm caused dangerous conditions with flash and riverine flooding across the Commonwealth, including in Cumberland County.

4.2.2. Summary of Hazards

As discussed in the Risk Assessment Update Process Summary (Section 4.1), the HMSC and municipalities were invited via email in 2024 to complete the *Evaluation of Identified Hazards and Risk Worksheet & Jurisdictional Hazard Risk Ranking Form survey* on SurveyMonkey following the HMSC meeting held on June 4, 2024. The respondents provided feedback on perceived changes to the level of risk for each hazard profiled in 2020, suggested hazards that were not previously profiled but have the potential to affect the community significantly and provided feedback regarding hazards profiled in the 2020 HMP that are not profiled in the 2024 HMP due to lack of occurrence or if the hazard is profiled and mitigated in other existing plans. After evaluation of these forms, the Standard List of Hazards from the SOG, and the 2023 Standard State All-Hazard Mitigation Plan, the HMSC determined that Cumberland County's 2025 HMP would identify, profile, and analyze the following hazards in the 2025 HMP. Table 4.2-3 contains a complete list of the profiled hazards and their descriptions.

Table 4.2-3: List of hazards profiled in the 2025 HMP with associated descriptions.

PROFILED HAZARDS	DESCRIPTION
NATURAL	

Table 4.2-3: List of hazards profiled in the 2025 HMP with associated descriptions.	
PROFILED HAZARDS	**DESCRIPTION**
Drought 	A drought is “a deficiency of precipitation over an extended period of time (usually a season or more), resulting in a water shortage” (NOAA NIDIS, 2024a). Indicators of drought include precipitation, temperature, streamflow, ground and reservoir water levels, soil moisture, and snowpack (NOAA NIDIS, 2024b). This hazard is of particular concern in Cumberland County due to the prevalence of farms and other water-dependent industries, water-dependent recreation uses, and residents who depend on wells for drinking water.
Earthquake 	An earthquake is the motion or trembling of the ground produced by 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, 2018).
Flood, Flash Flood, Ice Jam 	Flooding is an overflowing of water onto land that is normally dry (NOAA NSSL, 2024b). it is the most frequent and costly of all natural hazards in Pennsylvania. Heavy rainfall events have the potential to produce localized or widespread flooding. Cloudbursts are a sudden, very heavy rainfall, usually local in nature and of brief duration (Britannica, 2024). Small amounts of rain can result in floods in locations where the soil is frozen or saturated from a previous wet period or if the rain is concentrated in an area of impermeable surfaces such as large parking lots, paved roadways, or other impervious developed areas (MRCC, 2022). Winter flooding can include ice jams which occur when warm temperatures and heavy rain cause snow to melt rapidly.
Hurricane, Tropical Storm, Nor'easter 	Tropical storms systems (i.e. hurricanes, tropical storms, tropical depressions) impacting Cumberland County develop in tropical or sub-tropical waters found in the Atlantic Ocean, Gulf of Mexico, or Caribbean Sea (NOAA NOS, 2024). 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, 2024c). Potential threats from these storms include powerful winds, heavy rainfall, storm surges, coastal and inland flooding, rip currents, tornadoes, and landslides.

Table 4.2-3: List of hazards profiled in the 2025 HMP with associated descriptions.

PROFILED HAZARDS	DESCRIPTION
Pandemic and Infectious Disease 	Pandemic is defined as a disease outbreak affecting or attacking a large number of people across 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 (USDHS, 2022). Infectious diseases are also highly virulent, and can be spread from person-to-person.
Subsidence, Sinkhole 	Land subsidence is a gradual settling or sudden sinking of the Earth's surface owing to subsurface movement of earth materials (USGS, 2024). Sinkholes are subsidence features resulting from the downward movement of surficial material into a pre-existing subsurface void. There are two common causes of subsidence in Pennsylvania: 1) dissolution of carbonate rock such as limestone or dolomite and 2) mining activity. Collapse sometimes occurs only after a large amount of activity, or when a heavy burden is placed on the overlying material (PEMA, 2023).
Tornado, Wind Storm 	A tornado is a narrow, violently rotating column of air that extends from a thunderstorm to the ground (NOAA NSSL, 2024e). The impact of tornado or wind storm hazards is ultimately dependent on the population or amount of property (i.e., buildings, infrastructure, agricultural land, etc.) present in the area in which the they occur. Tornado events are often so severe that property loss or human fatality is typically inevitable if evacuation or proper construction standards are not implemented.
Wildfire 	Wildfires occur throughout wooded and open vegetation areas of Pennsylvania. Open fields, grass, dense brush, and forest-covered areas are typical sites for wildfire events. Much of the western half of Cumberland County consists of forested areas surrounded by cropland and pastures. Under dry conditions or droughts, wildfires have the potential to burn forests as well as croplands. Any small fire, if not quickly detected and suppressed, can get out of control. Most wildfires are caused by human carelessness or negligence (PA DCNR, 2024). However, some are precipitated by lightning (EPA, 2024). Large events may require evacuation from one or more communities and necessitate regional or national firefighting support.

Table 4.2-3: List of hazards profiled in the 2025 HMP with associated descriptions.	
PROFILED HAZARDS	**DESCRIPTION**
Winter Storm 	Winter storms are regional events which affect Cumberland County, adjacent counties, other areas of the Commonwealth, or even the larger northeastern U.S. Winter storms consist of cold temperatures, heavy snow or ice and sometimes strong winds. Winter storms are made with three ingredients cold air, lift, and moisture (NOAA NSSL, 2024g). A winter storm can adversely affect roadways, utilities, business activities, and can cause loss of life, frostbite and freezing conditions. They can result in the closing of secondary roads, particularly in rural locations, loss of utility services and depletion of oil heating supplies (FEMA, 2024b).
Extreme Temperature 	Extreme temperature hazards are not tied to a specific temperature threshold; instead, these hazards occur when the temperature is extremely high or extremely low (PSC, n.d.). Extremely high temperatures cause heat stress along with heat rash, sunburn, heat cramps, heat exhaustion, heat stroke, and death (CDC, 2017a). Cold temperatures can be extremely dangerous to humans and animals exposed to the elements as well. Without heat and shelter, cold temperatures can cause hypothermia, frost bite, and death (NOAA NWS, n.d.a).
HUMAN-MADE	
Civil Disturbance 	Civil disturbance is a broad term that is typically used by law enforcement to describe one or more forms of disturbance caused by a group of people. FEMA defines civil disturbance as civil unrest activity, such as demonstration, riot, or strike, that disrupts a community and requires intervention to maintain public safety (FEMA, 2022a).

Table 4.2-3: List of hazards profiled in the 2025 HMP with associated descriptions.	
PROFILED HAZARDS	**DESCRIPTION**
Dam Failure 	Dam failure is the uncontrolled release of water (and any associated wastes) from a dam. This hazard often results from a combination of natural and human causes, and can follow other hazards such as hurricanes, earthquakes, and landslides. The consequences of dam failures can include property and environmental damage and loss of life. (ASDSO, 2018).
Environmental Hazards – Hazardous Materials Releases 	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. The severity of the incident is dependent on the weather, geographical conditions, the type of material released, and the distance and related response time for emergency response teams (FEMA, 2019).
Nuclear Incident 	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, 2024b; Ready.gov, 2018).
Terrorism 	Terrorism is use of force or violence against persons or property with the intent to intimidate or coerce. Acts of terrorism include threats of terrorism; assassinations; kidnappings; hijackings; bomb scares and bombings; cyber-attacks (computer-based); and the use of chemical, biological, nuclear and radiological weapons (FBI, 2023). Cyber-attacks have become an increasingly pressing concern.

Table 4.2-3: List of hazards profiled in the 2025 HMP with associated descriptions.	
PROFILED HAZARDS	**DESCRIPTION**
Transportation Incident	Transportation incidents are defined as incidents involving highway, air, and rail travel. These incidents are collectively the costliest of all hazards in the Commonwealth in terms of lives lost, injuries, and economic losses. Pennsylvania has the fifth largest state highway system in the United States – larger than New York, New Jersey, and New England combined. Significant passenger vehicle, air, and rail transportation incidents can result in a wide range of outcomes from damage solely to property to serious injury or death.
Urban Fire and Explosion 	Urban fire and explosion hazards include vehicle and building/structure fires as well as overpressure rupture, overheat, or other explosions that do not ignite. This hazard occurs in denser, more urbanized areas statewide and most often occurs in residential structures. In 2022, there were an estimated 503,800 fires in both residential and nonresidential buildings, resulting in 2,860 deaths and over $14.5 billion in damage (U.S. Fire Administration, 2024b & 2024c).
Utility Interruption 	Utility interruption hazards are hazards that impair the functioning of important utilities in the energy, telecommunications, public works, and information network sectors. The focus of utility interruptions as a hazard lies in fuel, energy, or utility failure; this hazard is often secondary to other natural hazard events, particularly transportation accidents, lightning strikes, extreme heat or cold events, and coastal and winter storms. Utility interruptions occur throughout the Commonwealth but are usually small-scale, localized incidents.

4.2.3. Climate Change

The HMSC identified climate change as an issue that impacts the frequency and severity of the natural and manmade hazards facing Cumberland County. Climate change is not profiled as a separate hazard in this plan. Rather, the impacts of climate change for pertinent hazards have been included in the future occurrence section of each applicable hazard profile.

Cumberland County has identified climate change as a major issue that can affect the environment, economy, and quality of life for our residents. Following the 2020 HMP update, Cumberland County entered the PA Department of Environmental Protection's Climate Action Plan Program in July 2020. Through this program, the County worked with Dickinson College and Shippensburg University to develop a greenhouse gas inventory for the County. Then, the County formed a multidisciplinary climate change task force that developed a countywide climate action plan with implantation actions aimed at decreasing greenhouse gas emissions for various public, private, and non-governmental stakeholders in the County. The resulting 2022 Climate Action Plan, titled “Green Up the Footprint” is found at this link: https://www.cumberlandcountypa.gov/4898/Climate-Action-Plan

4.3 Hazard Profiles

NATURAL HAZARDS

4.3.1. Drought

4.3.1.1 Location and Extent

A drought is “a deficiency of precipitation over an extended period of time (usually a season or more), resulting in a water shortage” (NOAA NIDIS, 2024a). Indicators of drought include precipitation, temperature, streamflow, ground and reservoir water levels, soil moisture, and snowpack (NOAA NIDIS, 2024b). This hazard is of particular concern in Cumberland County due to the prevalence of farms and other water-dependent industries, water-dependent recreation uses, and residents who depend on wells for drinking water. Droughts are regional climatic events, so when these events occur in Cumberland County, impacts are felt across the entire county as well as areas outside county boundaries. The spatial extent for areas of impact can range from south-central Pennsylvania to the entire mid-Atlantic region. Areas with extensive agricultural land use can experience particularly significant impacts. The distribution of agricultural land by municipality in Cumberland County is included in Section 4.3.1.5.

4.3.1.2 Range of Magnitude

Droughts can have varying effects, depending upon what month they occur, severity, duration, and location. Some droughts may have their greatest impact on agriculture and even short-term droughts, when coupled with extreme temperatures, can be devastating. In some instances, droughts can contribute to risk of wildfire. Others may impact water supply or other water use activities such as recreation. Most droughts cause direct impacts to aquatic resources. Drought events are defined by rainfall amounts, vegetation conditions, soil-moisture conditions, water levels in reservoirs, stream flow, agricultural productivity, or economic impacts.

Hydrologic drought events result in a reduction of stream flows, reduction of lake/reservoir storage, and reduced groundwater levels. These events have a significant adverse impact 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. Severe drought events may require prioritization of water uses, with essential uses taking precedent and access to water for other uses restricted or denied altogether. Conversations should take place to prepare for a scenario like this.

The PA DEP uses five indicators to assess drought conditions:
1) Precipitation Deficits (the percentage difference between current rainfall conditions and the average)
2) Stream Flow (the percentile difference between current and historic stream flow gage measurements)
3) Groundwater Level (percentile indicating how much time the groundwater levels have been below the historical average levels)
4) Soil Moisture (as measured by the Palmer Drought Severity Index - a soil moisture algorithm calibrated for relatively homogeneous regions which measures dryness based on recent precipitation and temperature (see Table 4.3.1-1).
5) Reservoir Storage (percentages of storage draw down).

Table 4.3.1-1: Palmer Drought Severity Index (PSDI) classifications (NDMC, 2024b).

Severity Category	PSDI Value
Extremely wet	4.0 or more
Very wet	3.0 to 3.99
Moderately wet	2.0 to 2.99
Slightly wet	1.0 to 1.99
Incipient wet spell	0.5 to 0.99
Near normal	0.49 to -0.49
Incipient dry spell	-0.5 to -0.99
Mild drought	-1.0 to -1.99
Moderate drought	-2.0 to -2.99
Severe drought	-3.0 to -3.99
Extreme drought	-4.0 or less

PEMA has primary responsibility for managing droughts with direct support from PA DEP. PEMA and PA DEP use the following three stages to describe and manage droughts. They are listed 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. When three or more drought indicators are present for the County or group of counties, PEMA convenes a meeting of the Commonwealth Drought Task Force. The Commonwealth Drought Task Force includes representatives from federal, interstate, and state agency who would be potentially impacted by droughts or drought management operations. Informed by Task Force recommendations and direction from the Governor, the Secretary of the DEP may issue a drought watch on behalf of the Governor. The focus of a drought watch 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 5-10 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 up to 25 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.

Although not a drought phase, a public water supplier or local municipality may, with the approval of the Commonwealth Drought Coordinator, 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.

According to the Fourth National Climate Assessment (2018), drought impacts to the Northeastern United States, which includes Pennsylvania, includes adverse effects to ecosystem function, farm economic viability, and land use. According to the National Drought Mitigation Center at the University of Nebraska-Lincoln (2024a), environmental impacts of drought include:

- Reduced water and food availability, potentially increase disease in wild animals
- Fish and wildlife habitat loss or destruction
- Wildlife migration
- Increased stress on endangered species or even extinction
- Lower water levels in reservoirs, lakes, and ponds
- Wetlands loss
- Increased number and severity of wildfires
- Wind and water erosion of soils
- Poor soil quality

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.

The worst drought in Cumberland County was the 1980-1983 event described in Section 4.3.1.3.

4.3.1.3 Past Occurrence

Declared drought status for Cumberland County from November 1980 to 2024 is shown in Table 4.3.1-3. Descriptions for drought status categories (i.e., *watch*, *warning,* and *emergency*) are included in Section 4.3.1.2. Between 1930 and 2024, the Commonwealth of Pennsylvania experienced seven significant droughts extending from 1930-1934, 1939-1942, 1953-1955, 1961-1967, 1980-1983, 1991-1992, and 1999-2003. These were considered *emergency* events. The 1980-1983 event resulted in $196,000,000 in damages to crops across the Commonwealth and required the implementation of unusual consumption restraints in Cumberland County. Table 4.2-2 shows that since 1954, there have been five Gubernatorial Declarations or Proclamations issued (1963, 1980, 1991, 1999, and 2002) in response to drought conditions within Cumberland County and other areas of the Commonwealth. Through the 1999 Proclamation of Disaster Emergency, Governor Tom Ridge declared a drought emergency in 55 of the 67 Pennsylvania counties following extended dry weather through much of the summer. Water usage was restricted. Precipitation deficits for many counties for the months of May through July averaged between 5 and 7 inches. Precipitation departures for the 365-day period ending in mid-July were over one foot below normal in many places. This is about one-third of total annual normal precipitation in most areas. Streams were empty, wells dried up, and the Susquehanna River hit record low flows.

Based upon a review of the PA DEP Drought Status Map History, Cumberland County last experienced a drought between January 26, 2024, and March 6, 2024 (PA DEP, 2024).

Table 4.3.1-3: Cumberland County Declared Drought Status from 1980 to 2024 (PA DEP, 2024a).

Date	Drought Status	Date	Drought Status
Nov 18, 1980 - Apr 20, 1982	Emergency	Nov 6, 2001 - Dec 5, 2001	Warning
Apr 26, 1985 - Jul 29, 1985	Watch	Dec 5, 2001 - Feb 12, 2002	Warning
Jul 29, 1985 - Oct 22, 1985	Watch	Feb 12, 2002 - May 13, 2002	Emergency
Oct 22, 1985 - Oct 29, 1985	Watch	May 13, 2002 - Jun 14, 2002	Emergency
Oct 29, 1985 - Dec 19, 1985	Watch	June 14, 2002 - Aug 9, 2002	Emergency
Jul 7, 1988 - Aug 24, 1988	Watch	Aug 9, 2003 - Sep 5, 2002	Emergency
Aug 24, 1988 - Dec 12, 1988	Watch	Sep 5, 2002 - Nov 7, 2002	Emergency
Jun 28, 1991 - Jul 24, 1991	Warning	Nov 7, 2002 - Dec 19, 2002	Emergency
Jul 24, 1991 - Aug 16, 1991	Emergency	Dec 19, 2002 - Jan 8, 2003	Watch
Aug 16, 1991 - Sep 13, 1991	Emergency	Apr 11, 2006 - Jun 30, 2006	Watch
Sep 13, 1991 - Oct 21, 1991	Emergency	Aug 8, 2007 - Sep 5, 2007	Watch
Oct 21, 1991 - Jan 16, 1992	Warning	Sep 5, 2007 - Oct 5, 2007	Watch
Jan 17, 1992 - Apr 20, 1992	Warning	Oct 5, 2007 - Jan 11, 2008	Watch
Apr 20, 1992 - Jun 23, 1992	Warning	Jan 11, 2008 - Feb 15, 2008	Watch
Sep 1, 1995 - Sep 20, 1995	Warning	Sep 16, 2010 - Nov 10, 2010	Watch
Sep 20, 1995 - Nov 8, 1995	Warning	Sep 6, 2016 – Nov 3, 2016	Watch
Nov 8, 1995 - Dec 18, 1995	Watch	Nov 3, 2016 – Dec 16, 2016	Watch
Jul 17, 1997 - Oct 27, 1997	Watch	Dec 16, 2016 – Feb 14, 2017	Watch
Oct 27, 1997 - Nov 13, 1997	Watch	Feb 14, 2017 – April 6, 2017	Watch
Dec 3, 1998 - Dec 8, 1998	Watch	April 6, 2017 – May 16, 2017	Watch
Dec 8, 1998 - Dec 14, 1998	Watch	Sep 10, 2020 – Sep 30, 2020	Watch
Dec 14, 1998 - Dec 16, 1998	Warning	Sep 30, 2020 – Oct 28, 2020	Watch
Dec 16, 1998 - Jan 15, 1999	Warning	Oct 28, 2020 – Nov 17, 2020	Watch
Mar 15, 1999 - Jun 10, 1999	Watch	Nov 17, 2020 – Jan 7, 2021	Watch
Jun 10, 1999 - Jun 18, 1999	Warning	June 15, 2023 – Aug 24, 2023	Watch
Jun 18, 1999 - July 20, 1999	Warning	Aug 24, 2023 – Sep 22, 2023	Watch
Jul 20, 1999 - Sep 30,1999	Emergency	Sep 22, 2023 – Oct 20, 2023	Watch

Table 4.3.1-3: Cumberland County Declared Drought Status from 1980 to 2024 (PA DEP, 2024a).			
Date	**Drought Status**	**Date**	**Drought Status**
Sep 30, 1999 - Dec 16, 1999	Watch	Oct 20, 2023 – Dec 1, 2023	Watch
Dec 16, 1999 - Feb 25, 2000	Watch	Dec 1, 2023 – Dec 22, 2023	Watch
Feb 25, 2000 - May 5, 2000	Watch	Dec 22, 2023 – Jan 26, 2024	Watch
Aug 8, 2001 - Aug 24, 2001	Watch	Jan 26, 2024 – Mar 6, 2024	Watch
Aug 24, 2001 - Nov 6, 2001	Watch	Nov 1, 2024–Present	Watch

4.3.1.4 Future Occurrence

It is difficult to forecast the severity and frequency of future drought events in Cumberland County. Central Pennsylvania has an average of 3.4 dry periods (defined as 10 or more consecutive days having less than 0.01 inch of precipitation) per year from 1950 through 1992. Based on historical events, Cumberland County is expected to experience seven to eight drought events per century which reach *emergency* status, with each event typically lasting two to four years. Note that this estimate is based on the occurrence of past events over a short period of time and is not the result of detailed statistical sampling.

Uncertainty regarding the future occurrence of droughts exists due to the potential impacts of climate change. The annual Pennsylvania temperature has increased by 1.8°F over the last century and is expected to warm another 5.4°F by 2050. Greater average temperatures, coupled with a projected increase in days with temperatures above 90°F, may lead to agricultural losses or heat related deaths (PA DEP, 2021a).

As displayed in Figure 4.3.1-1, Cumberland County average annual temperature values have increased by 0.2° per decade from 1895 to 2024. When averaged over time periods of varying lengths, recent summer temperatures in Cumberland County have ranked among some of the highest recorded. August 2020 to July 2024 was the warmest 48-month period for the entirety of the data record dating back to 1895 (NOAA NCEI, 2024a).

Figure 4.3.1-1: Cumberland County annual temperature averages from 1895-2023 (NOAA NCEI, 2024a).

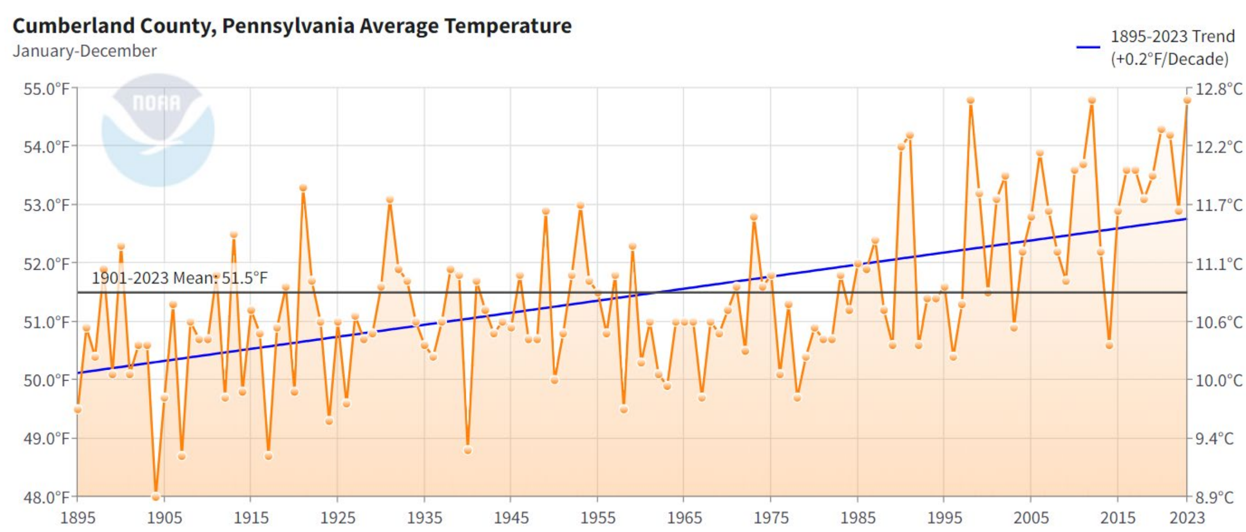


Figure 4.3.1-2 represents drought severity annualized frequency throughout Cumberland County. Data from this period shows that the majority of Cumberland County experienced low drought conditions (0.32%) with areas of Southampton Township and all of Hopewell Townships experiencing a 0% drought severity frequency. While areas of Southampton Township and all of Dickinson Township experienced the most severe drought frequencies with 0.95% and 1.27% respectively. Furthermore, several municipalities, including Camp Hill Borough, Shiremanstown Borough, Upper Frankford Township, Silver Spring Township, South Newton Township, North Middleton Township, and Carlisle Borough, all noted an increase in droughts over the past few years. Overall, the probability of future droughts can be considered *moderately likely* according to the Risk Factor Methodology (see Table 4.5.2-1).

Furthermore, the Climate Mapping for Resilience and Adaptation (CRMA) Tool provides county-level assessment reports for certain hazards, including drought. Figure 4.3.1-3 below shows the report for drought in Cumberland County. The future climate indicators that may contribute to drought include precipitation and temperature thresholds. According to CRMA, 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: Drought Severity in Cumberland County (FEMA, 2024). This image is a screen capture from the Cumberland County Hazard Mitigation Plan Map Series. Please hold the CTRL key and select the map below for the Hazard Mitigation Plan Map Series.

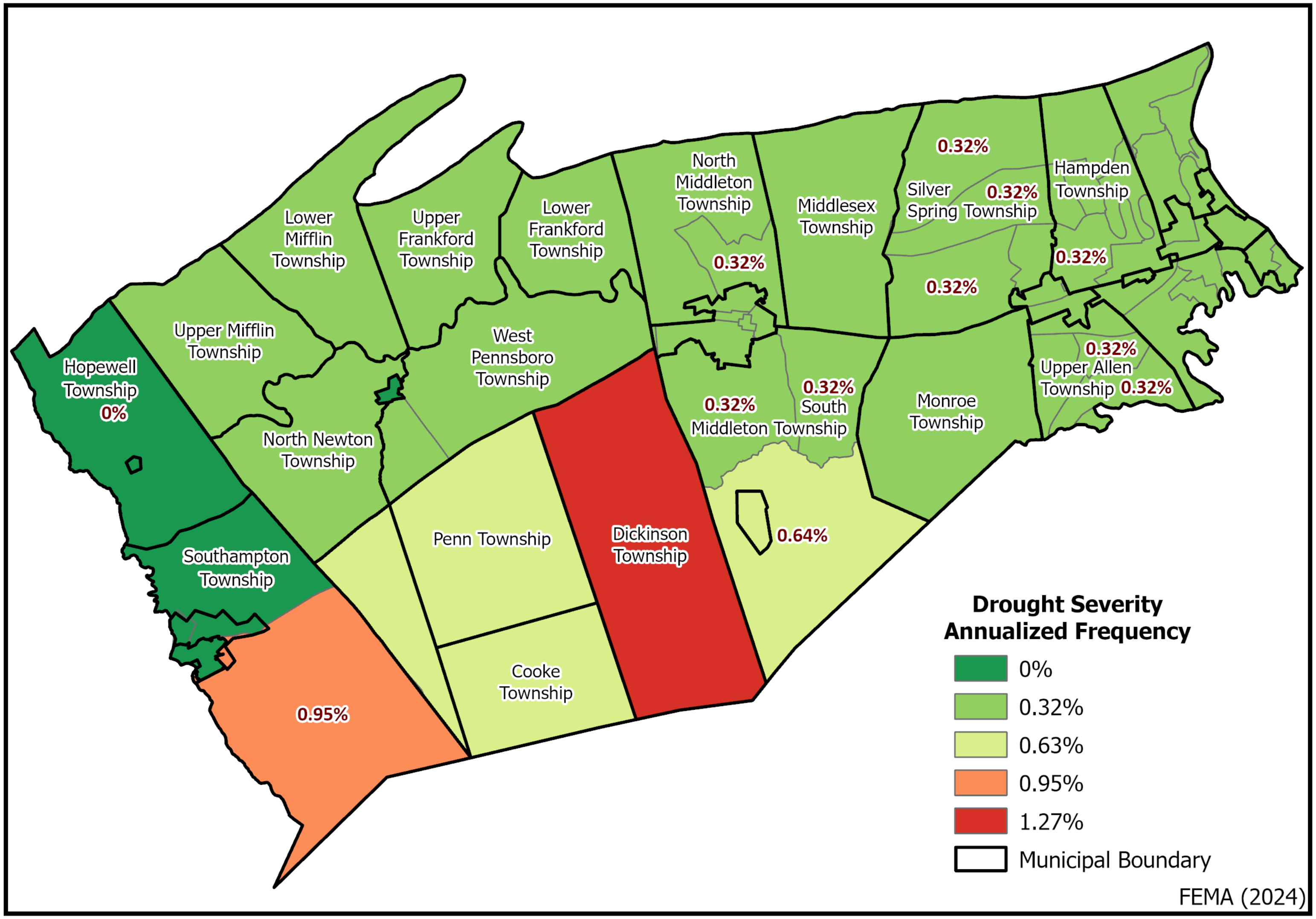


Figure 4.3.1-3: Cumberland County Drought Hazard Assessment Report (CRMA, 2025).

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	**41"** 40 - 43	**43"** 40 - 48	**44"** 41 - 48	**44"** 41 - 50	**45"** 41 - 49	**45"** 41 - 50	**47"** 41 - 51
Days per year with precipitation (wet days)	**181 days** 177 - 187	**181 days** 171 - 194	**181 days** 166 - 191	**181 days** 168 - 194	**180 days** 164 - 193	**181 days** 168 - 192	**179 days** 149 - 205
Days per year with no precipitation (dry days)	**184 days** 178 - 188	**184 days** 171 - 194	**184 days** 174 - 199	**184 days** 171 - 197	**185 days** 172 - 201	**184 days** 173 - 197	**186 days** 160 - 216
Maximum number of consecutive dry days	**12 days** 11 - 13	**13 days** 10 - 15	**12 days** 11 - 16	**13** days 11 - 15	**13 days** 11 - 16	**13 days** 11 - 15	**13 days** 11 - 17
Temperature thresholds:							
Annual days with maximum temperature > 90 °F	**12 days** 12 - 19	**33 days** 18 - 49	**35 days** 19 - 53	**43 days** 23 - 66	**52 days** 28 - 72	**53 days** 26 - 83	**84 days** 40 - 111
Annual days with maximum temperature > 100 °F	**0 days** 0 - 0	**2 days** 0 - 9	**3 days** 0 - 10	**4 days** 0 - 18	**7 days** 1 - 22	**7 days** 1 - 18	**23 days** 2 - 60

N/A = Data Not Available for the selected area

4.3.1.5 Vulnerability Assessment

The most significant losses resulting from drought events are typically found in the agriculture sector. The 1999 Gubernatorial Proclamation was issued in part due to significant crop damage. Preliminary estimates by the Department of Agriculture indicated possible crop losses across the Commonwealth in excess of $500 million. This estimate did not include a 20 percent decrease in dairy milk production which also resulted in million-dollar losses (NOAA NCEI, 2024). While these were statewide impacts, they illustrate the potential for droughts to severely impair the local economy, especially since a prolonged drought can negatively impact the livelihood of residents within agricultural communities. Prime farmlands in Cumberland County will be more susceptible to risks from drought, as will public and private water supplies.

According to the 2022 Census of Agriculture, Cumberland County has 146,389 acres of land in farms, a 14 percent decrease since 2017, which produce $300,139,000 in market value of agricultural products sold (USDA, 2022). The agriculture industry has a significant presence in the western portion of the County with products including dairy, meats, fruits, and vegetables. Land O' Lakes Butter in South Middleton Township is a large producer.

With these agricultural assets, drought events can severely impair the local economy with prolonged drought negatively impacting the livelihood of residents within agricultural communities particularly. Figure 4.3.1-3 shows the existing agricultural land based on the 2017/18 Land Use Land Cover (LULC) Data from the Chesapeake Conservancy's Chesapeake Bay Project (CBP). Table 4.3.1-4 summarizes the distribution of agricultural land by community using 2017/18 LULC CBP data. Without mitigation strategies in place, North Newton Township and West Pennsboro Township are most vulnerable to a drought based on the proportion of land within those communities dedicated to agricultural use. According to County land use data, 36.65 percent of land in the County is considered agricultural.

Figure 4.3.1-3: Agricultural Land Use Map (CBP, 2017/18). This image is a screen capture from the Cumberland County Hazard Mitigation Plan Map Series. Please hold the CTRL key and select the map below for the Hazard Mitigation Plan Map Series.

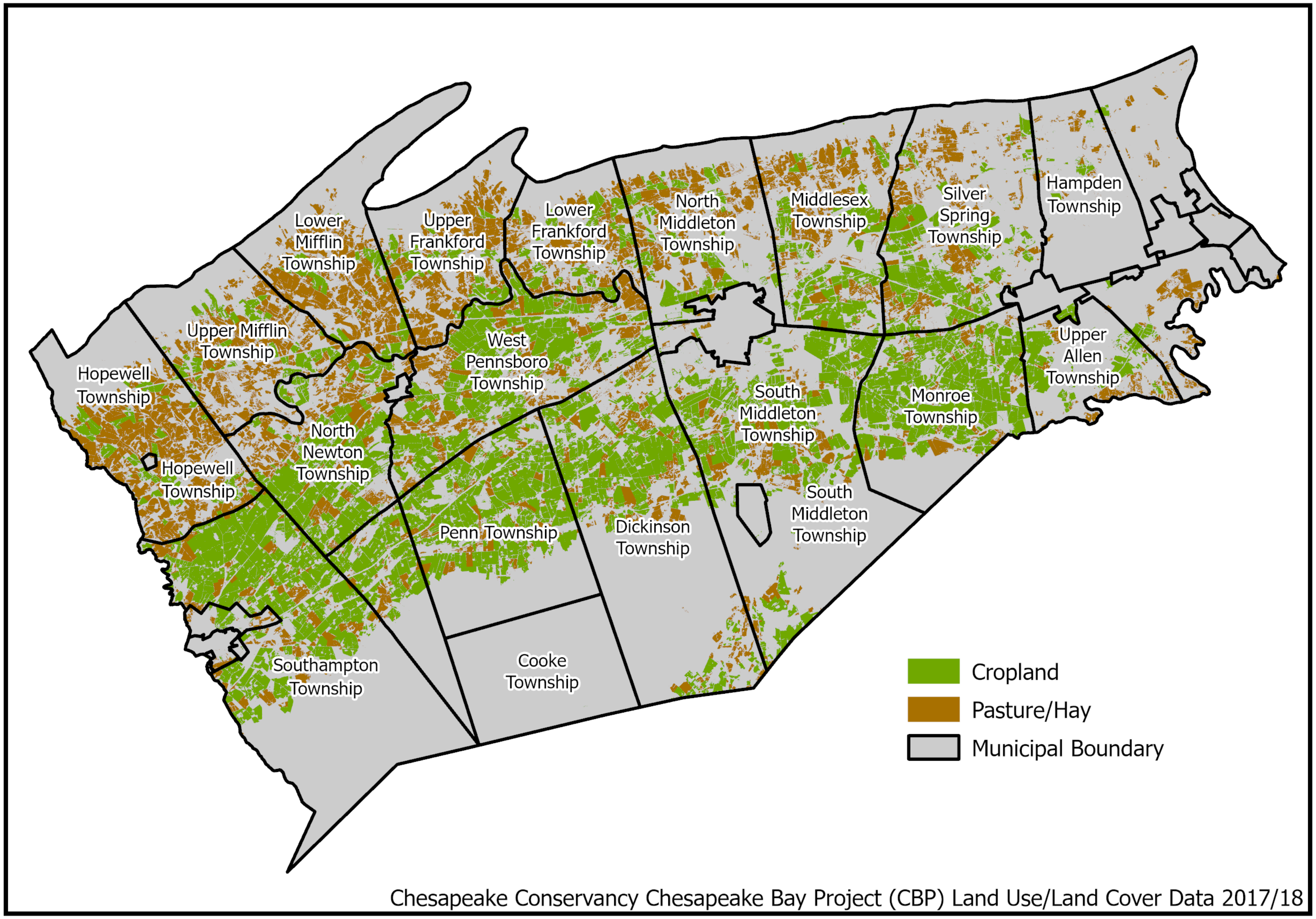


Table 4.3.1-4: Summary of agricultural land by acreage and percent of total land per municipality (Cumberland County GIS, 2024; CBP, 2017/18).

Municipality	Agriculture Acres	Total Acres	Percent Agricultural Land
Borough of Camp Hill	0.0	1,344.6	0%
Borough of Carlisle	177.4	3,525.3	5.0%
Township of Cooke	0.6	12,712.4	0.005%
Township of Dickinson	8,905.7	29,338.8	30.4%
Township of East Pennsboro	266.6	7,132.8	3.7%
Township of Hampden	585.4	11,283.8	5.2%
Township of Hopewell	8,381.3	17,897.3	46.8%
Borough of Lemoyne	6.0	1,024.4	0.6%
Township of Lower Allen	1,008.0	6,564.6	15.4%
Township of Lower Frankford	4,174.3	9,575.5	43.6%
Township of Lower Mifflin	5,693.3	15,288.4	37.2%
Borough of Mechanicsburg	162.8	1,540.5	10.6%
Township of Middlesex	6,971.5	16,721.4	41.7%
Township of Monroe	9,460.5	16,775.5	56.4%
Borough of Mt Holly Springs	4.7	964.3	0.5%
Borough of New Cumberland	11.4	1,097.2	1.0%
Borough of Newburg	22.9	103.4	22.2%
Borough of Newville	0.8	272.9	0.3%
Township of North Middleton	5,248.2	15,036.9	34.9%
Township of North Newton	9,519.5	14,584.5	65.3%
Township of Penn	9,001.5	19,000.5	47.4%
Borough of Shippensburg	95.1	840.2	11.3%
Township of Shippensburg	395.0	1,546.5	25.5%
Borough of Shiremanstown	0.5	192.8	0.3%
Township of Silver Spring	7,387.4	20,963.6	35.2%
Township of South Middleton	10,912.1	31,424.3	34.7%
Township of South Newton	2,889.0	7,325.9	39.4%
Township of Southampton	12,404.0	33,109.2	37.5%
Township of Upper Allen	2,296.0	8,558.4	26.8%
Township of Upper Frankford	5,358.3	12,508.0	42.8%
Township of Upper Mifflin	5,653.5	14,139.8	40.0%
Township of West Pennsboro	12,166.9	19,461.1	62.5%
Borough of Wormleysburg	0.7	546.3	0.13%
TOTAL	**129,160.8**	**352,395**	**36.65%**

Those who rely on well water are also vulnerable to drought. Table 4.3.1-5 indicates the number of domestic wells by municipality. It is important to note that the well data was obtained from the Pennsylvania GEOlogic Data Exploration (PaGEODE). PaGEODE contains well water data from PaGWIS, which relies on voluntary submissions of well record data by well drillers; as a result, it is not a complete database of all domestic wells in the County. This is the most complete dataset of domestic wells available. Currently, the County does not have access to an accurate data source to observe groundwater levels.

Table 4.3.1-5: Number of active domestic wells by municipality (PA DCNR PaGEODE, 2024).

Municipality	Total No. of Domestic Wells	Municipality	Total No. of Domestic Wells
Borough of Camp Hill	33	Borough of Newville	6
Borough of Carlisle	209	Township of North Middleton	457
Township of Cooke	147	Township of North Newton	439
Township of Dickinson	1,056	Township of Penn	606
Township of East Pennsboro	265	Borough of Shippensburg	9
Township of Hampden	349	Township of Shippensburg	13
Township of Hopewell	600	Borough of Shiremanstown	2
Borough of Lemoyne	2	Township of Silver Spring	606
Township of Lower Allen	182	Township of South Middleton	861
Township of Lower Frankford	325	Township of South Newton	374
Township of Lower Mifflin	259	Township of Southampton	523
Borough of Mechanicsburg	31	Township of Upper Allen	183
Township of Middlesex	514	Township of Upper Frankford	254
Township of Monroe	491	Township of Upper Mifflin	281
Borough of Mount Holly Springs	20	Township of West Pennsboro	952
Borough of New Cumberland	5	Borough of Wormleysburg	5
Borough of Newburg	15	Unknown Municipality	112
TOTAL	**10,186**		

4.3.1.6 Equity in Vulnerable Communities

Communities within Cumberland County with higher concentrations of low-income households could be more susceptible to drought. This includes Southampton Township, Newville Borough, and parts of the Borough of Carlisle 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 massive rocks called plates, 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. The impact of earthquakes can extend up to hundreds of thousands of square miles. Most earthquakes originate at faults, but not all faults are visible at the surface. Accordingly, the best guide to the distribution of earthquake hazard is often the distribution of past earthquakes (PA DCNR, 2003). Earthquake events in the Pennsylvania region including Cumberland County are mild. When events occur, they impact very small areas less than 100 kilometers in diameter. Earthquakes originating from outside Pennsylvania can also impact the Commonwealth, as was the case with a magnitude 5.8 earthquake in Virginia in August 2011 and a magnitude 4.8 earthquake in New Jersey in April 2024.

4.3.2.2 Range of Magnitude

Earthquake magnitude is often measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake. Table 4.3.2-1 summarizes Richter Scale magnitudes as they relate to the spatial extent of impacted areas. Based on historical events, earthquakes in the Pennsylvania region do not exceed magnitudes greater than 6.0. Per the table below, destruction from a 6.0 earthquake centered in Cumberland County would include slight damage to well-designed buildings but major damage to poorly constructed buildings.

Table 4.3.2-1: Richter scale magnitudes and associated earthquake size effects (PA DCNR, 2003).

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 up to about 62 miles from epicenter.
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 hundreds of miles across.

The impact an earthquake event has on an area is typically measured in terms of earthquake intensity. Intensity is most commonly measured using the Modified Mercalli Intensity (MMI) Scale based on direct and indirect measurements of seismic effects. A detailed description of the Modified Mercalli Intensity Scale is shown in Table 4.3.2-2. The earthquakes that occur in Pennsylvania tend to be relatively mild and cause minimal damage.

Table 4.3.2-2: Modified Mercalli Intensity Scale with associated impacts (PA DCNR, 2003).

Scale	Intensity	Description Of Effects	Corresponding Richter Scale Magnitude
I	Instrumental	Usually detected only on seismographs.	<4.2
II	Feeble	Felt only by a few persons at rest, especially on upper floors of buildings.	
III	Slight	Felt quite noticeably indoors, especially on upper floors. Most people don't recognize it as an earthquake (i.e., a truck rumbling).	
IV	Moderate	Can be felt by people walking; dishes, windows, and doors are disturbed.	
V	Slightly Strong	Sleepers are awoken; unstable objects are overturned.	<4.8
VI	Strong	Trees sway; suspended objects swing; objects fall off shelves; damage is slight.	<5.4
VII	Very Strong	Damage is negligible in buildings of good design and construction, slight to moderate in well-built ordinary structures, and considerable in poorly built or badly designed structures; some chimneys are broken.	<6.1
VIII	Destructive	Damage is slight in specially designed structures; considerable in ordinary, substantial buildings. Moving cars become uncontrollable; masonry fractures, poorly constructed buildings damaged.	<6.9
IX	Ruinous	Some houses collapse, ground cracks, pipes break open; damage is considerable in specially designed structures; buildings are shifted off foundations.	
X	Disastrous	Some well-built wooden structures are destroyed; most masonry and frame structures are destroyed along with foundations. Ground cracks profusely; liquefaction and landslides widespread.	<7.3
XI	Very Disastrous	Most buildings and bridges collapse, roads, railways, pipes and cables destroyed.	<8.1
XII	Catastrophic	Total destruction; trees fall; lines of sight and level are distorted; ground rises and falls in waves; objects are thrown upward into the air.	>8.1

Earthquakes are also known to cause fatal loss and injury, including substantial property damages of tens of billions of dollars, while disrupting the social and economic functioning of the affected area. However, no injury or severe damage from earthquake events has been reported in Cumberland County. Most property damage and earthquake-related deaths are caused by the failure and collapse of structures due to the ground shaking, which is dependent upon amplitude and duration of the earthquake (PA DCNR, 2003). Impacts to infrastructure could include train derailments, pipeline failures, and utility interruptions (Earle, 2015).

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 (Earle, 2015). 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. However, these are unlikely to occur in Cumberland County.

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

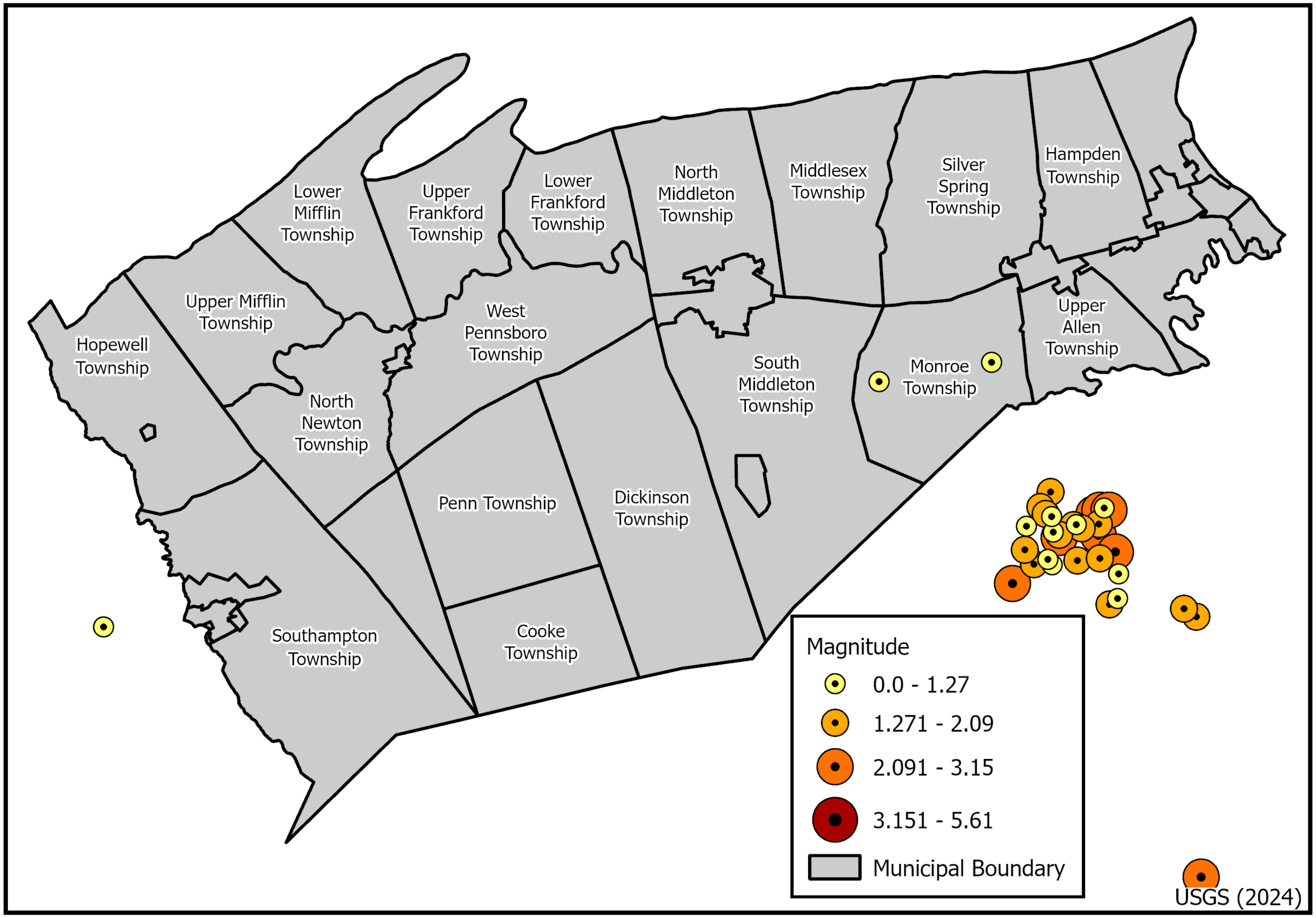
Table 4.3.2-3: Most Likely Lifelines Impacted by Earthquakes.

LIFELINES	NOTES
Food, Hydration, Shelter	Shelters may be affected depending on severity. Higher earthquake building standards can aid in mitigation.
Health and Medical	Personnel will likely be overutilized in response and recovery, leading to potential gaps in capability.
Hazardous Materials	Pipelines may be affected. Mitigation includes requiring higher building standards.

4.3.2.3 Past Occurrence

Minor tremors or aftershocks have been reported as a result of earthquake events with epicenters in nearby Lancaster County (Cumberland EOP, 1984), Virginia in 2011 (PennLive, 2011), and in New Jersey in 2024 (Person, 2024). Figure 4.3.2-1 shows recorded earthquake events in Pennsylvania between 1724 and 2024. Only two small-scale earthquake epicenters have been recorded in Cumberland County, both in Monroe Township. Earthquake events are shown in other areas of Pennsylvania, with a particular concentration of events occurring to the southeast of Cumberland County in York County. Several events are shown in nearby York County as well as one event in Adams County. Prior to 1960, an earthquake occurred on the eastern border of York County which had a magnitude measured greater than four on the Richter Scale.

Figure 4.3.2-1: Map showing the location of significant earthquake epicenters, earthquake hazard zones and Cumberland County municipal boundaries (USGS, 2024). This image is a screen capture from the Cumberland County Hazard Mitigation Plan Map Series. Please hold the CTRL key and select the map below for the Hazard Mitigation Plan Map Series.



4.3.2.4 Future Occurrence

The probability of an earthquake event occurring in Cumberland County is very low. Therefore, it is reasonable to believe that the County will not experience earthquake damage anytime soon. Overall, the probability of future earthquakes can be considered *unlikely* according to the Risk Factor Methodology (see Table 4.5.2-1). There is no expected impact from climate change on the future occurrence of earthquakes or their impacts.

4.3.2.5 Vulnerability Assessment

All structures and infrastructure in Cumberland 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. Cumberland County is located in a zone where only minor earthquake damage is expected (Cumberland EOP, 1984).

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 Cumberland 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 Cumberland 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 Cumberland County due to earthquake, damages are estimated to be limited to the more dilapidated structures and structures with unreinforced masonry. The number of structures that are at least 50 years old in Cumberland County is 59,062 (U.S. Census Bureau, 2023). Carlisle Borough (7,248 structures), Hampden Township (5,191 structures) East Pennsboro Township (4,975 structures), and Lower Allen Township (4,661 structures) are the municipalities with the most structures that are at least 50 years old. Furthermore, Upper Allen Township, Camp Hill, Mechanicsburg, and New Cumberland Boroughs all house more than 3,000 structures that are at least 50 years old, as displayed in Table 4.3.2-4 below.

Table 4.3.2-4: Number of Structures at Least 50 Years Old by Municipality (U.S. Census Bureau, 2023).	
Municipality	**Number of Structures at Least 50 Years Old**
Borough of Camp Hill	3257
Borough of Carlisle	7248
Township of Cooke	158
Township of Dickinson	674
Township of East Pennsboro	4975
Township of Hampden	5191
Township of Hopewell	341
Borough of Lemoyne	1942
Township of Lower Allen	4661
Township of Lower Frankford	349
Township of Lower Mifflin	308
Borough of Mechanicsburg	3624
Township of Middlesex	1074
Township of Monroe	1478
Borough of Mt Holly Springs	674
Borough of New Cumberland	3278
Borough of Newburg	109
Borough of Newville	514
Township of North Middleton	2778
Township of North Newton	494
Township of Penn	504
Borough of Shippensburg	2062
Township of Shippensburg	320
Borough of Shiremanstown	704
Township of Silver Spring	2240
Township of South Middleton	2854
Township of South Newton	270
Township of Southampton	903
Township of Upper Allen	3122
Township of Upper Frankford	390
Township of Upper Mifflin	229
Township of West Pennsboro	1282
Borough of Wormleysburg	1055
TOTAL	**59,062**

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 damage is anticipated.

4.3.2.6 Equity in Vulnerable Communities

Communities within Cumberland 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 Carlisle Borough, East Pennsboro Township, Hampden Township, and Lower Allen Township (see Table 4.3.2-5 below). 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.

Table 4.3.2-5: Owner-Occupied Vs. Renter-Occupied Housing by Municipality (U.S. Census Bureau, ACS, 2023).		
Municipality	**Owner-Occupied**	**Renter-Occupied**
Borough of Camp Hill	2,492	760
Borough of Carlisle	4278	4441
Township of Cooke	68	5
Township of Dickinson	1945	58
Township of East Pennsboro	5981	3054
Township of Hampden	10014	2961
Township of Hopewell	840	50
Borough of Lemoyne	1437	948
Township of Lower Allen	4840	3013
Township of Lower Frankford	582	118
Township of Lower Mifflin	581	91
Borough of Mechanicsburg	2851	1,361
Township of Middlesex	2105	600
Township of Monroe	2197	302
Borough of Mt Holly Springs	508	357
Borough of New Cumberland	2394	1054
Borough of Newburg	103	56
Borough of Newville	249	248
Township of North Middleton	3741	1106
Township of North Newton	766	163
Township of Penn	935	200
Borough of Shippensburg	703	1395
Township of Shippensburg	280	555
Borough of Shiremanstown	506	245
Township of Silver Spring	6765	1353
Township of South Middleton	5327	1329
Township of South Newton	346	83
Township of Southampton	2073	640
Township of Upper Allen	6716	2233
Township of Upper Frankford	692	65
Township of Upper Mifflin	402	70
Township of West Pennsboro	1696	467
Borough of Wormleysburg	660	733
TOTAL	**75,073**	**30,114**

4.3.3. Flood, Flash Flood & Ice Jam

4.3.3.1 Location and Extent

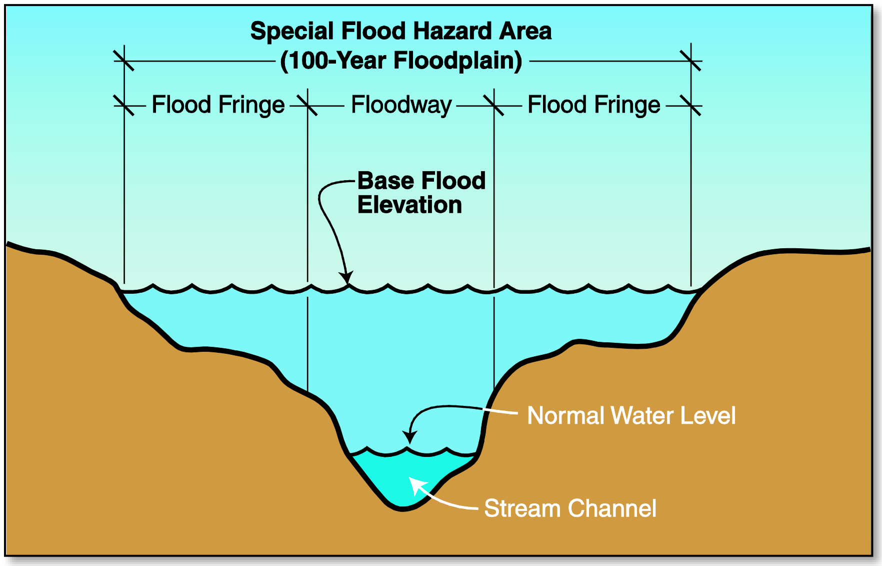
Flooding is an overflowing of water onto land that is normally dry (NOAA NSSL, 2024b). it is the most frequent and costly of all natural hazards in Pennsylvania. Flooding in Pennsylvania is usually associated with abnormally high and intense rainfall amounts. However, flooding can also be caused by sudden snowmelt, landslides, dam failures, lock failures, or levee failures. Heavy rainfall events have the potential to produce localized or widespread flooding. Cloudbursts are a sudden, very heavy rainfall, usually local in nature and of brief duration (Britannica, 2024). Large events such as a broad-scale tropical storm lasting more than 24 hours may affect drainage basins several thousand square miles in size.

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.

Flood sources within Cumberland County include rivers and streams. For inland areas like Central Pennsylvania, excess water from snowmelt or rainfall accumulates and overflows onto stream banks and adjacent floodplains. Floodplains found in lowlands, adjacent to rivers, streams, creeks, lakes or other large water bodies are subject to recurring floods. The size of the floodplain is described by the recurrence interval of a given flood. Flood recurrence intervals are explained in more detail in Section 4.3.3.4.

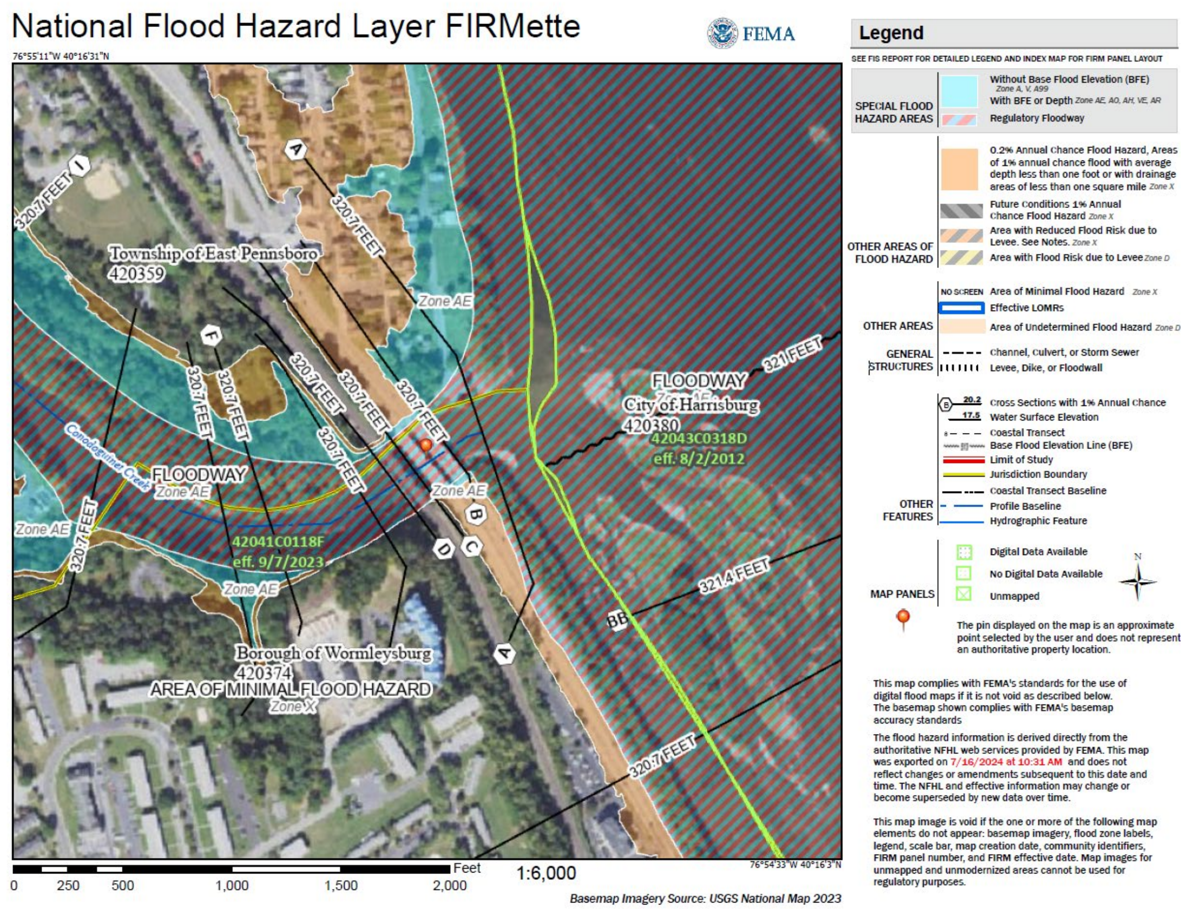
In assessing the potential spatial extent of flooding, it is important to know that a floodplain associated with a flood that has a 10% annual chance of occurring in a given year is smaller than the floodplain associated with a flood that has a 0.2% annual chance of occurring. The National Flood Insurance Program (NFIP), for which Flood Insurance Rate Maps (FIRM) are published, identifies the 1%-annual-chance flood, which is used to delineate the Special Flood Hazard Area and identify Base Flood Elevations (FEMA, 2022c). Figure 4.3.3-1 illustrates these terms. The Special Flood Hazard Area serves as the primary regulatory boundary used by FEMA, the Commonwealth of Pennsylvania, and Cumberland County local governments.

Figure 4.3.3-1: Diagram identifying Special Flood Hazard Area, 1 percent-annual-chance (100-Year) floodplain, floodway and flood fringe (PA DEP, 2023).



Countywide digital flood insurance rate maps (DFIRM's) were published for Cumberland County on March 16, 2009, and updated on September 7, 2023. All communities within the County are now shown on a single set of countywide DFIRM's. Previous FIRMs and Flood Boundary and Floodway Maps (FBFM) were digitized to produce a DFIRM that is compatible with Geographic Information Systems. Prior to the publication of this digital data, flood hazard information from FEMA was available through paper FIRMs and Q3 data. Additionally, FEMA recently updated its Map Service Center to provide National Flood Hazard Layer-dynamic maps that have increased the accessibility and customization of DFIRM viewing. An example of the mapping products published is shown in Figure 4.3.3-2. DFIRMs for the entire county can be obtained from the FEMA Map Service Center (https://msc.fema.gov/portal/home). These maps can be used to identify the expected spatial extent of flooding from a 1 percent- and 0.2 percent-annual-chance event.

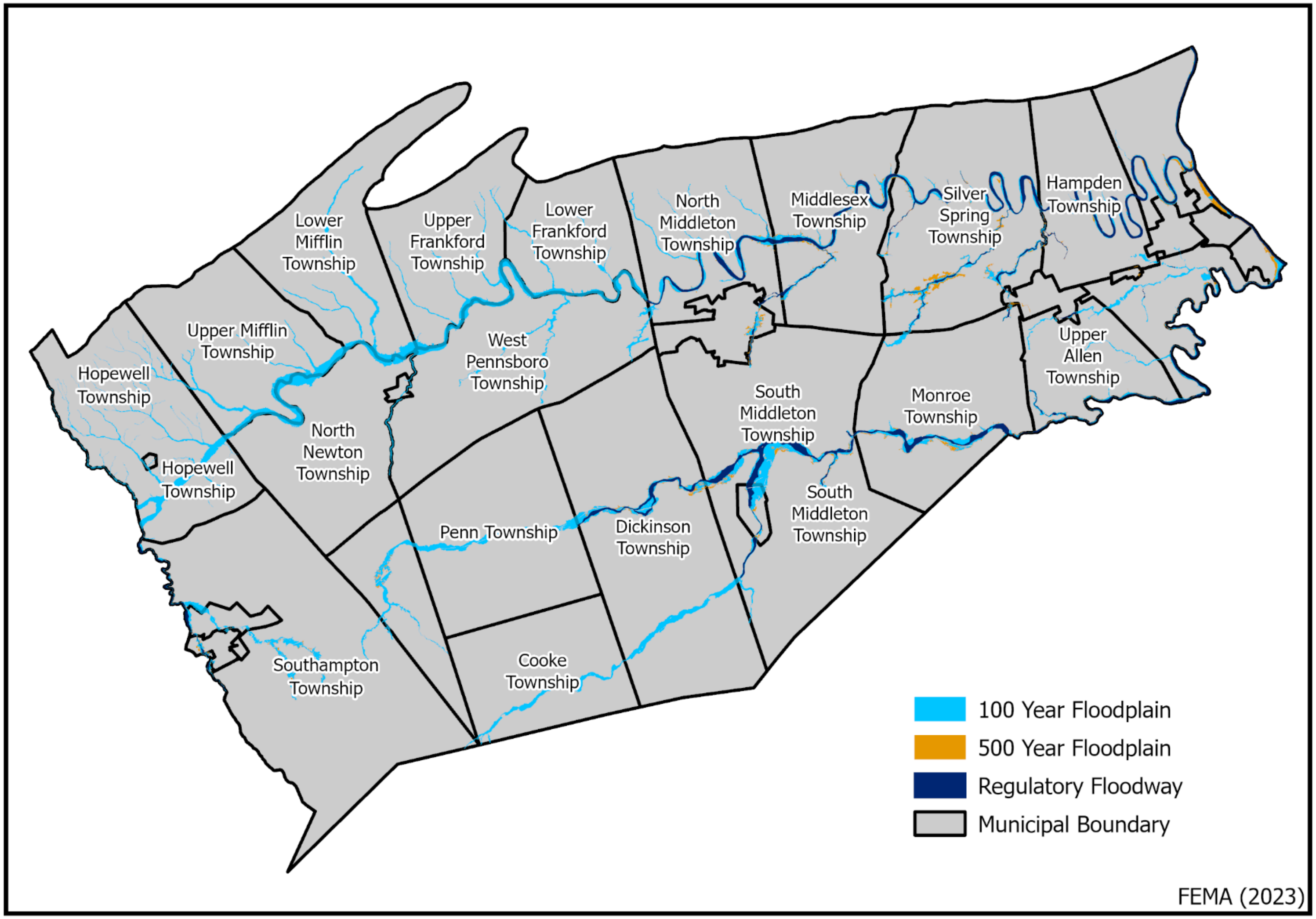
Figure 4.3.3-2: Most recent approved FIRM for a portion of the Borough of Wormleysburg, Cumberland County to serve as an example (FEMA, 2023). Remaining FIRMs for Cumberland County can be found at https://msc.fema.gov/portal/home.



Flood sources identified in the most recent DFIRMs include: Conodoguinet Creek, Dogwood Run, Green Ridge Run, Gum Run, Hogestown Run, Letort Spring Run, Long Pine Run, Middle Spring Creek, Middle Spring Creek Tributary, Mountain Creek, Navy Ship Parts Control Center Drainage Channel, Old Town Run, Potteiger Run, Susquehanna River, Taggerts Run, Trindle Spring Run, Trout Run, Wertz Run, Yellow Breeches Creek and Yellow Breeches Creek Northern Split. Figure 4.3.3-4 shows the location of watercourses in Cumberland County and the location of the FEMA Floodplains. Flood events caused by ice jams are limited primarily to the Susquehanna River and Conodoguinet Creek. Figure 4.3.3-3 displays an example of an ice jam forming in East Pennsboro Township.

Figure 4.3.3-3: Ice jam forming in East Pennsboro Township (Photograph courtesy of East Pennsboro Township, 2025).

Figure 4.3.3-4: Floodplains in Cumberland County (FEMA, 2023). This image is a screen capture from the Cumberland County Hazard Mitigation Plan Map Series. Please hold the CTRL key and select the map below for the Hazard Mitigation Plan Map Series.



4.3.3.2 Range of Magnitude

Both localized and widespread floods are considered hazards when people and property are affected. Injuries and deaths can occur when people are swept away by flood currents or bacteria and disease are spread by moving or stagnant floodwaters (Doocy et al., 2013). Most property damage results from inundation by sediment-filled water. A large amount of rainfall over a short time span, like a cloudburst, can result in flash flood conditions. Small amounts of rain can result in floods in locations where the soil is frozen or saturated from a previous wet period or if the rain is concentrated in an area of impermeable surfaces such as large parking lots, paved roadways, or other impervious developed areas (MRCC, 2022).

Rainfall in Pennsylvania is about average for the eastern United States. The American Meteorological Society classifies rainfall intensity into three categories (2012):

- Light rain – when precipitation rate is .01 to .10 inches/hour
- Moderate rain – when precipitation rate is .11 to .30 inches/hour
- Heavy rain – when precipitation rate is > .30 inches/hour

While significant flood events are typically associated with heavy rain, rainfall events of lesser intensity may also cause flooding given sufficient duration. Flood effects can be volume- or force-related, although both play a factor in all flooding events. Flood events that occur along larger streams with wide floodplains tend to result in large-scale inundations, causing widespread damage through soaking and silt deposits in homes, businesses, and industrial plants. The impacts of these events are typically a function of how much water was involved instead of the force of that moving water. On the other hand, flash floods resulting from bursts of heavy rainfall happen suddenly and powerfully as they sweep vehicles away, uproot trees, damage buildings and structures, and more (The Weather Channel, 2015). Flash floods are often unpredictable and, particularly if they occur at night, can cause major panic and loss of life due to low visibility (Špitalar et al., 2014). These events are common in hilly regions where runoff paths are steep, allowing water to reach higher velocity as it flows over the ground. Frozen or very dry surfaces can increase normal runoff velocities as well, particularly in small drainage areas, as water is not able to infiltrate the soil easily (Chen et al., 2017). In addition to slopes and frozen ground, ice and debris jams in channels and culverts can lead to quick-rising floods if they significantly obstruct the flow of water (NOAA NWS, 2024a).

Ice jams and snowmelt can help cause flash floods. A deep snowpack increases runoff produced by melting snow. Heavy spring rains falling on melting snowpack can produce flash flooding. Melting snowpack may also contribute to floods produced by ice jams (NOAA NSSL, 2024b). As ice or debris moves downstream, it may get caught on any sort of obstruction to the water flow. When this occurs, water can be held back, causing upstream flooding. When the jam finally breaks, flash flooding can occur downstream. Ice jams are common during the winter and spring along rivers, streams, and creeks (NOAA NWS, 2024a).

Several factors determine the severity of floods, including rainfall intensity and duration, topography, ground cover, and rate of snowmelt (Doocy et al., 2013). Water runoff is greater in areas with steep slopes and little or no vegetative ground cover. The County has sloping terrain, especially near the South and Blue Mountains, which can contribute to more severe floods as runoff reaches receiving water bodies more rapidly over steep terrain. Also, urbanization removes native vegetation and agricultural land present and replaces them with impervious surfaces, which drastically reduces stormwater infiltration rates and forces rainfall to run off into nearby surfaces (Polk, 2024). If mismanaged, this runoff can accumulate quickly and create hazardous conditions. Stormwater runoff may contain and transport harmful pollutants such as fertilizers or pesticides from agricultural/residential applications, bacteria from livestock and pet waste, oil from vehicles, and other pollutants. These contaminants may infiltrate drinking water supply or swimming areas. When excess nitrogen and phosphorus are flushed into the surface water from fertilizers, algal blooms can occur which degrade living conditions for fish and other organisms (Yencha, 2022). Furthermore, polluted stormwater runoff is often transported through a municipal separate storm sewer system (MS4) and then discharged into a local water body, untreated. Municipal communities have been encouraged to develop a comprehensive planning approach to manage stormwater and reduce this pollution source (EPA, 2024a).

Additionally, stormwater-caused erosion, and the resulting deposition of sediment, can alter stream channels and further harm aquatic life (Yencha, 2022). In parts of Cumberland County where development has occurred on karst topography, stormwater has the potential to exacerbate the formation of karst features (see Section 4.3.6) by rapidly removing soil from groundwater drainage conduits (Kochanov, 2015).

A heavy rainfall event in Cumberland County created hazardous conditions related to stormwater. In July 2018, the Borough of Newville received 9.8 inches of rain over the course of five days, including 3.3 inches in one hour. The Borough's stormwater system was overwhelmed, resulting in damage to a retaining wall, the closure of downtown streets and the declaration of a state of emergency by Mayor Randy Finkey (Gitt, 2018).

Cumberland County partnered with Stormwater PA and Alliance for the Chesapeake Bay to launch a website designed as an educational resource for dealing with stormwater issues. The site provides information on specific watersheds and outlines techniques that can be implemented by a variety of entities to mitigate the negative impacts of stormwater. The site can be accessed here: http://stormwaterpa.org/cumberland-county.html.

In Central Pennsylvania, including Cumberland County, there are seasonal differences in how floods are caused. In the winter and early spring (February to April), major flooding has occurred as a result of heavy rainfall on snowpack throughout contributing watersheds. Winter floods also have resulted from runoff of intense rainfall on frozen ground, and local flooding has been exacerbated by ice jams in rivers, streams and creeks (i.e., especially the Susquehanna River and Conodoguinet Creek).

Summer floods have occurred from intense rainfall on previously saturated soils. Summer thunderstorms deposit large quantities of rainfall over a short period of time that can result in flash flood events. In addition, as detailed in Section 4.3.4, the County occasionally experiences intense rainfall from tropical storms in late summer and early fall. Tropical Storm Agnes in 1972 created the worst flooding conditions on record for Cumberland County.

The most severe flooding in Central Pennsylvania has been associated with the Susquehanna River Basin, which drains directly into the Chesapeake Bay and is the largest river basin on the U.S. Atlantic Coast. Cumberland County lies within the Lower Susquehanna River Basin, which means that it is subject to heavy precipitation events that may occur outside of the County in the upper reaches of the Basin.

Floods are naturally occurring events that benefit riparian systems which have not been disrupted by human actions; benefits include groundwater recharge and the introduction of nutrient rich sediment improving soil fertility (WMO, 2006). However, the destruction of riparian buffers, changes to land-use and land cover throughout a watershed, and 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 as well. These facilities are discussed in Section 4.3.13; however, it is important to note that there are 8 SARA facilities in the 1 percent-annual-chance floodplain (Cumberland County GIS, 2025). Other environmental impacts of flooding include water-borne diseases, heavy siltation, erosion of streambanks and riverbeds, destruction of aquatic habitat, damage to water and sewer infrastructure located in floodplains, damage or loss of crops and vegetation, and drowning of both humans and animals (Washington State Department of Ecology, 2022). Extreme rain events can also lead to the failure of manure lagoons, which are typically built for 25-year storms. These failures can lead to significant runoff that may lead to harmful algae blooms in local waterways.

The potential impacts of floods, flash floods, and ice jams on community lifelines are as follows:

Table 4.3.3-1: 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.

4.3.3.3 Past Occurrence

Cumberland County has a long history of flooding events. Bordered to the east by the Susquehanna River and traversed by two of its tributaries, Yellow Breeches Creek and Conodoguinet Creek, the County has suffered damage from numerous major floods and localized flash flooding. Figures 4.3.3-5 and 4.3.3-6 show flooding in Lower Allen Township and East Pennsboro Township respectively.

Figure 4.3.3-5: Flooding on Oneida Road in Lower Allen Township, Cumberland County, PA (Photograph courtesy of Lower Allen Township, 2024).

Figure 4.3.3-6: Flooding at West Fairview Point in East Pennsboro Township, Cumberland County, PA (Photograph courtesy of East Pennsboro Township, 2024).

Twelve of the 18 Presidential Disaster and Emergency Declarations affecting Cumberland County have been in response to hazard events related to flooding (see Table 4.2-1) in the area. Frequent flooding occurs at the confluence of Yellow Breeches Creek and the Susquehanna River in the Borough of New Cumberland, and at the Conodoguinet Creek in Hogestown. Flooding events, including those associated with Disaster Declarations, are listed in Table 4.3.3-2.

Table 4.3.3-2: Flood and flash flood events impacting Cumberland County from 1936-2024 (SHELDUS, 2013, NOAA NCEI, 2024f, NOAA Hydrograph of Conodoguinet Creek & community surveys). Note that property damage values are estimates based on best available information. "Countywide" indicates that several locations in the County were affected.

Date	Location & Description	Estimated Property Damage ($)
3/1936	Countywide	5,724,000
4/2/1970	Countywide; Severe Thunderstorm	20,034
6/1972	Countywide; Tropical Storm Agnes	40,725,000
6/28/1973	Countywide; Severe Thunderstorm	15,152
9/1975	Countywide; Hurricane	1,515,152
10/1976	Countywide	*not provided*
1/24/1979	Countywide; Severe Thunderstorm	15,152
2/23/1979	Countywide; Severe Thunderstorm	15,152
2/2/1982	Countywide	1,515
3/14/1986	Countywide	14,706
9/12/1987	Countywide	12,500
11/28/1993	Countywide	*not provided*
8/25/1994	Countywide; Thunderstorms with very heavy rain produced significant poor drainage flooding throughout the County.	*not provided*
1/20/1995	Countywide	*not provided*
6/30/1995	Countywide; Heavy rain caused basement flooding within Cumberland County.	*not provided*
7/6/1995	Countywide; Severe thunderstorms throughout the County. Trees were uprooted in Mechanicsburg and within nearby Upper Allen Township. Eastern Cumberland County experienced three inches of rain within in an hour. The heavy rain caused flooding of basements and streets and created sinkholes in Mechanicsburg.	*not provided*
1/19/1996	Countywide; One flood-related death occurred in Cumberland County resulting from a vehicular accident involving a 32-year old male near Middlesex.	352,000
9/6/1996	Western Areas of the County; Newville had 9.8 inches of rain. One flood-related death resulting from a vehicular accident involving a 26-year old woman.	*not provided*
9/13/1996	Western areas of the County	*not provided*
12/13/1996	Countywide	*not provided*
9/11/1997	Countywide	*not provided*
11/7/1997	Western areas of the County	*not provided*
1/8/1998	Countywide	*not provided*

Table 4.3.3-2: Flood and flash flood events impacting Cumberland County from 1936-2024 (SHELDUS, 2013, NOAA NCEI, 2024f, NOAA Hydrograph of Conodoguinet Creek & community surveys). Note that property damage values are estimates based on best available information. “Countywide” indicates that several locations in the County were affected.		
Date	**Location & Description**	**Estimated Property Damage ($)**
3/21/1998	Countywide	*not provided*
9/6/1999	Eastern Areas of the County; Streets and underpasses were flooded in Shiremanstown and other eastern areas as heavy rain from Tropical Storm Dennis.	10,000
9/16/1999	Countywide	15,000
7/30/2000	Northeast Areas of the County; Heavy rains caused mud and water to flow into a couple of homes near an area under road construction.	*not provided*
9/1/2000	Mechanicsburg; Eight homes and one apartment were flooded in East Pennsboro Township.	50,000
1/3/2003	Rising waters on Conodoguinet Creek at Hogestown caused the river gauge to reach its flood stage of 8 feet briefly between 8 and 9 pm.	*not provided*
3/20/2003	Rainfall of over 1 inch caused the Yellow Breeches Creek at Camp Hill to exceed its flood stage of 7 feet. Minor flooding was reported, with several roads closed along the creek in the Carlisle area.	*not provided*
3/21/2003	Rainfall of over 1 inch caused the Conodoguinet Creek at Hogestown to exceed its flood stage of 8 feet. Minor flooding of low lying areas was reported.	*not provided*
6/7/2003	Heavy rainfall caused Yellow Breeches Creek at Camp Hill to exceed its flood stage of 7 feet.	*not provided*
6/8/2003	Heavy rainfall caused Conodoguinet Creek at Hogestown to reach flood Stage of 8 feet.	*not provided*
6/21/2003	Boiling Springs; Heavy rains caused rapid rises in streams and closed several roads in southern Cumberland County near the town of Boiling Springs. Lerew Road, Petersburg Road and Mount Zion Road, all directly adjacent to Old Town Run and Lerew Creek, were closed.	*not provided*
9/23/2003	Heavy rainfall caused Yellow Breeches Creek at Camp Hill to exceed its flood stage of 7 feet.	*not provided*
12/11/2003	Heavy rainfall caused the Conodoguinet Creek at Hogestown to exceed flood stage.	*not provided*
12/11/2003	Heavy rainfall caused Yellow Breeches Creek at Camp Hill to exceed flood stage.	*not provided*
8/1/2004	Shiremanstown; Heavy rain caused flash flooding along Yellow Breeches Creek in Cumberland County. Several homes were isolated by flood waters, accessible only by boat. One road was also flooded and impassable.	*not provided*
8/1/2004	Heavy rain caused flooding along Yellow Breeches Creek at Camp Hill.	*not provided*
9/17/2004	Countywide; As a result of this excessive rainfall from Hurricane Ivan and antecedent heavy rainfall from the remnants of Hurricane Frances one week earlier, widespread flooding occurred throughout central Pennsylvania from 9/17/2004 through 9/20/2004. Flood levels at many locations ranked in the top 5 for all flood events, with many river forecast points cresting above levels reached in the January 1996, flood. Moderate to major flooding was experienced on the larger tributaries of the Susquehanna River. The widespread flooding closed hundreds of roads and bridges across central Pennsylvania, causing a significant adverse impact on commerce and transportation for several days. Preliminary monetary estimates of flood damage from the remnants of Ivan across the state were over 260 million dollars.	1,515,152

Table 4.3.3-2: Flood and flash flood events impacting Cumberland County from 1936-2024 (SHELDUS, 2013, NOAA NCEI, 2024f, NOAA Hydrograph of Conodoguinet Creek & community surveys). Note that property damage values are estimates based on best available information. "Countywide" indicates that several locations in the County were affected.		
Date	**Location & Description**	**Estimated Property Damage ($)**
9/18/2004	Heavy rain caused the Conodoguinet Creek at Hogestown to exceed its flood stage of 8 feet.	*not provided*
9/18/2004	Heavy rain caused the Yellow Breeches Creek at Camp Hill to exceed its flood stage of 7 feet.	*not provided*
9/28/2004	Heavy rain caused the Yellow Breeches Creek at Camp Hill to exceed its flood stage of 7 feet.	*not provided*
9/28/2004	Countywide; The remnants of Hurricane Jeanne moved northeast along the east slopes of the Appalachians during Tuesday, September 28th, eventually moving off the mid-Atlantic Coast by early Tuesday evening. However, a large plume of tropical moisture to the northwest of the system produced widespread heavy rainfall across south central Pennsylvania during Tuesday, with rainfall amounts of 2 to 4 inches. This rainfall, combined with excessively wet soil and swollen rivers from the remnants of 2 antecedent tropical systems, produced mainly minor flooding across portions of south central Pennsylvania, with several road closures and some basement flooding reported.	*not provided*
9/29/2004	Heavy rain caused the Conodoguinet Creek at Hogestown to exceed its flood stage of 8 feet.	*not provided*
9/29/2004	Heavy rain and local runoff caused the Yellow Breeches Creek at Camp Hill to exceed its flood stage of 7 feet.	*not provided*
3/28/2008	Countywide; A low pressure system combined with abundant low level moisture drawn from the Gulf of Mexico and western Atlantic Ocean produced very heavy rainfall across the lower Susquehanna Valley. As a result of the heavy rainfall, numerous streams overflowed their banks onto adjacent roadways, resulting in road closures.	*not provided*
3/28/2005	Heavy rain caused Yellow Breeches Creek at Camp Hill to flood.	*not provided*
3/29/2005	Heavy rain caused Conodoguinet Creek at Hogestown to flood.	*not provided*
3/30/2005	Heavy rain caused the Susquehanna River at Harrisburg to flood, exceeding 17 ft. flood stage.	*not provided*
4/2/2005	Countywide; Widespread heavy rainfall across the lower Susquehanna Valley. Average rainfall amounts of 1 to 3 inches occurred during this time. This heavy rainfall led to numerous road closures as smaller streams and creeks overflowed their banks during Saturday afternoon and evening.	*not provided*
4/2/2005	Heavy rain caused Yellow Breeches Creek at Camp Hill to flood.	*not provided*
4/3/2005	Heavy rain caused Conodoguinet Creek at Hogestown to flood.	*not provided*
4/3/2005	Heavy rain caused the Susquehanna River at Harrisburg to flood.	*not provided*
6/27/2006	Countywide; Heavy rain associated with a stalled frontal boundary, interacting with the remnants of a weak tropical system, caused flash flooding throughout central and eastern Pennsylvania from June 27 through June 28. While flash flooding ended on the 28th, flood waters continued in some locations until July 1st. In Cumberland County, numerous roads and bridges were closed due to flood waters. 30 homes were evacuated on Betham Hollow Road due to access road washing out. Flooding was also extensive in Silver Spring Township. Heavy rain caused the Conodoguinet Creek at Hogestown and Yellow Breeches Creek at Camp Hill to flood.	*not provided*
11/16/2006	Shiremanstown; Heavy rain caused flash flooding in Cumberland County. Cedar Run overflowed its banks and flooded roads in Lower Allen Township.	*not provided*

Table 4.3.3-2: Flood and flash flood events impacting Cumberland County from 1936-2024 (SHELDUS, 2013, NOAA NCEI, 2024f, NOAA Hydrograph of Conodoguinet Creek & community surveys). Note that property damage values are estimates based on best available information. "Countywide" indicates that several locations in the County were affected.		
Date	**Location & Description**	**Estimated Property Damage ($)**
	Roads were also closed in Monroe Township due to Yellow Breeches Creek overflowing its banks.	
5/10/2007	Carlisle; Heavy rain from strong thunderstorms produced flash flooding across portions of the Lower Susquehanna Valley. Flooded intersections and closed roads due to rapid rises of area creeks and streams just north of Carlisle. County Emergency Manager reported a water rescue in Silver Spring Township around 8 pm. Rainfall reports of as much as 3.5 inches of rain in a 3 hour period were received in Carlisle.	*not provided*
7/29/2007	Carlisle; Thunderstorms with torrential rain produced flash flooding across Cumberland County. Numerous roads were flooded and closed throughout the county, along with a number of reports of flooded urban intersections.	*not provided*
5/28/2009	Newburg; Thunderstorms produced heavy rain and flash flooding in northern portions of Cumberland County. Roads were closed in Upper and Lower Mifflin Township. In the vicinity of Doubling Gap Creek, several roads were also closed.	*not provided*
7/2009	North Middleton; two flash flooding events.	*not provided*
7/23/2009	Gettysburg; Heavy rain caused flash flooding just north of Carlisle in North Middleton Township. Three to five feet of water inundated several homes along Echo Road. Water was over the top of resident mailboxes in some areas. Several municipal roads were also closed due to the flooding.	$100,000
7/23/2009	Newburg; Heavy rain produced flash flooding along the Pennsylvania Turnpike near Newville.	*not provided*
7/23/2009	Mechanicsburg; Heavy rain produced flash flooding just southeast of Mechanicsburg in Upper Allen Township. Several residents were evacuated from flooded homes. The flash flooding persisted late into the evening and transitioned into countywide flooding.	$100,000
7/24/2009	Eberleys Mill; Heavy rain caused Yellow Breeches Creek at Camp Hill to exceed flood stage. Moderate flooding was reported along Creekwood Drive in the Allendale section of Camp Hill, where reports of several flooded vehicles were received. Also, Cedar Cliff Drive was inundated by flood waters from the Creek.	$10,000
8/19/2009	Sheperdstown; Heavy rain caused flash flooding along a small stream tributary of the Yellow Breeches Creek. The high water covered a bridge along Hertzler Road in Upper Allen Township. The flash flooding transitioned into areal county flooding, which persisted until midnight.	*not provided*
1/25/2010	Mechanicsburg; Heavy rain caused widespread areal flooding of low lying urban and poor drainage areas. The Williams Grove Mobile Home Park was evacuated due to flooding at the Williams Grove Water Treatment Plant in Mechanicsburg. A number of roads were closed including Blosserville Road at the Conodoguinet Creek Bridge on the border of West Pennsboro and Upper Frankford Townships. Creek Road was closed between Route 74 and Kuhn Road in Monroe Township.	*not provided*
8/12/2010	Mount Holly Springs; Heavy thunderstorm rains produced flash flooding in Mount Holly Springs. Several municipal streets and underpasses were flooded.	$5,000
3/10/2011	Plainfield; Heavy rain brought flooding and closed numerous roads. Flood waters also caused the mandatory evacuation of the Williams Grove Mobile	*not provided*

Table 4.3.3-2: Flood and flash flood events impacting Cumberland County from 1936-2024 (SHELDUS, 2013, NOAA NCEI, 2024f, NOAA Hydrograph of Conodoguinet Creek & community surveys). Note that property damage values are estimates based on best available information. "Countywide" indicates that several locations in the County were affected.		
Date	**Location & Description**	**Estimated Property Damage ($)**
	Home Park. This included 81 mobile homes, where 250 persons were displaced.	
3/10/2011	New Cumberland; Yellow Breeches Creek experienced moderate flooding. A number of homes in the Green Lane Farms development are affected by high water. Cedar Cliff Drive on the left bank upstream from the bridge was inundated. Creekwood Drive had several feet of water on it, and water was approaching homes.	*not provided*
3/10/2011	New Kingston; The Conodoguinet Creek near Hogestown experienced a moderate flood. Some residences in the vicinity of Erb's Bridge Road, Prowell Road, Stone Spring Lane, and Oyster Mill Road were flooded.	*not provided*
4/16/2011	Carlisle Springs; Flash flooding resulted in 12 water rescues of people in cars on flooded roads at several locations. Cedar Run was reported out of banks and flooding Old Gettysburg Road near Shiremanstown.	*not provided*
4/16/2011	Lisburn; Yellow Breeches Creek near Camp Hill crested above moderate flood stage. Numerous homes along the entire length of Yellow Breeches Creek are affected by high water levels in both York and Cumberland Counties.	*not provided*
4/28/2011	Camp Hill; Several road closures and water rescues were reported in and around New Cumberland. Widespread flooding in Lower Allen Township. Cedar Run out of its banks flooding Old Gettysburg Road. Cars reported flooded, two homes and a business also flooded.	*not provided*
4/28/2011	Lisburn; Yellow Breeches Creek near Camp Hill crested above moderate flood stage. A number of homes along the entire length of Yellow Breeches Creek are affected by high water.	*not provided*
7/8/2011	Carlisle; Torrential thunderstorm rainfall produced localized flash flooding in Carlisle.	*not provided*
9/7/2011	Plainfield; Yellow Breeches Creek near Camp Hill crested at moderate flood stage. The Conodoguinet Creek near Hogestown crested at moderate flood stage. Many roads in the county were closed due to flooding from creeks and streams. Flooding was reported along the Susquehanna River in the Wormleysburg area. A portion of Bridge Street in New Cumberland was underwater and residents in that area evacuated. The street was closed, and Olde Towne Beverage was underwater. The Borough of New Cumberland was under state of emergency. A preliminary total of 160 structures suffered major damage, and 100 suffered minor damage with a total of 448 structures impacted.	$1,000,000
9/28/2011	Mount Holly Springs; Heavy rain produced flash flooding, resulting in two structure collapses and many roads being flooded.	*not provided*
5/29/2012	Shippensburg; A line of intense heavy thunderstorm rains caused flash flooding across much of the County. Carlisle reported 2.3 inches of rainfall in a short period of time. Flooded roads were reported in Camp Hill, Carlisle, Shippensburg and Southampton Townships. A water rescue was reported on Hummel Avenue in Camp Hill. Two cars were rescued from flood waters in Carlisle.	*not provided*
8/14/2012	Hunters Run; Torrential thunderstorm rains of 1-2 inches in less than an hour produced numerous reports of flash flooding across the eastern half of Cumberland County. Flash flooding closed SR42 near Mt. Holly Springs, South Front and Market Streets in Lemoyne, SR 11 in Silver Springs Township and the 400 block of Front Street in Hampden Township.	*not provided*

Table 4.3.3-2: Flood and flash flood events impacting Cumberland County from 1936-2024 (SHELDUS, 2013, NOAA NCEI, 2024f, NOAA Hydrograph of Conodoguinet Creek & community surveys). Note that property damage values are estimates based on best available information. "Countywide" indicates that several locations in the County were affected.		
Date	**Location & Description**	**Estimated Property Damage ($)**
8/26/2012	Shippensburg; Torrential thunderstorm rains produced localized flash flooding in and around the Shippensburg area. Several roads were closed and impassable at times including Walnut Bottom Road.	*not provided*
10/29/2012	Newburg; Generally minor flooding, with 1 flooded road and several flooded basements reported.	*not provided*
10/10/2013	Newburg; Excessive rainfall between 5-10 inches produced widespread significant flooding. Road closures were experienced near Boiling Springs and Mt. Holly Springs. Moderate river flooding occurred on the Yellow Breeches Creek in Camp Hill. Minor river flooding was observed on the Conodoguinet Creek at Hogestown.	*not provided*
5/16/2014	Newburg; Heavy rainfall of 2 to 4 inches produced widespread flooding. A vehicle was stranded on Walnut Bottom Road near Carlisle. The Conodoguinet Creek at Hogestown and Yellow Breeches Creek near Camp Hill exceeded minor flood stage, impacting low-lying areas in the Green Lane Farms Development, a mobile home park near Williams Grove, Erb's Bridge Road, Prowell Road, Stone Spring Lane and Oyster Mill Road.	*not provided*
7/27/2014	Heberlig; Heavy rain produced flash flooding and closed several roads across the county. High water forced several road closures from the west shore area to the Market Street bridge and Lemoyne.	*not provided*
6/8/2015	Countywide; Heavy rain (over 4 inches in 2 hours) brought flash flooding to the area. A family was evacuated from a home in the 600 block of Shippensburg Road (Route 533) in North Newton Township. Flooding was reported at the Laughlin Mill in Newville. Flash flooding was also reported in the Orrstown area and in Shippensburg.	*not provided*
6/23/2015	Plainfield; Reportedly, 1 foot of water flowed onto the parking lot of businesses at the intersection of Clay, North Bedford and North Hanover Streets in Carlisle. Two vehicles were stranded in the high waters, and one person was rescued by boat.	*not provided*
8/4/2017	Countywide; Heavy rainfall caused the flooding of numerous roads across the western portion of Cumberland County. A water rescue occurred at Clay and Hanover Streets in Carlisle.	*not provided*
4/17/2018	Conodoguinet Creek near Hogestown crests at 8.06 feet	*Not provided*
7/26/2018	Conodoguinet Creek near Hogestown crests at 10.10 feet	*Not provided*
9/11/2018	Conodoguinet Creek near Hogestown crests at 9.12 feet	*Not provided*
5/11/2020	Conodoguinet Creek near Hogestown crests at 8.70 feet (preliminary value, subject to change)	*Not provided*
9/1/2021	Countywide; The remnants of Hurricane Ida produced widespread heavy rainfall across Pennsylvania. Additionally, thunderstorms were observed southeast of I-81 and the PA Turnpike. Flash flooding with road closures reported across Cumberland County. Some roads reported flooded include Steigerwalt Hollow Road and Lewisberry Road, Walnut Bottom Road in Carlisle between South West Street and South College Street, and PA114 in both directions between Poplar Road, Springers Lane and Old York Road in Fairview Township.	*Not provided*
9/2/2021	Yellow Breeches Creek at Camp Hill crested at 10.53 feet at 330 am on 9/2, which is in moderate flood stage.	*Not provided*

Table 4.3.3-2: Flood and flash flood events impacting Cumberland County from 1936-2024 (SHELDUS, 2013, NOAA NCEI, 2024f, NOAA Hydrograph of Conodoguinet Creek & community surveys). Note that property damage values are estimates based on best available information. "Countywide" indicates that several locations in the County were affected.		
Date	**Location & Description**	**Estimated Property Damage ($)**
1/9/2024	Boiling Springs; Heavy rain and snowmelt led to flooding on Petersburg Road near Boiling Springs, closing the roadway.	*Not provided*

There are no known significant flood events in Cumberland County which can be attributed directly to an ice jam. However, the presence of river ice has compounded the impact of certain winter flood events, such as the January 1996 flood. The January 1996 event was the result of very rapid snowmelt punctuated by short, but intense rainfall and compounded by ice movement and jamming along the Susquehanna River. The Susquehanna River rose nearly 13 feet in two hours on the evening of January 19, 1996, in Harrisburg. This was the fastest rate of rise on the Susquehanna River ever recorded at Harrisburg in more than 100 years of record-keeping and was partly due to ice jams (NOAA – NWS, 1998). The event resulted in the collapse of portions of the pedestrian and bikeway Walnut Street Bridge which connected the eastern and western Shores of the Susquehanna River. High floodwaters and significant ice flow lifted two spans of the bridge off their foundations and carried them downstream.

In addition to the past flood events, the National Flood Insurance Program (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 4.3.3-3 and throughout this Plan Update represents the NFIP's definition of RL.

With respect to obtaining mitigation funding, FEMA's Hazard Mitigation Assistance (HMA) grant programs define a RL property as a structure that:

- Is covered by a contract for flood insurance made available under the NFIP; and
- 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
- 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.)

Under FEMA's HMA grant programs, a **Severe Repetitive Loss (SRL)** property is a structure that:

- Is covered under a contract for flood insurance made available under the NFIP; and

- 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 (including building and contents payments) 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.

Tables 4.3.3-3 and 4.3.3-4 show the number and type of Repetitive Loss and Severe Repetitive Loss properties in Cumberland County, respectively. Note that only communities with Repetitive Loss and Severe Repetitive Loss properties are shown. Based on input from the Pennsylvania Department of Community and Economic Development, an assumption is made that *non-residential* type is anything other than “residential” including, but not necessarily limited to “commercial” building types. Also, *ASSMD Condo* type refers to a situation where an individual owns the structure, or portion of the structure, but not any of the land. As of July 2024, there were 161 Repetitive Loss buildings in Cumberland County, 118 of which are identified as *single family*. Most of these properties are located in the Borough of New Cumberland, East Pennsboro Township, and the Borough of Camp Hill. None of these properties have been mitigated. In addition, there are twelve Severe Repetitive Loss properties in Cumberland County. Table 4.3.3-5 shows the number of NFIP claims since 1978.

Table 4.3.3-3: Total and mitigated Repetitive Loss properties in Cumberland County (FEMA, 2024).												
Municipality	2-4 Family		Assmd Condo		Non-Residential		Other Residential		Single Family		Total	
	Total	Mit.	Total	Mit.	Total	Mit.	Total	Mit.	Total	Mit.	Total	Mit.
Borough of Camp Hill	0	0	0	0	0	0	0	0	13	0	13	0
Borough of Carlisle	0	0	0	0	0	0	0	0	1	0	1	0
Township of Dickinson	0	0	0	0	1	0	0	0	0	0	1	0
Township of East Pennsboro	0	0	0	0	0	0	0	0	25	0	25	0
Township of Hampden	0	0	0	0	1	0	0	0	10	0	11	0
Township of Lower Allen	0	0	0	0	0	0	0	0	8	0	8	0
Township of Lower Frankford	0	0	0	0	0	0	0	0	1	0	1	0
Borough of Mechanicsburg	0	0	0	0	0	0	0	0	2	0	2	0
Township of Monroe	0	0	0	0	0	0	1	0	7	0	8	0
Borough of Mount Holly Springs	0	0	0	0	0	0	0	0	1	0	1	0
Borough of New Cumberland	12	0	0	0	15	0	4	0	27	0	58	0
Township of North Middleton	0	0	0	0	0	0	0	0	1	0	1	0
Township of Silver Spring	0	0	0	0	0	0	0	0	5	0	5	0
Township of South Middleton	0	0	0	0	0	0	0	0	3	0	3	0
Township of South Newton	0	0	0	0	0	0	0	0	2	0	2	0
Township of Upper Allen	0	0	0	0	0	0	0	0	4	0	4	0
Township of Upper Frankford	0	0	0	0	0	0	0	0	4	0	4	0
Borough of Wormleysburg	3	0	0	0	5	0	1	0	4	0	13	0
TOTAL	**15**	**0**	**0**	**0**	**22**	**0**	**6**	**0**	**118**	**0**	**161**	**0**

Table 4.3.3-4: Total and mitigated Severe Repetitive Loss properties in Cumberland County (FEMA 2024).												
County	**2-4 Family**		**Assmd Condo**		**Non-Residential**		**Other Residential**		**Single Family**		**Total**	
	Total	**Mit.**	**Total**	**Mit.**	**Total**	**Mit.**	**Total**	**Mit.**	**Total**	**Mit.**	**Total**	**Mit.**
Borough of Camp Hill	0	0	0	0	0	0	0	0	1	0	1	0
Township of East Pennsboro	0	0	0	0	0	0	0	0	1	0	1	0
Township of Lower Allen	0	0	0	0	0	0	0	0	1	0	1	0
Township of Monroe	0	0	0	0	0	0	1	0	3	0	4	0
Borough of New Cumberland	1	0	0	0	0	0	0	0	0	0	1	0
Township of Upper Allen	0	0	0	0	0	0	0	0	1	0	1	0
Township of Upper Frankford	0	0	0	0	0	0	0	0	1	0	1	0
Borough of Wormleysburg	0	0	0	0	1	0	1	0	0	0	2	0
TOTAL	**1**	**0**	**0**	**0**	**1**	**0**	**2**	**0**	**8**	**0**	**12**	**0**

Table 4.3.3-5: NFIP claims since 1978 (FEMA Community Information System, October 2024).			
Community	**Number Of Claims Paid**	**Total Paid Claims**	**Substantial Damage Closed Paid Losses**
Borough of Camp Hill	111	$2,941,045.46	6
Borough of Carlisle	25	$184,521.22	2
Township of Cooke	0	$0	0
Township of Dickinson	5	$20,378.51	0
Township of East Pennsboro	214	$3,429,897.67	7
Township of Hampden	193	$1,239,006.12	3
Township of Hopewell	1	$19,320	0
Borough of Lemoyne	9	$18,303	1
Township of Lower Allen	122	$1,998,322.2	8
Township of Lower Frankford	10	$155,535.77	9
Township of Lower Mifflin	0	$0	0
Borough of Mechanicsburg	43	$160,698.77	0
Township of Middlesex	3	$7,373	1
Township of Monroe	101	$1,240,340.38	4
Borough of Mount Holly Springs	14	$50,056.45	0
Borough of New Cumberland	424	$8,379,143.32	26
Borough of Newburg	0	$0	0
Borough of Newville	3	$55,532	1
Township of North Middleton	18	$126,399.09	0
Township of North Newton	2	$23,816	0
Township of Penn	1	$467	0
Township of Shippensburg	1	$2,543	0
Borough of Shippensburg	4	$4,939	0
Borough of Shiremanstown	1	$3,424	0
Township of Silver Spring	56	$426,552.25	4
Township of South Middleton	40	$387,894.97	2
Township of South Newton	11	$61,214.33	1
Township of Southampton	9	$212,569	1
Township of Upper Allen	46	$224,379.65	0
Township of Upper Frankford	39	$632,172.76	16
Township of Upper Mifflin	2	$3,863	0
Township of West Pennsboro	1	$975	0
Borough of Wormleysburg	127	$5,401,301.74	5
TOTAL	**1,636**	**$ 27,411,984.66**	**97**

4.3.3.4 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 Cumberland 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 (https://msc.fema.gov/portal/home).

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

Table 4.3.3-6: Recurrence intervals and associated probabilities of occurrence (USGS, 2024).

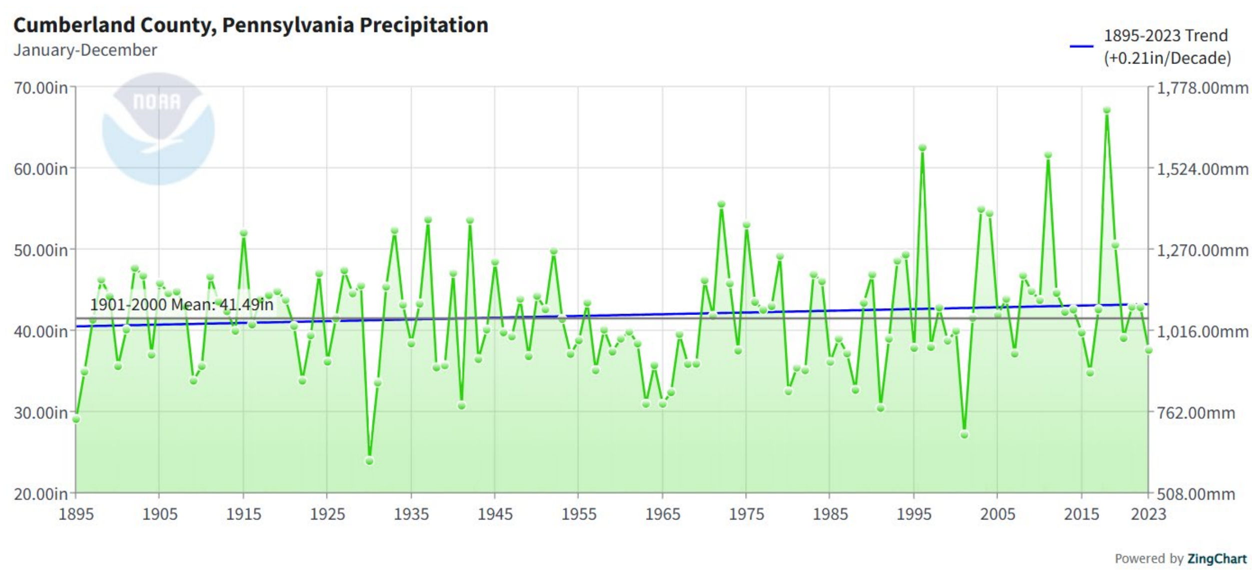
RECURRENCE INTERVAL	CHANCE OF OCCURRENCE IN ANY GIVEN YEAR (%)
10 year	10
50 year	2
100 year	1
500 year	0.2

In Cumberland County, flooding occurs commonly and can take place during any season of the year. Every two to three years, serious flooding occurs along one or more of Pennsylvania's major rivers or streams and it is not unusual for such events to happen several years in succession. Floods are described in terms of their extent (including the horizontal area affected and the vertical depth of floodwaters) and related probability of occurrence. Historical records are used to determine the probability of occurrence (percent chance) for a flood of specific extent to occur.

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.

Since heavy precipitation events can be precursors to, or causes of, flooding events, changes to precipitation rates can be illustrative of future potential occurrence of flooding conditions, although this relationship is complex as additional factors including soil moisture and land cover affect flooding occurrence as well. Figure 4.3.3-7 shows precipitation in Cumberland County from 1895 to 2023. Over time, the County has experienced a 0.21-inch increase in precipitation. Furthermore, the PA HMP indicates an increase of 7% to 9.25% in precipitation from 1901-2020 for Cumberland County.

Figure 4.3.3-7: Precipitation from 1895 to 2023 in Cumberland County, PA (NOAA NCEI, 2024b).



There are also some increasing trends in maximum streamflow in the Northeast United States consistent with this increase in observed extreme precipitation (Wehner et al. 2017). The trend of increased frequency and magnitude of heavy precipitation events is highly likely to continue (PA DEP, 2021b). This is due to the increase in atmospheric water vapor from a warming climate which results in a greater amount of rainfall falling in precipitation events. Globally, annual maximum daily precipitation increased 8.5% over the last 110 years, with extreme precipitation events increasing as well (Easterling et al. 2017).

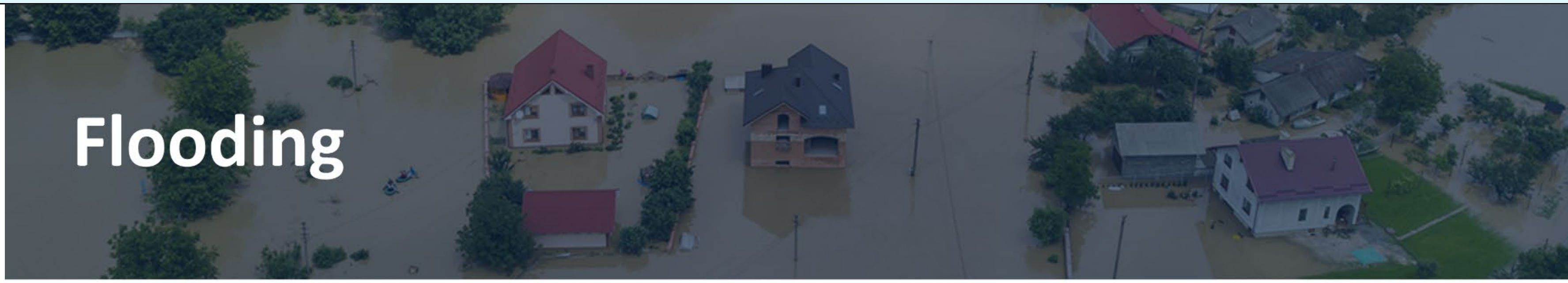
Recent precipitation trends in PA, linked to a changing climate, may lead to an increased likelihood of flooding events. Pennsylvania has displayed a 10% increase in annual precipitation, with many specific locations within the state experiencing a 20% increase. Furthermore, precipitation is expected to increase by another 8% by 2050, with a 14% increase during the winter season (Cumberland County, 2022). According to NOAA, 2018 was the wettest year on record in Pennsylvania with 64.04” of precipitation, beating out the 61.00” from 2011 (NOAA NCEI, 2024). The amount of precipitation associated with heavy rain events in the Northeast region of the United States has increased by 70% from 1958 to 2010 (PA DEP, 2021). In Pennsylvania, increases in heavy rain events have been observed at many sites and in Cumberland County the average number of days per year with over 1 inch of rainfall increased 2.8 days, almost 60%, from 1971 to 2013 (Leary, 2023). The overall increase in precipitation and intensification of individual storm events are likely to be some of the most relevant impacts of climate change that will be felt in Cumberland County.

The increase in flooding caused by abnormally high precipitation in 2018 contributed to $125 million in Pennsylvania infrastructure damage (PA DEP, 2021a). With increased precipitation, urbanization and land development associated with population growth can compound flooding issues if stormwater is not managed properly. The PA DCNR Bureau of Facility Design &

Construction anticipates, and has plans to mitigate, a likely increase in the overtopping of roadways by flood waters. The Bureau also expects to reassess and potentially adjust stormwater systems to increase future capacity (PA DCNR, 2018).

The Climate Mapping for Resilience and Adaptation (CRMA) Tool provides a county-level assessment report for flooding, shown in Figure 4.3.3-8 below. According to CRMA, 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 4.3.3-8: Cumberland County Flooding Hazard Assessment Report (CRMA, 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"** 40 - 48	**44"** 41 - 48	**44"** 41 - 50	**45"** 41 - 49	**45"** 41 - 50	**47"** 41 - 51
Days per year with precipitation (wet days)	**181 days** 177 - 187	**181 days** 171 - 194	**181 days** 166 - 191	**181 days** 168 - 194	**180 days** 164 - 193	**181 days** 168 - 192	**179 days** 149 - 205
Maximum period of consecutive wet days	**11 days** 10 - 12	**11 days** 10 - 13	**12 days** 10 - 14	**12 days** 10 - 13	**12 days** 10 - 15	**12 days** 10 - 15	**12 days** 10 - 18
Annual days with:							
Annual days with total precipitation > 1inch	**5 days** 4 - 5	**5 days** 4 - 7	**6 days** 5 - 7	**6 days** 5 - 7	**6 days** 5 - 8	**6 days** 5 - 8	**7 days** 5 - 9
Annual days with total precipitation > 2 inches	**0 days** 0 - 1	**1 days** 0 - 1	**1 days** 0 - 1	**1 days** 0 - 1	**1 days** 0 - 1	**1 days** 0 - 1	**1 days** 1 - 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	**6 days** 5 - 6	**6 days** 6 - 7	**7 days** 7 - 8	**7 days** 7 - 8	**8 days** 7 - 8	**8 days** 7 - 9	**9 days** 9 - 10
Days with maximum temperature below 32 °F	**21 days** 19 - 24	**14 days** 5 - 21	**14 days** 7 - 20	**12 days** 4 - 17	**10 days** 4 - 16	**9 days** 2 - 16	**4 days** 0 - 10

N/A = Data Not Available for the selected area

More frequent stormwater events such as those that occurred in 2018 may impact roads, businesses and other infrastructure in Cumberland County and the surrounding region. County municipalities in the Census-defined urbanized area are required by the Environmental Protection Agency to secure a municipal separate storm sewer system (MS4) permit for discharge of urban stormwater. The permit requires the municipalities to identify stormwater impacts on flooding and water quality and develop best management practices (BMPs) that address those issues.

Pennsylvania's Storm Water Management Act (Act 167) requires counties to develop watershed-based plans to manage the negative effects of accelerated stormwater runoff. Upon approval of the county plans, each municipality must adopt ordinances consistent with the plan including zoning, subdivision and land development, erosion and sedimentation and post-construction stormwater management measures. These provisions require developers to implement Best Management Practices (BMPs) that manage the change in the 2-year 24 hour storm volume, rate and quality of stormwater emanating from projects which in turn reduces the impacts of stormwater on businesses, roads, and other infrastructure.

In addition to Act 167 requirements, municipalities and other entities that are considered an urbanized area by the 2010 US Census Bureau must obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for discharges of stormwater from their municipal separate storm sewer systems (MS4s). A municipal separate storm sewer is any conveyance or system of conveyances (including but not limited to streets, ditches, and pipes) that is: owned by a municipality or other public body (created under state law) having jurisdiction over disposal of sewage, industrial wastes, stormwater or other wastes; designed or used for collecting or conveying stormwater; not a combined sewer (i.e., not intended for both sewage and stormwater); AND not part of a publicly owned treatment works (POTW).

Urbanized areas from the 2010 census are found in all Cumberland County municipalities from Carlisle east to the Susquehanna River, except for Mt. Holly Springs. These municipalities are required to operate under an individual or general MS4 permit. The permit requirements were designed to help reduce the discharge of pollutants, to protect water quality and fulfill the requirements of the Clean Water Act and Pennsylvania Clean Streams Law. As part of their permit requirements, municipalities are required to implement Pollutant Reduction Plans (PRPs)and Minimum Control Measures (MCMs) to address these sources of pollution.

Expected increases in temperature throughout the Northeast region of the U.S. may benefit the agricultural industry by lengthening the growing season. However, excess moisture and precipitation are currently the leading causes of crop loss in the region (Wolfe et al., 2017). Greater annual rainfall could compound these issues. The increase in frequency of heavy precipitation can harm crops by eroding soil and depleting soil nutrients, as well as harm water quality with the increase of agricultural runoff (EPA, 2024c).

As a part of the Hazard Mitigation Plan update process, representatives of County municipalities were asked to identify whether the frequency, magnitude, or extent of each hazard has increased, decreased, or not changed since the 2020 version of the Plan. The online survey was entitled Evaluation of Identified Hazards and Risk. A significant portion of respondents observed that flood and flash flood risks had increased. Participants stated that the amount of rain and the frequency of rain has continuously increased each year, leading to the increase in flood events. Some participants contributed this change to climate change. Overall, the probability of future floods can be considered *highly likely* according to the Risk Factor Methodology (see Table 4.5.2-1).

4.3.3.5 Vulnerability Assessment

Cumberland County is vulnerable to flooding that causes loss of lives, property damage, and road closures. For purposes of assessing vulnerability, the County focused on community assets that are located in the 1 percent-annual-chance floodplain. While greater and smaller floods are possible, information about the extent and depths for this floodplain is available for all municipalities countywide, thus providing a consistent basis for analysis. Figure 4.3.3-2 shows the 1 percent-annual-chance floodplain provided by FEMA in 2023.

Cumberland County GIS has assembled hazard areas and performed a threat analysis for the 2025 Hazard Mitigation Plan update. The 2014 Plan used structures as the primary analysis for hazard impacts. Cumberland County GIS does not maintain a structures layer, nor is there a layer available for analysis that is accurate and routinely updated. Therefore, the primary analysis of hazard impacts utilized addressed units during the 2020 and 2025 Plan updates, a GIS dataset that is maintained by the County. This dataset includes the street address, latitude and longitude coordinates, and additional information about a given property. A tool was developed that cycled through each municipality within the County and selected all addressed structures that were within the preliminary FEMA floodplain dataset. When a structure is visible in the orthoimagery, the feature is placed on the structure. If no structure is visible in the orthoimagery, the feature is placed in the center of the tax parcel (Cumberland County GIS, 2024). It is important to note that addressed units account for more residences, as there can be many apartment units in a single building, whereas structures count more buildings on farm, commercial, and industrial properties (Cumberland County GIS, 2024).

Using this methodology, it was determined that 1,561 out of 116,446 (2.1%) addressed units in the County are located within the preliminary SFHA with 1,328 of the units designated as residential (Table 4.3.3-7). A total of 5,652 mobile homes were identified within the County, with 303 (4.9%) located within the preliminary SFHA. Table 4.3.3-7 reveals that Hampden Township, Mount Holly Springs Borough, and Monroe Township each contain over 150 structures that are vulnerable to the impacts of a 1 percent-annual-chance flood. Hampden Township in particular has experienced stormwater challenges and continuous land development issues related to flooding and currently has 155 structures located in the preliminary SFHA. Monroe Township and Mount Holly Springs Borough have more mobile homes within the 1 percent-annual-chance floodplain than any other municipality contributing to 57.6 percent and 40 percent, respectively, of all mobile homes in the County in the preliminary SFHA. These structures are particularly vulnerable to the impacts of flooding events.

Table 4.3.3-7: Number of total addressed units and mobile homes both in and out of the 1 percent-annual-chance floodplain, by municipality (Cumberland County GIS, 2024).

Municipality	Total Structures / Addressed Units	Structures / Addressed Units in Preliminary SFHA	Percent of Total Units in Preliminary SFHA	Mobile Homes	Mobile Homes in SFHA	Percent of Mobile Homes in SFHA
Borough of Camp Hill	3,748	12	0.3%	0	0	0%
Borough of Carlisle	9,209	125	1.4%	15	0	0%
Township of Cooke	421	12	2.9%	4	0	0%
Township of Dickinson	2,329	17	0.7%	186	1	0.5%
Township of East Pennsboro	9,331	74	0.8%	64	2	3.1%
Township of Hampden	14,623	155	1.1%	519	2	0.4%
Township of Hopewell	937	8	0.9%	77	1	1.3%
Borough of Lemoyne	2,235	0	0%	0	0	0%
Township of Lower Allen	8,507	75	0.9%	80	1	1.3%
Township of Lower Frankford	742	8	1.1%	171	1	0.6%
Township of Lower Mifflin	768	43	5.6%	257	39	15.2%
Borough of Mechanicsburg	4,834	1	0%	0	0	0%
Township of Middlesex	3,435	16	0.5%	771	7	0.9%
Township of Monroe	2,834	163	5.8%	177	102	57.6%
Borough of Mt Holly Springs	926	170	18.4%	120	48	40.0%
Borough of New Cumberland	3,365	119	3.5%	0	0	0%
Borough of Newburg	137	0	0%	0	0	0%
Borough of Newville	766	1	0.1%	12	0	0%
Township of North Middleton	5,807	34	0.6%	515	3	0.6%
Township of North Newton	939	4	0.4%	58	0	0%
Township of Penn	1,200	4	0.3%	102	1	1.0%
Borough of Shippensburg	2,233	62	2.8%	4	0	0.0%
Township of Shippensburg	1,392	60	4.3%	281	41	14.6%
Borough of Shiremanstown	801	0	0%	0	0	0%
Township of Silver Spring	9,062	58	0.6%	395	1	0.3%
Township of South Middleton	7,433	94	1.3%	446	4	0.9%
Township of South Newton	536	25	4.7%	28	4	14.3%
Township of Southampton	3,364	89	2.6%	488	35	7.2%
Township of Upper Allen	8,998	47	0.5%	124	0	0%
Township of Upper Frankford	1,026	22	2.1%	408	8	2.0%
Township of Upper Mifflin	573	1	0.2%	100	0	0%
Township of West Pennsboro	2,345	13	0.6%	250	2	0.8%

Borough of Wormleysburg	1,590	49	3.1%	0	0	0%
TOTAL	**116,446**	**1,561**	**2.1%**	**5,652**	**303**	**4.9%**

Table 4.3.3-8: Addressed units in the SFHA by Generalized Parcel Type (Cumberland County GIS, 2024).

Municipality	Total Addressed Units	Total Non-Residential Addressed Units	Non-Residential Units Within Preliminary SFHA	Percent Non-Residential Units Within Preliminary SFHA	Total Residential Addressed Units	Residential Units Within Preliminary SFHA	Percent Residential Units Within Preliminary SFHA	Total Addressed Units Within Preliminary SFHA
Borough of Camp Hill	3,748	355	0	0%	3,393	12	0.4%	12
Borough of Carlisle	9,209	1,423	21	0.2%	7,786	104	1.3%	125
Township of Cooke	421	22	2	0.5%	399	10	2.5%	12
Township of Dickinson	2,329	92	2	0.1%	2,237	15	0.7%	17
Township of East Pennsboro	9,331	538	6	0.1%	8,793	68	0.8%	74
Township of Hampden	14,623	961	13	0.1%	13,662	142	1.0%	155
Township of Hopewell	937	43	1	0.1%	894	7	0.8%	8
Borough of Lemoyne	2,235	390	0	0%	1,845	0	0%	0
Township of Lower Allen	8,507	879	13	0.2%	7,628	62	0.8%	75
Township of Lower Frankford	742	17	0	0%	725	8	1.1%	8
Township of Lower Mifflin	768	31	1	0.1%	737	42	5.7%	43
Borough of Mechanicsburg	4,834	636	0	0%	4,198	1	0%	1
Township of Middlesex	3,435	238	3	0.1%	3,197	13	0.4%	16
Township of Monroe	2,834	97	10	0.4%	2,737	153	5.6%	163
Borough of Mt Holly Springs	926	96	17	1.8%	830	153	18.4%	170
Borough of New Cumberland	3,365	267	38	1.1%	3,098	81	2.6%	119
Borough of Newburg	137	11	0	0%	126	0	0%	0
Borough of Newville	766	157	0	0%	609	1	0.2%	1
Township of North Middleton	5,807	375	4	0.1%	5,432	30	0.6%	34
Township of North Newton	939	58	1	0.1%	881	3	0.3%	4
Township of Penn	1,200	53	0	0%	1,147	4	0.3%	4
Borough of Shippensburg	2,233	346	36	1.6%	1,887	26	1.4%	62
Township of Shippensburg	1,392	182	4	0.3%	1,210	56	4.6%	60

Table 4.3.3-8: Addressed units in the SFHA by Generalized Parcel Type (Cumberland County GIS, 2024).								
Municipality	**Total Addressed Units**	**Total Non-Residential Addressed Units**	**Non-Residential Units Within Preliminary SFHA**	**Percent Non-Residential Units Within Preliminary SFHA**	**Total Residential Addressed Units**	**Residential Units Within Preliminary SFHA**	**Percent Residential Units Within Preliminary SFHA**	**Total Addressed Units Within Preliminary SFHA**
Borough of Shiremanstown	801	81	0	0%	720	0	0%	0
Township of Silver Spring	9,062	473	8	0.1%	8,589	50	0.6%	58
Township of South Middleton	7,433	474	18	0.2%	6,959	76	1.1%	94
Township of South Newton	536	31	2	0.4%	505	23	4.6%	25
Township of Southampton	3,364	97	6	0.2%	3,267	83	2.5%	89
Township of Upper Allen	8,998	399	9	0.1%	8,599	38	0.4%	47
Township of Upper Frankford	1,026	29	1	0.1%	997	21	2.1%	22
Township of Upper Mifflin	573	27	0	0%	546	1	0.2%	1
Township of West Pennsboro	2,345	108	1	0%	2,237	12	0.5%	13
Borough of Wormleysburg	1,590	171	16	1.0%	1,419	33	2.3%	49
TOTAL	**116,446**	**9,157**	**233**	**2.54%**	**107,289**	**1328**	**1.24%**	**1561**

There are 8 SARA facilities located in the 1 percent-annual-chance floodplain. This includes one SARA facility located in Penn Township, Monroe Township, Middlesex Township, Lower Allen Township, Hampden Township, and 2 in Mount Holly Springs Borough. Communities where these facilities are located and communities downstream are vulnerable to hazardous material contamination during significant flooding events.

A total of 1,010 critical facilities were identified in Cumberland County. Of these, 24 are located in the SFHA (2.38%). Details are provided in Table 4.3.3-9.

Past occurrence shows that flooding events of varying extents take place annually. These events have caused loss of life, repetitive inundation of roads, and significant dollar losses (see Section 4.3.3 and Section 4.4.3). A majority of the Repetitive Loss structures within the County are located in the Borough of New Cumberland, East Pennsboro Township, the Borough of Camp Hill, and the Borough of Wormleysburg. These communities are particularly vulnerable to repeated flood damages and ensuing flood insurance claims.

When considering the population in the SFHA, the greatest number of at-risk residents live in Mount Holly Springs (approximately 420 residents in SFHA), Upper Allen Township (approximately 400 residents in SFHA), Hampden Township (approximately 332 residents in SFHA), and New Cumberland Borough (approximately 324 residents in SFHA). In all, there are approximately 3,925 (2 percent) residents of Cumberland County living within the SFHA. This data is detailed in Table 4.3.3-10.

Table 4.3.3-9: Critical Facilities and Community Lifelines in the SFHA in Cumberland County (Cumberland County GIS, 2024).			
Community	**Total Critical Facilities/Community Lifelines In Municipality**	**Total Critical Facilities/Community Lifelines In SFHA**	**Percent Critical Facilities/Community Lifelines In SFHA**
Borough of Camp Hill	38	0	0%
Borough of Carlisle	118	3	2.5%
Township of Cooke	4	0	0%
Township of Dickinson	15	0	0%
Township of East Pennsboro	72	0	0%
Township of Hampden	108	1	0.9%
Township of Hopewell	12	0	0%
Borough of Lemoyne	27	0	0%
Township of Lower Allen	69	1	1.4%
Township of Lower Frankford	2	0	0%
Township of Lower Mifflin	6	0	0%
Borough of Mechanicsburg	49	0	0%
Township of Middlesex	50	1	2.0%
Township of Monroe	14	1	7.1%
Borough of Mt Holly Springs	17	3	17.6%
Borough of New Cumberland	21	0	0%
Borough of Newburg	2	0	0%
Borough of Newville	16	0	0%
Township of North Middleton	45	1	2.2%
Township of North Newton	13	0	0%
Township of Penn	14	1	7.1%
Borough of Shippensburg	24	5	20.8%
Township of Shippensburg	23	0	0%
Borough of Shiremanstown	9	0	0%
Township of Silver Spring	67	0	0%
Township of South Middleton	74	6	8.1%
Township of South Newton	6	0	0%
Township of Southampton	20	0	0%
Township of Upper Allen	44	1	2.3%
Township of Upper Frankford	8	0	0%
Township of Upper Mifflin	3	0	0%
Township of West Pennsboro	16	0	0%
Borough of Wormleysburg	4	0	0%
TOTAL	**1,010**	**24**	**2.38%**

Table 4.3.3-10: Population in the SFHA in Cumberland County (U.S. Census Bureau, 2020).			
Municipality	**Total 2020 Population**	**2020 Population In SFHA***	**Percent Population In SFHA**
Borough of Camp Hill	7,926	39	0.5%
Borough of Carlisle	19,188	287	1.5%
Township of Cooke	180	4	2.0%
Township of Dickinson	5,366	51	1.0%
Township of East Pennsboro	21,496	153	0.7%
Township of Hampden	30,486	332	1.1%
Township of Hopewell	3,256	24	0.7%
Borough of Lemoyne	4,635	-	0.0%
Township of Lower Allen	19,659	203	1.0%
Township of Lower Frankford	1,910	17	0.9%
Township of Lower Mifflin	1,577	84	5.3%
Borough of Mechanicsburg	8,977	1	0.0%
Township of Middlesex	7,457	28	0.4%
Township of Monroe	6,074	318	5.2%
Borough of Mt Holly Springs	2,037	420	20.6%
Borough of New Cumberland	7,305	324	4.4%
Borough of Newburg	326	-	0.0%
Borough of Newville	1,231	2	0.1%
Township of North Middleton	11,714	87	0.7%
Township of North Newton	2,526	11	0.4%
Township of Penn	2,995	12	0.4%
Borough of Shippensburg	4,592	169	3.7%
Township of Shippensburg	5,312	191	3.6%
Borough of Shiremanstown	1,611	-	0.0%
Township of Silver Spring	17,850	118	0.7%
Township of South Middleton	15,478	211	1.4%
Township of South Newton	1,201	67	5.6%
Township of Southampton	7,019	221	3.1%
Township of Upper Allen	20,272	400	2.0%
Township of Upper Frankford	1,931	30	1.6%
Township of Upper Mifflin	1,256	-	0.0%
Township of West Pennsboro	5,613	32	0.6%
Borough of Wormleysburg	3,031	90	3.0%
TOTAL	**251,487**	**3,925**	**2%**
**Calculated by selecting address points that intersect the SFHAs and applying the average persons per address point for the corresponding census block group. This is an approximation of populations living within the SFHA.*			

4.3.3.6 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 Middlesex Township, Hampden Township, North Middleton Township, Southampton Township, South Middleton Township, and Silver Spring Township may be particularly vulnerable (see Table 4.3.7-5 in Section 4.3.7.5). 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.

4.3.4. Hurricane, Tropical Storm, & Nor'easter

4.3.4.1 Location and Extent

Tropical storms systems (i.e. hurricanes, tropical storms, tropical depressions) impacting Cumberland County develop in tropical or sub-tropical waters found in the Atlantic Ocean, Gulf of Mexico, or Caribbean Sea (NOAA NOS, 2024). Cyclones with maximum sustained winds of less than 39 miles per hour (mph) 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 (NOAA, 2024b). While Cumberland County is located over 150 miles from the Atlantic Coast, tropical storms and hurricanes can track inland causing heavy rainfall and 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, 2024c). Potential threats from these storms include powerful winds, heavy rainfall, storm surges, coastal and inland flooding, rip currents, tornadoes, and landslides. Extra-tropical is a term used to describe a hurricane or tropical storm 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). Nor'easters can also produce heavy precipitation in the form of rain, snow, or ice. Nor'easters are typically much larger than hurricanes, often with diameters 3 or 4 times larger that place more areas at risk. In addition, they move slower than hurricanes and may linger for days and through multiple tide cycles, increasing the amount of damage they may do (Flood Panel, n.d.). Although not a concern for Cumberland County, nor'easters may cause coastal flooding and beach erosion.

Hurricanes, tropical storms, and nor'easters are regional events that can impact very large areas hundreds to thousands of miles across over the life of the storm. Therefore, all communities within Cumberland County are equally subject to the impacts of these storms. Areas subject to flooding, wind, and winter storm damage are particularly vulnerable.

4.3.4.2 Range of Magnitude

The impacts associated with hurricanes, tropical storms, and nor'easters are primarily wind damage and flooding, as well as winter weather impacts from nor'easters. It is not uncommon for tornadoes to develop during these events. Historical tropical storm and hurricane events have brought intense rainfall, sometimes leading to damaging floods, as well as northeast winds, which, combined with waterlogged soils, can cause trees and utility poles to fall, as illustrated in Figure 4.3.4-1.

Figure 4.3.4-1: Heavy wind resulted in a tree collapsing on a house in 2024 (Photograph courtesy of Cumberland County Planning Department, 2024).

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, but not a threat to Cumberland County), which are combined to estimate potential damage. Table 4.3.4-1 lists Saffir-Simpson Scale categories with associated wind speeds and expected damages. Categories 3, 4, and 5 are classified as “major” hurricanes.

Table 4.3.4-1: Saffir-Simpson Scale categories with associated wind speeds and damages (NOAA NHC, 2022).

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.

Table 4.3.4-1: Saffir-Simpson Scale categories with associated wind speeds and damages (NOAA NHC, 2022).		
Storm Category	**Wind Speed (Mph)**	**Description Of Damages**
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.
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	>156	**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 Cumberland County is assessed in Section 4.3.4.4. It is important to recognize the potential for the cascading effects of flooding during these storm events; the risk assessment for flood-related damages is discussed in Section 4.3.3. Environmental impacts associated with hurricanes and tropical storms are consistent with the impacts described for flooding in Section 4.3.3.2 and tornadoes and windstorms in Section 4.3.7.2. The impact of severe winter weather which sometimes occurs during nor'easter events is discussed in Section 4.3.9.2.

In 2011, Tropical Storm Lee brought up to 9 inches of rain to parts of Cumberland County resulting in widespread flooding (Ginter, 2011). Thousands of people across the state were evacuated and resulted in at least 4 deaths (Kiner, 2019). The worst hurricane or tropical storm event in Cumberland County was Hurricane Agnes in 1972, described in Section 4.3.4.3. The worst nor'easter event in Cumberland County occurred from January 6-8, 1996, resulting in Presidential Disaster Declaration 1085. Blizzard conditions including heavy snow, strong winds, and very cold temperatures caused $635,000 in property damage in Cumberland County (NWS, 1996 and NCEI, 2018). About a week later, unseasonably high temperatures and rainfall melted the thick snowpack left by the nor'easter and resulted in Presidential Disaster Declaration 1093 for flooding (USGS, 1996).

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

Table 4.3.4-2: 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.
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.

4.3.4.3 Past Occurrence

Previous tropical storm and hurricane events that have impacted Cumberland County are listed in Table 4.3.4-3; example damage can be seen in Figure 4.3.4-1 and Figure 4.3.4-3. With the exception of Tropical Storm Beryl and Tropical Storm Isaias, Presidential or Gubernatorial Disaster Declarations were issued for all of these events. Storms with centers of circulation passing through or near Cumberland County are shown in Figure 4.3.4-4.

Table 4.3.4-3: Previous tropical storm events significantly affecting Cumberland County (NOAA NCEI, 2024).	
Year	**Event**
1972	Tropical Storm Agnes
1975	Hurricane Eloise
1994	Tropical Storm Beryl
1996	Hurricane Fran
1999	Hurricane Dennis
1999	Hurricane Floyd
2003	Tropical Storm Henri
2003	Tropical Storm Isabel
2004	Tropical Depression Ivan
2006	Tropical Depression Ernesto

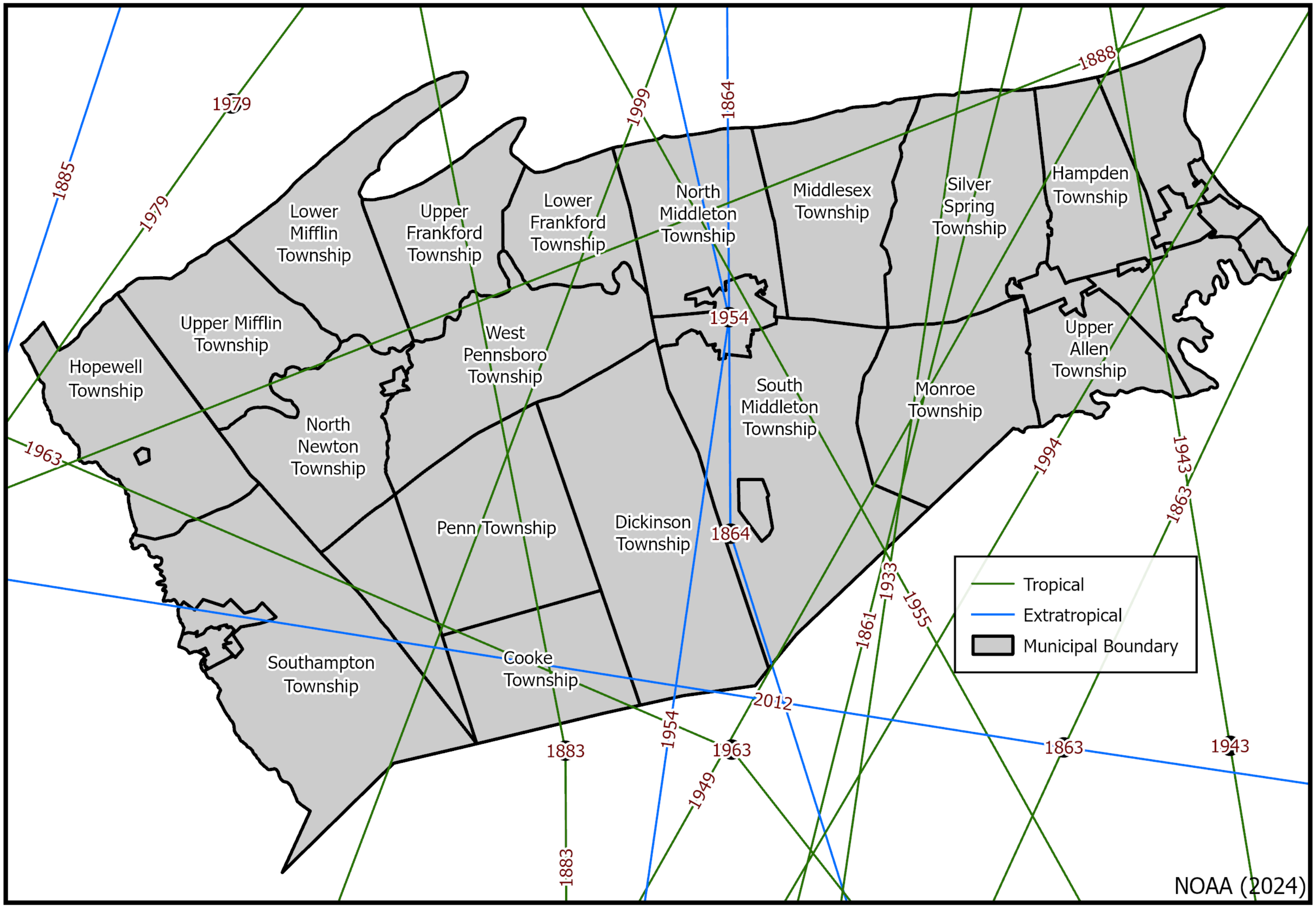
Table 4.3.4-3: Previous tropical storm events significantly affecting Cumberland County (NOAA NCEI, 2024).

Year	Event
2011	Tropical Storm Lee
2012	Hurricane Sandy
2020	Tropical Storm Isaias
2021	Hurricane Ida
2024	Tropical Storm Debby

Figure 4.3.4-2: Flood damage to the Reading G&H Branch at Carlisle Junction (Cumberland County, PA), due to Hurricane Agnes (Photograph courtesy of Michael Bupp/*The Sentinel*, courtesy of the Cumberland County Historical Society, 2018).

Figure 4.3.4-3: Flooding caused by Hurricane Ida results in the closure of Lewisberry Road near York Road in New Cumberland on September 1st, 2021 (Photograph courtesy of Sean Simmers / PennLive, 2021).

Figure 4.3.4-4: Historical Coastal Storm Events impacting Cumberland County (NOAA, 2024). This image is a screen capture from the Cumberland County Hazard Mitigation Plan Map Series. Please hold the CTRL key and select the map below for the Hazard Mitigation Plan Map Series.



Of the storms listed in Table 4.3.4-3, Tropical Storm Agnes was the most devastating event the County experienced. Agnes made landfall in Florida as a minimal hurricane. However, it combined with a non-tropical low over the Mid-Atlantic Region to produce rainfall amounts of up to 19 inches in some locations. Table 4.3.4-4 provides a breakdown of the damages by municipality and flood source, some of which are centered in adjacent York County but were included in the database as affecting Cumberland County.

Table 4.3.4-4: Distribution of flood damages by municipality and flood source from Tropical Storm Agnes (SHELDUS, 2013).

Municipality	Flood Source	Damages ($)
Enola	Susquehanna River	2,212,000
Carlisle Borough	Letort Spring Run	5,151,000
Camp Hill Borough	Conodoguinet Creek	14,833,000
Shippensburg Borough	Middle Spring Creek	854,000
Wormleysburg Borough	Susquehanna River	4,588,000
New Cumberland Borough	Susquehanna River	9,092,000
Goldsboro Borough (York County)	Susquehanna River	1,712,000
Lemoyne Borough	Susquehanna River	708,000
Dillsburg Borough (York County)	Dogwood Run	614,000
Mount Holly Springs Borough	Mountain Creek	639,000
Huntsdale	Yellow Breeches Creek	49,000
Boiling Springs	Yellow Breeches Creek	219,000
Upper Allen Township (Grantham)	Yellow Breeches Creek	54,000

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. However, other sources provide record that some of the winter storms listed in Section 4.3.9.3 were nor’easters. For instance, a severe nor’easter affected areas from North Carolina to Maine starting on January 4, 1994 and immobilized millions of people. The nor’easter brought icy rain and very heavy snow, which drifted up to three feet deep, closed major highways, and brought down power lines, resulting in Presidential Major Disaster Declaration 1015 (DeCourcy Hinds, 1994). Another nor’easter starting on October 29, 2011, brought 6-10” of heavy, wet snow across Cumberland County. Because trees were still covered in leaves, the weight of the snow on the leaves brought down many trees and power lines. High winds followed the storm, causing more trees and power lines to fall, leaving thousands of Cumberland County residents without power for days (Cumberland County DPS, 2011). Across the Northeast, a state of emergency was declared in New Jersey, Massachusetts, Connecticut, and some counties in New York, and at least three million customers lost power (Barnard and Nir, 2011).

In March 2017 Winter Storm Stella, a nor’easter, resulted in over a foot of snow in parts of Cumberland County and many snow related cancellations (Miller, 2017). Another nor’easter produced 10 to 12 inches of snow across Cumberland County from December 16-17, 2020. Along with this, a nor’easter produced 10 to 16 inches of snow across Cumberland County from January 31 to February 2, 2021 (NOAA NCEI, 2021). In February 2024, nor’easter Lorraine swept across the northeast, depositing 5 to 7 inches of snow across Cumberland County. The heavy snowfall and gusty winds throughout the day produced numerous power outages throughout the county prompting a warming shelter to open. Furthermore, I-81 northbound was partially closed due to multiple crashes from the snowy conditions (NOAA NCEI, 2024d and The Weather Channel, 2024). The worst nor'easter event recorded in Cumberland County occurred in January 1996 and is described in Section 4.3.4.2.

4.3.4.4 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. 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.

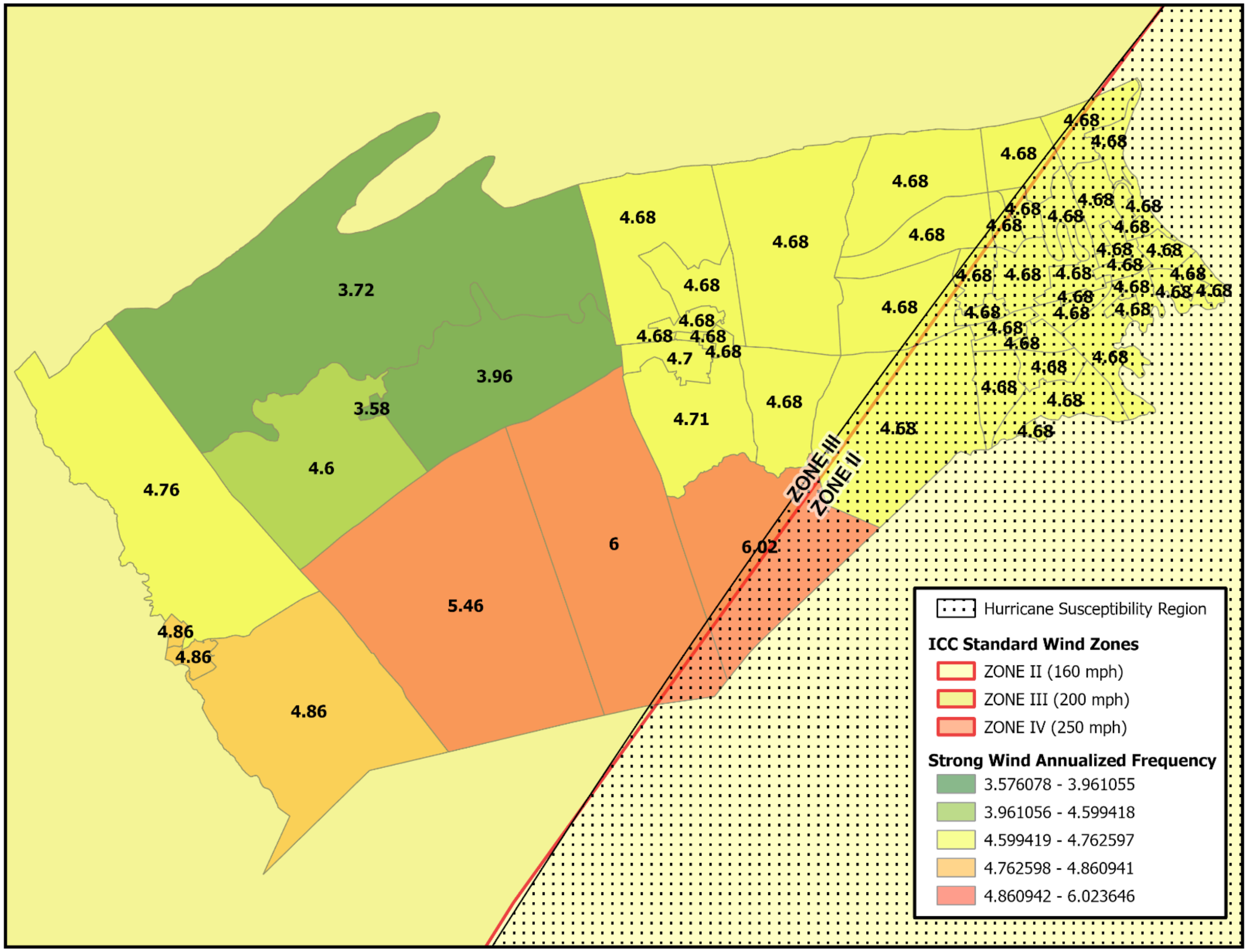
The relationship between climate change and hurricanes is complex due to the variety of potential factors that impact their development. For example, dust from the Sahara Desert that is lifted high in the atmosphere during a particularly hot and dry summer can inhibit the development of some hurricane 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, potentially lingering storm paths, and higher storm surges 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/). As storms get stronger, building codes should follow suit. A 2017 study from the University of Pennsylvania found that homes built in Florida after the implementation of a statewide building code in 2002 experienced significantly less damage (Done, Simmons, Czajkowski, 2018). 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).

As previously mentioned, in Pennsylvania, increases in heavy rain events have been observed at many sites and in Cumberland County the average number of days per year with over 1 inch of rainfall increased 2.8 days, almost 60%, from 1971 to 2013 (Leary, 2023). These changes may lead to greater threats to human safety and infrastructure in Cumberland County. Figure

4.3.4-5 shows International Building Code wind zones for Cumberland County and Pennsylvania. These zones specify the minimum windspeed a building must be capable of withstanding in order to meet the requirements of shelter design. Most of the County falls in Zone III (200 mph) with a small eastern portion within Zone II (160 mph). Overall, the probability of future hurricanes, tropical storms, and nor’easters can be considered *highly likely* according to the Risk Factor Methodology (see Table 4.5.2-1).

Figure 4.3.4-5: Design wind speeds for community shelters in Pennsylvania. This image is a screen capture from the Cumberland County Hazard Mitigation Plan Map Series. Please hold the CTRL key and select the map below for the Hazard Mitigation Plan Map Series.



4.3.4.5 Vulnerability Assessment

Cumberland County is vulnerable to the impact of flooding and severe wind caused by hurricanes, tropical storms, and nor'easters. Flood vulnerability is addressed in Section 4.3.3.5 and vulnerability to wind damage is addressed in Section 4.3.8.5. The County is also vulnerable to severe winter weather impacts caused by nor'easters which are evaluated in Section 4.3.9.5.

4.3.4.6 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 Middlesex Township, Hampden Township, North Middleton Township, Southampton Township, South Middleton Township, and Silver Spring Township may be particularly vulnerable (see Table 4.3.7-5 in Section 4.3.7.5). 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 the Borough of Carlisle have limited vehicle access. Populations of people experiencing homelessness will require extra help finding locations to shelter in place.

4.3.5. Pandemic, Emerging, Zoonotic, and Infectious Disease

4.3.5.1 Location and Extent

Pandemic is defined as a disease outbreak affecting or attacking a large number of people across 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 (USDHS, 2022). Infectious diseases are also highly virulent and can be spread person-to-person.

Pandemic and infectious disease events cover a wide geographical area and can affect large populations, potentially including the entire population of Cumberland County and beyond. The exact size and extent of an infected population is dependent upon how easily the illness is spread, the mode of transmission and the amount of contact between infected and uninfected individuals. The transmission rates of pandemic illnesses are often higher in denser areas where there are large concentrations of people. The transmission rate of infectious diseases depend on the mode of transmission of a given illness. Pandemic events can also occur after other natural disasters, particularly floods, when there is the potential for bacteria to grow and contaminate water (Van Seventer & Hochberg, 2017).

Prior to COVID-19 Cumberland County's primary pandemic focus was on influenza and the Department of Public Safety staff continues to participate in preparedness exercises (Figure 4.3.5-1). Pandemic influenza planning began in response to the H5N1 (avian) flu outbreak in Asia, Africa, Europe, the Pacific, and the Near East in the late 1990s and early 2000s (Knobler, Mack, Mahmoud, et al, 2005). 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, 2010). 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).

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. Different strands of influenza mutate over time and replace older strands of the virus and thus have drastically different effects.

Figure 4.3.5-1: Thirty-three members of the Cumberland County Emergency Operations Center participated in the pandemic flu virtual tabletop exercise on May 20, 2014 (Photograph courtesy of Nick Smallwood/FEMA, 2014).

In late 2019 and early 2020, a novel coronavirus 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 or if the infected person is asymptomatic and can be fatal. 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 (CDC, 2023b). Flu like in nature, symptoms of COVID-19 virus include fever, cough, shortness of breath, and diarrhea. In extreme COVID cases that require hospitalization, patients require ventilators to support breathing and may pass away from the virus or related reasons (CDC, 2024m). In Cumberland County, the virus has infected over 64,028 residents and led to 985 deaths as of July 2023 (PA DOH, 2023).

Zoonotic diseases are those that occur when bacteria are passed from animals to humans (CDC, 2024g). Zoonotic diseases are also a prevalent issue in Cumberland County, this would include diseases spread by mosquitos such as Zika Virus and West Nile Virus. Zika virus is an illness that is spread primarily through mosquito bites but can also be transmitted from mother to fetus during pregnancy, as well as through sexual contact, transfusion of blood and blood products, and possibly through organ transplantation. The virus first became a public health concern after the 2015 outbreak in Brazil. Zika virus infection during pregnancy is a cause of microcephaly and other congenital malformations in the infant, including limb contractures, high muscle tone, eye abnormalities and hearing loss. These clinical features are collectively referred to as congenital Zika syndrome. In addition, Zika virus can also cause Guillain-Barré syndrome, neuropathy and myelitis, particularly in adults and older children (WHO, 2022).

West Nile Virus is the leading cause of mosquito-borne disease in the continental United States (CDC, 2024h). West Nile Virus is a zoonotic, vector-borne disease that can cause fever, headache, body aches, joint pains, vomiting, diarrhea, or rashes. Symptoms of severe illness include high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness, paralysis, encephalitis, or meningitis. However, not everyone who contracts West Nile Virus exhibit symptoms, around 8 out of 10 infected people are asymptomatic (CDC, 2024p). People become infected with the virus when mosquitoes feed on infected birds and then bite people. The virus is rarely transmitted from person-to-person by blood transfusion, organ transplantation, and mother to baby, during pregnancy, delivery, or breastfeeding (CDC, 2024o). Cases of West Nile occur during mosquito season, which starts in the summer and continues through fall (CDC, 2024h).

Ticks are also potential vectors for zoonotic diseases, including Lyme disease. Early signs and symptoms of Lyme disease include an Erythema migrans (EM) rash, which can appear on any area of a body and is most known for a “bullseye” appearance, however, it can also appear as a round or oval shape darker than your skin tone. Other symptoms that may occur in the absence of rash include fever, chills, headache, fatigue, muscle and joint aches, and swollen lymph nodes. Later signs and symptoms (days to months after tick bite) are severe headaches, neck stiffness, additional EM rashes, facial palsy, arthritis, heart palpitations or an irregular heartbeat (Lyme carditis), dizziness, shortness of breath, inflammation of the brain and spinal cord, nerve pain, numbness, or tingling in the hands or feet (CDC, 2024l). Most cases of Lyme disease can be treated successfully with a few weeks of antibiotics (CDC, 2024d).

Lyme disease isn’t the only tickborne disease or virus that ticks can transmit to humans, and there are others that can be more dangerous. The following list contains additional tickborne diseases and their symptoms:

- Anaplasmosis – A disease transmitted by blacklegged ticks, may cause fever, chills, severe headache, muscle aches, nausea, vomiting, diarrhea, and loss of appetite.
- fever, chills, headache, muscle aches, nausea, and abdominal pain. Late-stage symptoms include respiratory failure, bleeding problems, organ failure, and death. It can be treated with antibiotics (CDC, 2024a).
- Babesiosis – A disease caused by a parasite that infect red blood cells transmitted by blacklegged or deer ticks. Symptoms may include fever, chills, sweats, headache, body aches, loss of appetite, nausea, and fatigue. It can be treated with antiparasitic medications (CDC, 2024b).
- Ehrlichiosis – A bacterial disease transmitted by lone star tick and the blacklegged tick, may cause fever, chills, headache, muscle aches, and sometimes upset stomach. It can be treated with antibiotics (CDC, 2024c).
- Powassan Virus – A rare virus transmitted by blacklegged ticks that causes fever, headache, vomiting, and weakness. Severe symptoms include encephalitis, meningitis, confusion, loss of coordination, difficulty speaking, and seizures. There are no vaccines to prevent or medicines to treat Powassan virus disease (CDC, 2024e).
- Rocky Mountain Spotted Fever (RMSF) – A bacterial disease transmitted by American dog ticks, may cause fever, headache, rash, nausea or vomiting, stomach pain, muscle pain, and lack of appetite. RMSF can be life-threatening. Early treatment with the antibiotic doxycycline can prevent death and severe illness (CDC, 2024f).

4.3.5.2 Range of Magnitude

The magnitude of a pandemic or infectious disease threat in Cumberland County will range significantly depending on the aggressiveness of the virus in question and the ease of transmission. In the case of West Nile virus, about 8 out of 10 cases are clinically asymptomatic. Approximately 1 out of 5 cases result in febrile illness (fever), most people with febrile illness due to West Nile virus recover completely, but fatigue and weakness can last for weeks or months. However, 1 in 150 cases result in severe neurological disease or death (CDC, 2024p). West Nile Virus first appeared in Pennsylvania in 2000, Cumberland County was 1 of 19 counties that tested positive for the virus with three positive mosquitoes' cases (PA DEP, 2024b).

Pandemic influenza is fairly easily transmitted from person-to-person but advances in medical technologies have greatly reduced the number of deaths it causes (Doshi, 2008). The magnitude of a pandemic may be exacerbated by the fact that outbreaks would occur across Pennsylvania, 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 (USDHHS, 2017).

In terms of lives lost, the impact various pandemic influenza outbreaks have had globally over the last century has declined. The severity of illness from the 2009 H1N1 influenza flu virus varied as expected with any influenza pandemic. The gravest cases occurring mainly among those considered at high risk: children, the elderly, pregnant women, and chronic disease patients with reduced immune system capacity. Most people infected with H1N1 in 2009 recovered without needing medical treatment, and this flu strain is now included in flu shots. According to the CDC, about 70% of those who were hospitalized with the 2009 H1N1 flu virus in the United States belonged to a high-risk group (CDC, 2009). This pattern is expected to continue with future novel flu strains.

The 1918 Spanish flu pandemic remains the worst-case pandemic event on record both in Pennsylvania and worldwide. While mortality figures were probably under-reported, in the first month of the pandemic alone, 8,000 Pennsylvanians died from the flu or its complications (CDC, 2019).

First reaching the commonwealth in March 2020, COVID-19 is still impacting populations in Pennsylvania at the time of this plan development. This virus quickly became a great concern in 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, 2023). 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, 2024j).

In Cumberland County, the virus has a moderate incidence rate with a total of 64,028 cases confirmed for an estimated 2023 population of over 270,000 from 2020-2024. (PA DOH, 2023; US Census Bureau 2023). Statewide 3,565,278 cases have been confirmed with 51,334 deaths for an estimated population of 13 million (PA DOH, 2024, US Census Bureau 2020). Current data shows that older residents with pre-existing health conditions, infants, people with weakened immune systems, pregnant women, and people with disabilities may be more susceptible for greater risk for serious illness. In Pennsylvania, COVID-19 occurrences have been evenly spread across the 20-69 demographic with fewer cases occurring in the under 20 age group. However, over 90% of the COVID-19 deaths have occurred in the 60+ age categories (PA DOH, 2020).

Viruses like COVID-19 constantly change through mutation, which sometimes result 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 (CDC, 2023a).

While COVID-19 or pandemic events do not cause environmental harm themselves, capacity in the environmental sector was similarly reduced. Several studies have found that the global socio-economic disruptions from the COVID-19 pandemic have directly and indirectly impacted community's abilities to implement projects that can improve environmental conditions such as air and water quality, reduction of noise, and restoration of ecology (Rume & Didar-Ul Islam, 2020).

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

Table 4.3.5-1: Most Likely Lifelines Impacted by Pandemic, Emerging, Zoonotic, and Infectious Diseases.

LIFELINES	NOTES
Safety and Security	Government services and administration will be significantly impacted by widespread disease. Response plans will need to be developed.
Food, Hydration, Shelter	Staffing issues may occur due to illness at various points in the food supply chain.

Health and Medical	Hospitals will be impacted through staffing issues, an increase in patients, and supply chain issues as the disease becomes more widespread.

4.3.5.3 Past Occurrence

Lyme disease has been a nationally notifiable condition in the United States since 1991. Lyme disease cases are reported to the CDC by state health departments and the District of Columbia through the National Notifiable Diseases Surveillance System (NNDSS). Table 4.3.5-2 provides the number of Lyme disease cases reported in Cumberland County from 2001 to 2022 to the CDC.

Table 4.3.5-2: Reported Lyme Disease occurrences in Cumberland County from 2001 to 2022 (CDC, 2024k).

Year	Reports	Year	Reports
2001	18	2012	119
2002	25	2013	83
2003	69	2014	200
2004	50	2015	227
2005	36	2016	176
2006	60	2017	238
2007	78	2018	177
2008	56	2019	169
2009	138	2020	9
2010	126	2021	4
2011	92	2022	209
TOTAL	2,359		

More than 230 Zika virus cases were reported to the Pennsylvania Department of Health from 2015 to May of 2018. These include 183 virus disease cases (symptomatic individuals who tested positive for Zika virus), 51 virus infection cases (asymptomatic individuals who tested positive for Zika virus), and one presumptive viremic blood donor case (individuals who had no symptoms at the time of donating blood, but whose blood tested positive for Zika virus. No zika virus cases have been reported in Pennsylvania since 2018.

West Nile virus arrived in the United States in 1999 and was first detected in Pennsylvania in 2000 in mosquitoes, birds, and a horse. To help detect, track and control the virus, the Pennsylvania departments of Health, Environmental Protection (DEP) and Agriculture developed a comprehensive surveillance program, Pennsylvania's West Nile Control Program. Table 4.3.5-3 provides a yearly summary of positive test results by year in Cumberland County for West Nile virus from 2000 to 2017.

Table 4.3.5-3: List of previous West Nile virus cases in Cumberland County from 2000 to 2017 (PA DEP, 2024b).

Year	Total Positive Cases	Positive Human Cases	Positive Mosquito Cases	Positive Bird Cases	Positive Veterinary Cases	Positive Sentinel Cases
2000	3	0	3	0	0	0
2001	4	0	0	4	0	0
2002	55	0	8	47	0	0
2003	71	4	12	36	19	0
2004	4	0	1	2	1	0
2005	1	0	1	0	0	0
2006	2	0	0	2	0	0
2007	33	0	28	5	0	0
2008	31	0	31	0	0	0
2009	22	0	20	2	0	0
2010	27	1	26	0	0	0
2011	132	0	123	9	0	0
2012	220	2	213	4	1	0
2013	73	0	73	0	0	0
2014	133	0	133	0	0	0
2015	132	1	127	4	0	0
2016	56	0	56	0	0	0
2017	210	2	203	3	2	0

After 2017, the way in which data was reported changed several times. Table 4.3.5-4 shows a general summary of the data reports for 2018-2024 from the West Nile Control Program page on the PA DEP website.

Table 4.3.5-4: List of previous West Nile virus cases in Cumberland County from 2018 to 2024 (PA DEP, 2024b).

Year	Total Positive Cases	Positive Mosquito Cases	Mosquito Rank	Positive Bird Cases	Positive Equine Cases	Positive Human Cases
2018	422	417	N/A	5	N/A	0
2019	56	52	8	4	N/A	0
2020	3	3	14	0	N/A	0
2021	99	99	10	0	N/A	0
2022	121	121	9	0	0	0
2023	176	174	5	2	0	0
2024	175	172	4	2	1	0

While West Nile virus occurrences are fairly recent, 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 outbreaks over the past 100 years. A list of events worldwide is shown in Table 4.3.5-5.

Table 4.3.5-5: List of previous significant outbreaks over the past century (PA DOH, WHO, CDC, 2024).

DATE	PANDEMIC NAME/SUBTYPE	WORLDWIDE DEATHS (APPROXIMATE)
1918-1920	Spanish Flu / H1N1	50 million
1957-1958	Asian Flu / H2N2	1-3 million
1968-1969	Hong Kong Flu / H3N2	1 million
2009 - 2010	Swine Flu / A/H1N1	12,000
2020-2024	Corona Virus / COVID 19	7 million*

** This Figure was from July 2024. COVID-19 is an ongoing event and the worldwide deaths figure will change.*

Deaths occurred in the United States as a result of the Corona Virus, Spanish Flu, Asian flu, and Hong Kong Flu outbreaks. The Spanish Flu claimed 500,000 lives in the United States, and there were 350,000 cases in Pennsylvania. Most deaths resulting from the Asian flu occurred between September 1957 and March 1958; there were about 70,000 deaths in the United States and approximately 15% of the population of Pennsylvania was affected. The first cases of the Hong Kong Flu in the U.S. were detected in September of 1968 with deaths peaking between December 1968 and January 1969 (Global Security, 2009).

Influenza rates in Pennsylvania were affected by the Covid-19 Pandemic, with no data being available for the 2020-2021 influenza season, as flu activity was abnormally low, likely due to Covid-19 mitigation measures (PA DOH, 2021). Since the onset of the Pandemic, numbers of reported flu cases have steadily risen since Covid-19 measures have slowed and people have gotten back to a new normal. The 2021-2022 flu season had a reported 2,674 flu cases, with the 2022-2023 flu season almost doubling with 4,381 reported cases. The current 2023-2024 flu season is still ongoing, but so far, the season is following the upward trend with a reported 4,272 flu cases as of July 27, 2024. As the flu season ends in the fall, this number will continue to rise. Before the onset of the Pandemic, the 2018-2019 flu season had only a reported 1,939 cases while the 2019-2020 flu season had 2,664. Previously, the 2017-2018 influenza season was considered one of the impactful of the previous decade in Cumberland County at 3,217 cases, up from 1,040 cases in 2015-2016 and 2,421 cases in 2016-2017. Most notably, the 2009-2010 season in Cumberland County only had 431 confirmed cases. From the data from the Pennsylvania Department of Health, Influenza Type A seems to be the leading cause of reported flu cases over the last decade, far outpacing the numbers for Influenza Type B and Type U.

As of July 2024, COVID-19 has claimed 1,195,175 deaths in the United States (CDC, 2024n).

Figure 4.3.5-2: Residents reacted to the stay-at-home order issued by Governor Tom Wolfe as a response to COVID-19 pandemic. Shelves throughout the region were stripped of necessary supplies such as hand sanitizers, household cleaners, paper towels and toilet tissue (Cumberland County Planning Department 2020).

4.3.5.4 Future Occurrence

Future occurrences of pandemics and infectious diseases are difficult to predict. Occurrences of pandemic influenza 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.

This unpredictability makes it increasingly important to develop aggressive planning and eradication measures so that Pennsylvania is prepared for outbreaks. Instances of the West Nile virus have been generally decreasing due to such efforts, and prevention against the Zika virus, like mosquito control and insect repellent, have done the same (PA DEP, 2024).

Climate change may be a driving cause in any dramatic changes or shifts in viruses and other diseases by potentially creating favorable conditions for transmission through milder winters, earlier spring seasons, and warmer temperatures. One way this benefits the spread of infectious diseases is through expanding the habitats of mosquitos and allowing them more time to reproduce (See Figure 4.3.5-3). In addition, different fungi are now able to survive in new environments, and the narrowing differences between environmental temperatures and human body temperatures means fungi may become more adapted to survive in humans (CDC, 2024i). 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). Warming temperatures associated with climate change are projected to increase the range of suitable tick habitat and also extend the period when ticks are active each year, increasing the time and range that humans could be exposed to tick-borne diseases (EPA, 2024d). Since 2019, the Asian long horned tick have been discovered in Pennsylvania possibly due to changing environmental conditions that allow them to survive (PennState Extension, 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's important to note that even if these changes don't occur 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. However, looking at the number of historical incidences of pandemic-potential diseases, the probability of future pandemic events can be considered *moderately likely* according to the Risk Factor Methodology (see Table 4.5.2-1).

Figure 4.3.5-3: The yearly activity of the Asian Tiger Mosquito has increased, prolonging human exposure to vector-borne diseases (Taber et al., 2017).

4.3.5.5 Vulnerability Assessment

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 Cumberland County has some vulnerability to pandemic and infectious disease threats. Schools and major universities are particularly vulnerable to the spread of disease due to the presence of large population groups in relatively close confinement.

Certain population groups are at higher risk of pandemic flu infection. This population group includes people 65 years and older, children younger than five years old, pregnant women, and people of any age with certain chronic medical conditions. Such conditions include but are not limited to diabetes, heart disease, asthma and kidney disease (CDC, 2015). Schools, colleges, convalescent centers, and other institutions serving those younger than five 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. 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 (Saunders-Hastings & Krewski, 2016). 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 Cumberland County. According to the 2022 Agricultural Census, livestock, poultry, and egg sales make up 73% of Cumberland County's agricultural sales. Although poultry and egg sales totaled around $60,107, Cumberland County is more of a dairy producer with the total sales of milk from cows being $111,116 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, 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. It is currently unknown how COVID-19 will change the economic environment.

4.3.5.6 Equity in Vulnerable Populations

Equity considerations during pandemics and infectious disease outbreaks are crucial as there are a number of populations at an increased risk. 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 are essential workers. This includes Carlisle Borough, Newville Borough, and Southampton Township as they have areas with the highest populations below the poverty level. In addition, Carlisle Borough, East Pennsboro Township, Hampden Township, and Silver Spring Township have the highest concentration of people without health insurance (see Table 4.3.5-6 below). 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. This would add Camp Hill Borough, East Pennsboro Township, Hampden Township, Lower Allen Township, North Middleton Township, Silver Spring Township, South Middleton Township, and Upper Allen Township (see Table 4.3.10-3 in Section 4.3.10.5) to municipalities that may be particularly vulnerable. The HMP will address congregate care facilities with regard to risk identification, capability, and mitigation action with respect to COVID-19 impacts on residents. Households with inadequate broadband connection 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.

Table 4.3.5-6: Number of Individuals Without Health Insurance by Municipality (U.S. Census Bureau, ACS, 2023).

Municipality	Number of Individuals Without Health Insurance
Borough of Camp Hill	231
Borough of Carlisle	1038
Township of Cooke	8
Township of Dickinson	32
Township of East Pennsboro	1308
Township of Hampden	1477
Township of Hopewell	546
Borough of Lemoyne	112
Township of Lower Allen	625
Township of Lower Frankford	113
Township of Lower Mifflin	145
Borough of Mechanicsburg	313
Township of Middlesex	494
Township of Monroe	347

Borough of Mt Holly Springs	251
Borough of New Cumberland	423
Borough of Newburg	58
Borough of Newville	127
Township of North Middleton	437
Township of North Newton	515
Township of Penn	416
Borough of Shippensburg	209
Township of Shippensburg	146
Borough of Shiremanstown	133
Township of Silver Spring	1041
Township of South Middleton	326
Township of South Newton	496
Township of Southampton	814
Township of Upper Allen	738
Township of Upper Frankford	114
Township of Upper Mifflin	157
Township of West Pennsboro	422
Borough of Wormleysburg	292
TOTAL	**13,904**

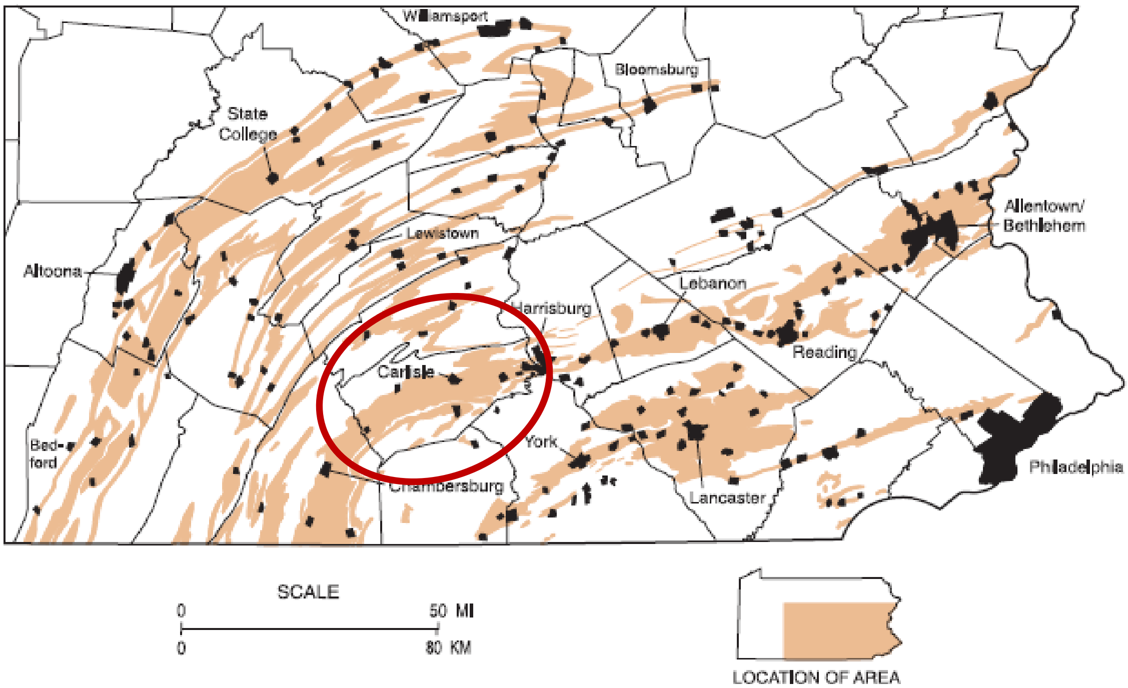
4.3.6. Subsidence & Sinkholes

4.3.6.1 Location and Extent

Land subsidence is a gradual settling or sudden sinking of the Earth's surface owing to subsurface movement of earth materials (USGS, 2024). Sinkholes are subsidence features resulting from the downward movement of surficial material into a pre-existing subsurface void. There are two common causes of subsidence in Pennsylvania: 1) dissolution of carbonate rock such as limestone or dolomite and 2) mining activity.

Subsidence potential in Cumberland County is primarily associated with the dissolution of carbonate bedrock such as limestone and dolomite by water. Water passing through naturally occurring fractures and bedding planes dissolves the bedrock leaving voids below the surface. Eventually, overburden on top of the voids collapses, leaving surface depressions resulting in karst topography. Characteristics structures associated with karst topography include sinkholes, linear depressions and caves. Often, sub-surface solution of limestone will not result in the immediate formation of karst features. Collapse sometimes occurs only after a large amount of activity, or when a heavy burden is placed on the overlying material (PEMA, 2023). Abrupt or long-term changes in the ground surface may also occur following sub-surface fluid extraction (e.g. natural gas, water, oil, etc.). Figure 4.3.6-1 shows that much of Cumberland County lies in an area of Pennsylvania where limestone, dolomite, or both are present near ground surface, thus making it more susceptible to natural sinkhole development. The map includes locations of larger towns and cities that are adjacent to these areas underlain by carbonate bedrock.

Figure 4.3.6-1: Map of areas in eastern and central Pennsylvania susceptible to subsidence based on the presence of underlying carbonate rock formations with urban areas shown in black (Kochanov, 1999).

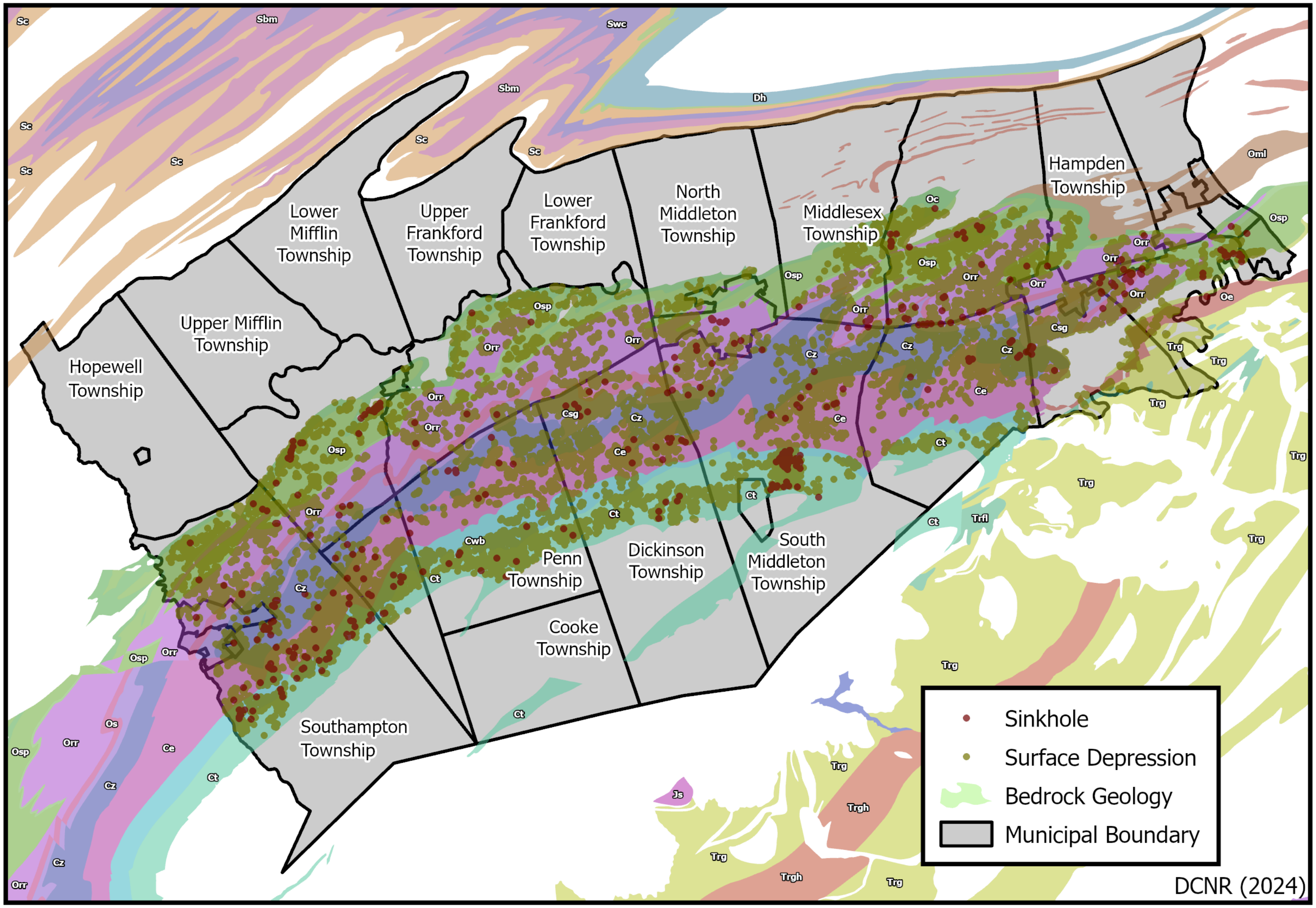


Due to the nature of geology in the region, karst features typically occur along southwest-to-northeast deposits of limestone. These are located along an approximately 10-mile wide band that passes through the center of the County, roughly parallel to the counties' northern and southern borders. The deposits are predominantly Ordovician- and Cambrian-period layers, exposed at the surface through folding, faulting and long-term erosion.

The DCNR maintains a partial inventory of karst features, as shown on Figure 4.3.6-2, for Cumberland County. Mapped karst features include sinkholes and surface depressions. There is wide variation in the size of karst features, and fewer karst features have been mapped in the existing urban areas of the County. However, this is likely a result of development activities that disguise, cover, or fill existing karst features rather than an absence of the features themselves (PA DCNR, 2003).

Human activity can also result in 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. Stormwater infrastructure has been an exacerbating factor in subsidence events in Cumberland County. In some cases, construction, land grading or earthmoving activities that cause changes in stormwater flow can trigger sinkhole events (PA DEP, 2024c).

Figure 4.3.6-2: Karst features and underlying carbonate rock formations in Cumberland County (DCNR, 2024). This image is a screen capture from the Cumberland County Hazard Mitigation Plan Map Series. Please hold the CTRL key and select the map below for the Hazard Mitigation Plan Map Series.



4.3.6.2 Range of Magnitude

No two subsidence areas or sinkholes are exactly alike. Variations in size, shape, time period under which they occur (i.e., gradually or abruptly), and their proximity to development ultimately determines the magnitude of damage incurred (Kochanov, 2015). 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 damage to private and public property including buildings, roads, and underground infrastructure (Kochanov, 2015). Events could result in minor elevation changes or deep, gaping holes in the ground surface, as illustrated in Figure 4.3.6-3 and Figure 4.3.6-4. Subsidence and sinkhole events can cause severe damage in urban environments, although gradual events can be addressed before significant damage occurs. If long-term subsidence or sinkhole formation is not recognized and mitigation measures are not implemented, fractures or complete collapse of building foundations and roadways may result. The cost to fill in and stabilize sinkholes can be significant even if the sinkhole itself is limited in extent. General recommendations have been published for site investigations prior to construction of buildings due to the potential for karst subsidence (Root, 1978). These recommendations vary depending on the rock type immediately underlying soil cover and include thorough geotechnical investigations to identify un-collapsed karst features and potential excavation to solid rock prior to construction.

Although underground drainage systems form naturally over time in karst regions, discrete rainfall events, ineffective stormwater infrastructure and land development can exacerbate the negative impacts of subsidence. Heavy rainfall can cause a buildup of stormwater when development reduces the surface area available for infiltration. If directed toward underground karstic drains, the accumulated stormwater can flush the soil that fills the drains, resulting in collapse of the overlying land surface (Kochanov, 2015). This rapid formation of sinkholes can cause extensive property damage. The potential for increased precipitation from extreme rainfall events caused by a changing climate could lead to the formation of more sinkholes from the flushing of karstic drains.

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 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.

Figure 4.3.6-3: A small sinkhole opened up on Cumberland Drive, outside of the Franklin Science Center in Shippensburg University on April 28, 2024. This resulted in the closure of Cumberland Drive (Thompson, 2024) (Photograph courtesy of Allyson Ritchey / *The Slate*, 2024).

Figure 4.3.6-4: A small sinkhole opened up on Susquehanna Avenue in East Pennsboro Township due to flash flooding in 2021 (Photograph courtesy of East Pennsboro Township, 2024).

In addition to infrastructure and building damage, the presence of sinkholes can result in increased potential for groundwater contamination from contaminants such as sewage, fertilizers, herbicides, pesticides, or industrial products. Due to their porous nature, sinkholes are sometimes used as instruments for enhancing groundwater recharge. However, if hazardous materials are spilled at a recharge point, groundwater can quickly be contaminated due to the lack of soil substrate which normally would slow migrating contaminants (Kochanov, 2015). Vegetation is usually damaged during abrupt subsidence events. However, re-growth takes place over time. Land subsidence can also result in more frequent and expansive flooding and changes in river canal and drain flow systems.

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

Table 4.3.6-1: Most Likely Lifelines Impacted by Subsidence and Sinkholes.

LIFELINES	NOTES
	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.
	Significant damage to homes, disruption of water utility services, and potential groundwater contamination may occur.
	Direct damage to transportation infrastructure may occur depending on the location of the hazard.

4.3.6.3 Past Occurrence

Cumberland County does not have a record of a significant subsidence-based disaster. Table 4.3.6-2 shows the number of karst features per municipality including caves, sinkholes, surface depressions, and surface mines. Surface depressions comprise 12,857 of the 13,269 total karst features in the County.

Table 4.3.6-2: Number of karst features per municipality in Cumberland County (Cumberland County GIS, 2024).

Municipality	Caves (No Data)	Sinkholes	Surface Depressions	Surface Mines	Total
Borough of Camp Hill	-	0	28	0	28
Borough of Carlisle	-	8	144	0	152
Township of Cooke	-	0	0	0	0
Township of Dickinson	-	24	1,681	1	1,706
Township of East Pennsboro	-	0	1	0	1
Township of Hampden	-	3	133	0	136
Township of Hopewell	-	0	0	8	8
Borough of Lemoyne	-	1	5	0	6
Township of Lower Allen	-	34	444	0	478
Township of Lower Frankford	-	0	0	2	2
Township of Lower Mifflin	-	0	0	1	1

Table 4.3.6-2: Number of karst features per municipality in Cumberland County (Cumberland County GIS, 2024).					
Municipality	**Caves (No Data)**	**Sinkholes**	**Surface Depressions**	**Surface Mines**	**Total**
Borough of Mechanicsburg	-	1	149	0	150
Township of Middlesex	-	4	257	3	264
Township of Monroe	-	15	1,193	2	1,210
Borough of Mt Holly Springs	-	0	3	0	3
Borough of New Cumberland	-	1	25	0	26
Borough of Newburg	-	0	0	0	0
Borough of Newville	-	0	0	0	0
Township of North Middleton	-	0	55	3	58
Township of North Newton	-	28	461	14	503
Township of Penn	-	23	1,279	1	1,303
Borough of Shippensburg	-	0	44	0	44
Township of Shippensburg	-	3	77	0	80
Borough of Shiremanstown	-	2	19	0	21
Township of Silver Spring	-	33	1,100	3	1,136
Township of South Middleton	-	73	1,294	1	1,368
Township of South Newton	-	18	538	0	556
Township of Southampton	-	75	2,399	4	2,478
Township of Upper Allen	-	14	600	0	614
Township of Upper Frankford	-	0	0	1	1
Township of Upper Mifflin	-	0	0	2	2
Township of West Pennsboro	-	6	928	0	934
Borough of Wormleysburg	-	0	0	0	0
TOTAL	**0**	**366**	**12857**	**46**	**13269**

4.3.6.4 Future Occurrence

Based on geological conditions and the presence of previously formed sinkholes, subsidence events are likely to occur in the future for the areas of Cumberland County underlain by carbonate rock. Shippensburg University noted that sinkholes continue to form around campus on the online survey for the Evaluation of Identified Hazards and Risk Worksheet. Overall, the probability of future subsidence events can be considered *moderately likely* according to the Risk Factor Methodology (see Table 4.5.2-1).

Recent stormwater and precipitation events in Cumberland County and the surrounding region (as documented in Section 4.3.3.4) have the likelihood of increasing karst events such as sinkholes and subsidence. PA DEP's list of activities that can lead to sinkholes consists of a decline of water levels, disturbances of the soil, water leaks, concentration of water flow in a specific area, water impoundments, and heavy loads on the surface (PA DEP, 2024c). Hydrological changes play a big part in sinkhole formation, whether it is adding more water or taking some away. This change creates opportunities for destabilization as either soil is very saturated, or cracks and voids are no longer being filled by groundwater. A potential concern for the future will be how much projected precipitation and intense rainfall event increases from climate change will contribute, as they can result in at least 3 of the activities listed (soil disturbance, concentrated water flows, heavy loads).

Major development activity in Cumberland County is required to prepare a stormwater management plan that outlines the volume and rate of stormwater emanating from a development site for both pre and post construction conditions. Stormwater management plans typically consider the prevalent karst geology found in the region and require best management practices that decrease the risk of sinkholes due to stormwater discharge.

4.3.6.5 Vulnerability Assessment

Sinkholes can appear very suddenly and without warning and can continue to grow after the initial collapse making the surrounding ground unstable. Sinkholes on roadways are a danger to drivers, and those around gas lines can result in leaks or explosions if left undetected. Sinkholes cause structural damage and instability in homes, commercial buildings, roads, and bridges. As a natural characteristic of karst watersheds, the presence of high flow-rate springs heighten the potential vulnerability to contamination from improper chemical or waste management.

The valley portions of the County are most vulnerable to the effects of natural subsidence events. Local roads may need annual repair and damage to gas lines, telephone, and electrical entry road facilities could occur in highly populated areas. Based on historical events, Southampton and South Middleton Townships are most vulnerable to sinkhole events. These municipalities have the highest occurrences of sinkholes. However, there are eight other municipalities in Cumberland County reporting ten or more sinkhole events, and a total of 19 communities have had reported sinkhole events. Furthermore, Southampton, Dickinson, South Middleton, Penn, Monroe, and Silver Spring Townships have the most recorded karst features (see Table 4.3.6-2).

The vulnerability of individual structures and critical facilities (excluding oil and gas wells) to subsidence and sinkhole events depends on underground site conditions related to the presence of limestone at each location.

Table 4.3.6-3 lists the number of addressed units and critical facilities that intersect karst geology in each municipality. This does not mean that a recorded karst feature such as a sinkhole or surface depression exists in proximity to a structure, but that their formation and resulting damage are possible due to underlying, soluble rock units. Table 4.3.6-4 categorizes the structures as residential or non-residential. There are 75,651 total addressed units that intersect karst geology, with the greatest number in the Borough of Carlisle (9,209), Hampden Township (8,134), Lower Allen Township (7,029), South Middleton Township (6,949), Silver Spring Township (6,602), and Borough of Mechanicsburg (4,834).

Over 95 percent of structures intersect with karst geology in the Borough of Carlisle, West Pennsboro Township, the Borough of Newville, Shippensburg Township, the Borough of Mechanicsburg, the Borough of Shiremanstown, the Borough of Shippensburg, and

Southampton Township. The Borough of Carlisle has the highest number of critical facilities that intersect karst geology, with a total of 118.

Table 4.3.6-3: Addressed Units Intersecting Karst Geology in Cumberland County (Cumberland County GIS, 2024).

Municipality	Total Addressed Units	Addressed Units Intersecting Karst Geology	Percent of Addressed Units Intersecting Karst Geology	Total Critical Facilities in Municipality	Total Critical Facilities Intersecting Karst Geology	Percent of Critical Facilities Intersecting Karst Geology
Borough of Camp Hill	3,748	2,137	57.0%	38	25	65.8%
Borough of Carlisle	9,209	9,209	100%	118	118	100%
Township of Cooke	421	92	21.9%	4	2	50.0%
Township of Dickinson	2,329	1,753	75.3%	15	11	73.3%
Township of East Pennsboro	9,331	1,353	14.5%	72	25	34.7%
Township of Hampden	14,623	8,134	55.6%	108	74	68.5%
Township of Hopewell	937	0	0%	12	0	0%
Borough of Lemoyne	2,235	1,296	58.0%	27	16	59.3%
Township of Lower Allen	8,507	7,029	82.6%	69	67	97.1%
Township of Lower Frankford	742	5	0.7%	2	0	0%
Township of Lower Mifflin	768	0	0%	6	0	0%
Borough of Mechanicsburg	4,834	4,834	100%	49	49	100%
Township of Middlesex	3,435	1,798	52.3%	50	39	78.0%
Township of Monroe	2,834	2,503	88.3%	14	14	100%
Borough of Mt Holly Springs	926	854	92.2%	17	17	100%
Borough of New Cumberland	3,365	2,053	61.0%	21	12	57.1%
Borough of Newburg	137	0	0%	2	0	0%
Borough of Newville	766	754	98.4%	16	16	100%
Township of North Middleton	5,807	1,378	23.7%	45	22	48.9%
Township of North Newton	939	400	42.6%	13	8	61.5%
Township of Penn	1,200	1,113	92.8%	14	14	100%
Borough of Shippensburg	2,233	2,233	100%	24	24	100%
Township of Shippensburg	1,392	1,392	100%	23	23	100%
Borough of Shiremanstown	801	801	100%	9	9	100%
Township of Silver Spring	9,062	6,602	72.9%	67	55	82.1%
Township of South Middleton	7,433	6,949	93.5%	74	71	95.9%
Township of South Newton	536	500	93.3%	6	6	100%
Township of Southampton	3,364	3,262	97.0%	20	20	100%
Township of Upper Allen	8,998	4,155	46.2%	44	19	43.2%
Township of Upper Frankford	1,026	0	0%	8	0	0%

Table 4.3.6-3: Addressed Units Intersecting Karst Geology in Cumberland County (Cumberland County GIS, 2024).						
Municipality	**Total Addressed Units**	**Addressed Units Intersecting Karst Geology**	**Percent of Addressed Units Intersecting Karst Geology**	**Total Critical Facilities in Municipality**	**Total Critical Facilities Intersecting Karst Geology**	**Percent of Critical Facilities Intersecting Karst Geology**
Township of Upper Mifflin	573	0	0%	3	0	0%
Township of West Pennsboro	2,345	2,226	94.9%	16	12	75.0%
Borough of Wormleysburg	1,590	836	52.6%	4	0	0%
TOTAL	**116,446**	**75,651**	**65.0%**	**1,010**	**768**	**76.0%**

Table 4.3.6-4: Parcel Type for Addressed Units Intersecting Karst Geology (Cumberland County GIS, 2024).								
Municipality	**Total Addressed Units**	**Total Non-Residential Addressed Units**	**Non-Residential Units Intersecting Karst Geology**	**Percent of Non-Residential Units**	**Total Residential Addressed Units**	**Residential Units Intersecting Karst Geology**	**Percent of Residential Units Intersecting Karst Geology**	**Total Addressed Units Intersecting Karst Geology**
Borough of Camp Hill	3,748	355	256	72.1%	3,393	1,881	55.4%	2,137
Borough of Carlisle	9,209	1,423	1,423	100%	7,786	7,786	100%	9,209
Township of Cooke	421	22	13	59.1%	399	79	19.8%	92
Township of Dickinson	2,329	92	72	78.3%	2,237	1,681	75.1%	1,753
Township of East Pennsboro	9,331	538	145	27.0%	8,793	1,208	13.7%	1,353
Township of Hampden	14,623	961	777	80.9%	13,662	7,357	53.9%	8,134
Township of Hopewell	937	43	0	0%	894	0	0%	0
Borough of Lemoyne	2,235	390	215	55.1%	1,845	1,081	58.6%	1,296
Township of Lower Allen	8,507	879	837	95.2%	7,628	6,192	81.2%	7,029
Township of Lower Frankford	742	17	0	0%	725	5	0.7%	5
Township of Lower Mifflin	768	31	0	0%	737	0	0%	0
Borough of Mechanicsburg	4,834	636	636	100%	4,198	4,198	100%	4,834
Township of Middlesex	3,435	238	205	86.1%	3,197	1,593	49.8%	1,798
Township of Monroe	2,834	97	94	96.9%	2,737	2,409	88.0%	2,503
Borough of Mt Holly Springs	926	96	95	99.0%	830	759	91.4%	854
Borough of New Cumberland	3,365	267	121	45.3%	3,098	1,932	62.4%	2,053
Borough of Newburg	137	11	0	0%	126	0	0%	0
Borough of Newville	766	157	156	99.4%	609	598	98.2%	754
Township of North Middleton	5,807	375	223	59.5%	5,432	1,155	21.3%	1,378
Township of North Newton	939	58	21	36.2%	881	379	43.0%	400
Township of Penn	1,200	53	50	94.3%	1,147	1,063	92.7%	1,113
Borough of Shippensburg	2,233	346	346	100%	1,887	1,887	100%	2,233
Township of Shippensburg	1,392	182	182	100%	1,210	1,210	100%	1,392

Table 4.3.6-4: Parcel Type for Addressed Units Intersecting Karst Geology (Cumberland County GIS, 2024).								
Municipality	**Total Addressed Units**	**Total Non-Residential Addressed Units**	**Non-Residential Units Intersecting Karst Geology**	**Percent of Non-Residential Units**	**Total Residential Addressed Units**	**Residential Units Intersecting Karst Geology**	**Percent of Residential Units Intersecting Karst Geology**	**Total Addressed Units Intersecting Karst Geology**
Borough of Shiremanstown	801	81	81	100%	720	720	100%	801
Township of Silver Spring	9,062	473	413	87.3%	8,589	6,189	72.1%	6,602
Township of South Middleton	7,433	474	462	97.5%	6,959	6,487	93.2%	6,949
Township of South Newton	536	31	31	100%	505	469	92.9%	500
Township of Southampton	3,364	97	91	93.8%	3,267	3,171	97.1%	3,262
Township of Upper Allen	8,998	399	239	59.9%	8,599	3,916	45.5%	4,155
Township of Upper Frankford	1,026	29	0	0%	997	0	0%	0
Township of Upper Mifflin	573	27	0	0%	546	0	0%	0
Township of West Pennsboro	2,345	108	98	90.7%	2,237	2,128	95.1%	2,226
Borough of Wormleysburg	1,590	171	85	49.7%	1,419	751	52.9%	836
TOTAL	**61,119**	**9,157**	**7,367**	**80.5%**	**107,289**	**68,284**	**63.6%**	**75,651**

4.3.6.6 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.

4.3.7. Tornado & Windstorm

4.3.7.1 Location and Extent

Both tornado and windstorm events can occur throughout Cumberland County. A tornado is a narrow, violently rotating column of air that extends from a thunderstorm to the ground (NOAA NSSL, 2024e). The impact of tornado or windstorm hazards is ultimately dependent on the population or amount of property (i.e., buildings, infrastructure, agricultural land, etc.) present in the area in which they occur. Tornado events are often so severe that property loss or human fatality is typically inevitable if evacuation or proper construction standards are not implemented.

Tornado events are usually localized. However, severe thunderstorms may result in conditions favorable to the formation of numerous or long-lived tornadoes. While tornadoes nationally can occur at any time during the day or night or any month of the year but are most frequent during late afternoon into early evening, the warmest hours of the day, and most likely to occur during the spring and early summer months of March through June (NOAA NSSL, 2024e), they are most frequent (and most violent) in May, June, and July for Pennsylvania. Tornadoes can and have occurred during any month of the year 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. The typical tornado damage path is about one or two miles, with a width of around 50 yards (NOAA NWS, 2024b). Movement can range from almost stationary to more than 60 mph. A typical tornado travels at around 10–20 miles per hour (NOAA NSSL, 2024d). The largest tornado path widths can exceed one mile, while the smallest widths can be less than 10 yards. Widths can even vary considerably during a single tornado, since its size can change during its lifetime. Path lengths can range from a few yards to more than 100 miles (NOAA NWS, 2024b).

Windstorms are generally defined with sustained wind speeds of 40 mph or greater lasting for one hour or longer, or winds of 58 mph or greater for any duration (NOAA NWS, 2024e). Straight-line winds and windstorms are different from tornadoes in that they don’t involve any rotation. They are experienced on a region-wide scale. They may accompany tornadoes and thunderstorms as most straight-lined winds are a result of outflow generated by a thunderstorm downdraft. Wind speeds can reach up to 100 mph and can produce a damage path extending for hundreds of miles (NOAA NSSL, 2024c).

Figure 4.3.7-1: Straight-line winds, estimated to be upwards of 60 mph, blew through a mobile home community in Lower Mifflin Township on July 17th, 2024 (Photograph courtesy of Alyssa Kratz / *Fox43*).

4.3.7.2 Range of Magnitude

Each year more than 1,200 tornadoes take place in the United States. From 1993 to 2022, an average of 71 people were killed by tornadoes each year (NOAA DOC, 2024). From 2010 to 2021, tornadoes caused $14.1 billion in damages, an average of $2.5 million per storm (Hurst, 2021). Previous events in Cumberland County are estimated to have caused approximately $1,217,000 in total damages (see Table 4.3.7-2). While the extent of tornado damage is usually localized, the vortex of extreme wind associated with a tornado can result in some of the most destructive forces on Earth. The damage caused by a tornado is a result of the high wind velocity and wind-blown debris, also accompanied by lightning or large hail. Tornadic wind speeds can be as high as 300 miles per hour in the most violent tornadoes. Wind speeds that high can cause automobiles to become airborne, rip ordinary homes to shreds, and turn broken glass and other debris into lethal missiles (NOAA NSSL, 2024d). Wind speeds from the strongest recorded tornado in Cumberland County did not exceed 206 mph (see 4/3/1961 event in Table 4.3.7-2).

Most years there are far more damage reports from thunderstorm straight line winds than from tornadoes (NOAA, 2024a). In damaging high wind conditions, wind damage occurs to unanchored mobile homes, porches, carports, awnings, pool enclosures, and with some shingles blown from roofs. Large branches break off trees with weak or diseased trees blown down. Loose objects are easily blown about and can become dangerous projectiles. Widely scattered power outages may occur. Winds are considered extremely dangerous for high profile vehicles and for boaters on area lakes (NOAA NWS, 2024f).

Damages and deaths can be especially significant when tornadoes move through populated, developed areas. 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 damages to structures of light construction such as mobile homes.

The Enhanced Fujita Scale, also known as the “EF-Scale,” measures tornado strength and associated damages. The EF-Scale is an update to the earlier Fujita Scale, also known as the “F-Scale,” that was published in 1971. The EF-Scale provides engineered wind estimates and better damage descriptions. It classifies United States tornadoes into six intensity categories, as shown in Table 4.3.7-1, based upon the estimated maximum winds occurring within the wind vortex. Since its implementation by the National Weather Service in 2007, the EF-Scale has become the definitive metric for estimating wind speeds within tornadoes based upon damage to buildings and structures. F-Scale categories with corresponding EF-Scale wind speeds are provided in Table 4.3.7-1 since previous tornado occurrences listed in Table 4.3.7-3 are based on the F-Scale.

Table 4.3.7-1: Enhanced Fujita Scale (EF-Scale) categories with associated wind speeds and description of damages (The Weather Channel, 2024)

EF-Scale Number	Wind Speed (Mph)	F-Scale Number	Type Of Damage Possible
EF0	65–85	F0-F1	**Light damage**: Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF1	86-110	F1	**Moderate damage**: Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111–135	F1-F2	**Considerable damage**: Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136–165	F2-F3	**Severe damage**: Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166–200	F3	**Devastating damage**: Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	>200	F3-F6	**Incredible damage**: Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 109 yards (327 ft); high-rise buildings have significant structural deformation; incredible phenomena will occur.

Figure 4.3.4-5 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. Cumberland County falls within Zone II and Zone III, meaning design wind speeds for shelters and critical facilities should be able to withstand a 3-second gust of up to 200 mph, regardless of

whether the gust is the result of a tornado, hurricane, tropical storm, or windstorm event. Therefore, these structures should be able to withstand speeds experienced in an EF4 tornado.

The impact of tornado hazards is ultimately dependent on the population or amount of property (i.e., buildings, infrastructure, agricultural land, etc.) 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.

Since tornado events are typically localized, environmental impacts are rarely widespread. The impacts of windstorms on the environment typically take place over a larger area. In either case, where these events occur, severe damage to plant species is likely. This includes uprooting or total destruction of trees and an increased threat of wildfire in areas where dead trees are not removed. Hazardous material facilities should meet design requirements for the wind zones identified in Figure 4.3.4-5 in order to prevent release of hazardous materials into the environment. A potential worst-case scenario could be a tornado that results in loss of life and significant property damage resulting in the release of hazardous materials into the surrounding environment.

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

Table 4.3.7-2: Most likely lifelines impacted by Tornadoes or Windstorms.

LIFELINES	NOTES
Safety and Security	Government officials, including police and fire, will be needed for community safety due to potential harm from tornadoes, high winds, and associated weather conditions.
Food, Hydration, Shelter	Tornadoes and windstorms cause significant damage to agricultural operations and structures.
Energy (Power & Fuel)	Energy lifelines in response to recovery due to potential direct damage from tornadoes and windstorms.
Hazardous Materials	Material storage facilities and operations may be damaged due to significant damage from tornadoes and windstorms.

4.3.7.3 Past Occurrence

Tornadoes have occurred in all seasons and all regions of Pennsylvania, including Cumberland County. The northern, western and southeastern portions of the Commonwealth have been struck more frequently. One of the deadliest tornadoes in Pennsylvania occurred during a May 1985 storm which killed six people, injured 60, and destroyed campers, manufactured homes,

homes and businesses across Lycoming, Union and Northumberland Counties. While this event did not occur in Cumberland County, it took place only about 60 miles to the north. Between 1854 and 1979, there were six official tornadoes within Cumberland County (Cumberland EOP, 1984). A list of tornado and funnel cloud events that occurred in Cumberland County between 1961 and 2024 is shown in Table 4.3.7-3 with an associated F-Scale magnitude (see Table 4.3.7-1 for corresponding EF-Scale magnitude). Note that tornado events have not occurred since 2022. Figure 4.3.7-3 provides a photograph of wind damage. A map showing the approximate location for many of these events is included in Figure 4.3.7-4.

Table 4.3.7-3: Previous tornado and funnel cloud events in Cumberland County (NOAA NCEI, 2024g; NOAA NCEI, 2024k).

Location	Date	Estimated Length	Estimated Width	Magnitude (F-Scale)	Estimated Property Damage ($)
Countywide	4/16/1961	*not provided*	*not provided*	F3	250,000
Countywide	6/3/1964	*not provided*	*not provided*	F1	25,000
Countywide	3/21/1976	3 miles	70 yards	F0	0
Countywide	3/21/1976	5 miles	90 yards	F1	25,000
Countywide	7/31/1985	3 miles	20 yards	F1	250,000
Countywide	4/9/1991	3 miles	20 yards	F0	250,000
Countywide	4/9/1991	0 miles	20 yards	F1	250,000
Shippensburg	7/30/1996	3 miles	50 yards	F1	0
Carlisle Springs	6/21/2000	0 miles	30 yards	F0	0
Lemoyne	8/4/2004	1 mile	75 yards	F0	20,000
Newville	8/4/2004	3 miles	125 yards	F1	50,000
Oakville	9/17/2004	2 miles	50 yards	F1	0
Mechanicsburg	8/31/2005	2 miles	100 yards	F1	0
Wormleysburg	9/28/2006	3 miles	100 yards	F1	75,000
Mechanicsburg	6/13/2007	-	-	Funnel Cloud	0
Wertzville	5/26/2011	2.64 miles	100 yards	F1	15,000
Summerdale	5/15/2018	0.08 miles	40 yards	F1	3,000
Carlisle SPGS	5/27/2022	0.15 miles	125 yards	F1	4,000

There are hundreds of high wind events recorded in Cumberland County since 1950. In 1979, the County experienced straight-line winds from a thunderstorm in excess of 90 mph. This storm caused severe tree and related property damage to the population center in the eastern portion of the County. A list of events that have occurred since 2005 is shown in Table 4.3.7-4. Windstorm events may be the result of thunderstorms, hurricanes, tropical storms, winter storms, or nor'easters.

Figure 4.3.7-3: Heavy winds resulted in a tree falling and killing one man inside of his house in South Middleton Township on March 11th, 2024 (Photograph Courtesy of Evan Popalis, Lara Bonatesta, Justin Raub / *abc27 News*)

Figure 4.3.7-4: Historical tornado touchdown events from 1950 – 2024, and tornado touchdown events by census tract (DCNR, 2024; NOAA, 2024). This image is a screen capture from the Cumberland County Hazard Mitigation Plan Map Series. Please hold the CTRL key and select the map below for the Hazard Mitigation Plan Map Series.

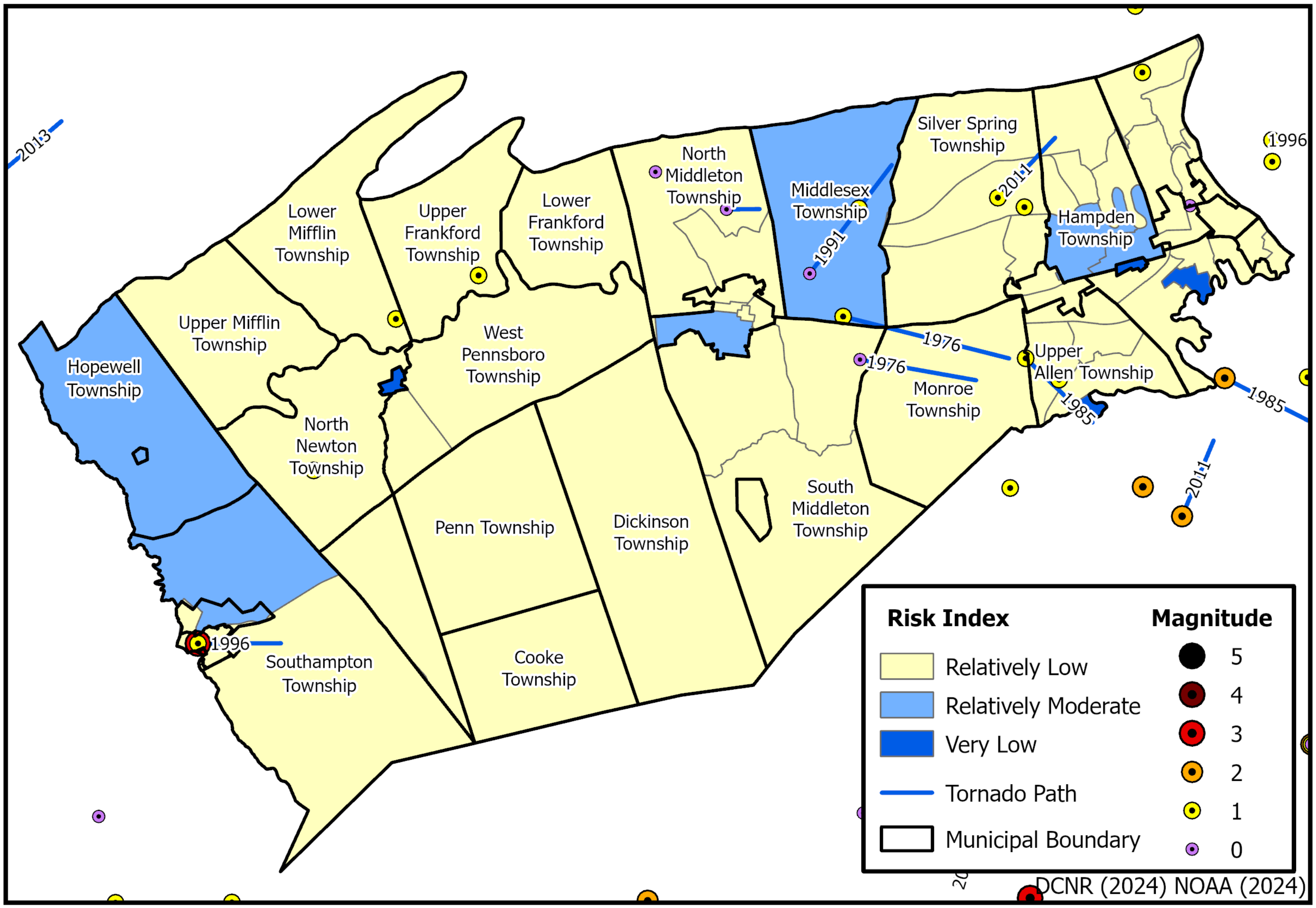


Table 4.3.7-4: Previous windstorm events in Cumberland County (NOAA NCEI, 2024j & community surveys).			
Location	**Date**	**Estimated Wind Speed (Knots)**	**Estimated Property Damage ($)**
Enola	6/9/2005	50	*not provided*
Doubling Gap	6/9/2005	50	*not provided*
Shippensburg	6/13/2005	60	*not provided*
Camp Hill	7/19/2005	50	*not provided*
Carlisle	8/14/2005	50	*not provided*
Carlisle	6/22/2006	50	*not provided*
Countywide	7/4/2006	50	*not provided*
Countywide	12/1/2006	45	*not provided*
Countywide	2/5/2007	*not provided*	*not provided*
Countywide	2/5/2007	*not provided*	*not provided*
Shippensburg	6/8/2007	50	*not provided*
Bonny Brook	6/13/2007	50	*not provided*
Newburg	6/19/2007	50	*not provided*
Williams Grove	6/19/2007	50	*not provided*
Shiremanstown	6/19/2007	62	*not provided*
Newville	7/28/2007	50	*not provided*
Oakville	8/9/2007	50	*not provided*
Carlisle	8/25/2007	50	125,000
Enola	8/25/2007	50	*not provided*
Countywide	12/23/2007	50	*not provided*
Bloserville	6/29/2008	50	*not provided*
Mount Holly Springs	6/29/2008	50	*not provided*
Barnitz	7/23/2008	50	*not provided*
Newville	8/2/2008	50	*not provided*
Shiremanstown	8/7/2008	52	*not provided*
Countywide	12/31/2008	50	10,000
Countywide	2/12/2009	50	50,000
North Middleton	8/21/2009	68	*not provided*
Williams Grove	4/16/2010	50	*not provided*
Carlisle	5/14/2010	50	*5,000*
Middlesex	6/4/2010	50	*25,000*
Greason	6/4/2010	50	*5,000*
Newville	6/12/2010	50	*5,000*
New Cumberland	6/16/2010	52	*not provided*
Carlisle	6/24/2010	50	5,000
Allen	6/24/2010	50	5,000
New Cumberland	7/12/2010	50	5,000
Shippensburg	7/25/2010	50	5,000
Carlisle	8/16/2010	50	5,000

Table 4.3.7-4: Previous windstorm events in Cumberland County (NOAA NCEI, 2024j & community surveys).			
Location	**Date**	**Estimated Wind Speed (Knots)**	**Estimated Property Damage ($)**
Boiling Springs	9/22/2010	50	5,000
Shippensburg	9/22/2010	50	5,000
Lees Crossroads	5/26/2011	50	5,000
Carlisle	5/26/2011	56	5,000
Enblass	5/26/2011	50	5,000
Mechanicsburg	5/26/2011	50	5,000
Cedar Cliff Manor	5/26/2011	50	5,000
Mechanicsburg	5/26/2011	52	*not given*
Shippensburg	5/27/2011	50	5,000
New Kingstown	5/27/2011	50	5,000
Countywide	6/9/2011	50	5,000
Greason	7/7/2011	50	*not given*
Carlisle Springs	7/7/2011	50	*not given*
Springville	8/1/2011	60	5,000
West Hill	8/1/2011	50	5,000
Carlisle	5/27/2012	50	5,000
Mechanicsburg	5/27/2012	50	5,000
New Cumberland	5/27/2012	50	5,000
Newville	5/29/2012	50	5,000
Greason	5/29/2012	50	5,000
Cedar Cliff Manor	6/1/2012	50	5,000
Toland	6/29/2012	50	*not given*
Newburg	7/5/2012	50	5,000
Walnut Bottom	7/5/2012	50	5,000
Middlesex	7/18/2012	50	1,000
Gettysburg Junction	7/18/2012	50	5,000
Cedar Cliff Manor	7/31/2012	50	2,500
Wertzville	8/4/2012	50	5,000
Plainfield	8/26/2012	50	5,000
Doubling Gap	8/26/2012	50	5,000
Countywide	10/29/2012	50	*not given*
Walnut Bottom	6/13/2013	50	5,000
Carlisle	6/25/2013	50	5,000
Countywide	9/11/2013	50	2,000
Shiremanstown	6/3/2014	56	1,000
Countywide	7/8/2014	50-70	10,000
Countywide	7/27/2014	50-56	4,000
Plainfield	8/21/2014	50	500
Shippensburg	5/16/2015	50	1,000

Table 4.3.7-4: Previous windstorm events in Cumberland County (NOAA NCEI, 2024j & community surveys).			
Location	**Date**	**Estimated Wind Speed (Knots)**	**Estimated Property Damage ($)**
Mechanicsburg	5/31/2015	50	2,500
Middlesex	6/8/2015	50	1,500
Mount Holly Springs	6/20/2015	50	500
Carlisle	7/9/2015	50	5,000
Countywide	4/3/2016	52	5,000
Hockersville	6/21/2016	52	2,000
Eberleys Mill	8/16/2016	52	2,000
Cedar Cliff Manor	10/30/2016	52	8,000
Countywide	2/12/2017	43	*not given, one fatality*
Countywide	6/23/2017	52	5,000
Cedar Cliff Manor	7/19/2017	52	4,000
Countywide	8/4/2017	52	12,000
Countywide	3/2/2018	52	*not given*
Countywide	4/4/2018	52	*not given*
Bonny Brook	5/15/2018	52-65	54,000
Carlisle	5/19/2019	52	Not given
Middlesex	5/19/2019	52	Not given
Bloserville	5/23/2019	52	3,000
Mechanicsburg	7/16/2019	52	3,000
Barnitz	8/15/2019	52	Not given
Hunters Run	5/29/2020	52	4,000
Lisburn	5/29/2020	52	6,000
Carlisle	6/03/2020	52	4,000
Greason	6/04/2020	52	9,000
Gettysburg Jct	6/04/2020	52	4,000
Hockersville	7/06/2020	52	3,000
Longsdorf	8/28/2020	52	5,000
Cleversburg	11/15/2020	52	10,000
Cumminsville	11/15/2020	52	Not given
Pine Glen	5/26/2021	52	Not given
Middlesex	5/26/2021	52	Not given
Barnitz	6/30/2021	52	12,000
Allen	6/30/2021	52	3,000
Sheperdstown	6/30/2021	52	No given
Newburg	7/07/2021	52	4,000
Rossmoyne	7/11/2021	52	Not given
Eberleys Mill	7/11/2021	55	Not given
New Kingstown	8/11/2021	52	3,000
Carlisle Springs	8/13/2021	52	15,000

Table 4.3.7-4: Previous windstorm events in Cumberland County (NOAA NCEI, 2024j & community surveys).			
Location	**Date**	**Estimated Wind Speed (Knots)**	**Estimated Property Damage ($)**
Pine Glen	8/18/2021	52	3,000
Middlesex	8/18/2021	52	3,000
Mt Holly Springs	8/18/2021	52	3,000
New Cumberland	3/07/2022	52	Not given
Greenspring	3/31/2022	52	3,000
Goodyear	3/31/2022	52	3,000
Greason	5/22/2022	52	4,000
Mt Holly Springs	5/22/2022	52	5,000
Allen	5/22/2022	52	4,000
New Kingstown	6/16/2022	52	3,000
Greenspring	7/20/2023	52	2,000
Greason	7/21/2023	52	2,000
Toland	7/21/2023	52	3,000
New Kingstown	7/21/2023	52	4,000
Newville	7/28/2023	52	3,000
Barnitz	9/07/2023	52	6,000

4.3.7.4 Future Occurrence

Pennsylvania averages about 16 tornadoes per year, with the majority occurring in May, June, and July (Pann, 2023). While the chance of being hit by a tornado is small, the damage that results when the tornado arrives is devastating. An F4 tornado 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. Refer to Figure 4.3.4-5 for specific International Building Code requirements for wind shelters in the County.

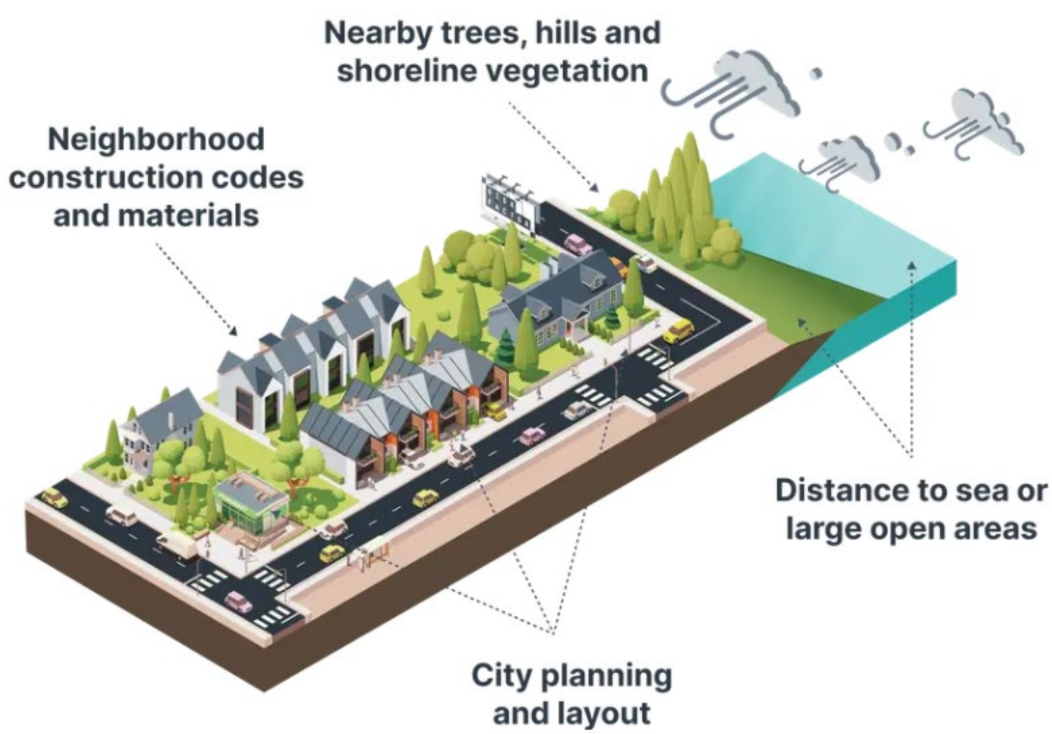
In the United States, variability in tornado activity has increased, with fewer days of year of activity but more activity on those days (Brooks et al., 2014). Climate models project atmospheric conditions conducive to severe thunderstorms, tornadoes, and hail and wind will become more likely, but those 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). Several municipalities, including Shiremanstown Borough, Upper Frankford Township, Upper Mifflin Township, South Newton Township, and West Pennsboro Township noted an increase in wind storms / more severe wind conditions. Because windstorm events are more common and there is probable increased threat of severe convective storms due to the effects of climate change, the overall probability of future tornado and windstorm events can be considered *highly likely* according to the Risk Factor Methodology (see Table 4.5.2-1).

4.3.7.5 Vulnerability Assessment

According to First Street, an area's wind vulnerability is primarily determined by its topography, surface roughness, and proximity to the sea (see Figure 4.3.7-5). There are a number of factors that can exacerbate the effects of wind across an area, including the angle of incidence between a house and the onrushing winds. Damage may occur to roofs, walls, and windows in structures. Common vulnerability to wind damages includes but are not limited to:

1. Neighborhood construction materials – Having updated construction codes and building materials that have been tested against severe winds can help reduce damage.
2. City planning and layout – The way buildings are arranged and spaced relative to the sea and each other can impact how winds impact the areas. Dense neighborhoods or being nearby to commercial buildings results in higher debris vulnerability while sparser neighborhoods can have lower debris vulnerability.
3. Distance to sea or large open areas – Being close to water or large open areas increases wind speed. Areas that are far from the shoreline are less likely to experience wind damages since a combination of friction and loss of energy source (evaporating water from the ocean surface) rob a hurricane of energy and slow wind speeds.
4. Nearby trees, hills and shoreline vegetation – Unlike manmade materials, trees, hills, dunes and even plants between bodies of water and homes may block the wind from storms and reduce the damage to those homes.

Figure 4.3.7-5: The below image illustrates key factors that make an area vulnerable to wind damage (First Street, 2024b).



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. 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 Cumberland 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 communication and response, particularly in more rural areas of the county. A worst-case scenario for utility interruption in Cumberland 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 4.3.4.

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 Bureau, 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 4.3.7-5 lists the number of these structures in each municipality.

Table 4.3.7-5: Number of mobile homes per municipality in Cumberland County, PA (Cumberland County GIS, 2025).

Municipality	Number of Total Addressed Units	Number of Mobile Homes	Percent of Total Addressed Units that are Mobile Homes
Borough of Camp Hill	3748	0	0.0%
Borough of Carlisle	9209	15	0.2%
Township of Cooke	421	4	1.0%
Township of Dickinson	2329	186	8.0%
Township of East Pennsboro	9331	64	0.7%
Township of Hampden	14623	519	3.5%
Township of Hopewell	937	77	8.2%
Borough of Lemoyne	2235	0	0.0%
Township of Lower Allen	8507	80	0.9%
Township of Lower Frankford	742	171	23.0%
Township of Lower Mifflin	768	257	33.5%
Borough of Mechanicsburg	4834	0	0.0%
Township of Middlesex	3435	771	22.4%
Township of Monroe	2834	177	6.2%
Borough of Mt Holly Springs	926	120	13.0%
Borough of New Cumberland	3365	0	0.0%
Borough of Newburg	137	0	0.0%
Borough of Newville	766	12	1.6%
Township of North Middleton	5807	515	8.9%
Township of North Newton	939	58	6.2%
Township of Penn	1200	102	8.5%
Borough of Shippensburg	2233	4	0.2%
Township of Shippensburg	1392	281	20.2%
Borough of Shiremanstown	801	0	0.0%
Township of Silver Spring	9062	395	4.4%
Township of South Middleton	7433	446	6.0%
Township of South Newton	536	28	5.2%
Township of Southampton	3364	488	14.5%
Township of Upper Allen	8998	124	1.4%
Township of Upper Frankford	1026	408	39.8%
Township of Upper Mifflin	573	100	17.5%
Township of West Pennsboro	2345	250	10.7%
Borough of Wormleysburg	1590	0	0.0%
TOTAL	**116446**	**5652**	**8.0%**

As of 2020, there is an estimated total of 5,652 mobile home structures in Cumberland County. Table 4.3.7-5 details the total residential structures and the number of mobile home structures in each municipality. Middlesex Township, Hampden Township, and North Middleton Township have the most mobile homes, 771, 519, and 515 respectively.

Upper Frankford and Lower Mifflin Townships have the highest percentages of residential structures that are mobile homes (39.8 percent and 33.5 percent, respectively). The boroughs of Camp Hill Borough, Lemoyne, Mechanicsburg, New Cumberland, Newburg, Shiremanstown, and Wormleysburg are the only municipalities in the County that have no mobile homes. Zoning restrictions within these municipalities are most likely the cause of this difference. Higher concentrations of mobile home structures increase the vulnerability of the area to tornadoes and windstorms.

Additional evaluation criteria include building age and building codes that may have been in effect at the time of construction, type of construction and condition of the structure (i.e., how well the structure has been maintained). With the exception of building age, this information is not available for structures countywide. However, parcel data includes *year-built* information. As illustrated in Figure 4.3.7-6, a total of 18,123 parcels, approximately 17 percent of all parcels in the County (as of 2024), had primary structures built prior to 1950. The parcel data also contains 16,717 (16% of all) structures that have an unknown construction date. Note that additional information on construction type and building codes enforced at time of construction would allow a more thorough assessment of the vulnerability of structures to tornadoes and severe wind.

Pennsylvania's statewide building code, known as the Uniform Construction Code (UCC), has been enforced since 2004. Regulations are derived from codes issued by the International Code Council (ICC), including the International Building Code (IBC). As ICC codes are revised, the UCC reviews and adopts the periodic changes. Any construction permits sought after October 1, 2018, require adherence to the 2015 International Codes issued by the ICC. All Cumberland County municipalities chose to opt-in to the UCC in 2004, which means that each is responsible for enforcing UCC codes within their jurisdiction.

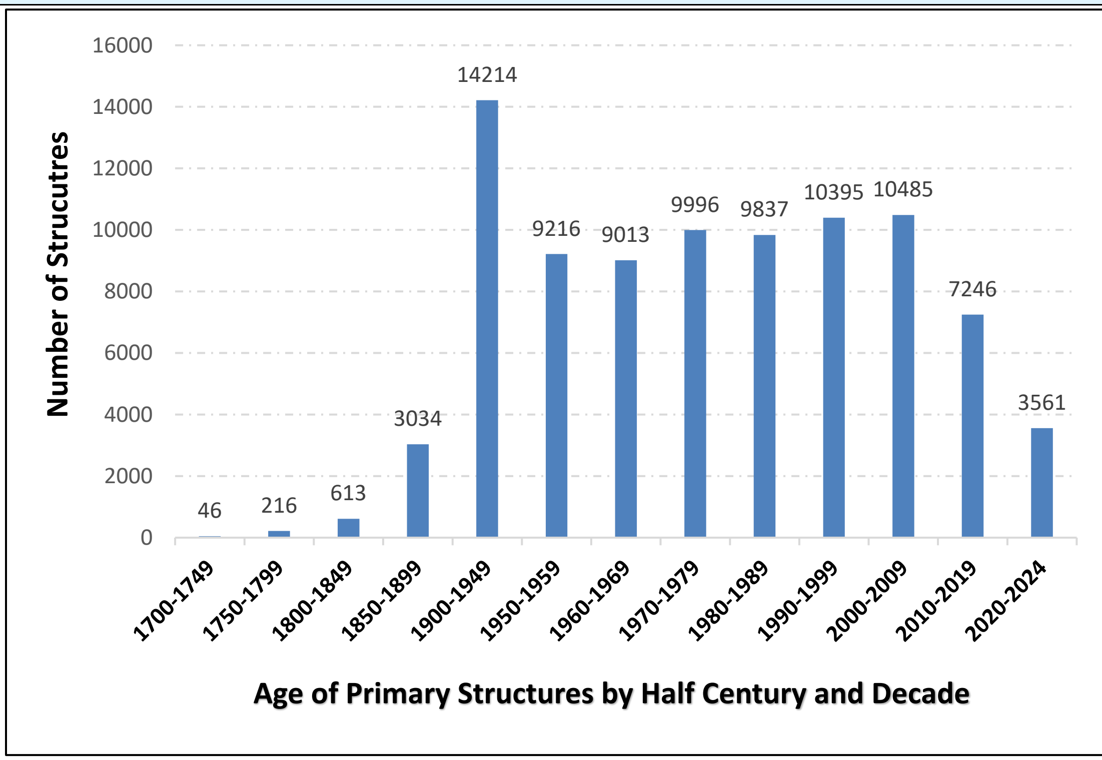
Table 4.3.7-5: Distribution of the age of primary structures per parcel identified in the County parcel database as main-building built in each decade between 1700 to 2024. (Cumberland County GIS, 2024). Note that structures built in the 1700s through 1949 are summed by half century, not decade.

Age of Primary Structure by Half Century and Decade	Number of Structures	Percentage of Structures
1700-1749	46	0.0%
1750-1799	216	0.2%
1800-1849	613	0.6%
1850-1899	3,034	2.9%
1900-1949	14,214	13.6%
1950-1959	9,216	8.8%
1960-1969	9,013	8.6%

Table 4.3.7-5: Distribution of the age of primary structures per parcel identified in the County parcel database as main-building built in each decade between 1700 to 2024. (Cumberland County GIS, 2024). Note that structures built in the 1700s through 1949 are summed by half century, not decade.

Age of Primary Structure by Half Century and Decade	Number of Structures	Percentage of Structures
1970-1979	9,996	9.6%
1980-1989	9,837	9.4%
1990-1999	10,395	9.9%
2000-2009	10,485	10.0%
2010-2019	7,246	6.9%
2020-2024	3,561	3.4%
Unknown	16,717	16.0%
TOTAL	**104,589**	**100.0%**

Figure 4.3.7-6: Age of Distribution of the age of primary structures per parcel identified in the County parcel database as main-building built in each decade between 1700 to January 2024 (Cumberland County GIS, 2024). Note that structures built in the 1700s through 1949 are summed by half century, not decade.



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, Cumberland 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 4.3.4-5 in order to prevent release of hazardous materials into the environment.

4.3.7.6 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 Middlesex Township, Hampden Township, North Middleton Township, Southampton Township, South Middleton Township, and Silver Spring Township may be particularly vulnerable (see Table 4.3.7-5). Additionally, households without vehicles, smartphones, or people with disabilities are also at higher risk if evacuation becomes necessary as all of 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.

4.3.8. Wildfire

4.3.8.1 Location and Extent

Wildfires occur throughout wooded and open vegetation areas of Pennsylvania. Open fields, grass, dense brush, and forest-covered areas are typical sites for wildfire events. Much of the western half of Cumberland County consists of forested areas surrounded by cropland and pastures. Under dry conditions or droughts, wildfires have the potential to burn forests as well as croplands. Any small fire, if not quickly detected and suppressed, can get out of control. Most wildfires are caused by human carelessness or negligence (PA DCNR, 2024). However, some are precipitated by lightning (EPA, 2024). Large events may require evacuation from one or more communities and necessitate regional or national firefighting support.

Wildfires can occur any time of the year, but mostly occur during long, dry hot spells. The greatest potential for wildfires is in the spring months of March, April, and May, and, to a lesser extent, the autumn months of October and November. In the spring, bare trees allow sunlight to reach the forest floor, drying fallen leaves and other ground debris. In the fall, dried leaves are also fuel for fires. Approximately 99 percent of wildfires in Pennsylvania are caused by people, often by debris burns. Several fires have started in a person's backyard and traveled through dead grasses and weeds into bordering woodlands (PA DCNR, 2024).

According to First Street, three major factors make an area vulnerable to wildfires (see Figure 4.3.8-1).

1. Vegetation and fuel sources – The type of fuels for a fire can impact the intensity and speed of it spreading. Dry grass can catch fire and spread quickly with high winds, extremely intense fires tend to build more in dry dense vegetation areas where treetop canopies can cast embers miles away.
2. Possible ignition sources – Electric transmission lines, areas prone to lightning, and historic data should be considered when determining where human-caused fires are more likely to occur.
3. Topography and weather – Topography refers to the surface features of land. After a fire begins, the topography of the land and the weather determine how far and fast fires spread. Fires generally climb uphill and more intense winds can spread a fire more quickly and carry embers further.

Forests are the dominant land use in Pennsylvania and represent 35% of the land area in Cumberland County (Cumberland County, 2022). Portions of the Michaux (District 1) and Tuscarora (District 3) State Forests are located in Cumberland County. These forests, as well as several State Gameland areas, are of particular concern for wildfire events due to the large area of expanded woodland. Figure 4.3.8-2 shows the specific location of previous wildfire events from 1999 to 2020, and the burn probability throughout Cumberland County. Overall, most areas of Cumberland County have a low probability for wildfires. However, the southern portions of Southampton, Penn, Cooke, Dickinson, and South Middleton Townships have a moderate probability of wildfires with most occurring throughout these areas.

Figure 4.3.8-1: The below image illustrates key factors that make an area vulnerable to wildfire (First Street, 2024a).

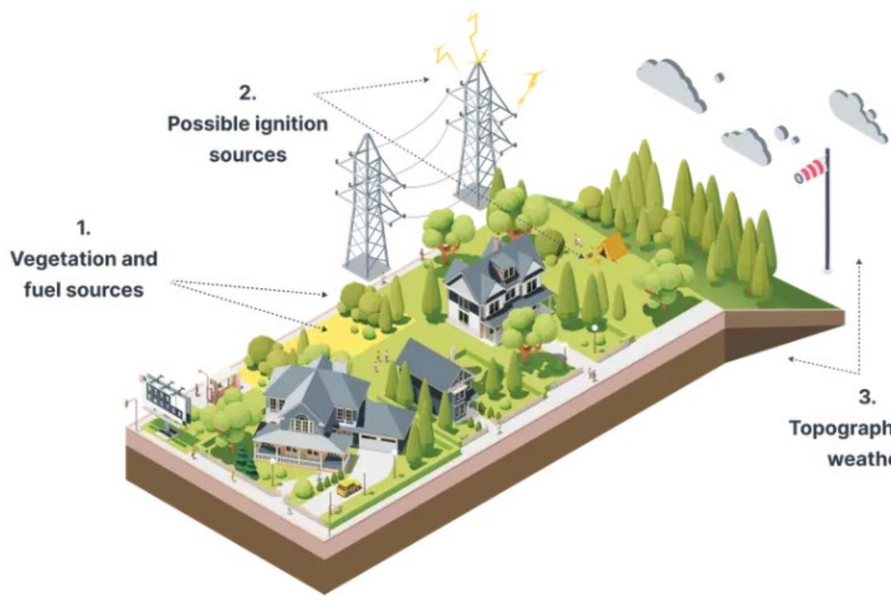
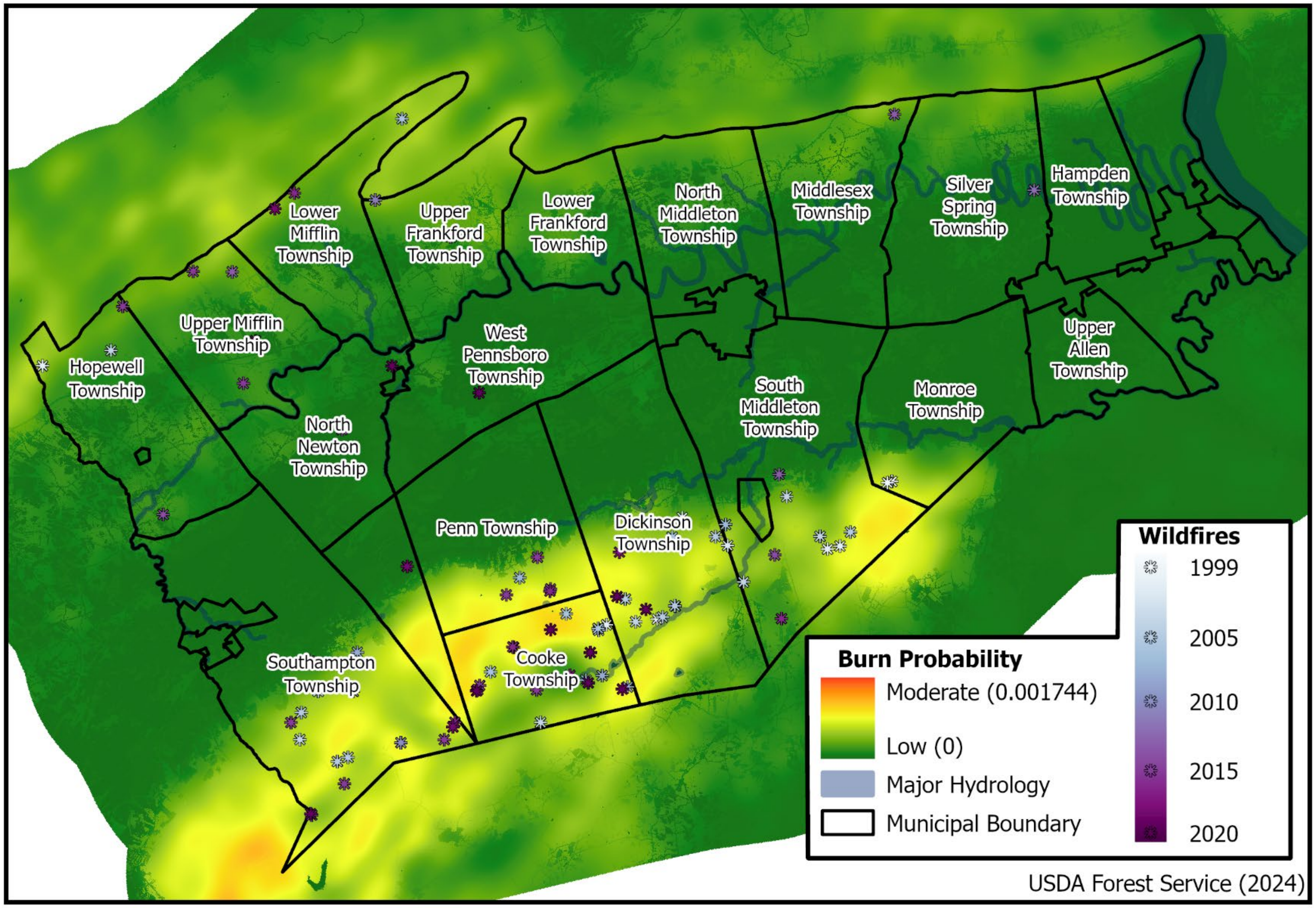


Figure 4.3.8-2: Historical wildfire events from 1999 to 2020, and burn probability throughout Cumberland County (USDA Forest Service, 2024). This image is a screen capture from the Cumberland County Hazard Mitigation Plan Map Series. Please hold the CTRL key and select the map below for the Hazard Mitigation Plan Map Series.



4.3.8.2 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. An example of a local wildfire is provided in Figure 4.3.8-3.

Figure 4.3.8-3: A wildfire in Cumberland County, PA (Photograph courtesy of Cumberland County, 2024).

The impact of a severe wildfire can be devastating. A wildfire can kill people, livestock, fish and wildlife. They often destroy property, valuable timber, forage and recreational and scenic values. Vegetation loss is a concern but typically not a serious impact as fires burn dead trees, leaves, and grasses that add nutrients to soil and can both stimulate and help create space for new growth (USDA-FS, 2022). However, vegetation loss also creates the opportunity for non-native grasses to invade, which has been demonstrated to suppress native vegetation regrowth and result in hotter and longer-lasting fires in the deciduous forests that populate most of the Eastern United States, including Pennsylvania (Flory et al. 2015). The most significant environmental impact is the potential for severe erosion, silting of stream beds and reservoirs from landslides and debris flow, and flooding due to ground-cover loss following a fire event (Ryan-Burkett, 2014).

In addition to the risk wildfires pose to the 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 areas away from the communities that they are chartered to protect.

Beyond the human and societal impacts, wildfire also affects the Earth's climate. Forests in particular store large amounts of carbon. When they burn, they immediately release carbon dioxide into the atmosphere, which in turn contributes to climate change. After burning, forests also release carbon dioxide more gradually through decomposition (EPA, 2024).

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

Table 4.3.8-1: Most Likely Lifelines Impacted by Wildfire.

LIFELINES	NOTES
	Fire departments will need to respond and possibly recover where community safety is threatened.
	Shelter lifeline as wildlife directly threatens homes and potentially agricultural operations.
	Potential serious injuries and fatalities may occur.

4.3.8.3 Past Occurrence

The Cumberland County Department of Public Safety shared wildfire data from 2021 to 2024 in Cumberland County. This information is provided in Table 4.3.8-2 below. Dickinson Township had the most wildfires in the last 4 years with a total of 18 wildfires, while the Township of Southampton had a total of 14 wildfires. Furthermore, South Middleton and Silver Spring Township tied for third place with a total of 8 wildfires. Overall, Cumberland County had a total of 131 wildfire events reported from 2021 to 2024. The year 2021 had the most wildfire events with a total of 45 in one year.

Table 4.3.8-2: Number of wildfires per municipality in Cumberland County from 2021-2024 (Cumberland County Department of Public Safety, 2024).

Municipality	2021	2022	2023	2024	Total Wildfires
Borough of Camp Hill	0	0	0	0	0
Borough of Carlisle	1	1	1	2	5
Township of Cooke	3	2	2	0	7
Township of Dickinson	9	1	5	3	18
Township of East Pennsboro	0	1	0	1	2
Township of Hampden	1	2	2	0	5
Township of Hopewell	2	0	2	0	4
Borough of Lemoyne	1	1	0	0	2
Township of Lower Allen	2	2	0	3	7
Township of Lower Frankford	1	2	2	1	6
Township of Lower Mifflin	1	0	1	4	6
Borough of Mechanicsburg	0	0	0	0	0
Township of Middlesex	3	1	1	1	6
Township of Monroe	1	1	0	0	2
Borough of Mt Holly Springs	0	0	0	2	2
Borough of New Cumberland	1	0	0	0	1
Borough of Newburg	1	0	0	0	1
Borough of Newville	0	0	0	0	0
Township of North Middleton	1	0	0	0	1
Township of North Newton	3	0	3	0	6
Township of Penn	3	1	2	1	7
Borough of Shippensburg	0	0	0	0	0
Township of Shippensburg	0	0	0	0	0
Borough of Shiremanstown	0	0	0	0	0
Township of Silver Spring	1	1	2	4	8
Township of South Middleton	3	1	1	3	8
Township of South Newton	0	0	0	1	1
Township of Southampton	2	2	4	6	14
Township of Upper Allen	0	0	0	0	0
Township of Upper Frankford	2	1	0	1	4
Township of Upper Mifflin	1	0	1	1	3
Township of West Pennsboro	2	0	0	3	5
Borough of Wormleysburg	0	0	0	0	0
TOTAL	**45**	**20**	**29**	**37**	**131**

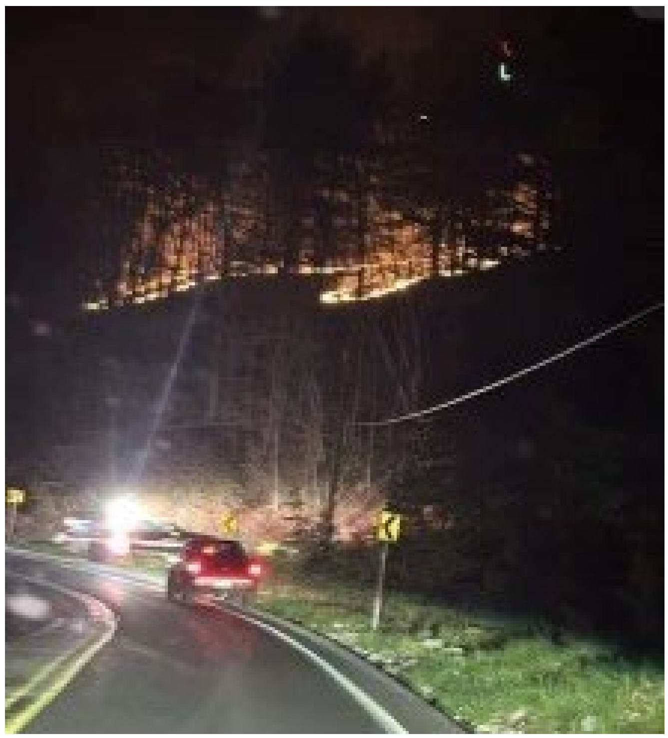
There has been a total of 89 wildfire events reported to the United States Department of Agriculture (USDA) United States Forest Service (USFS) from 1992-2020 in the County (See Table 4.3.8-3). Cooke Township contained the most wildfire events with 23 total, while Southampton Township had the second most with 16 and then Dickinson Township with 13 wildfire events. Information on wildfire events occurring on private land is not available. An example of a local wildfire is shown in Figure 4.3.8-4.

Table 4.3.8-3: List of wildfire events reported in Cumberland County from 1992-2020 (USDA USFS, 2024).

Municipality	Wildfires per Municipality
Borough of Camp Hill	0
Borough of Carlisle	0
Township of Cooke	23
Township of Dickinson	13
Township of East Pennsboro	0
Township of Hampden	0
Township of Hopewell	4
Borough of Lemoyne	0
Township of Lower Allen	0
Township of Lower Frankford	0
Township of Lower Mifflin	3
Borough of Mechanicsburg	0
Township of Middlesex	1
Township of Monroe	2
Borough of Mt Holly Springs	0
Borough of New Cumberland	0
Borough of Newburg	0
Borough of Newville	0
Township of North Middleton	0
Township of North Newton	2
Township of Penn	5
Borough of Shippensburg	0
Township of Shippensburg	0
Borough of Shiremanstown	0
Township of Silver Spring	1
Township of South Middleton	11
Township of South Newton	1
Township of Southampton	16
Township of Upper Allen	0
Township of Upper Frankford	2

Table 4.3.8-3: List of wildfire events reported in Cumberland County from 1992-2020 (USDA USFS, 2024).	
Municipality	**Wildfires per Municipality**
Township of Upper Mifflin	4
Township of West Pennsboro	1
Borough of Wormleysburg	0
TOTAL	**89**

Figure 4.3.8-4: Wildfire on a mountain side in Cumberland County, PA (Photograph courtesy of Cumberland County, 2024).



Wildfire information obtained from the U.S. Forest Service is aggregated by state forest. Table 4.3.8-4 shows acreage burned in Michaux and Tuscarora State Forests between 1995 and 2015, some of which includes areas outside of Cumberland County. During this time frame, 255.6 acres burned in Michaux State Forest while 9.11 acres burned in Tuscarora State Forest. Additional research conducted on the National Oceanographic and Atmospheric Administration (NOAA) Storm Events Database has revealed that no wildfires were reported in Cumberland County from January 1, 2016, through December 31, 2024.

Table 4.3.8-4: Acres burned due to wildfires in Michaux and Tuscarora State Forests from 1999 to 2015 (USFS, 2017; PA DCNR, 2017).

Year	State Forest	Area Burned (Acres)
2015	Michaux	1.1
	Tuscarora	1.5
2014	Michaux	30
	Tuscarora	1.25
2013	Michaux	0
	Tuscarora	1.5
2012	Michaux	0.5
	Tuscarora	0.25
2011	Michaux	0.01
	Tuscarora	0
2010	Michaux	0
	Tuscarora	0
2009	Michaux	2.6
	Tuscarora	0
2008	Michaux	14.4
	Tuscarora	0
2007	Michaux	17.9
	Tuscarora	0.3
2006	Michaux	77.65
	Tuscarora	0
2005	Michaux	50.1
	Tuscarora	4.3
2004	Michaux	0
	Tuscarora	0
2003	Michaux	3
	Tuscarora	0
2002	Michaux	42.4
	Tuscarora	0.01
2001	Michaux	1
	Tuscarora	0
2000	Michaux	0
	Tuscarora	0
1999	Michaux	15
	Tuscarora	0

4.3.8.4 Future Occurrence

Previous events indicate that annual wildfire occurrences in the County are expected. Weather conditions like drought can increase the likelihood of wildfires occurring. Prolonged periods of drought caused by climate change can potentially increase the length of the wildfire season and provide a more favorable climate for ignition. The increased temperatures and associated decrease in soil moisture, connected to anthropogenic greenhouse gas emission could create conditions more conducive to wildfires (Wehner et al., 2017). Currently, wildfire occurrences in Pennsylvania are concentrated in the spring and fall but changing weather patterns may extend the wildfire season. It is important to note that most wildfires in Pennsylvania are human caused. As a result, the occurrence of future wildfire events will strongly depend on patterns of human activity. Events are more likely to occur in wildfire-prone areas experiencing new or additional development.

There is virtually a 100 percent chance of a forest fire of some size occurring in any given year within Cumberland County. However, the likelihood of one of those fires attaining significant size and intensity is unpredictable and highly dependent on environmental conditions and firefighting response. Smaller fires still pose a significant danger to life and property. Key factors in the occurrence and spread of wildfires are temperature, soil moisture, humidity, precipitation, topography, wind speed, and both the size and amount of fuel or vegetation (Moore, 2021). In Pennsylvania, conditions are currently most conducive to wildfires in the spring and autumn, as trees are bare, temperatures are warm, and humidity is low (PA DCNR, 2024). Invasive forest insects can increase the likelihood and severity of wildfires by killing existing plants and providing more fuel (Jenkins et al. 2014). One species that could impact Pennsylvania in this way is the spotted lanternfly.

Climate changes have the potential to increase the frequency, extent, and severity of wildfires by lengthening the wildfire seasons through warmer temperatures throughout the year, longer dry seasons, and increases in drought events (EPA, 2024). Decreases in the surface soil moisture due to enhanced evaporation under a warmer climate is likely and could contribute to wildfire conditions, especially in the summer and fall (Wehner et al. 2017). While total rainfall is projected to increase across the state, the nature of it being from less frequent but more intense events combined with rising temperatures means that drought conditions are expected to increase as well (PA Climate Impacts Assessment, 2021). Overall, the probability of future wildfires can be considered *moderately likely* according to the Risk Factor Methodology (see Table 4.5.2-1).

The Climate Mapping for Resilience and Adaptation (CRMA) Tool provides a county-level assessment report for wildfire, shown in Figure 4.3.8-5 below. The future climate indicators for wildfire are precipitation and temperatures thresholds. According to CRMA, the days per year with no precipitation is 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 4.3.8-5: Cumberland County Wildfire Hazard Assessment Report (CRMA, 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:							
Days per year with no precipitation (dry days)	**184 days** 178 - 188	**184 days** 171 - 194	**184 days** 174 - 199	**184 days** 171 - 197	**185 days** 172 - 201	**184 days** 173 - 197	**186 days** 160 - 216
Maximum number of consecutive dry days	**12 days** 11 - 13	**13 days** 10 - 15	**12 days** 11 - 16	**13 days** 11 - 15	**13 days** 11 - 16	**13 days** 11 - 15	**13 days** 11 - 17
Days per year with precipitation (wet days)	**181 days** 177 - 187	**181 days** 171 - 194	**181 days** 166 - 191	**181 days** 168 - 194	**180 days** 164 - 193	**181 days** 168 - 192	**179 days** 149 - 205
Temperature thresholds:							
Annual days with maximum temperature > 90°F	**12 days** 12 - 19	**33 days** 18 - 49	**35 days** 19 - 53	**43 days** 23 - 66	**52 days** 28 - 72	**53 days** 26 - 83	**84 days** 40 - 111
Annual days with maximum temperature > 100°F	**0 days** 0 - 0	**2 days** 0 - 9	**3 days** 0 - 10	**4 days** 0 - 18	**7 days** 1 - 22	**7 days** 1 - 18	**23 days** 2 - 60

N/A = Data Not Available for the selected area

4.3.8.5 Vulnerability Assessment

Using structure inventory data provided by the County, Table 4.3.8-5 shows there are 282 structures scattered throughout the Michaux and Tuscarora State Forests in Cumberland County spreading throughout six municipalities. Of these municipalities, Cooke Township is most vulnerable, with about 60 percent of its structures located within forested areas. It is likely that many of these structures are used for recreation and not as year-round residences.

Table 4.3.8-5: Number of structures in the Michaux and Tuscarora State Forests per municipality (Cumberland County GIS, 2024).

Municipality	Total Addressed Units in Municipality	Structures Addressed Units in State Forest	Percent of Addressed Units in State Forest
Borough of Camp Hill	3,748	0	0%
Borough of Carlisle	9,209	0	0%
Township of Cooke	421	251	59.6%
Township of Dickinson	2,329	6	0.3%
Township of East Pennsboro	9,331	0	0%
Township of Hampden	14,623	0	0%
Township of Hopewell	937	0	0%
Borough of Lemoyne	2,235	0	0%
Township of Lower Allen	8,507	0	0%
Township of Lower Frankford	742	0	0%
Township of Lower Mifflin	768	22	2.9%
Borough of Mechanicsburg	4,834	0	0%
Township of Middlesex	3,435	0	0%
Township of Monroe	2,834	0	0%
Borough of Mt Holly Springs	926	0	0%
Borough of New Cumberland	3,365	0	0%
Borough of Newburg	137	0	0%
Borough of Newville	766	0	0%
Township of North Middleton	5,807	0	0%
Township of North Newton	939	0	0%
Township of Penn	1,200	0	0%
Borough of Shippensburg	2,233	0	0%
Township of Shippensburg	1,392	0	0%
Borough of Shiremanstown	801	0	0%
Township of Silver Spring	9,062	0	0%
Township of South Middleton	7,433	1	0%
Township of South Newton	536	0	0%

Township of Southampton	3,364	1	0%
Township of Upper Allen	8,998	0	0%
Township of Upper Frankford	1,026	0	0%
Township of Upper Mifflin	573	1	0.2%
Township of West Pennsboro	2,345	0	0%
Borough of Wormleysburg	1,590	0	0%
TOTAL	**116,446**	**282**	**0.24%**

There are no critical facilities in Cumberland County located within a state forest.

Additionally, Cumberland County does not have any career fire departments. The 29 fire companies in the County are staffed by volunteers. However, there are several fire companies that have paid staff on duty for 24 hours and 7 days a week to report to calls and drive fire apparatus. Cumberland County has seen an increase in municipalities utilizing their public works and other municipal employees to support fire company staffing in recent years (Cumberland County Department of Public Safety, October 17, 2024, personal communication).

Fire companies, particularly volunteer fire companies, face significant challenges today and into the future. Maintaining sufficient numbers of capable volunteers is an omnipresent concern for volunteer fire companies throughout the Commonwealth and County. The pool of available volunteers has been steadily declining, a trend likely to continue throughout the next planning period. The statewide decline in volunteers is driven by many factors: economic pressures necessitating dual income households, loss of local employment opportunities, and reduced reliance on service organizations for social activity and networking. These pressures are not expected to result in the loss of any individual fire company.

4.3.8.6 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 Carlisle Borough, East Pennsboro Township, Hampden Township, Lower Allen Township, Silver Spring Township, and Upper Allen Township may be particularly vulnerable (See Table 4.3.10-3 in Section 4.3.10.5).

4.3.9. Winter Storm

4.3.9.1 Location and Extent

Winter storms are regional events which affect Cumberland County, adjacent counties, other areas of the Commonwealth, or even the larger northeastern U.S. Winter storms for Cumberland County include blizzards and/or heavy snowfall, hail, heavy precipitation or ice storms, and temperature extremes. Snowstorms occur approximately five times per year. These storms are more prevalent in the northern and western regions of Pennsylvania and include ice and high wind.

Winter storms consist of cold temperatures, heavy snow or ice and sometimes strong winds. The effects of these storms can sometimes last for weeks, bringing several inches or even feet of snow and ice and cold temperatures. Winter storms are made with three ingredients (NOAA NSSL, 2024g):

- Cold Air – Below freezing temperatures in the clouds and near the ground are necessary to make snow and/or ice.
- Lift – Something to raise the moist air to form the clouds and cause precipitation. An example of lift is warm air colliding with cold air and being forced to rise over the cold dome. The boundary between the warm and cold air masses is called a front. Another example of lift is air flowing up a mountainside.
- Moisture – To form clouds and precipitation. Air blowing across a body of water, such as a large lake or the ocean, is an excellent source of moisture.

Cumberland County averages 11 to 20 inches of snow annually, as shown in Figure 4.3.9-1. Winter storms deliver significant snowfall to the County on a regular basis and several examples are described and illustrated in Section 4.3.9.3.

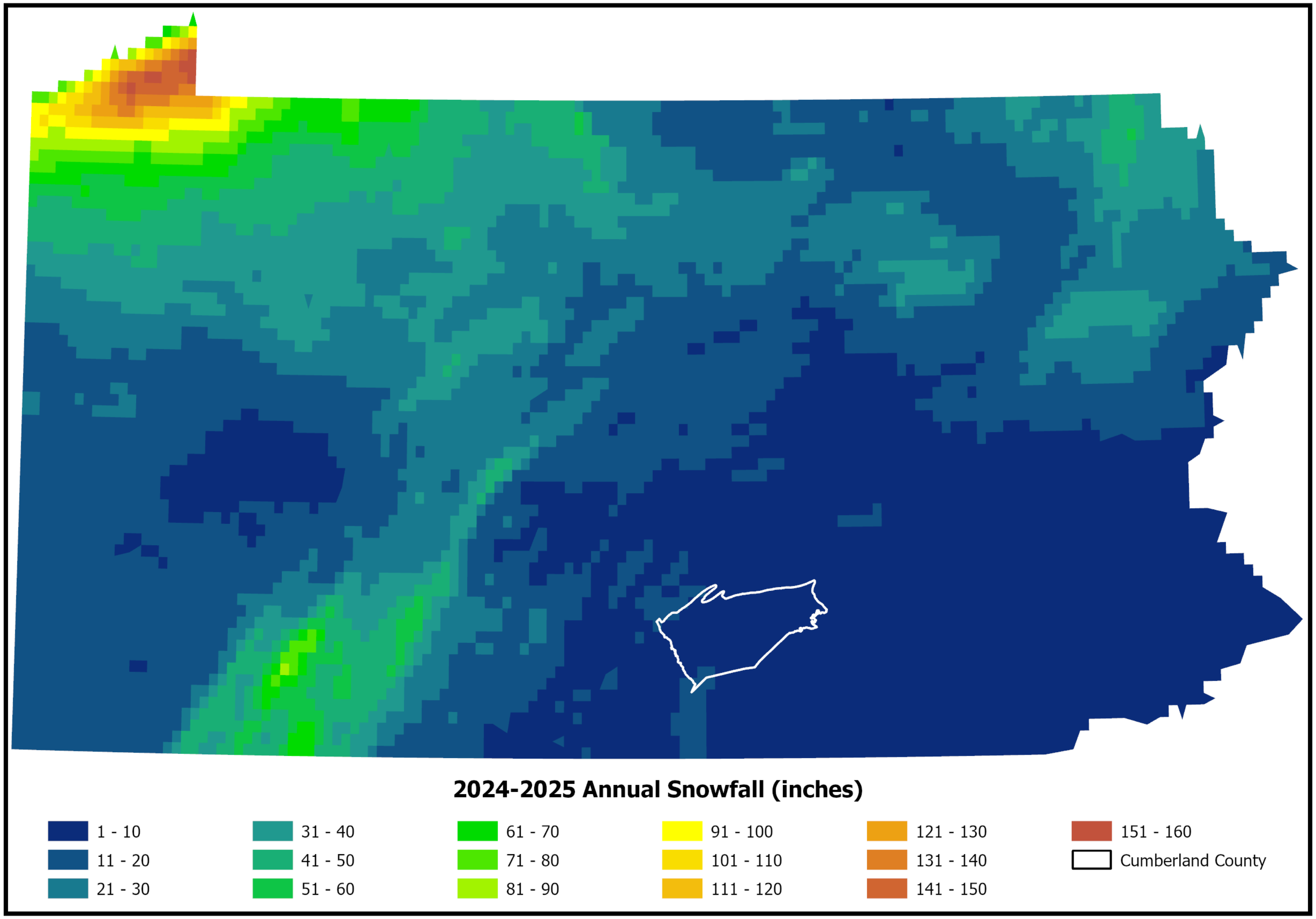
Table 4.3.9-1: Types of Winter Storms (NOAA NSSL, 2024f; NOAA NWS, 2024f)

Type	Description
Blizzards	Storms consisting of snow or blowing snow, winds of at least 35mph, and visibility frequently reduced to less than a ¼ mile. These conditions must last for at least 3 hours.
Ice Storms	Storms where at least ¼" of ice accumulates on exposed surfaces. They create hazardous driving and walking conditions. Tree branches and powerlines can easily snap under the weight of the ice.
Lake Effect Storms	Storms that are created by cold, dry air moving through warm, moist air over lakes, adding moisture that is then deposited in the form of snow. They affect areas to the south and east of lakes.
Snow Squalls	Brief, intense snow showers accompanied by strong, gusty winds. Accumulation may be significant.

Table 4.3.9-2: Types of Winter Precipitation (NOAA NSSL, 2024f)

Type	Description
Snow	Ice crystals that form in wintertime clouds that cling to each other as they fall forming snowflakes; they will remain in this form if the temperature from cloud to ground is at or below 0°C/32°F. Accumulation can range from none to significant. Wind conditions will impact visibility.
Sleet	Partially melted snowflakes that have passed through a small layer of warm air on their descent, only to refreeze as they approach the ground and form frozen rain drops.
Freezing Rain	Completely melted snowflakes that have passed through a large layer of warm air on their descent; they are then “supercooled” but not frozen by a small layer of cold air directly above the ground. The water drops will refreeze when contacting anything that is 0°C/32°F or below, creating a layer of ice on exposed surfaces. A significant accumulation of freezing rain lasting several hours or more is called an ice storm

Figure 4.3.9-1: The 2024-2025 Average Annual Snowfall in Cumberland County. This image is a screen capture from the Cumberland County Hazard Mitigation Plan Map Series. Please hold the CTRL key and select the map below for the Hazard Mitigation Plan Map Series.



4.3.9.2 Range of Magnitude

Due to their regular occurrence, these storms are considered hazards only when they result in damage to specific structures or cause disruption to traffic, communications, electric power, or other utilities. A winter storm can adversely affect roadways, utilities, business activities, and can cause loss of life, frostbite and freezing conditions. They can result in the closing of secondary roads, particularly in rural locations, loss of utility services and depletion of oil heating supplies (FEMA, 2024b). Winter storms can also cause building or structure collapses, most commonly with warehouses and other commercial buildings, if snowfall and accumulation is significant enough (Geis et al. 2012).

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. The worst winter storms, in early 1994, are described in Section 4.3.9.3.

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

Table 4.3.9-3: Most Likely Lifelines Impacted by Winter Storms.

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.
Transportation	Transportation lifeline in response and recovery due to direct damage to infrastructure and dangerous road conditions.

4.3.9.3 Past Occurrence

Cumberland County and the Commonwealth of Pennsylvania have a long history of severe winter weather. The worst winter storm in the country on record occurred on March 11-14, 1993. This blizzard, often called the Storm of the Century, stretched from Canada to the Gulf of

Mexico but was worst in the Eastern United States, including all of Pennsylvania. This storm caused widespread blackout conditions and registered snowfall totals of 13" in Philadelphia, 20" in Harrisburg, 23.6" in the Pittsburgh area (The Keystone, 2024), and a state-high 36" of snow (with 10' drifts) in Latrobe, Westmoreland. This event garnered a Presidential Emergency Declaration and the overall damage estimate for all states was $5.5 billion (NOAA NCEI, 2017).

In 1994 the state was hit by a series of protracted winter storms. The severity and nature of these storms combined with accompanying record-breaking frigid temperatures posed a major threat to the lives, safety and well-being of Commonwealth residents and caused major disruptions to the activities of schools, businesses, hospitals and nursing homes.

The first of these devastating winter storms occurred in early January 1994 with record snowfall depths of more than 33 inches across southwest and south-central portions of the Commonwealth, including Cumberland County, strong winds and sleet/freezing rains. A ravaging ice storm followed, closing major arterial roads and downing trees and power lines which left almost 600,000 residents without power in the southeast, many for several days NOAA NCEI, 1994). Utility crews from a five-state area were called to assist in power restoration repairs. Officials from PP&L stated that this was the worst winter storm in the history of the company; related damage-repair costs exceeded $5,000,000.

The record cold conditions resulted in numerous water-main breaks and interruptions of service to thousands of municipal and city water customers throughout the Commonwealth. Additionally, the extreme cold in conjunction with accumulations of frozen precipitation resulted in acute shortages of road salt; trucks were dispatched to haul salt from New York to expedite deliveries to Pennsylvania Department of Transportation storage sites (Russakoff, 1994).

During January and February 1994, Pennsylvania experienced at least 17 regional or statewide winter storms (Dunn, 1994). In January 1996, another series of severe winter storms with 27- and 24-inch accumulated snow depths was followed by 50 to 60-degree temperatures resulting in rapid melting and flooding (see Table 4.3.3-2). The worst winter storm on record to occur in Cumberland County on January 1, 1996, where 37.7 inches of snow fell over a three-day period (Bonura, 2018).

In January 2016, Winter Storm Jonas brought heavy snow to Pennsylvania, with a record-breaking 30.2 inches measured in Harrisburg, 36.9 inches in Mechanicsburg, and 34 inches in Pine Grove Furnace (state park in Cumberland County) by the National Weather Service (Kiner, 2017). A Declaration of Disaster Emergency was made, airports were closed, and the Pennsylvania Turnpike was so heavily impacted through adverse road conditions and roadway incidents that more than 500 vehicles were stranded for more than 24 hours; over 300 personnel were involved in response and recovery operations (PennLive, 2016). A 66-year-old Mount Holly Springs man died of hypothermia and heart disease in a snowbank outside of a store (NOAA NCEI, 2016).

Since the 2020 HMP update, no extreme snowfall events have occurred. The most snowfall in recent years occurred in 2021 when a winter storm produced 10 to 16 inches of snow across Cumberland County from January 31st to February 2nd (NOAA NCEI, 2021). In February 2024, nor'easter Lorraine swept across the northeast, depositing 5 to 7 inches of snow across Cumberland County. The heavy snowfall and gusty winds throughout the day produced numerous power outages throughout the county prompting a warming shelter to open. Furthermore, I-81 northbound was partially closed due to multiple crashes from the snowy conditions (NOAA NCEI, 2024d and The Weather Channel, 2024). Figure 4.3.9-2 displays a recent snowfall event in Cumberland County.

Figure 4.3.9-2: The results of a winter storm that took place in Cumberland County. (Photograph courtesy of Cumberland County Department of Planning, 2024).

Six of the 20 Presidential Disaster and Emergency Declarations affecting Cumberland have been in response to hazard events related to winter storms (see Table 4.2-1). In addition to the events described above, other winter storm events, including those associated with Disaster Declarations, are listed in Table 4.3.9-4. A photograph of one of the events is provided as Figure 4.3.9-3.

Table 4.3.9-4: Previous winter storm events impacting Cumberland County (Cumberland EOP, 1984; NOAA NCEI, 2024e; NOAA NCEI, 2024h; NOAA NCEI, 2024i; NOAA NCEI, 2024l). Only significant events are shown prior to 2003, while all events since 2003 are listed.

Location	Date	Type	Property Damage ($)
Statewide	January 1966	Winter Storm	*not provided*
Statewide	February 1972	Major Winter Storm	*not provided*
Statewide	January 1978	Winter Storm	*not provided*
Statewide	1977	Major Winter Storm	*not provided*
Statewide	February 1978	Major Winter Storm	*not provided*
Statewide	1981	Major Winter Storm	*not provided*
Statewide	1981	Major Winter Storm	*not provided*
Several Counties	1/6/1994	Record Snowfall	988,000
Statewide	1/7/1996	Blizzard	635,000
Several Counties	3/4/2001	Heavy Snow	150,000
Several Counties	2/6/2003	Heavy Snow	*not provided*
Statewide	2/16/2003	Heavy Snow	263,000
Several Counties	12/5/2003	Heavy Snow	*not provided*
Several Counties	2/6/2004	Ice Storm	*not provided*
Several Counties	3/19/2004	Heavy Snow	*not provided*
Several Counties	2/24/2005	Heavy Snow	*not provided*
Statewide	3/1/2005	Heavy Snow	*not provided*
Statewide	12/9/2005	Heavy Snow	*not provided*
Statewide	12/16/2005	Winter Storm	*not provided*
Several Counties	2/12/2006	Heavy Snow	*not provided*
Several Counties	2/13/2007	Winter Storm	*not provided*
Several Counties	3/16/2007	Heavy Snow	*not provided*
Several Counties	12/13/2007	Winter Storm	*not provided*
Several Counties	12/15/2007	Winter Storm	*not provided*
Several Counties	2/1/2008	Winter Storm	*not provided*
Several Counties	2/12/2008	Ice Storm	*not provided*
Statewide	1/6/2009	Ice Storm	*not provided*
Statewide	1/27/2009	Winter Storm	*not provided*
Countywide	12/19/2009	Winter Storm	*not provided*
Countywide	02/05/2010	Winter Storm	*not provided*
Countywide	02/09/2010	Winter Storm	*not provided*
Countywide	02/01/2011	Winter Storm	*not provided*
Countywide	02/21/2011	Heavy Snow	*not provided*
Countywide	10/29/2011	Heavy Snow	*not provided*
Countywide	12/14/2013	Winter Storm	*not provided*
Countywide	02/04/2014	Winter Storm	*not provided*
Countywide	02/13/2014	Heavy Snow	*not provided*
Several Counties	11/25/2014	Heavy Snow	*not provided*

Table 4.3.9-4: Previous winter storm events impacting Cumberland County (Cumberland EOP, 1984; NOAA NCEI, 2024e; NOAA NCEI, 2024h; NOAA NCEI, 2024i; NOAA NCEI, 2024l). Only significant events are shown prior to 2003, while all events since 2003 are listed.

Location	Date	Type	Property Damage ($)
Several Counties	1/22/2016	Winter Storm	*not provided*
Several Counties	3/13/2017	Winter Storm	*not provided*
Several Counties	2/17/2018	Winter Storm	*not provided*
Several Counties	3/20/2018	Winter Storm	*not provided*
Several Counties	11/15/2019	Winter Storm	*not provided*
Several Counties	2/11/2019	Winter Storm	*not provided*
Several Counties	2/20/2019	Winter Storm	*not provided*
Several Counties	12/16/2020	Winter Storm	*not provided*
Several Counties	1/31/2021	Winter Storm	*not provided*
Several Counties	2/1/2021	Winter Storm	*not provided*
Several Counties	1/6/2022	Winter Storm	*not provided*
Several Counties	3/12/2022	Winter Storm	*not provided*
Several Counties	1/6/2024	Heavy Snow	*not provided*
Several Counties	2/13/2024	Heavy Snow	*not provided*
Several Counties	2/16/2024	Heavy Snow	*not provided*

Figure 4.3.9-3: Snowplow in Silver Spring Township, Cumberland County, PA on January 7th, 2024 (Photograph courtesy of Robert Stover / *Fox43*, 2024).

4.3.9.4 Future Occurrence

Winter storms are a regular, annual occurrence in Cumberland County. Approximately 35 winter storms occur across Pennsylvania and about five occur in Cumberland County annually. Table 4.3.9-5 shows the snow depths expected for 10 percent-, 4 percent-, 2 percent- and 1 percent-annual-chance snowfalls over a 1-day, 2-day and 3-day period in Cumberland County. These depths are based on data collected at the weather station in Carlisle, PA between 1894 and

1980. Data was available for 73 years of this 86-year time period; however, additional data collection would improve statistical calculation of annual probabilities. Although, Camp Hill Borough, Penn Township, and Carlisle Borough noted a decrease in Winter Storms, the overall probability of future winter storms can be considered *highly likely* according to the Risk Factor Methodology (see Table 4.5.2-1).

Table 4.3.9-5: Extreme snowfall amounts measured in inches for 10 percent, 4 percent, 2 percent and 1 percent-annual probability of occurrence storms in Cumberland County (NCDC, 2007; NOAA NCEI, 2024c).

Time Frame	Annual Probability of Occurrence				Observed Max
	10 percent	4 percent	2 percent	1 percent	
1-Day	15.4	18.7	21.1	23.5	30.0
2-Day	18.6	22.9	26.0	29.1	36.9
3-Day	19.7	24.2	27.4	30.6	37.7

Winter storm tracks in North America have shifted northward by 0.4 degrees latitude and there has been an increase in frequency and intensity of storms since 1950. The most recent decades have brought some of the highest single-day and seasonal snowfall totals to many different parts of the Commonwealth, including Cumberland County. This trend may change in the future as the nature of winter precipitation changes. Projections show increases in winter precipitation but less of it will fall as snow (Zarzycki, 2018). This change will lead to fewer snowstorms, but data shows the decrease is more likely with smaller-scale storms than large-scale ones (Zarzycki, 2018). One of the primary causes of this increased precipitation is the warming of sea surface temperatures in the Atlantic Ocean; higher temperatures lead to an increased amount of water vapor in the air, providing more fuel for storms (Huang et. al. 2021).

In addition to this increase in fuel from the Atlantic, 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 and 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, 2021). More studies are ongoing.

The projections of less snow and a higher percentage of winter precipitation as rainfall are already playing out in some parts of the state, but not so in others. The number of snow-covered days declined by 1.5 days per decade for January and by 1 day per decade for February in the Northeast; snowfall totals are expected to decline 20-30% in the northern part of the state and 50-60% in southern parts (DCNR, 2015). In Cumberland County, freezing days, or days with daily minimum temperature below 32F, occurred 128 days per year on average from 1971 to

2000. The number decreased during that time period. As the climate warms, the average number of freezing days per year are projected to decrease to a range of 105 to 119 days per year in the near-term, 82 to 106 days per year by mid-century, and 58 to 89 days by late-century (Leary, 2023).

To sum up the myriad of projections, it is expected that there will be an increase in winter precipitation in the state, and it is very likely that an increasing amount of it will fall as rain instead of snow. There will be a decrease in the number of days where conditions allow for snow at all, but when they are cold enough, the result could be a significant amount of snowfall (Zarzycki, 2018).

4.3.9.5 Vulnerability Assessment

In Cumberland 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 closings. Power failures and interruption of water supplies are not uncommon from ice storms as well as heavy snow or blizzard conditions. These include the more sparsely populated areas of Cooke, Lower Mifflin, North Newton, Penn, South Newton, Southampton, Upper Frankford, and Lower Mifflin Townships. 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. Motorists may occasionally become stranded on major highways, especially on I-81 and I-83, during these storms.

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.

Critical facilities would be impacted by a storm event, but these structures are largely constructed of concrete and masonry; therefore, they should only suffer minimal structural damage. Because power interruption can occur, backup power is recommended for critical facilities and infrastructure.

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 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 Cumberland 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 Cumberland County built prior to 1940 according to the ACS 2023 five-year estimates. Carlisle Borough has the most structures of any municipality in the county built prior to 1940 (over 4,400). However, Newville and Shippensburg Boroughs have the largest proportion of housing units built prior to 1940 (78.5 and 56.0 percent, respectively). While the U.S. Census Bureau provides estimates for residential structures, the age of non-residential structures is not available.

Table 4.3.9-6: Housing Units Built Prior to 1940 in Cumberland County (U.S. Census Bureau, ACS, 2023).

Municipality	NUMBER OF HOUSING UNITS BUILT PRIOR TO 1940	PERCENT OF TOTAL HOUSING UNITS
Borough of Camp Hill	1533	43.4%
Borough of Carlisle	4434	48.0%
Township of Cooke	93	44.1%
Township of Dickinson	406	18.8%
Township of East Pennsboro	1473	15.8%
Township of Hampden	416	3.1%
Township of Hopewell	68	7.5%
Borough of Lemoyne	1115	46.1%
Township of Lower Allen	893	10.7%
Township of Lower Frankford	46	6.0%
Township of Lower Mifflin	111	16.0%
Borough of Mechanicsburg	1690	38.7%
Township of Middlesex	349	12.6%
Township of Monroe	564	22.1%
Borough of Mt Holly Springs	340	36.5%
Borough of New Cumberland	1552	43.4%
Borough of Newburg	78	48.4%
Borough of Newville	446	78.5%
Township of North Middleton	719	13.8%
Township of North Newton	171	17.9%
Township of Penn	259	21.7%
Borough of Shippensburg	1311	56.0%
Township of Shippensburg	115	11.6%
Borough of Shiremanstown	277	36.3%
Township of Silver Spring	616	7.3%
Township of South Middleton	710	10.4%
Township of South Newton	164	35.0%
Township of Southampton	316	10.8%

Township of Upper Allen	629	6.9%
Township of Upper Frankford	141	16.9%
Township of Upper Mifflin	103	20.4%
Township of West Pennsboro	633	27.4%
Borough of Wormleysburg	361	25.3%
TOTAL	**22,132**	**20.1%**

As all structures and infrastructure in Cumberland County will be exposed to heavy snow and ice, all of Cumberland County has adopted the 2009 IBC and IRC building codes. New construction will be able to withstand the weight of heavy snow or ice.

Since winter storms have become a regular occurrence in Cumberland County, as well as other counties throughout the Commonwealth, strategies have been developed to respond to these events. Snow removal and utility repair equipment is present to respond to typical events. The use of auxiliary heat and electricity supplies such as wood burning stoves, kerosene heaters and gasoline power generators reduces the impact winter storm events have on individuals who have this equipment available. Locations lacking adequate equipment to protect against cold temperatures or significant snow and ice are more vulnerable to winter storm events. Although warming shelters are a municipal responsibility in Cumberland County, some municipalities have pre-identified warming shelters that may include a municipal building, fire company, or a local church. These warming shelters are opened on an as needed basis, in coordination with the municipal Emergency Management Coordinator. In the event that additional capacity is needed or that a municipality does not have an identified warming shelter, a request would be made to the Cumberland County Department of Public Safety and forwarded to the American Red Cross, which would then work with PEMA to resolve (Cumberland County Department of Public Safety, personal communication, October 17, 2024). Even for communities that are prepared to respond to winter storms, severe events involving snow accumulations that exceed six or more inches in a 12-hour period can cause many traffic accidents, interrupt power supply and communications, and cause the failure of inadequately designed and/or maintained roof systems.

4.3.9.6 Equity in Vulnerable Communities

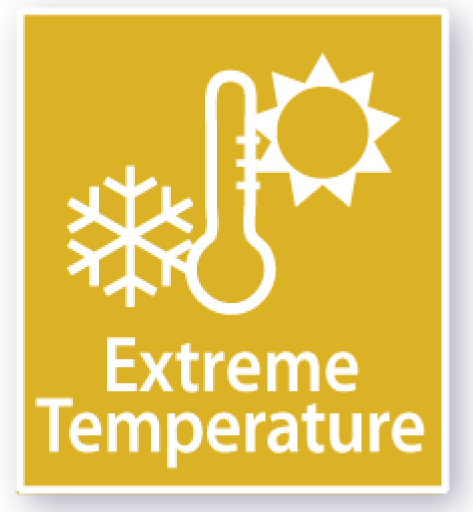
During winter storms there will be a disproportionate impact on low-income and marginalized communities. Low-income families are more likely to live in poorly insulated or older homes that are less able to withstand extreme cold. These homes may lack sufficient heating, insulation, and weatherproofing, 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 them 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 Camp Hill Borough, Carlisle Borough, East Pennsboro Township, Hampden Township, Lower Allen Township, Newville Borough, North Middleton Township, Silver Spring

Township, South Middleton Township, Southampton Township, and Upper Allen Township may be particularly vulnerable.

4.3.10. Extreme Temperature

4.3.10.1 Location and Extent

Extreme temperatures include 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.



4.3.10.2 Range of Magnitude

All of Cumberland County may be subject to extreme temperatures in the summer and winter seasons. Areas most susceptible to extreme heat include urban environments, as buildings and pavement absorb and retain heat, causing an Urban Heat Island Effect. Areas most susceptible to extreme cold include higher elevations. Different populations and industries may experience extreme temperatures differently. Demographics must also be considered, as large populations of elderly or poor represent those most vulnerable to temperature extremes.

Figure 4.3.10-1 and Figure 4.3.10-2 show annual mean maximum and minimum temperatures throughout Pennsylvania and highlight Cumberland County. Most of Cumberland County exhibits an annual maximum temperature of 63-64°F and an annual minimum temperature of 47-48°F. Elevation and topography account for local differences seen on the maps.

Figure 4.3.10-1: Annual mean maximum temperature in Pennsylvania (NOAA NCEI, 2015). This image is a screen capture from the Cumberland County Hazard Mitigation Plan Map Series. Please hold the CTRL key and select the map below for the Hazard Mitigation Plan Map Series.

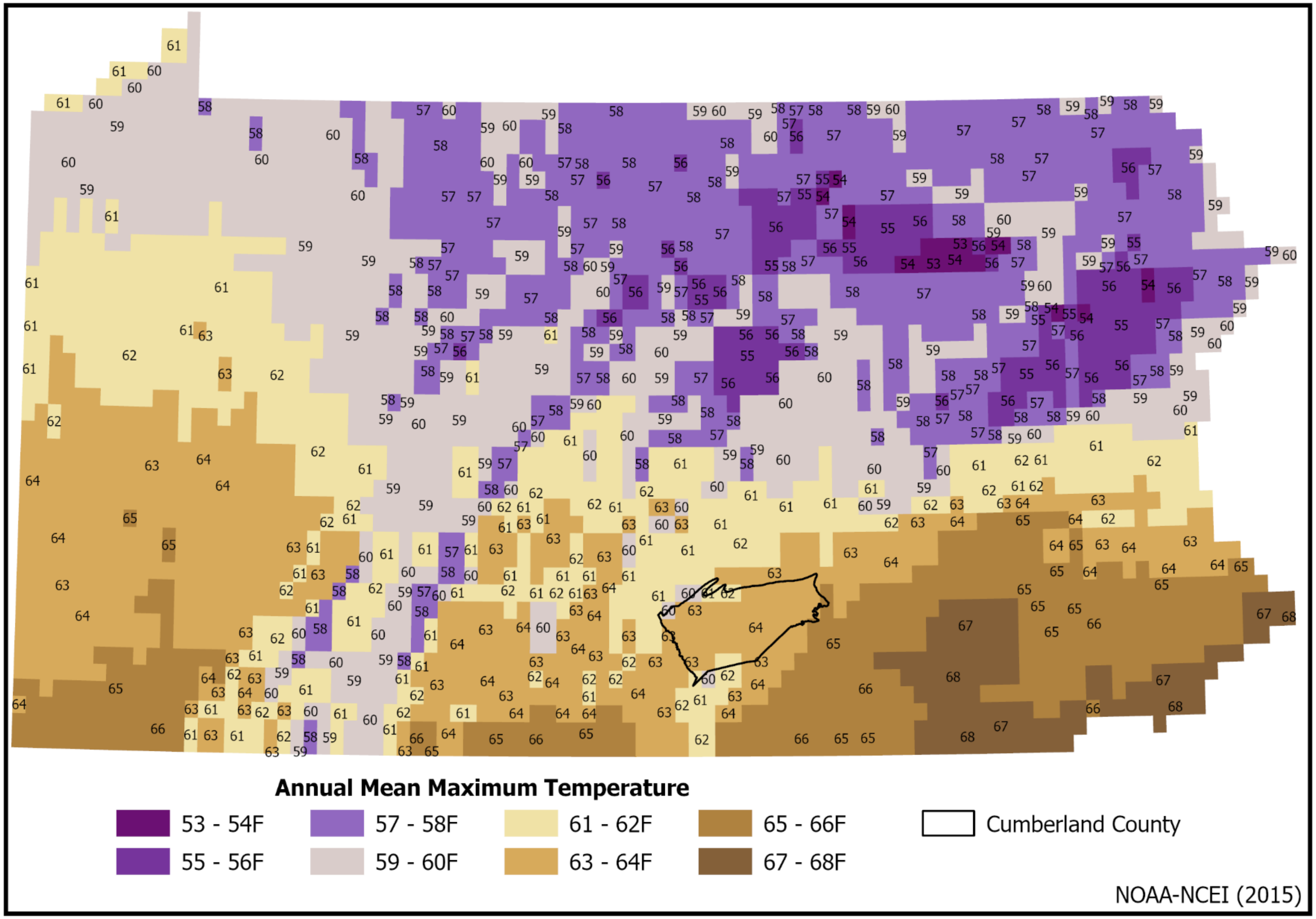
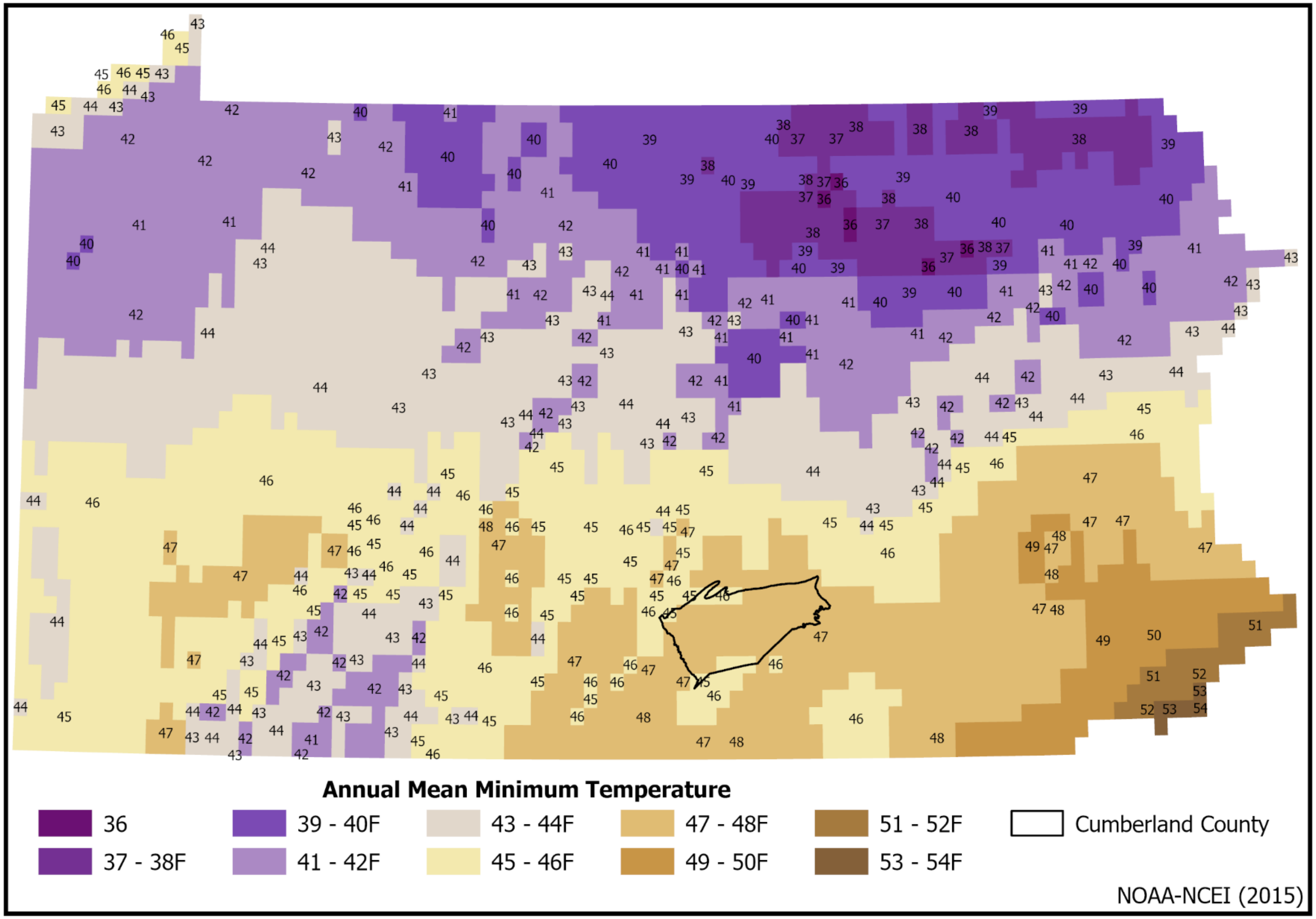


Figure 4.3.10-2: Annual mean minimum temperature in Pennsylvania (NOAA NCEI, 2015). This image is a screen capture from the Cumberland County Hazard Mitigation Plan Map Series. Please hold the CTRL key and select the map below for the Hazard Mitigation Plan Map Series.



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 event for Cumberland 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; influenza and other infectious diseases would be secondary impacts.

The experience of extreme heat and extreme cold varies considerably depending on humidity and wind conditions, respectively. Figure 4.3.10-3 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 Figure 4.3.10-3 serves 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, 2025a).

Figure 4.3.10-3: Effects of Wind Speed on Extreme Cold Events (Wind Chill) and Humidity on Extreme Heat Events (Heat Index) (NOAA NWS, 2025b) (NOAA NWS, 2025c)

Extreme Cold and Wind Chill

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

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

Extreme Heat and Heat Index

NWS Heat Index

Temperature (°F)

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

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution; Extreme Caution; Danger; Extreme Danger

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 4.3.10-1: 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.

4.3.10.3 Past Occurrence

Table 4.3.10-2 shows extreme weather events from 2000 to 2025. Since 1999, there have been a total of 8 heat/excessive heat events and 3 extreme cold/wind chill events.

Table 4.3.10-2: Previous Temperature Extremes Impacting Cumberland County, 1999-2024 (NOAA NCEI, 2024d)

DATE	EVENT	TEMPERATURE (HEAT INDEX AND WIND CHILL)	DEATHS	INJURIES	PROPERTY DAMAGE RECORDED	CROP DAMAGE RECORDED
07/05/1999	Heat	N/A	0	0	$0.00	$0.00
07/17/2006	Heat	Mid 90s° F (heat index of 96-101)	0	0	$0.00	$0.00
07/18/2006	Heat	Mid 90s° F (heat index of 96-101)	0	0	$0.00	$0.00
07/31/2006	Heat	Mid 90s° F (heat index of 98-103)	0	0	$0.00	$0.00
08/01/2006	Heat	Mid 90s° F (heat index of 103-108)	0	0	$0.00	$0.00
02/05/2007	Extreme Cold/wind Chill	-10 to -15° F (with wind chills)	0	0	$0.00	$0.00
02/05/2007	Extreme Cold/wind Chill	-10 to -15° F (with wind chills)	0	0	$0.00	$0.00
07/21/2011	Excessive Heat	Upper 90s and low 100s° F (heat index of 105–115)	0	0	$0.00	$0.00
02/15/2015	Extreme Cold/wind Chill	-25 to -35° F (with wind chills)	0	0	$0.00	$0.00
07/25/2016	Excessive Heat	Heat index of 105-110 degrees	0	0	$0.00	$0.00
07/02/2018	Excessive Heat	90s° F (heat index of 100-105)	0	0	$0.00	$0.00

4.3.10.4 Future Occurrence

Due to its location and geography, the County is more likely to encounter excessive heat than extreme cold weather. Topography and vegetation can impact temperature differentials across the County. The probability of an extreme temperature event in Cumberland County is considered possible as defined by the Risk Factor Methodology probability criteria (see Table 4.5.2-1).

According to the Fifth National Climate Assessment, which utilized the Intergovernmental Panel on Climate Change's Shared Socioeconomic Pathways (SSP) (RCP) 4.5 and 8.5 scenarios, the annual average temperature across the United States is projected to increase by 2.5°F (RCP 4.5) or 2.9°F (RCP 8.5) between 2021 and 2050, relative to 1976-2005. The RCP 4.5 scenario assumes moderate measures are taken to reduce emissions, while the 8.5 scenario assumes a lower effort and thus more severe impacts. For the Northeast region, the change in annual average temperature is 3.98°F (RCP 4.5) or 5.09°F (RCP 8.5) by 2036-2065 and 5.27°F (RCP 4.5) or 9.11°F (RCP 8.5) by 2071-2100. These changes translate to approximately 20 to 30 more days above 90°F and 20 to 30 fewer days below freezing in the northeastern parts of the United States by mid-century (RCP 8.5) (Jay et al. 2023).

The Climate Mapping for Resilience and Adaptation (CRMA) Tool provides a county-level assessment report for extreme heat, shown in Figure 4.3.10-4 below. The future climate indicators that may contribute to extreme heat are temperature thresholds and annual temperature. According to CRMA, 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 102-103 degrees Fahrenheit by Mid Century and 104-108 by the Late Century. These changes may intensify the impacts from extreme heat.

Figure 4.3.10-4: Cumberland County Extreme Heat Hazard Assessment Report (CRMA, 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	**12 days** 12 - 19	**33 days** 18 - 49	**35 days** 19 - 53	**43 days** 23 - 66	**52 days** 28 - 72	**53 days** 26 - 83	**84 days** 40 - 111
Annual days with maximum temperature > 95°F	**3 days** 2 - 5	**10 days** 4 - 24	**12 days** 4 - 22	**16 days** 5 - 36	**22 days** 7 - 39	**22 days** 6 - 50	**49 days** 13 - 84
Annual days with maximum temperature > 100°F	**0 days** 0 - 0	**2 days** 0 - 9	**3 days** 0 - 10	**4 days** 0 - 18	**7 days** 1 - 22	**7 days** 1 - 18	**23 days** 2 - 60
Annual days with maximum temperature > 105°F	**0 days** 0 - 0	**0 days** 0 - 1	**0 days** 0 - 3	**1 days** 0 - 5	**2 days** 0 - 11	**2 days** 0 - 13	**9 days** 0 - 39
Annual temperature:							
Annual single highest maximum temperature °F	**96 °F** 95 - 97	**100 °F** 97 - 104	**101 °F** 98 - 105	**102 °F** 98 - 108	**103 °F** 99 - 111	**104 °F** 99 - 110	**108 °F** 100 - 118
Annual highest maximum temperature averaged over a 5-day period °F	**92 °F** 91 - 92	**95 °F** 93 - 100	**96 °F** 93 - 100	**97 °F** 94 - 102	**98 °F** 94 - 106	**99 °F** 94 - 106	**103 °F** 95 - 114
Cooling degree days (CDD)	**887 degree-days** 818 - 935	**1,246 degree-days** 1,030 - 1,544	**1,292 degree-days** 1,038 - 1,585	**1,439 degree-days** 1,112 - 1,850	**1,604 degree-days** 1,227 - 1,977	**1,631 degree-days** 1,192 - 2,225	**2,296 degree-days** 1,559 - 3,099

N/A = Data Not Available for the selected area

4.3.10.5 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 following table shows the number of elderly (>65) and disabled individuals within Cumberland County according to the ACS 2023 five-year estimates. Overall, Cumberland County contains a total of 49,724 residents above the age of 65 and 32,950 residents with a disability. Hampden Township has the highest elderly and disabled population (over 5,800 and 3,600 for 65+ and disabled individuals respectively) with Upper Allen Township following behind for both categories (over 4,800 and 3,000 for 65+ and disabled individuals respectively).

Table 4.3.10-3: Number of Elderly (>65) and Disabled Individuals by Municipality (U.S. Census Bureau, ACS, 2023)

Municipality	Elderly (>65)	Disabled
Borough of Camp Hill	1,520	1072
Borough of Carlisle	3691	2911
Township of Cooke	36	27
Township of Dickinson	1040	515
Township of East Pennsboro	3835	2545
Township of Hampden	5806	3666
Township of Hopewell	539	375
Borough of Lemoyne	903	597
Township of Lower Allen	3763	2524
Township of Lower Frankford	291	239
Township of Lower Mifflin	287	238
Borough of Mechanicsburg	1583	1,232
Township of Middlesex	1766	944
Township of Monroe	1389	980
Borough of Mt Holly Springs	315	347
Borough of New Cumberland	1279	1106
Borough of Newburg	41	23
Borough of Newville	133	161
Township of North Middleton	2749	1672
Township of North Newton	333	284
Township of Penn	580	366
Borough of Shippensburg	842	725

Township of Shippensburg	362	435
Borough of Shiremanstown	338	286
Township of Silver Spring	4378	2051
Township of South Middleton	3504	1722
Township of South Newton	165	125
Township of Southampton	1151	670
Township of Upper Allen	4814	3046
Township of Upper Frankford	315	261
Township of Upper Mifflin	179	263
Township of West Pennsboro	1365	746
Borough of Wormleysburg	432	796
TOTAL	**49,724**	**32,950**

All 33 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.

4.3.10.6 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. This means areas of Camp Hill Borough, Carlisle Borough, East Pennsboro Township, Hampden Township, Lower Allen Township, Newville Borough, North Middleton Township, Silver Spring Township, South Middleton Township, Southampton Township, and Upper Allen Township may be particularly vulnerable.

HUMAN-MADE OR TECHNOLOGICAL HAZARDS

4.3.11. Civil Disturbance

4.3.11.1 Location and Extent

Civil disturbance is a broad term that is typically used by law enforcement to describe one or more forms of disturbance caused by a group of people. FEMA defines civil disturbance as civil unrest activity, such as demonstration, riot, or strike, that disrupts a community and requires intervention to maintain public safety (FEMA, 2022a). Civil disturbances are typically a symptom of and a form of protest against major socio-political problems. Civil disturbance hazards include the following:

- ***Famine:*** Involves a widespread scarcity of food leading to malnutrition, increased mortality, and a period of psychosocial instability associated with the scarcity of food, such as riots, theft of food, and the fall of governments caused by political instability borne of an inability to deal with the crisis caused by famine (Tilly, 1971).
- ***Misinformation:*** Erroneous information spread unintentionally (Makkai, 1970).
- ***Civil Disturbance, Public Unrest, Mass Hysteria, and Riot:*** Group acts of violence against property and individuals, for example (18 U.S.C. § 232, 2008).
- ***Strike or Labor Dispute:*** Controversies related to the terms and conditions of employment, for example (29 U.S.C. § 113, 2008).

Typically, the severity of the action coincides with the level of public outrage. In addition to a form of protest against major socio-political problems, civil disturbances can also arise out of union protest, institutional population uprising, or from large celebrations that become disorderly.

The scale and scope of civil disturbance events varies widely. However, government facilities, local landmarks, prisons, and universities are common sites where crowds and mobs may gather. There are two prisons within Cumberland County; the Cumberland County Prison in the Borough of Carlisle and the White Hill State Prison in Lower Allen Township. The Tresslercare Wilderness School, a juvenile correction facility, is located in South Middleton Township. College and universities in the County include Central Pennsylvania College, Dickinson College, Messiah College, Penn State Dickinson School of Law, Shippensburg University and U.S. Army War College.

4.3.11.2 Range of Magnitude

Civil disturbances can take the form of small gatherings or large groups blocking or impeding access to a building or disrupting normal activities by generating noise and intimidating people as illustrated in Figure 4.3.11-1. They can range from a peaceful sit-in to a full-scale riot, in which a mob burns or otherwise destroys property and terrorizes individuals. Even in its more passive forms, a group that blocks roadways, sidewalks, or buildings interferes with public order. Often that which was intended to be a peaceful demonstration to the public and the government can escalate into general chaos. There are two types of large gatherings typically associated with civil disturbances: a crowd and a mob. A crowd may be defined as a casual, temporary collection of people without a strong, cohesive relationship. Crowds can be classified into four categories (UMN, 2010):

- ***Casual Crowd:*** A casual crowd is merely a group of people who happen to be in the same place at the same time. Violent conduct does not occur.
- ***Cohesive or Conventional Crowd:*** A cohesive or conventional crowd consists of members who are involved in some type of unified behavior. Members of this group are involved in some type of common activity, such as worshipping, dancing, or watching a sporting event. Although they may have intense internal discipline, they require substantial provocation to arouse to action.
- ***Expressive Crowd:*** An expressive crowd is one held together by a common commitment or purpose. Although they may not be formally organized, they are assembled as an expression of common sentiment such as excitement or frustration. Members wish to be seen as a formidable influence. One of the best examples of this type is a group assembled to protest. Note that a conventional crowd may sometimes become an expressive crowd; because excitement and emotional expression are defining features of expressive crowds, individuals in such crowds are engaging in collective behavior as described above.
- ***Aggressive or Acting Crowd:*** An aggressive or acting crowd goes one step beyond an expressive crowd by behaving in violent or other destructive behavior, such as looting. A mob, an intensely emotional crowd that commits or is ready to commit violence is a primary example of an acting crowd. Panic is another example, a sudden reaction by a crowd that involves self-destructive behavior, such as accidental trampling when fleeing an emergency. Crowds that become aggressive are usually assembled for a specific purpose. This crowd often has leaders who attempt to arouse the members or motivate them to action. The crowd may be more impulsive and emotional and require only minimal stimulation to arouse violence.

A mob can be defined as a large disorderly crowd or throng. Mobs are usually emotional, loud, tumultuous, violent and lawless. Similar to crowds, mobs have different levels of commitment and can be classified into four categories (Alvarez and Bachman, 2008):

- Aggressive Mob: An aggressive mob is one that attacks, riots and terrorizes. The object of violence may be a person, property, or both. An aggressive mob is distinguished from an aggressive crowd only by lawless activity. Examples of aggressive mobs are the inmate mobs in prisons and jails, mobs that act out their frustrations after political defeat, or violent mobs at political protests or rallies.
- Escape Mob: An escape mob is attempting to flee from something such as a fire, bomb, flood, or other catastrophe. Members of escape mobs are generally difficult to control can be characterized by unreasonable terror.

- Acquisitive Mob: An acquisitive mob is one motivated by a desire to acquire something. Riots caused by other factors often turn into looting sprees. This mob exploits a lack of control by authorities in safeguarding property.
- Expressive Mob: An expressive mob is one that expresses fervor or revelry following some sporting event, religious activity, or celebration. Members experience a release of pent-up emotions in highly charged situations.

The worst civil disturbance event on record in Cumberland County, a prison riot, is described in Section 4.3.11.3.

The following community lifelines are at risk during a civil disturbance:

Table 4.3.11-1: Most Likely Lifelines Impacted by Civil Disturbance.

LIFELINES	NOTES
Health and Medical	Community safety may be at risk requiring police intervention.
Transportation	Medical personnel might be needed for response and recovery as participants may be injured, injure others, and demonstrations may impede emergency service operations.
Safety and Security	Community safety may be at risk requiring police intervention.

4.3.11.3 Past Occurrence

In the spring and summer of 2020, hundreds of peaceful residents gathered at the square in Carlisle to show support for George Floyd. The protest called attention to victims that are unfairly targeted and profiled by law enforcement. Nationally, several of these gatherings were evolving into aggressive and acquisitive mobs that included loitering and theft. During this time period, the Cumberland County Emergency Operations Center worked weekends to prepare for a potential acquisitive or aggressive Mob. The group that gathered in Carlisle remained peaceful.

Throughout the spring of 2024 numerous colleges across the nation began protests over Israel's actions against Palestinians in the War in Gaza. Cumberland County was no exception. In the beginning of May 2024, students at Dickinson College set up at encampment at Britton Plaza. The encampment included lawn chairs, tents, signs and banners with a range of messages supporting the Palestinian cause (Morrison & Rush, 2024). Figure 4.3.11-1 illustrates the encampment at Dickinson College. The protest demanded the end to the war in Gaza, financial transparency from the university itself, a scholarship fund for Palestinian students, divestment from sponsors who heavily donate toward Israel, and the cancellation of Commencement Speaker Michael Smerconish (Ritchey & Beam, 2024). Nationally, more than 60 similar encampments have occurred across U.S. campuses with over 2,000 college students being arrested as a result. Police at Emory University even used gas, pepper balls, stun guns and rubber bullets on students to clear the encampment there. However, the protest was peaceful for the entire week it lasted at Dickinson College with no police involvement or violence needed (Morrison & Rush, 2024).

Figure 4.3.11-1: The Pro-Palestinian encampment that took place on Dickinson College's Campus (Photograph courtesy of Sarah Burns from *WJAC*, 2024).

The worst civil disturbance event on record in Cumberland County, was a riot that occurred at the White Hill State Correction Prison in 1989. The event actually consisted of two aggressive mob uprisings, the second taking place the day after the first. Part of the reason for the riots is suspected to be overcrowding, the prison had a capacity of 1,826 inmates, however, the population was 2,600 when the riots broke out. Furthermore, changes in policy regarding visitors and sick calls, coupled with a slow/neglectful administration are also cited as causes for the riots. During the riots between October 25th and October 27th, 123 people were injured including 69 corrections officers and 41 inmates. In addition, 14 out of 31 prison buildings were destroyed and the entire damage cost estimate was $57 million (Kiner, 2020).

4.3.11.4 Future Occurrence

Minor civil disturbances may occur in Cumberland County, but it is not possible to accurately predict the probability of future occurrence for civil disturbance events over the long-term. Shippensburg Township, Lower Allen Township, and West Pennsboro Township all indicated an increase in civil disturbance across the country. However, overall, the probability of future civil disturbances can be considered *unlikely* according to the Risk Factor Methodology (see Table 4.5.2-1).

It may be possible to recognize the potential for an event to occur in the near-term. For example, an upcoming significant sporting event at one of the colleges or universities in the County may result in gathering of large crowds. Local law enforcement should anticipate these types of events and be prepared to handle a crowd so that peaceful gatherings are prevented from turning into unruly public disturbances.

4.3.11.5 Vulnerability Assessment

Adjacent counties were invited to participate in the 2024 update of the Cumberland County HMP. A representative of the Dauphin County Department of Public Safety noted in September 2024 that a lot of Dauphin County municipalities reflect concern over civil unrest. However, in general, Cumberland County is not particularly vulnerable to civil disturbance events. Most civil disturbance events, should they occur, would have minimal impact.

Jurisdictional losses for civil disturbance events are difficult to predict and can vary significantly in range. Sites previously identified in Section 4.3.11.1 are locations where such events are more likely to occur and therefore should be considered more vulnerable. Adequate law enforcement at these locations minimizes the chances of a small assembly of people turning into a significant disturbance. This will ensure improved response times, optimal communications, and containment of the event as during these events major roadways can be blocked and disturb traffic and larger events may involve the interruption or removal of communication. More broadly, in the case of large civil disturbance events, the County may incur losses related to work stoppages in addition to any acts of vandalism that may occur. In addition, Cumberland County has instituted a permitting process to use county facilities for public gatherings which enables an assessment of the potential for civil disturbance.

4.3.11.6 Equity in Vulnerable Communities

In terms of equity, communities with less access to the internet and smartphones may have difficulties getting updates on the state of a civil disturbance. This includes most of the rural municipalities in the county. Outreach should also be provided in secondary languages in municipalities such as Carlisle Borough, East Pennsboro Township, Hampden Township, Lower Allen Township, North Middleton Township, and Upper Allen Township (see Table 4.3.11-2 below) who have higher concentrations of households with limited English. Ensuring that evacuation plans and recovery services are accessible to everyone is critical.

Table 4.3.11-2: Number of Limited English Speaking Households by Municipality (U.S. Census Bureau, ACS, 2023)

Municipality	Number of Limited English Speaking Household
Borough of Camp Hill	71
Borough of Carlisle	299
Township of Cooke	0
Township of Dickinson	0
Township of East Pennsboro	168
Township of Hampden	203
Township of Hopewell	12
Borough of Lemoyne	34
Township of Lower Allen	118
Township of Lower Frankford	4
Township of Lower Mifflin	0
Borough of Mechanicsburg	58
Township of Middlesex	41
Township of Monroe	0
Borough of Mt Holly Springs	8
Borough of New Cumberland	37
Borough of Newburg	0
Borough of Newville	3
Township of North Middleton	140
Township of North Newton	6
Township of Penn	13
Borough of Shippensburg	69
Township of Shippensburg	6
Borough of Shiremanstown	22
Township of Silver Spring	96
Township of South Middleton	85
Township of South Newton	12
Township of Southampton	59
Township of Upper Allen	173
Township of Upper Frankford	0
Township of Upper Mifflin	4
Township of West Pennsboro	0
Borough of Wormleysburg	0
TOTAL	**1,741**

4.3.12. Dam Failure

Due to data sensitivity, the Dam Failure profile can be found in Appendix F.

4.3.13. Environmental Hazard – Hazardous Materials Release

4.3.13.1 Location and Extent

Hazardous material releases pose 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 result in human and wildlife injury, property damage, and contamination of air, water, and soil.

Environmental hazards in Cumberland County focus mainly on hazardous material releases which can occur wherever hazardous materials are manufactured, used, stored, or transported. Such releases usually occur at fixed site facilities or along transportation routes. Interstates 81, 76, and 83, U.S. Routes 11, 15, 11/15 and PA Route 581 are considered major transportation routes in Cumberland County. There are several points where these transportation routes cross streams within the watershed that serves as a part of the County's domestic water supply, which increases the potential negative impact of transportation-related releases of hazardous materials (HAZMAT). A 2020 Hazardous Materials Commodity Flow Study was completed for the Cumberland County Department of Public Safety. There were 10,023 over-the-road vehicles counted during the study period with 677 identified as having hazardous materials, which represents approximately 0.068% of the vehicles. For rail, there was a total of 4,630 railcars identified during the study, of which 241 had hazardous substances. For both road and rail, flammable liquids was the most common type of hazardous material to be shipped within or through the County. Recommendations from the Commodity Flow Study included continued hazardous material incident training and use of the current Emergency Response Guidebook/other resource reference materials to assist in handling incidents properly (MCM Consulting Group, Inc., 2020).

Transportation of hazardous materials on highways involves tanker trucks or trailers, which are responsible for the greatest number of hazardous material release incidents (FEMA, 1997), as illustrated in Figure 4.3.13-1. Hazardous material releases from rail transport are also of concern due to collisions and derailments that result in large spills. Severe rail events have reportedly occurred in the Enola and Lemoyne rail yards. In addition to risks posed by road and rail corridors, pipelines present the possibility for a leak of hazardous materials. The Study identified a wide variety of chemicals transported throughout pipelines in the County with natural gas as the most transported commodity (MCM Consulting Group, Inc., 2020). The County contains roughly 30 miles of the Mariner East II natural gas pipeline, installed by Sunoco.

Potential also exists for hazardous material releases to occur along rail lines as collisions and derailments of train cars can result in large spills. Several railroad accidents have occurred in Pennsylvania involving hazardous materials.

Pipelines also transport hazardous liquids and flammable substances such as natural gas. Incidents can occur when pipes corrode, are damaged during excavation, incorrectly operated, or damaged by other forces. Pipelines transporting natural gas compose most of the total pipeline miles in the Commonwealth. According to the Pipeline and Hazardous Materials Safety Administration, Cumberland County has 18 miles of active natural gas transmission pipelines and 141 miles of active liquid petroleum pipelines (PHSMA, 2022). In addition, hazardous materials can be transported by aircraft or by watercraft. Crashes, spills of materials, and fires on these vessels can pose a hazard.

Facilities that use, manufacture, or store hazardous materials in Pennsylvania must comply with both Title III of the federal Superfund Amendments and Reauthorization Act (SARA), also known as the Emergency Planning and Community Right-to-Know Act (EPCRA), and the Commonwealth's reporting requirements under the Hazardous Materials Emergency Planning and Response Act (1990-165), as amended. The community right-to-know reporting requirements keep communities abreast of the presence and release of chemicals at individual facilities.

Key information about the chemicals handled by industrial facilities is contained in the U.S. Environmental Protection Agency's (EPA) Toxic Release Inventory (TRI) database. Facilities that employ 10 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 in the course of a calendar year are required to report TRI information to the EPA, the federal enforcement agency for SARA Title III, and PEMA. Additional hazardous materials are contained at the military installations within and surrounding Cumberland County (e.g., Carlisle Barracks U.S. Army Garrison).

4.3.13.2 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, hazardous materials can include toxic chemicals, radioactive materials, infectious substances and hazardous wastes. Such releases can affect nearby populations and contaminate critical or sensitive environmental areas.

With hazardous material release, whether accidental or intentional, there are several potentially exacerbating or mitigating circumstances that will affect its severity or impact. Mitigating conditions are precautionary measures taken in advance to reduce the impact of a release on the surrounding environment. Primary and secondary containment or shielding by sheltering-in-place protects people and property from the harmful effects of a hazardous material release. 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 with the type of material released and the distance and related response time for emergency response teams (FEMA, 2019). 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.

Generally, the ways hazardous materials are harmful to humans and other animals can be broken into several categories referred to as the TRACEM model (FEMA, 2019):

- Thermal Harm: exposure to extreme temperatures either through contacting a heated surface or inhaling fumes
- Radiological Harm: exposure to ionizing radiation removes electrons from atoms and causes damage to living cells and DNA
- Asphyxiation: exposure to materials that reduce oxygen levels, typically in confined spaces or with very concentrated forms of hazardous material, that tissues cannot be oxygenated enough
- Chemical Harm: exposure to chemicals that include poisons, corrosive agents, certain metals, opioids, pesticides, and more. The injuries and illnesses that result will depend entirely on the material.
- Etological (Biological) Harm: exposure to organic materials such as bacteria, viruses, and biological toxins which can produce delayed responses as pathogens take time to multiply
- Mechanical Harm: either contact with fragmentation or debris created in pressure releases or explosions, injuries caused solely by pressure increases (eardrum and blood vessel rupture), or secondary blast injuries when victims are thrown by blasts.

The environmental impacts of hazardous material releases include:

- Hydrologic effects – surface and groundwater contamination
- Other effects on water quality such as changes in water temperature
- Damage 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

A worst-case hazardous material release could involve the contamination of public drinking water supplies and local waterways.

The potential impacts of hazardous materials release on community lifelines are as follows:

Table 4.3.13-1: 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.

4.3.13.3 Past Occurrence

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 facility.

SARA Title III and Pennsylvania Hazardous Material Emergency Planning and Response Act (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 (EOC) to provide effective emergency response coordination.

Total hazardous materials incidents in Cumberland County from 2013-2023 are displayed in Table 4.3.13-2. It can be seen that the number of hazardous materials incidents in Cumberland County reported to PEMA decreased to 4 incidents in 2023 (PEMA 2023; PEMA – KC, 2023).

Table 4.3.13-2: Number of Hazardous materials incidents from 2013 – April 2023 (PEMA, 2023; PEMA-KC, 2023)					
2013 Incidents	**2014 Incidents**	**2015 Incidents**	**2016 Incidents**	**2017 Incidents**	**2018 Incidents**
16	28	34	31	28	14
2019 Incidents	**2020 Incidents**	**2021 Incidents**	**2022 Incidents**	**2023 Incidents**	
17	41	16	15	4	

The U.S. EPA Toxic Release Inventory (TRI) reports that 50,621 pounds of chemicals were released on-site at facilities located in Cumberland County in 2023, and there was a total transfer of 411,021 pounds (EPA, 2025). Table 4.3.13-3 lists the release of these chemicals by company. Many of these companies have or are federally listed SARA Title III facilities. Other prior year TRI information can be found on the EPA Toxic Release Inventory Database website.

Table 4.3.13-3: Summary of 2023 Toxic Release Inventory data in Cumberland County (EPA, 2025).		
Company	**Chemicals Released**	**Municipality**
The Ames Cos Inc.	Certain glycol ethers, Nickel, Manganese	Borough of Camp Hill
Nestle Purina Petcare Co	Manganese compounds, Zinc compounds, Copper compounds, Propylene,	Borough of Mechanicsburg
Schreiber Foods Inc	Nitric acid, Nitrate compounds (water dissociable; reportable only when in aqueous solution)	Shippensburg Township
Vitro Flat Glass Llc Carlisle Plant	Zinc compounds, Ammonia	Borough of Carlisle
Adm Animal Nutrition Inc	Zinc compounds, Manganese compounds, Copper compounds	Borough of Camp Hill
Purina Animal Nutrition Llc - Harrisburg	Copper compounds, Manganese compounds, Zinc compounds	Shippensburg Township
Carlisle Syntec A Div Of Carlisle Construction Materia	Antimony compounds, Xylene (mixed isomers), Zinc compounds, Thiram, Diisocyanates, Toluene	Borough of Carlisle
Atlas Roofing Corp	Ethylene glycol, Diisocyanates,	Borough of Camp Hill
World Energy Harrisburg Llc	Methanol	Borough of Camp Hill
Frog Switch & Manufacturing Co	Manganese	Borough of Carlisle
Dairy Farmers Of Amer/Mechanicsburg	Nitrate compounds (water dissociable; reportable only when in aqueous solution), Nitric acid	Borough of Mechanicsburg
Land O'lakes - Carlisle	Nitrate compounds (water dissociable; reportable only when in aqueous solution), Nitric acid	Borough of Carlisle
Amsted Rail Co Inc.	Manganese,	Borough of Camp Hill
Adm Milling Co	Chlorine	Borough of Camp Hill
Jlg Industries Inc Shippensburg Facility	Zinc compounds	Shippensburg Township
Skyline Steel Llc-Camp Hill	Manganese	Borough of Camp Hill
Safety-Kleen Systems New Kingstown (Nkp)	Methanol	Silver Spring Township

In 2023, across the Commonwealth, there were 1,121 highway related hazardous material incidents totaling $901,392 in damages and 8 railway related incidents totaling $484,500 in damages (PHMSA, 2024). As of October 1, 2024, there have been already 984 highway related hazardous material incidents totaling $582,905 in damages and 8 railway related incidents totaling $9,000 in damages (PHMSA, 2024). Other prior year incident information for Pennsylvania can be found on the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration website.

On May 6, 2017, 160,000 gallons of mud used to lubricate the horizontal drilling process related to the installation of the Mariner East II Pipeline leaked through natural fractures in the ground and reached the surface, forcing Sunoco to temporarily halt the drilling process. However, as of February 2022, the Mariner East II Pipeline is currently complete (McCarty, 2022).

4.3.13.4 Future Occurrence

While many hazardous materials release incidents have occurred in Cumberland County in the past, they are generally considered difficult to predict. An occurrence is largely dependent upon the accidental or intentional actions of a person or group. Intentional acts are addressed under Section 4.3.14. In some instances, hazardous material releases can result in associated cascading hazards. For example, a tanker truck accident could result in a hazardous material release which could result in a fire or explosion on the roadway. Likewise, a tornado or a fire at a factory could result in accidental hazardous material release. Overall, the probability of future hazardous material release incidents can be considered *moderately likely* according to the Risk Factor Methodology (see Table 4.5.2-1).

4.3.13.5 Vulnerability Assessment

Transportation carriers must have response plans in place to address accidents, otherwise the local emergency response team will step in to secure and restore the area, as illustrated in Figure 4.3.13-1. Quick response minimizes the volume and concentration of hazardous materials that disperse through air, water and soil. In the event of an accidental or intentional release, the size and type of chemical released would be critical determinants of the effects on nearby residents and the environment.

Figure 4.3.13-1: A firefighter worked to contain diesel fuel spilling from the fuel tank of a truck after an accident in Lower Allen Township, Cumberland County, PA on December 30, 2005 (Photograph courtesy of Jason Minick/*The Sentinel*, 2014).

All PA counties must retain the services of a hazardous materials response team or employ their own per PEMA requirements. Cumberland County employs its own hazardous material response team that can be deployed to the site of a chemical spill. The team is prepared for a variety of hazard events, including a spill on county railways. Additionally, first responders receive hazardous response training from a variety of entities including the Pennsylvania State Fire Marshall and PEMA. Figure 4.3.13-2 displays an Emergency Management employee for Cumberland County displaying Special Hazards Operations Team equipment at Carlisle Fire and Rescue (Vaughn, 2015).

Figure 4.3.13-2: Cumberland County Special Hazards Operations Team equipment (Photograph courtesy of Joshua Vaughn/*The Sentinel*, 2015).

Water treatment facilities and water suppliers are particularly vulnerable to hazardous material releases and also face the potential for cascade failures. Expansion of the Mechanicsburg Fuel Terminal to provide increased storage for ethanol products has increased vulnerability to residents of Silver Spring Township. Potential risk is increased not only by the fixed facility itself, but also rail and truck transport to and from the facility. Lightning damaged a heating oil tank at the facility in July 2013, resulting in the evacuation of about 300 people from their homes. In June 2018, a fire started at the facility while gasoline was being transferred from one pipe to another. The fire was contained within an hour, and the small gasoline leak that resulted was contained in the facility (Gitt, 2018).

Tables 4.3.13-4 through 4.3.13-7 provide data related to structures and critical facilities vulnerable to hazardous materials incidents at fixed facilities and in transit. The municipalities with the greatest number of the 104,979 structures within 1.5 miles of a SARA facility are Hampden Township (14,230), the Borough of Carlisle (9,209), and East Pennsboro Township (9,176). The municipalities with the greatest number of the 951 critical facilities within 1.5 miles of a SARA facility are the Borough of Carlisle (118) and Hampden Township (108). The vast majority (96,222) of the 104,979 structures within 1.5 miles of a SARA facility are residential. The municipalities with the greatest number of structures vulnerable to hazardous materials incidents in transit are the Borough of Carlisle, Hampden Township, Lower Allen Township, and East Pennsboro Township due to being within 0.25 mile of major roads (Interstates, United States Highways, and Pennsylvania Highways) or rail lines. The municipalities with the greatest number of critical facilities vulnerable to hazardous materials incidents in transit are Hampden

Township, the Borough of Carlisle, and East Pennsboro Township. The vast majority (75,873) of the 84,419 addressed units vulnerable to hazardous materials releases in transit are residential.

Table 4.3.13-4: Addressed Units and Critical Facilities Vulnerable to Hazardous Materials Incidents-Fixed Facility Incidents for Cumberland County (Cumberland County GIS, 2024).

Municipality	Total Addressed Units	Addressed Units Within 1.5 mi of SARA Facilities	Percent of Addressed Units Within 1.5 mi of SARA Facilities	Total Critical Facilities in Municipality	Total Critical Facilities within 1.5 mi of SARA Facilities	Percent of Critical Facilities within 1.5 mi of SARA Facilities
Borough of Camp Hill	3,748	3,748	100%	38	38	100%
Borough of Carlisle	9,209	9,209	100%	118	118	100%
Township of Cooke	421	0	0%	4	0	0%
Township of Dickinson	2,329	1,124	48.3%	15	11	73.3%
Township of East Pennsboro	9,331	9,176	98.3%	72	72	100%
Township of Hampden	14,623	14,230	97.3%	108	108	100%
Township of Hopewell	937	105	11.2%	12	4	33.3%
Borough of Lemoyne	2,235	2,235	100%	27	27	100%
Township of Lower Allen	8,507	8,262	97.1%	69	67	97.1%
Township of Lower Frankford	742	62	8.4%	2	0	0%
Township of Lower Mifflin	768	427	55.6%	6	3	50.0%
Borough of Mechanicsburg	4,834	4,834	100%	49	49	100%
Township of Middlesex	3,435	3,095	90.1%	50	50	100%
Township of Monroe	2,834	2,084	73.5%	14	11	78.6%
Borough of Mt Holly Springs	926	926	100%	17	17	100%
Borough of New Cumberland	3,365	3,365	100%	21	21	100%
Borough of Newburg	137	0	0%	2	0	0%
Borough of Newville	766	766	100%	16	16	100%
Township of North Middleton	5,807	5,503	94.8%	45	45	100%
Township of North Newton	939	457	48.7%	13	6	46.2%
Township of Penn	1,200	698	58.2%	14	14	100%
Borough of Shippensburg	2,233	2,233	100%	24	24	100%
Township of Shippensburg	1,392	1,392	100%	23	23	100%
Borough of Shiremanstown	801	801	100%	9	9	100%
Township of Silver Spring	9,062	8,358	92.2%	67	63	94.0%
Township of South Middleton	7,433	6,633	89.2%	74	73	98.6%
Township of South Newton	536	126	23.5%	6	0	0%

Table 4.3.13-4: Addressed Units and Critical Facilities Vulnerable to Hazardous Materials Incidents-Fixed Facility Incidents for Cumberland County (Cumberland County GIS, 2024).

Municipality	Total Addressed Units	Addressed Units Within 1.5 mi of SARA	Percent of Addressed Units Within 1.5 mi of SARA Facilities	Total Critical Facilities in Municipality	Total Critical Facilities within 1.5 mi of SARA Facilities	Percent of Critical Facilities within 1.5 mi of SARA Facilities
Township of Southampton	3,364	2,949	87.7%	20	18	90.0%
Township of Upper Allen	8,998	8,809	97.9%	44	44	100%
Township of Upper Frankford	1,026	764	74.5%	8	6	75.0%
Township of Upper Mifflin	573	4	0.7%	3	0	0%
Township of West Pennsboro	2,345	1,014	43.2%	16	10	62.5%
Borough of Wormleysburg	1,590	1,590	100%	4	4	100%
TOTAL	**116,446**	**104,979**	**90.2%**	**1,010**	**951**	**94.2%**

Table 4.3.13-5: Structures Vulnerable to Hazardous Materials Releases at Fixed Facilities by Parcel Type (Cumberland County GIS, 2024).								
Municipality	**Total Addressed Units**	**Total Non-Residential Addressed Units**	**Non-Residential Addressed Units Within SARA Risk Radii**	**Percent Non-Residential Units Within SARA Risk Radii**	**Total Residential Addressed Units**	**Residential Addressed Units Within SARA Risk Radii**	**Percent Residential Units Within SARA Risk Radii**	**Total Addressed Units Within SARA Risk Radii**
Borough of Camp Hill	3,748	355	355	100%	3,393	3,393	100%	3,748
Borough of Carlisle	9,209	1,423	1,423	100%	7,786	7,786	100%	9,209
Township of Cooke	421	22	0	0%	399	0	0%	0
Township of Dickinson	2,329	92	59	64.1%	2,237	1,065	47.6%	1,124
Township of East Pennsboro	9,331	538	533	99.1%	8,793	8,643	98.3%	9,176
Township of Hampden	14,623	961	958	99.7%	13,662	13,272	97.1%	14,230
Township of Hopewell	937	43	10	23.3%	894	95	10.6%	105
Borough of Lemoyne	2,235	390	390	100%	1,845	1,845	100%	2,235
Township of Lower Allen	8,507	879	869	98.9%	7,628	7,393	96.9%	8,262
Township of Lower Frankford	742	17	1	5.9%	725	61	8.4%	62
Township of Lower Mifflin	768	31	17	54.8%	737	410	55.6%	427
Borough of Mechanicsburg	4,834	636	636	100%	4,198	4,198	100%	4,834
Township of Middlesex	3,435	238	217	91.2%	3,197	2,878	90.0%	3,095
Township of Monroe	2,834	97	88	90.7%	2,737	1,996	72.9%	2,084
Borough of Mt Holly Springs	926	96	96	100%	830	830	100%	926
Borough of New Cumberland	3,365	267	267	100%	3,098	3,098	100%	3,365
Borough of Newburg	137	11	0	0%	126	0	0%	0
Borough of Newville	766	157	157	100%	609	609	100%	766
Township of North Middleton	5,807	375	366	97.6%	5,432	5,137	94.6%	5,503
Township of North Newton	939	58	29	50.0%	881	428	48.6%	457
Township of Penn	1,200	53	39	73.6%	1,147	659	57.5%	698
Borough of Shippensburg	2,233	346	346	100%	1,887	1,887	100%	2,233

Table 4.3.13-5: Structures Vulnerable to Hazardous Materials Releases at Fixed Facilities by Parcel Type (Cumberland County GIS, 2024).								
Municipality	Total Addressed Units	Total Non-Residential Addressed Units	Non-Residential Addressed Units Within SARA Risk Radii	Percent Non-Residential Units Within SARA Risk Radii	Total Residential Addressed Units	Residential Addressed Units Within SARA Risk Radii	Percent Residential Units Within SARA Risk Radii	Total Addressed Units Within SARA Risk Radii
Township of Shippensburg	1,392	182	182	100%	1,210	1,210	100%	1,392
Borough of Shiremanstown	801	81	81	100%	720	720	100%	801
Township of Silver Spring	9,062	473	448	94.7%	8,589	7,910	92.1%	8,358
Township of South Middleton	7,433	474	464	97.9%	6,959	6,169	88.6%	6,633
Township of South Newton	536	31	5	16.1%	505	121	24.0%	126
Township of Southampton	3,364	97	83	85.6%	3,267	2,866	87.7%	2,949
Township of Upper Allen	8,998	399	397	99.5%	8,599	8,412	97.8%	8,809
Township of Upper Frankford	1,026	29	20	69.0%	997	744	74.6%	764
Township of Upper Mifflin	573	27	0	0%	546	4	0.7%	4
Township of West Pennsboro	2,345	108	50	46.3%	2,237	964	43.1%	1,014
Borough of Wormleysburg	1,590	171	171	100%	1,419	1,419	100%	1,590
TOTAL	**116,446**	**9,157**	**8,757**	**95.6%**	**107,289**	**96,222**	**89.7%**	**104,979**

Table 4.3.13-6: Addressed units and Critical Facilities Vulnerable to Hazardous Materials Incidents in Transit for Cumberland County (Cumberland County GIS, 2024).										
Municipality	**Total Addressed Units**	**Structures Addressed Units Within 0.25 mi of Major Roads**	**Percent of Units Within 0.25 mi of Major Roads**	**Structures Addressed Units Within 0.25 mi of rail lines**	**Percent of Units within 0.25 mi of rail lines**	**Total Critical Facilities in Municipality**	**Critical Facilities within 0.25 mi of Major Roads**	**Percent Critical Facilities within 0.25 mi of Major Roads**	**Total Critical Facilities within 0.25 mi of rail lines**	**Percent Critical Facilities within 0.25 mi of rail lines**
Borough of Camp Hill	3,748	3,544	94.6%	709	18.9%	38	38	100%	6	15.8%
Borough of Carlisle	9,209	8,561	93.0%	3,093	33.6%	118	111	94.1%	19	16.1%
Township of Cooke	421	266	63.2%	29	6.9%	4	4	100%	0	0%
Township of Dickinson	2,329	1,292	55.5%	604	25.9%	15	4	26.7%	1	6.7%
Township of East Pennsboro	9,331	6,602	70.8%	1,896	20.3%	72	66	91.7%	26	36.1%
Township of Hampden	14,623	9,169	62.7%	1,395	9.5%	108	88	81.5%	43	39.8%
Township of Hopewell	937	503	53.7%	0	0%	12	7	58.3%	0	0%
Borough of Lemoyne	2,235	2,141	95.8%	1,787	80.0%	27	27	100%	17	63.0%
Township of Lower Allen	8,507	7,023	82.6%	2,449	28.8%	69	65	94.2%	32	46.4%
Township of Lower Frankford	742	209	28.2%	0	0%	2	0	0%	0	0%
Township of Lower Mifflin	768	432	56.3%	0	0%	6	6	100%	0	0%
Borough of Mechanicsburg	4,834	4,279	88.5%	2,878	59.5%	49	45	91.8%	43	87.8%
Township of Middlesex	3,435	1,753	51.0%	103	3.0%	50	39	78.0%	17	34.0%
Township of Monroe	2,834	1,782	62.9%	301	10.6%	14	11	78.6%	2	14.3%
Borough of Mt Holly Springs	926	795	85.9%	588	63.5%	17	17	100%	5	29.4%
Borough of New Cumberland	3,365	3,165	94.1%	1,036	30.8%	21	21	100%	15	71.4%
Borough of Newburg	137	137	100%	0	0%	2	2	100%	0	0%
Borough of Newville	766	766	100%	0	0%	16	16	100%	0	0%
Township of North Middleton	5,807	3,305	56.9%	474	8.2%	45	40	88.9%	9	20.0%
Township of North Newton	939	709	75.5%	14	1.5%	13	12	92.3%	1	7.7%
Township of Penn	1,200	756	63.0%	178	14.8%	14	9	64.3%	3	21.4%

Table 4.3.13-6: Addressed units and Critical Facilities Vulnerable to Hazardous Materials Incidents in Transit for Cumberland County (Cumberland County GIS, 2024).

Municipality	Total Addressed Units	Structures Addressed Units Within 0.25 mi of Major Roads	Percent of Units Within 0.25 mi of Major Roads	Structures Addressed Units Within 0.25 mi of rail lines	Percent of Units within 0.25 mi of rail lines	Total Critical Facilities in Municipality	Critical Facilities within 0.25 mi of Major Roads	Percent Critical Facilities within 0.25 mi of Major Roads	Total Critical Facilities within 0.25 mi of rail lines	Percent Critical Facilities within 0.25 mi of rail lines
Borough of Shippensburg	2,233	2,162	96.8%	877	39.3%	24	23	95.8%	14	58.3%
Township of Shippensburg	1,392	1,223	87.9%	183	13.1%	23	20	87.0%	5	21.7%
Borough of Shiremanstown	801	801	100%	685	85.5%	9	9	100%	9	100%
Township of Silver Spring	9,062	4,959	54.7%	1,024	11.3%	67	46	68.7%	15	22.4%
Township of South Middleton	7,433	4,365	58.7%	537	7.2%	74	64	86.5%	9	12.2%
Township of South Newton	536	378	70.5%	224	41.8%	6	5	83.3%	5	83.3%
Township of Southampton	3,364	2,338	69.5%	462	13.7%	20	11	55.0%	4	20.0%
Township of Upper Allen	8,998	5,413	60.2%	636	7.1%	44	42	95.5%	2	4.5%
Township of Upper Frankford	1,026	472	46.0%	0	0%	8	7	87.5%	0	0%
Township of Upper Mifflin	573	388	67.7%	0	0%	3	1	33.3%	0	0%
Township of West Pennsboro	2,345	1,230	52.5%	0	0%	16	9	56.3%	0	0%
Borough of Wormleysburg	1,590	1,231	77.4%	1,153	72.5%	4	4	100%	4	100%
TOTAL	**116,446**	**82,149**	**70.5%**	**23,315**	**20.0%**	**1,010**	**869**	**86.0%**	**306**	**30.3%**

Table 4.3.13-7: Addressed Units Vulnerable to Hazardous Materials Releases in Transit by (0.25 mi from Highway or Rail) by Generalized Structure Type (Cumberland County GIS, 2024).

Municipality	Total Addressed Units	Total Non-Residential Addressed Units	Non-Residential Addressed Units Vulnerable to HAZMAT by Transit	Percent Non-Residential Units Vulnerable to HAZMAT by Transit	Total Residential Addressed Units	Residential Addressed Units Vulnerable to HAZMAT by Transit	Percent Residential Units Vulnerable to HAZMAT by Transit	Total Addressed Units Vulnerable to HAZMAT by Transit
Borough of Camp Hill	3,748	355	354	99.7%	3,393	3,190	94.0%	3,544
Borough of Carlisle	9,209	1,423	1,411	99.2%	7,786	7,177	92.2%	8,588
Township of Cooke	421	22	19	86.4%	399	247	61.9%	266
Township of Dickinson	2,329	92	62	67.4%	2,237	1,316	58.8%	1,378
Township of East Pennsboro	9,331	538	466	86.6%	8,793	6,165	70.1%	6,631
Township of Hampden	14,623	961	909	94.6%	13,662	8,798	64.4%	9,707
Township of Hopewell	937	43	29	67.4%	894	474	53.0%	503
Borough of Lemoyne	2,235	390	390	100%	1,845	1,764	95.6%	2,154
Township of Lower Allen	8,507	879	825	93.9%	7,628	6,292	82.5%	7,117
Township of Lower Frankford	742	17	7	41.2%	725	202	27.9%	209
Township of Lower Mifflin	768	31	25	80.6%	737	407	55.2%	432
Borough of Mechanicsburg	4,834	636	632	99.4%	4,198	3,667	87.4%	4,299
Township of Middlesex	3,435	238	218	91.6%	3,197	1,555	48.6%	1,773
Township of Monroe	2,834	97	87	89.7%	2,737	1,731	63.2%	1,816
Borough of Mt Holly Springs	926	96	96	100%	830	801	96.5%	899
Borough of New Cumberland	3,365	267	265	99.3%	3,098	2,923	94.4%	3,188
Borough of Newburg	137	11	11	100%	126	126	100%	137
Borough of Newville	766	157	157	100%	609	609	100%	766
Township of North Middleton	5,807	375	332	88.5%	5,432	2,983	54.9%	3,315
Township of North Newton	939	58	50	86.2%	881	659	74.8%	709
Township of Penn	1,200	53	38	71.7%	1,147	727	63.4%	765

Table 4.3.13-7: Addressed Units Vulnerable to Hazardous Materials Releases in Transit by (0.25 mi from Highway or Rail) by Generalized Structure Type (Cumberland County GIS, 2024).

Municipality	Total Addressed Units	Total Non-Residential Addressed Units	Non-Residential Addressed Units Vulnerable to HAZMAT by Transit	Percent Non-Residential Units Vulnerable to HAZMAT by Transit	Total Residential Addressed Units	Residential Addressed Units Vulnerable to HAZMAT by Transit	Percent Residential Units Vulnerable to HAZMAT by Transit	Total Addressed Units Vulnerable to HAZMAT by Transit
Borough of Shippensburg	2,233	346	345	99.7%	1,887	1,841	97.6%	2,186
Township of Shippensburg	1,392	182	162	89.0%	1,210	1,112	91.9%	1,274
Borough of Shiremanstown	801	81	81	100%	720	720	100%	801
Township of Silver Spring	9,062	473	415	87.7%	8,589	4,993	58.1%	5,408
Township of South Middleton	7,433	474	429	90.5%	6,959	4,175	60.0%	4,604
Township of South Newton	536	31	26	83.9%	505	353	69.9%	379
Township of Southampton	3,364	97	64	66.0%	3,267	2,477	75.8%	2,541
Township of Upper Allen	8,998	399	353	88.5%	8,599	5,312	61.8%	5,665
Township of Upper Frankford	1,026	29	22	75.9%	997	450	45.1%	472
Township of Upper Mifflin	573	27	18	66.7%	546	370	67.8%	388
Township of West Pennsboro	2,345	108	88	81.5%	2,237	1,142	51.1%	1,230
Borough of Wormleysburg	1,590	171	160	93.6%	1,419	1,115	78.6%	1,275
TOTAL	**116,446**	**9,157**	**8,546**	**93.3%**	**107,289**	**75,873**	**70.7%**	**84,419**

Figure 4.3.13-3 depicts areas that are vulnerable to hazmat releases within the County by transit due to their distance from emergency response capability. Table 4.3.13-8 displays the addressed units within 10- and 14-minute fire service response coverages. Cumberland County has a total of 115,859 addressed units within 10 minutes of a fire station, 418 addressed units within 14 minutes of a fire station, and 170 addressed units that are greater than 14 minutes from a fire station (Cumberland County GIS, 2024). There is a very small percentage of addressed units outside of the emergency response coverage area, and 10- and 14-minute coverage is adequate, based on the 2020 National Fire Protection Association (NFPA) emergency staffing and response times (Table 4.3.13-9).

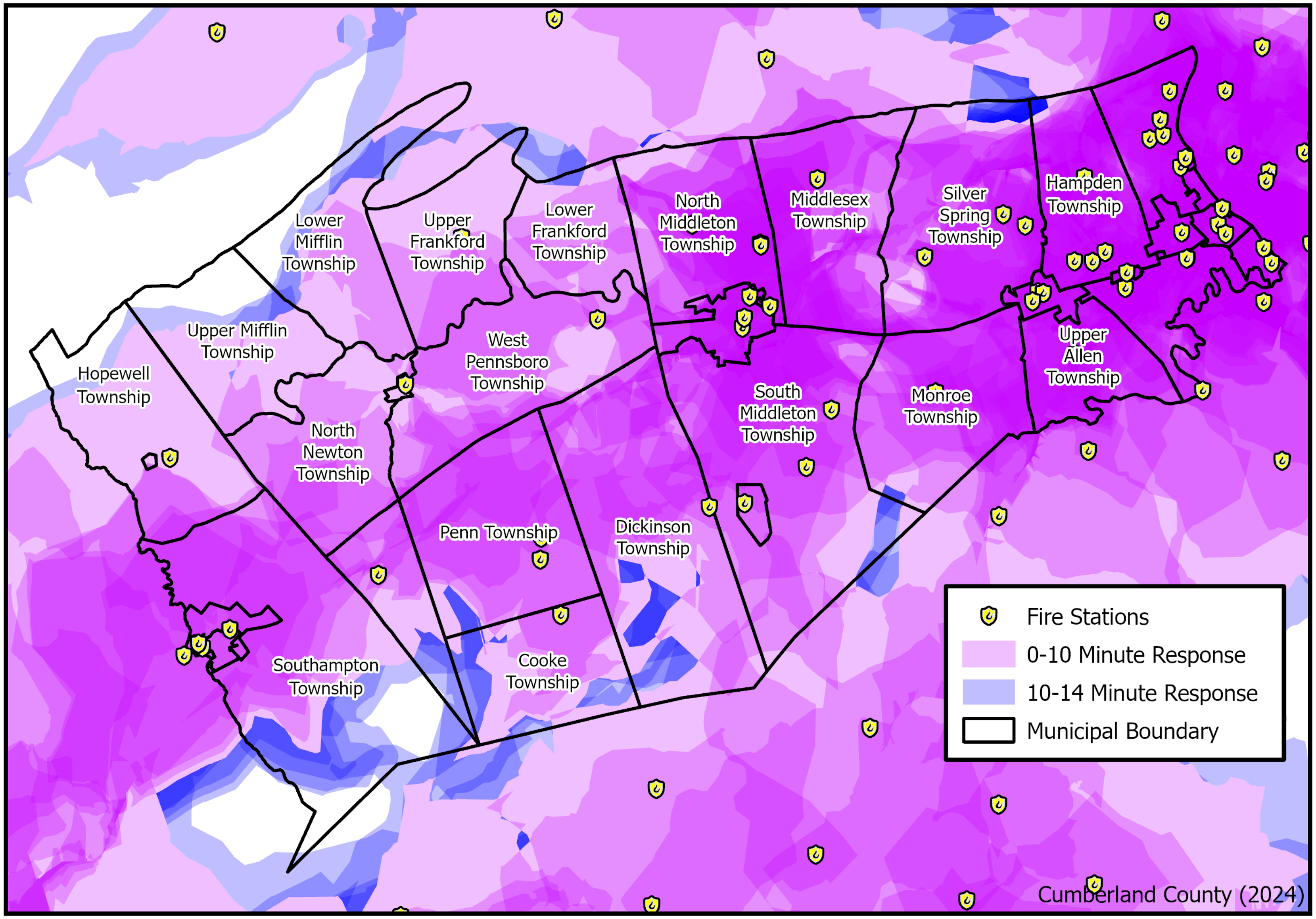
Table 4.3.13-8: Addressed units within 10- and 14-minute fire service response coverages (Cumberland County GIS, 2024).

Service Response Area	Addressed Units within Coverage	Percentage of Addressed Units within Coverage
10 Minutes	115,859	99.50%
14 Minutes	418	0.36%
Out of Coverage	170	0.15%
TOTAL	**116,447**	**100.00%**

Table 4.3.13-9: NFPA 1720 Emergency Staffing and Response Time Standards (NFPA, 2020).

Demand Zone	Demographics	Minimum Staff to Respond	Response Time (Minutes)	Meets Objective (%)
Urban Area	>1,000 people/mi^2	15	9	90
Suburban Area	500-1,000 people/mi^2	10	10	80
Rural Area	<500 people/mi^2	6	14	80
Remote Area	Travel distance ≥ 8 mi	4	Directly dependent on travel distance	90
Special Risks	Determined by Authority Having Jurisdiction (AHJ)	Determined by AHJ based on risk	Determined by AHJ	90

Figure 4.3.13-3: Areas of Cumberland County that are vulnerable to HAZMAT releases by transit based on fire service response time (Cumberland County, 2024). This image is a screen capture from the Cumberland County Hazard Mitigation Plan Map Series. Please hold the CTRL key and select the map below for the Hazard Mitigation Plan Map Series.



4.3.13.6 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, Carlisle Borough, East Pennsboro Township, Hampden Township, and Silver Spring Township have the highest concentration of people without health insurance (see Table 4.3.5-6 in Section 4.3.5.6) have the highest concentration of people without health insurance.

4.3.14. Nuclear Incident

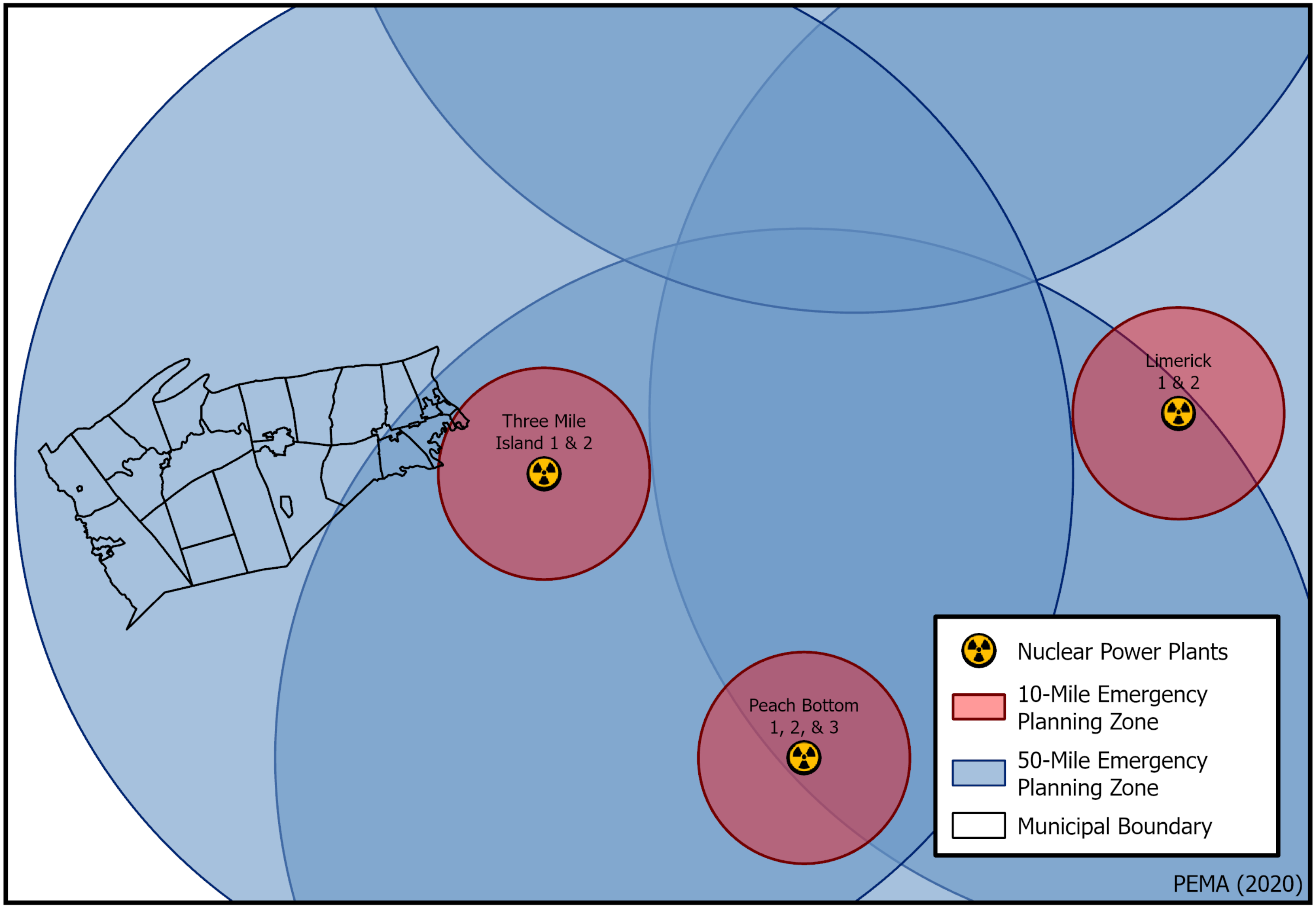
4.3.14.1 Location and Extent

The Nuclear Regulatory Commission encourages the use of Probabilistic Risk Assessments (PRA) to estimate quantitatively the potential risk to public health and safety considering the design, operations and maintenance practices at nuclear power plants. PRAs typically focus on accidents that can severely damage the core and that may challenge containment (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).

The southeastern edge of the County is within the Ingestion Exposure Pathway EPZ of the Peach Bottom nuclear facility located in Lancaster County. Furthermore, Three Mile Island plans to be online again by 2028 to provide power to Microsoft as announced in September 2024 (see Section 4.3.14.4). As a result, the very southeastern edge of Cumberland County is located within the 10-mile Plume Exposure Pathway EPZ and all of the county is located in the 50-mile Ingestion Exposure Pathway EPZ as seen in Figure 4.3.14-1 below.

The other nuclear plants in Pennsylvania are more than 50 miles away from Cumberland County. 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 Cumberland County.

Figure 4.3.14-1: Nuclear power plants and EPZs in Cumberland County (PEMA, 2020). This image is a screen capture from the Cumberland County Hazard Mitigation Plan Map Series. Please hold the CTRL key and select the map below for the Hazard Mitigation Plan Map Series.



4.3.14.2 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 the whole-body external exposure to gamma radiation from the passing plume and from deposited material, thyroid exposure through inhalation from the passing plume, and committed effective dose exposure to other critical organs through inhalation. The duration of primary exposures could range in length from hours to days. The Ingestion Exposure Pathway refers to exposure primarily from ingestion of contaminated water or foods, such as milk, fresh vegetables, and aquatic foodstuffs, and may result in an increased risk of radiation-induced cancer to the thyroid, bone marrow and other organs. The Cumberland County Radiological Emergency Response Plan, which is part of the County Emergency Operations Plan, includes the following:

- Preventive and emergency protective actions;
- Response levels and associated protective action guides for food;
- Recommended protective action guides within the Ingestion Exposure Pathway EPZ; and Information for farmers to assist in protection of their livestock and crops from radioactive contamination.

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 plan 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, 2024q). 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, 2024b). In order to better prepare for an emergency, drills are conducted locally (Figure 4.3.15-2).

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 a number of sirens to alert the public located in the Plume Ingestion 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.

The worst past occurrence for Cumberland County is the Site Area Emergency at Three Mile Island in 1979, described in Section 4.3.14.3.

The potential impacts of nuclear incidents on community lifelines are as follows:

Table 4.3.14-1: Most Likely Community Lifelines Impacted by Nuclear Incidents.

LIFELINE	NOTES
Safety and Security	Law enforcement, fire services and general community safety measures are crucial during a nuclear incident. The safety and security community lifeline will be essential for managing evacuations, securing affected areas and providing guidance to the public.
Food, Hydration, Shelter	Nuclear incidents can contaminate foodstuffs, crops, water supplies and land, requiring protection and testing. Reception Centers and Shelters will need to provide temporary housing, food and essential supplies.
Health and Medical	Nuclear incidents can lead to widespread health problems like acute radiation syndrome, radiation burns and long-term consequences such as cancer.

4.3.14.3 Past Occurrence

Nuclear incidents rarely occur, but the incident at Three Mile Island is the worst fixed-nuclear facility accident in U.S. history. The resulting contamination and state of the reactor core led to the development of a fourteen-year cleanup and scientific effort (New York Times, 1993). Additionally, the President's 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." (President's Commission on the Accident of Three Mile Island, 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).

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 1979 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.

Today, the TMI 2 reactor is permanently shut down and 99 percent of its fuel has been removed. The reactor coolant system is fully drained and the radioactive water decontaminated and evaporated. The accident's radioactive waste was shipped off site to an appropriate disposal area, and the reactor fuel and core debris was shipped to the Department of Energy's Idaho National Laboratory. The company TMI-2 Solutions acquired the license for Unit 2 in 2020 and is responsible for remaining decommissioning activities there (USNRC, 2024a).

4.3.14.4 Future Occurrence

Across the United States, a number of Unusual Event and Alert classification level events occur each year at the 100+ nuclear facilities that warrant notification of local emergency managers. Of these, emergencies occur less frequently. For example, in 1997, there were forty notifications of *Unusual Events* and three *Alert* events nationwide. Overall, the probability of future nuclear incidents can be considered *unlikely* according to the Risk Factor Methodology (see Table 4.5.2-1).

On September 20th, 2019, Constellation Energy (formally Exelon Generation) shut down the Three Mile Island Generating Station Unit 1 (TMI-1) after a legislative effort to bail out the plant failed when it could not keep up with demand for other cheaper energy sources (Mandler, 2024). The decommissioning approach that had been selected by Constellation Energy for TMI-1 is the SAFSTOR method. However, in September 2024 it was announced by Constellation Energy that the TMI-1 reactor will restart as part of 20-year deal with Microsoft. Microsoft will buy energy from the plant as part of its goal to help match the power its data centers use with carbon-free technology. The reactor is expected to be online in 2028, pending approval from the U.S. Nuclear Regulatory Commission. TMI-1 will also be renamed Crane Clean Energy Center in honor of the CEO of Constellation Energy (CBS News, 2024).

4.3.14.5 Vulnerability Assessment

Health and environmental consequences from exposure to radiation levels can have serious long-term effects, and most of the literature related to nuclear incidents indicates that effects are experienced well within the fifty-mile Ingestion Exposure Pathway Emergency Planning Zone. Most of Cumberland County is outside of the emergency evacuation zone; however, the entire County would be affected on some level by such an event and is therefore considered at risk.

The County's overall vulnerability to a nuclear incident has been decreased by the decommissioning of Three Mile Island. The primary vulnerability with Three Mile Island is the ISFSI which, if compromised, could result in a release of radioactive material. The likelihood of such a release is low.

There is also potential for a nuclear accident to occur on the major roads and railroads that run through Cumberland County. The municipalities and populations vulnerable to events that may occur on these transportation routes are addressed in Section 4.3.16-5.

4.3.14.6 Equity in Vulnerable Communities

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. Carlisle Borough, East Pennsboro Township, Hampden Township, Lower Allen Township, and Upper Allen Township (see Table 4.3.14-2 below) have the highest concentration of households without a vehicle while Carlisle Borough, East Pennsboro Township, Hampden Township, Lower Allen Township, North Middleton Township, and Upper Allen Township (see Table 4.3.11-2 in Section 4.3.11-6) who have higher concentrations of households with limited English. 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.

Table 4.3.14-2: Number of Households Without a Vehicle by Municipality (U.S. Census Bureau, ACS, 2023).

Municipality	Number of Households Without a Vehicle
Borough of Camp Hill	173
Borough of Carlisle	1089
Township of Cooke	0
Township of Dickinson	41
Township of East Pennsboro	465
Township of Hampden	455
Township of Hopewell	103
Borough of Lemoyne	150
Township of Lower Allen	435
Township of Lower Frankford	22
Township of Lower Mifflin	2
Borough of Mechanicsburg	134
Township of Middlesex	74
Township of Monroe	134
Borough of Mt Holly Springs	41
Borough of New Cumberland	124
Borough of Newburg	1
Borough of Newville	27
Township of North Middleton	39
Township of North Newton	49
Township of Penn	87
Borough of Shippensburg	198
Township of Shippensburg	31
Borough of Shiremanstown	35
Township of Silver Spring	176
Township of South Middleton	264
Township of South Newton	82
Township of Southampton	158
Township of Upper Allen	411
Township of Upper Frankford	22
Township of Upper Mifflin	21
Township of West Pennsboro	29
Borough of Wormleysburg	45

TOTAL	**5,117**

4.3.15. Terrorism

4.3.15.1 Location and Extent

The Federal Bureau of Investigation (FBI) defines terrorism as the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives (28 CFR § 0.85).

Furthermore, Pennsylvania defines terroristic threats in Title 18, Section 2706 of the Crimes Code as follows; A person commits the crime of terroristic threats if the person communicates, either directly or indirectly, a threat to:

(1) commit any crime of violence with intent to terrorize another;
(2) cause evacuation of a building, place of assembly or facility of public transportation; or
(3) otherwise cause serious public inconvenience, or cause terror or serious public inconvenience with reckless disregard of the risk of causing such terror or inconvenience.

An important consideration in evaluating terrorism hazards is the existence of facilities, landmarks, or other buildings of international, national, or regional importance. Military and civilian government facilities, international airports, large cities, and high-profile landmarks are considered high-risk targets. Other targets can include large public gatherings, water and food supplies, utilities, and corporate centers. Terrorists can also use cyber-attacks or send explosive, chemical, or biological agents through the mail (CHEMM, 2024).

While Cumberland County has many notable landmarks from a local historic perspective, there are no sites which are considered significant landmarks in terms of national or international importance. However, the Pennsylvania state capital located to the east of the County across the Susquehanna River and Gettysburg National Military Park located to the south in Adams County are potential terrorist targets.

Nonetheless, terrorism can take many forms and terrorists have a wide range of personal, political, or cultural agendas. Therefore, there is no location that is not a potential terrorist target. Two types of terrorist activity are particularly relevant to Cumberland County: agroterrorism and intentional hazardous material releases. Agroterrorism is the direct, intentional, generally covert contamination of food supplies or introduction of pests and/or disease agents to crops and livestock. Cumberland County is semi-rural with about 36.65 percent of its land area dedicated to agriculture in 2024.

There are also a number of SARA Title III facilities and major transportation routes that traverse the County; making intentional hazardous material releases a potential threat to citizens and the environment. This hazard is addressed in Section 4.3.13. Critical facilities including police stations, hospitals, fire stations, schools, wastewater treatment plants, water supply facilities, may be potential terrorist targets. A complete list of these facilities and community lifelines is included in Appendix E. The County has also identified the following potential terrorist targets within and outside of county boundaries, including areas which may be targets due to the gathering of large crowds:

- Army Barracks and War College (North Middleton Township)
- Navy Support Facility (Hampden Township)
- Cumberland York Area Local Defense Group (CYALDG)
- Letterkenny Army Depot (Franklin County)
- Three Mile Island Nuclear Power Plant (see Section 4.3.14)
- Old Carlisle Fairgrounds – *Carlisle Events* (Carlisle Borough & North Middleton Township)
- Ken Millen Stadium (Carlisle Borough)
- East Pennsboro School District (East Pennsboro Township)
- West Shore Stadium (Lower Allen Township)
- Cumberland Valley High School Stadium (Silver Spring Township)
- Boiling Springs High School (South Middleton Township)
- Big Spring School District (West Pennsboro Township)
- Messiah College (Upper Allen Township)
- Dickinson College Stadium (Borough of Carlisle)
- Norfolk-Southern Enola Yard

In addition, all bridges and railways (discussed in Section 4.3.15) across the County are considered potential targets. Middlesex Township experienced a suspected bomb incident in 2005 at the Pilot Truck stop located on Harrisburg Pike (Route 11). A suitcase was detonated by bomb team experts after it was believed to contain explosives. While it was later found not to be a bomb, the incident was a learning experience and served as a live exercise. Response to the incident was adequate, an important finding since the intersection of I-81 and I-76 is located within the Township.

4.3.15.2 Range of Magnitude

The term “terrorism” refers to intentional, criminal, and malicious acts, but the functional definition of terrorism can be interpreted in many ways. The Federal Bureau of Investigation (FBI) classifies terrorism into two categories (FBI, 2024b):

- **International terrorism:** Violent acts committed by individuals and/or groups inspired by or associated with designated foreign terrorist organizations or nations (state-sponsored), and
- **Domestic terrorism:** Violet, criminal acts carried out by individuals and/or groups to further ideological goals stemming from domestic influences, such as those of a political, religious, social, racial, or environmental nature.

FEMA defines the three main goals of terrorism as causing public fear, convincing citizens that the government cannot protect against terrorism, and making the motivating causes known to the public. Terrorist attacks can take many forms. The FBI identifies the following as some of the common tactics of terrorism (FBI, 2023):

- Agroterrorism
- Arson/incendiary attack
- Armed attack
- Assassination
- Biological agent
- Chemical agent
- Cyberterrorism
- Conventional bomb
- Hijackings
- Intentional hazardous materials release
- Kidnapping
- Nuclear bomb
- Radiological agent

Explosives have been a prominent method of conducting terrorism, but intelligence suggests that the possibility of biological or chemical terrorism is increasing. The FBI has found that the Internet, the rise of social media, domestic extremists, and lone offenders are reshaping terrorism and changing its form (FBI, 2024b).

The severity of terrorist incidents depends upon the method of attack, the proximity of the attack to people, animals, or other assets and the duration of exposure to the incident or attack device. For example, chemical agents are poisonous gases, liquids or solids that have toxic effects on people, animals, or plants. Many chemical agents can cause serious injuries or death. In this case, the severity of injuries depends on the type and amount of the chemical agent used and the duration of exposure.

Biological agents are organisms or toxins that have illness-producing effects on people, livestock and crops. There may be a deliberate effort to impact the environment in order to impact things like food production, water supplies, and more (FBI, 2023). Some biological agents cannot be easily detected and may take time to develop, which makes it difficult to know that a biological attack has occurred until victims display symptoms. In other cases, the effects are immediate. Those affected by a biological agent require the immediate attention of professional medical personnel. Some agents are contagious, which may result in the need for victims to be quarantined.

In recent years, cyber terrorism has become a larger threat than in years past. Cyberterrorism is defined as the 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 (Fairleigh Dickinson University, 2024). 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. One of the more prominent groups involved in large-scale hacking events recently is the group Fancy Bears from Russia. They have been known to overtake websites, steal information, and alter the content that is presented to the public. The largest threat to institutions from cyber terrorism comes from any processes that are networked and controlled via computer. Any vulnerability that could allow access to sensitive data or processes should be addressed and any possible measures taken to harden those resources to attack.

The FBI defines an "active shooter" as one or more individuals actively engaged in killing or attempting to kill people in a populated area (FBI, 2024a). In most cases, active shooters use firearms and there is no pattern or method to their selection of victims. No substantive research has yet been compiled to address the potential vulnerability to an active shooter incident. Some of these incidents have occurred in public places, and some in places that are considered more restrictive like schools. There is no discernible pattern to the location chosen by the shooters.

In Cumberland County past events have consisted of bomb threats, as described in Section 4.3.15.3.

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

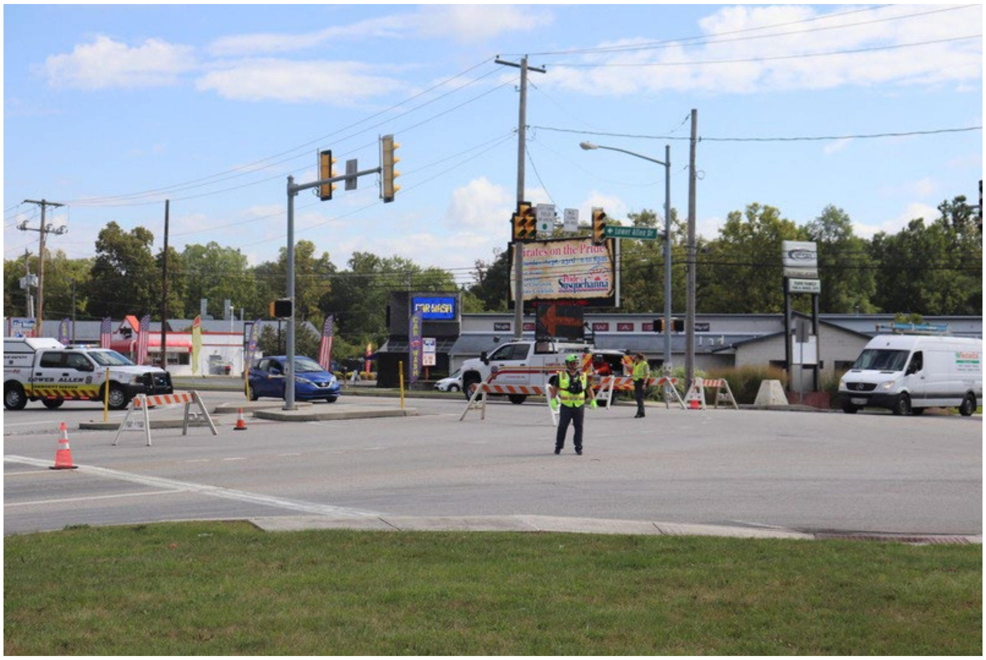
Table 4.3.15-1: Most Likely Lifelines Impacted by Terrorism.

LIFELINES	NOTES
	Community safety is often threatened, and police, fire, and other government services are either targeted or needed to respond to terroristic threats or actions.
	Water resources and the food supply chain may be targeted by biological terrorism.
	Energy infrastructure may be a potential target for terrorism.
	Hazardous materials facilities may be a potential target for terrorism.

4.3.15.3 Past Occurrence

Cumberland County experiences terrorist incidents annually. In 2001, 36 terrorist incidents (i.e., bomb threats) were reported while 13 incidents were reported in 2002. In 2007, 21 incidents were reported while 18 incidents were reported in 2008 (PEMA 2007 & 2008). Specific details regarding these incidents are not available. In more recent years, there have been 4 terrorist incidents in 2022 and 2 incidents in 2023 (PEMA PEIRS, 2024). A photograph of a bomb scare response at the county courthouse is provided in Figure 4.3.15-1.

Figure 4.3.15-1: A bomb threat at the Capital City Mall resulted in evacuation and the closure of traffic around the mall on September 18, 2023 (Photograph courtesy of Jonathan Bergmueller / *PennLive*).



A recent example would be September 18, 2023. The Capital City Mall was evacuated “out of complete caution” following a bomb threat that had been emailed to the to the mall’s administration. Bomb dogs from multiple counties searched the mall and no explosives were found. Traffic around the mall was closed as well (Wise, 2023a). Another example would be on November 30, 2023. A bomb threat caused the Big Spring High School in Newville to evacuate to the nearby elementary school in response. Police inspected the entire high school, the bomb threat turned out to be fraudulent (Hall, 2023).

Another very recent bomb threat occurred on April 15, 2024, at the Cumberland County Prison. The Cumberland County Sheriff’s Office, Carlisle Borough, and Middlesex Township Police Departments responded to assist with the incident. The Sheriff’s K-9 and Carlisle Borough’s K-9 were utilized for a controlled sweep of the prison, which was conducted while the prison was in lockdown. The area was deemed clear within a few hours (Stockburger, 2024).

4.3.15.4 Future Occurrence

Based on historical events, Cumberland County can expect to experience several terrorist incidents each year. Note that this estimate is based on the occurrence of past events over a short period of time and is not the result of detailed statistical sampling. Although previous events have not resulted in what are considered significant terrorist attacks, the severity of a future incident cannot be predicted with a sufficient level of certainty. Overall, the probability of future significant terrorist incidents can be considered *unlikely* according to the Risk Factor Methodology (see Table 4.5.2-1).

4.3.15.5 Vulnerability Assessment

Since the probability of terrorism occurring cannot be quantified in the same way as that of many natural hazards, it is not possible to assess vulnerability in terms of likelihood of occurrence. Instead, vulnerability is assessed in terms of specific assets. By identifying potentially at-risk terrorist targets in Cumberland County, planning efforts can be put in place to reduce the risk of attack. All communities in Cumberland County are vulnerable on some level, directly or indirectly, to a terrorist attack. However, communities where the previously mentioned potential targets are located should be considered more vulnerable. Site-specific assessments should be based on the relative importance of a particular site to the surrounding community or population, threats that are known to exist and vulnerabilities including:

- **Inherent vulnerability:**
  - Visibility – How aware is the public of the existence of the facility?
  - Utility – How valuable might the place be in meeting the objectives of a potential terrorist?
  - Accessibility – How accessible is the place to the public?
  - Asset mobility – is the asset's location fixed or mobile?
  - Presence of hazardous materials – Are flammable, explosive, biological, chemical and/or radiological materials present on site? If so, are they well secured?
  - Potential for collateral damage – What are the potential consequences for the surrounding area if the asset is attacked or damaged?
  - Occupancy – What is the potential for mass casualties based on the maximum number of individuals on site at a given time?
- **Tactical vulnerability:**
  - *Site Perimeter*
    - Site planning and Landscape Design – Is the facility designed with security in mind – both site-specific and with regard to adjacent land uses?
    - Parking Security – Are vehicle access and parking managed in a way that separates vehicles and structures?
  - *Building Envelope*
    - Structural Engineering – Is the building's envelope designed to be blast-resistant? Does it provide collective protection against chemical, biological and radiological contaminants?
  - *Facility Interior*
    - Architectural and Interior Space Planning – Does security screening cover all public and private areas?
    - Mechanical Engineering – Are utilities and Heating, Ventilating and Air Conditioning (HVAC) systems protected and/or backed up with redundant systems?
    - Electrical Engineering – Are emergency power and telecommunications available? Are alarm systems operational? Is lightning sufficient?
    - Fire Protection Engineering – Are the building's water supply and fire suppression systems adequate, code-compliant and protected? Are on-

site personnel trained appropriately? Are local first responders aware of the nature of the operations at the facility?

- Electronic and Organized Security – Are systems and personnel in place to monitor and protect the facility?

4.3.15.6 Equity in Vulnerable Communities

Regarding equity in the face of an act of terrorism, there are several communities to consider. Emergency response plans should be included and take into account the needs of diverse populations, including non-English speakers, individuals with disabilities, and those with limited access to technological resources like smartphones or internet connections. Carlisle Borough, East Pennsboro Township, Hampden Township, Lower Allen Township, North Middleton Township, and Upper Allen Township (see Table 4.3.11-2 in Section 4.3.11-6) have higher concentrations of households with limited English. Carlisle Borough, Silver Spring Township, East Pennsboro Township, Wormleysburg Borough and Lower Allen Township have the largest minority populations (see Section 4.5.4). Carlisle Borough, East Pennsboro Township, Hampden Township, Lower Allen Township, Silver Spring Township, and Upper Allen Township (See Table 4.3.10-3 in Section 4.3.10.5) have the largest number of people with a disability.

4.3.16. Transportation Accidents

4.3.16.1 Location and Extent

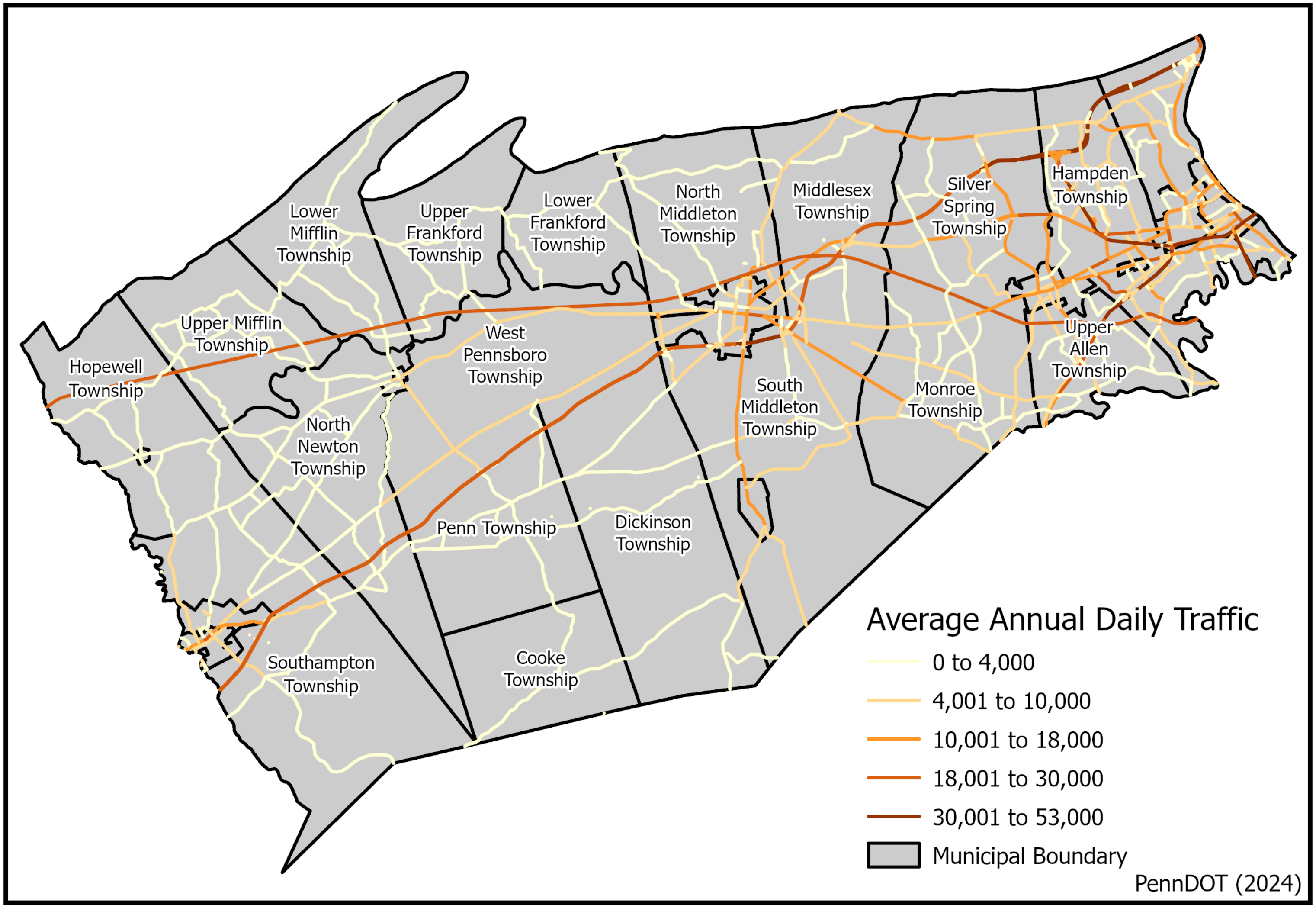
For the purposes of this plan, transportation accidents are defined as incidents involving highway, rail, and air travel. These incidents are collectively the costliest of all hazards in the Commonwealth in terms of lives lost, injuries, and economic losses. Pennsylvania has the fifth largest state highway system in the United States – larger than New York, New Jersey, and New England combined. Within Cumberland County, there are over 2,011 miles of roads, 452 bridges and approximately 270 miles of railways. Key freight routes include I-81, I-76, I-83, PA 581 and PA 34/94. The Norfolk Southern Railroad runs along the entire eastern border of the Borough of New Cumberland. There is a potential for major accidents on any of these roads, bridges or railways.

The County has two public airports, these are Shippensburg Airport and Carlisle Airport. As well as twelve private airports; Carlisle Barracks Heliport, Carlisle Regional Medical Center Heliport, Neiderer Airport, North Middlesex Heliport, Holy Spirit Hospital Heliport, Phico Heliport, Williams Grove Heliport, Ibm Distribution Center Heliport, Deitch Airport, Heberlig Airport, Botsford Aerodrome Airport, and Harsco Heliport. Furthermore, there is a considerable amount of commercial air traffic from two airports located outside of the County; Harrisburg International Airport in Dauphin County and Capital City Airport in York County. Commercial air traffic flyovers not only bother residents with noise, but they also present the possibility of injury, damage to structures and fire, if an aircraft were to crash. A five-mile radius around each airport can be considered a high-risk area since most aviation incidents occur near take-off or landing sites. While Harrisburg International Airport is the largest airport in the area, it is greater than five miles away from the County. Highway traffic volumes and transportation infrastructure are illustrated on Figure 4.3.16-1.

Rail transportation incidents are generally classified as one of three types:

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

Figure 4.3.16-1: Cumberland County highway traffic volume (PennDOT, 2024). This image is a screen capture from the Cumberland County Hazard Mitigation Plan Map Series. Please hold the CTRL key and select the map below for the Hazard Mitigation Plan Map Series.



4.3.16.2 Range of Magnitude

Significant passenger vehicle, air, and rail transportation incidents can result in a wide range of outcomes from damage solely to property to serious injury or death. Most air incidents are non-fatal and cause minor injuries or property damage. The majority of motor vehicle crashes are non-fatal in Pennsylvania, but PennDOT estimates that every hour several people are injured in a car crash, and there are a handful of deaths as a result of a car crash each day. Most fatal crashes occur in May-August but the highest number of crashes overall occur in October-January (PennDOT, 2021).

Some of the most important components of vehicle crashes and their severity are speed, lane departures, and alcohol and seat belt use. Speeding is correlated with both more frequent and more severe crashes, as it reduces the driver's ability to react. Research has even shown that traveling above 50 mph can begin to cancel out many new safety features (Insurance Institute for Highway Safety, 2021). From 2016-2020, 52% of statewide highway fatalities involved a lane departure (PennDOT, 2022). In 2023, 23 alcohol-related crashes occurred each day and 40% of driver fatalities in the 41-45 age group were from drinking drivers; roughly 3 out of 4 drinking drivers were male (PennDOT, 2023). Seat belts can reduce the risk of fatal injuries by as much as 60%, while reducing the risk of injury by 65% (PennDOT, 2023).

A growing concern is the size and weight of cars and trucks has been increasing, which has led to a deadlier environment for pedestrians even though they are safer for the driver and any passengers (Insurance Institute for Highway Safety, 2021). An additional growing concern is electric vehicle considerations for first responders, as EV crashes must be handled a bit different than typical internal combustion engine (ICE) ones. EV fires are less likely to occur, but they burn hotter, require more water, and can even reignite hours or weeks after the initial fire, all of which can create issues for first responders and towing companies (DVRPC, 2022).

The environmental impacts of transportation incidents can vary greatly. In the case of a simple motor vehicle crash, train derailment, or aviation incident, the environmental impact is minimal. However, if the incident involves any type of vehicle moving chemicals or other hazardous materials, the impact will be considerably larger and may include an explosion or the release of potentially hazardous material. Railway and roadway incidents in particular have the potential to result in hazardous materials release. An example of this type of worst-case scenario is described in Section 4.2.1 and resulted in closure of Interstate 81 and U.S. Route 22/322 westbound during the repair of two damaged bridges, causing a severe disruption to transportation in Cumberland County and the rest of the Capitol Region in 2013. For a complete discussion of the environmental impacts of hazardous materials releases, see Section 4.3.12.

The potential impacts of transportation incidents on community lifelines are as follows:

Table 4.3.16-1: Most Likely Lifelines Impacted by Transportation Incidents.

LIFELINE	NOTES
Safety and Security	Direct harm to the community, including drivers, bicyclists, and pedestrians.

Health and Medical	Medical personnel might be needed due to the significant risk of injury and death that transportation incidents represent.
Hazardous Materials	Potential negative consequences of incidents occurring while transporting these materials.

4.3.16.3 Past Occurrence

Total crashes decreased by approximately 20% from 2019 to 2020, which could be attributed to the lockdown measures in place during the pandemic. Although, 2021 to 2023 shows a steady increase in total crashes once again. However, there's still a 5% decrease in total crashes when comparing 2019 to 2023. Table 4.3.16-2 displays trends in crashes and fatalities in the County from 2019-2023, with 2023 being the most recent year for which statistics are available.

Table 4.3.16-2: Five-year trend of vehicular crashes in Cumberland County from 2019 – 2023 (PennDOT, 2024c).

	2019	2020	2021	2022	2023
Total Crashes	2,551	2,033	2,380	2,422	2,423
Fatal Crashes	17	14	24	15	22
Pedestrian Fatal Crashes	2	2	5	1	2

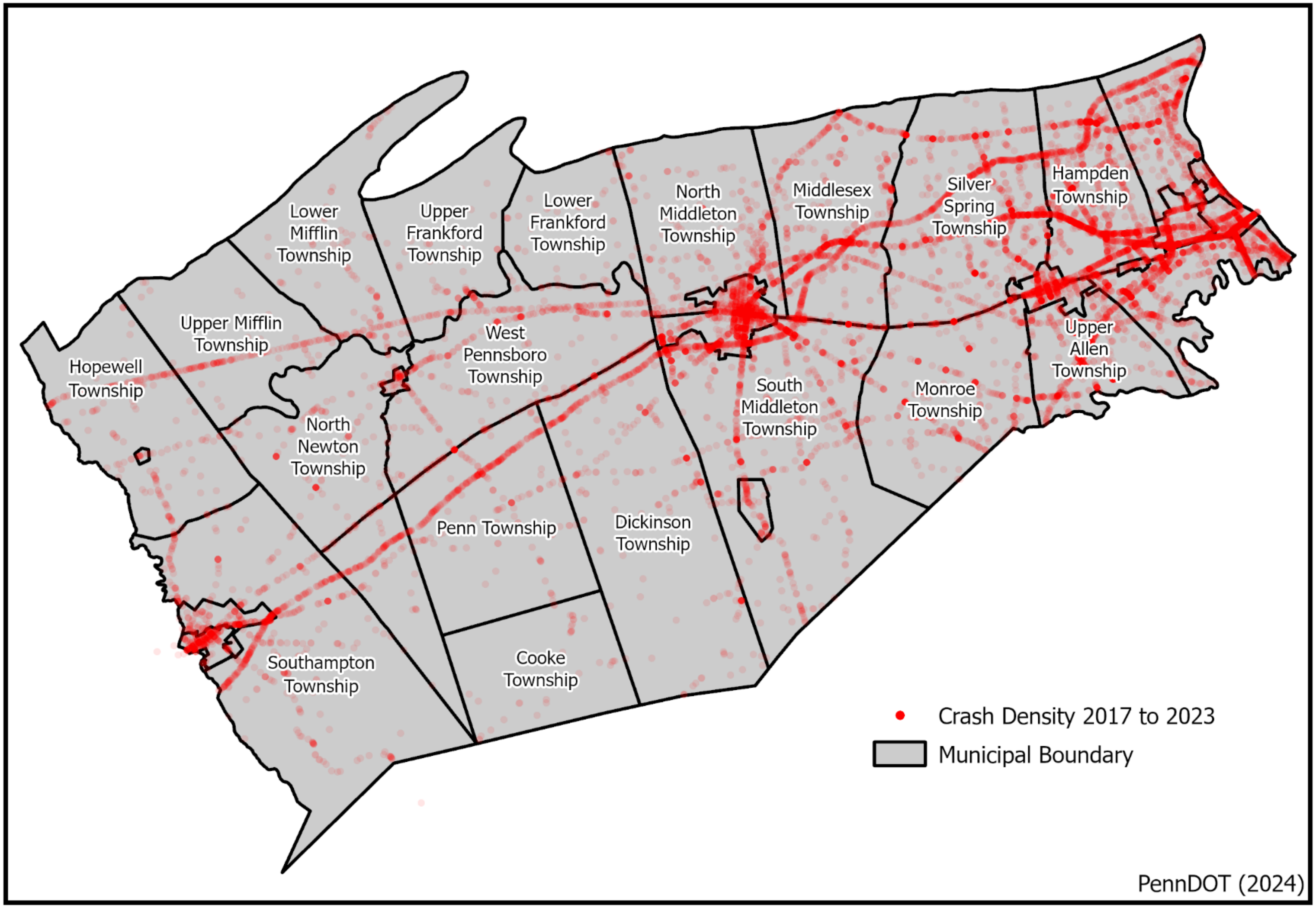
Based on previous events, the following intersections and corridors in Cumberland County have been identified by the Harrisburg Area Transportation Study (HATS) for safety initiatives in order to reduce fatalities, major injuries and economic loss to society based on a 2016 study they conducted (the most up-to-date data available as of August 2024):

- Intersections:
    - Trindle Rd & Locust Point Rd in Silver Spring Twp./Monroe Twp.
- Corridors:
    - Camp Hill Borough
        - Route 11 (Cumberland Blvd) from Country Club Rd to Walnut St
    - Hampden Twp.
        - Rt 944 (Wertzville Rd) from Good Hope Rd to I-81 Ramps
    - Silver Spring Twp.
        - Rt 944 (Wertzville Rd) from Sample Bridge Rd to Hunter Dr
        - Rt 114 (Conodoguinet Pkwy) from Old Willow Mill Rd to North Bend Dr
    - Monroe Twp.
        - Lisburn Rd from Williams Grove Rd to Cope Dr
    - Carlisle Borough
        - High St from Mooreland Av to Spruce St
        - S Hanover St from High St to Noble Blvd.

        - N Hanover St from High St to Penn St
    - Mt Holly Springs Borough
        - Baltimore Av from Lakeside Dr to Freedom Dr
    - North Newton Borough
        - Shippensburg Rd from Oakville Rd to Willis Rd
    - Shippensburg Borough
        - King St from Morris St to Prince St

PennDOT has identified roads across the County which commonly experienced traffic crash incidents in 2023 (see Figure 4.3.16-2).

Figure 4.3.16-2: Crashes in Cumberland County between 2017 to 2023 (PennDOT, 2024). This image is a screen capture from the Cumberland County Hazard Mitigation Plan Map Series. Please hold the CTRL key and select the map below for the Hazard Mitigation Plan Map Series.



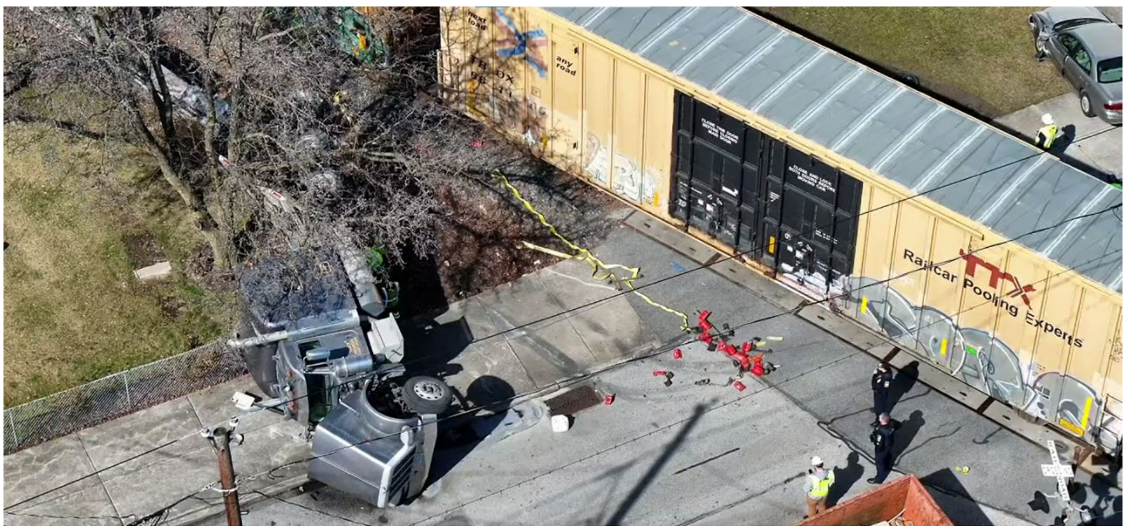
Commercial and school related bus accidents are also a concern. For example, a charter bus veered off the Pennsylvania Turnpike near Carlisle and struck a tree on March 9, 2013, killing the driver and one passenger (Malmont and Cress, 2013). On February 9, 2016, a school bus transporting middle and high school students from the Cumberland Valley School District collided with a car after failing to stop at a stop sign. One passenger in the car was killed, three were transported to local hospitals and no serious injuries were reported among the students on the bus (PennLive, 2016). In more recent years, a school bus for Big Spring School District failed to stop at a stop sign, crashing into an SUV on December 12, 2023. A total of 8 people were injured, including 6 students on the bus and the two passengers from the SUV. All were taken to the hospital for evaluation, injuries ranged from moderate to minor, with no life-threatening injuries (Miller, 2023).

Two plane crashes occurred within the Borough of New Cumberland in 1983 and 1984, both in highly populated areas. One occurred beside an active playground. The other accident involved a crash into a residential property, killing both the pilot and an occupant of the house and threatening several others. A Cessna plane crashed in a residential area on Forge Road near the intersection with West Hunter Road in South Middleton Township on March 24, 2014, but only the pilot was injured (Carr, 2014). All other plane crashes of past years have occurred in mountainous terrain and resulted in death or injury to occupants of the aircraft only. For example, a single-engine Aero Bristell crashed into trees about 500 feet north of Carlisle airport's Runway 28. The crash resulted in injuries to only the two people on board (Marroni, 2020). A photograph of this event is shown in Figure 4.3.16-3.

Figure 4.3.16-3: An Aero Bristell plane crashed into trees at Carlisle Airport in Carlisle, Cumberland County, PA on October 18, 2020 (Photograph courtesy of Vicki Vellios Briner / *PennLive*, 2020).

Rail accidents are also a potential concern for residents of Cumberland County. For example, a freight train struck a tractor-trailer hauling a 135-foot-long concrete bridge span at the Brandtsville Crossing in Monroe Township on September 12, 2013 (Croley, 2013). The crash and train derailment did not cause fatalities but resulted in significant property damage as well as closure of both lanes of York Road for more than 24 hours (Croley, 2013). More recently, a crash occurred between a train and tractor-trailer on February 26, 2024, in downtown Carlisle in the area of the 400 block of N. Bedford Street. No injuries were reported, but traffic in the area was affected with detours having to be in place until the afternoon (Schweigert, 2024). A photograph of this event is provided in Figure 4.3.16-4.

Figure 4.3.16-4: A train struck a tractor-trailer in Carlisle, Cumberland County, PA on February 26, 2024 (Photograph courtesy of Keith Schweigert / *Fox43,* 2024).



4.3.16.4 Future Occurrence

The number of transportation related accidents is expected to increase with growing populations and increased traffic volumes. Over the first half of the 2010–2020-decade, Cumberland County’s population grew faster than any other county in the state of Pennsylvania. The 2010 population was 235,406 and increased to 259,469 in 2020, a 10% increase (U.S. Census Bureau, 2024). Transportation and warehousing contribute significantly to the County’s economy and employment. In 2022, this sector accounted for 7% of overall employment (U.S. Census Bureau, 2022). In Daily vehicle miles traveled (DVMT) decreased throughout the state following the financial crisis and economic recession of 2007-2009, but Cumberland County’s travel demand has nearly returned to pre-recession levels. This increase has outpaced Pennsylvania’s increase in DVMT (HATS 2017). It is anticipated that by 2030, over 121,000 long haul trucks will operate daily in the County, 109,000 of which will be traveling through the region without making a pickup or delivery (HATS, 2010). The increase in population and the growth of the transportation and warehousing economic sector will put greater demand on the county’s roadways and will likely result in the continued occurrence of transportation accidents.

Figure 4.3.16-2 displays total vehicle crashes for major roads throughout Cumberland County from 2017 to 2023. Accidents were concentrated in the Borough of Carlisle and in eastern municipalities including Hampden Township, and the Boroughs of Camp Hill, Lemoyne, and Mechanicsburg. The map provides a basis for estimating the number of future traffic crash incidents at specific points on given roads across the County. Crashes are likely to continue or increase without mitigation.

Changes to Pennsylvania's climate will also have an impact on future occurrences of transportation incidents. Changes in precipitation, extreme weather events, and heat pose risks to transportation infrastructure, affecting performance, safety, and reliability. Flooding can weaken roadways and tunnels and potentially lead to landslides that affect highways, railways, and bridges. Rising temperatures can damage roadways, rail infrastructure, and make it more difficult for airplanes to take off (EPA, 2022c).

A 70% increase in the amount of rainfall associated with extreme events was measured in Pennsylvania from 1958-2010 (PA DEP, 2021). This aspect of climate change could increase the risk of flooding to transportation corridors in the County. PennDOT initiated an Extreme Weather Vulnerability Study, in part to examine the potential impacts of an increase in extreme weather events on state-owned roads and bridges in three sample counties: Lycoming, Allegheny and Delaware. Representative Concentration Pathway (RCP) 8.5, often described as the "business as usual" climate change model, was applied to project flooding inundation of state-owned roadways and bridges. Results showed many locations that could be newly subjected to flooding in the future due to increases in heavy rainfall (PennDOT, 2019). Although Cumberland County was not included in this projection, all regions in Pennsylvania are likely to experience increases in extreme rainfall which will more frequently inundate important roads and railways.

An emerging industry in transportation is autonomous or "self-driving" vehicles, often referred to as Highly Automated Vehicles (HAVs). PennDOT has aided efforts by deploying roadside communication units to enable communication between infrastructure and vehicles and actively contributing to the national effort of developing uniform standards and practices (PennDOT, 2024b). In recent years PennDOT has released several documents for HAVs, this includes Act 130, which was signed November 2022 and enacted in July 2023. Act 130 includes significant amendments to the State's vehicle code (Title 75) and covers definitions, rules, equipment standards, inspections, and other regulations concerning HAVs. This Act provides a framework for how these vehicles should operate, focusing on areas like safety, licensing, insurance, and operations on public roads. Additionally, Act 130 introduces new offenses, such as the theft of catalytic converters, and establishes guidelines for the reporting and handling of vehicular crashes. It also outlines the responsibilities of different government bodies in regulating and overseeing the use of HAVs in Pennsylvania (PennDOT, 2024a).

Additionally, the probability of aviation incidents nationwide was 3.45 incidents per 100,000 flight hours in 2016. This incident rate has decreased each year since 2013 when it was 4.95 incidents per 100,000 flight hours (FAA, 2018). Therefore, the likelihood of an aviation incident in the County is considered low. Information on previous railway accidents is insufficient to assess the probability of future occurrence.

As part of the Evaluation of Identified Hazards and Risk, many municipality representatives observed that traffic on the Interstate Highways passing through the County has increased, and that this would magnify the risks associated with transportation accidents. Some of the respondents connected increases in traffic to the growth of the warehouse and distribution industry.

Overall, the probability of future transportation accidents can be considered *highly likely* according to the Risk Factor Methodology (see Table 4.5.2-1).

4.3.16.5 Vulnerability Assessment

A transportation-related incident can occur on any stretch of road in Cumberland County. However, severe accidents are more likely along major highways such as I-81, I-76, I-83, U.S. Routes 11, 15, 11/15 and PA Route 581 which experience heavier traffic volumes including heavy freight vehicles. Dickinson Township, Middlesex Township, North Middleton Township, Hampden Township, South Middleton Township, and Carlisle Borough indicated an increase in traffic and therefore more transportation related accidents in their areas. The combination of high traffic volume, severe winter weather in the County and large numbers of hazardous materials haulers increase the chances of traffic accidents occurring. Accidents may also occur on any rail line or air flight path. The age and condition of bridges is another important risk factor to consider in the analysis of transportation accident vulnerability.

Table 4.3.16-3 lists total addressed units' data and critical facilities within 0.25 mile of major roads which includes, interstates, United States highways, and Pennsylvania highways, and rail lines within 5 miles of an airport, which does not include heliports. Carlisle Borough is most vulnerable to transportation accidents with a significant number of addressed units within 0.25 miles of a major highway and within 0.25 miles of a rail line and contains the second most addressed units within 5 miles of an airport (Hampden Township contains more). Carlisle Borough also has the most critical facilities within 0.25 miles of a major road and within 5 miles of an airport.

Table 4.3.16-3: Addressed units and critical facilities within 0.25 mi of major roads (interstates, US highways, state highways) and rail lines and within 5 miles of an airport (Cumberland County GIS, 2024).														
Municipality	**Total Addressed Units**	**Structures Addressed Units Within 0.25 mi of Major Roads**	**Percent of Units Within 0.25 mi of Major Roads**	**Structures Addressed Units Within 0.25 mi of rail lines**	**Percent of Units within 0.25 mi of rail lines**	**Structures Addressed Units Within 5 mi of Airport/**	**Percent of Units Within 5 mi of Airport**	**Total Critical Facilities in Municipality**	**Critical Facilities within 0.25 mi of Major Roads**	**Percent Critical Facilities within 0.25 mi of Major Roads**	**Total Critical Facilities within 0.25 mi of rail lines**	**Percent Critical Facilities within 0.25 mi of rail lines**	**Critical Facilities within 5 mi of Airport/**	**Percent of Critical Facilities within 5 mi of Airport**
Borough of Camp Hill	3,748	3,544	95%	709	19%	3,748	100%	38	38	100%	6	15.8%	38	100%
Borough of Carlisle	9,209	8,561	93%	3,093	34%	9,209	100%	118	111	94.1%	19	16.1%	118	100%
Township of Cooke	421	266	63%	29	7%	0	0%	4	4	100%	0	0%	0	0%
Township of Dickinson	2,329	1,292	55%	604	26%	1,296	56%	15	4	26.7%	1	6.7%	10	66.7%
Township of East Pennsboro	9,331	6,602	71%	1,896	20%	9,331	100%	72	66	91.7%	26	36.1%	72	100%
Township of Hampden	14,623	9,169	63%	1,395	10%	14,623	100%	108	88	81.5%	43	39.8%	108	100%
Township of Hopewell	937	503	54%	0	0%	937	100%	12	7	58.3%	0	0%	12	100%
Borough of Lemoyne	2,235	2,141	96%	1,787	80%	2,235	100%	27	27	100%	17	63.0%	27	100%
Township of Lower Allen	8,507	7,023	83%	2,449	29%	8,408	99%	69	65	94.2%	32	46.4%	69	100%
Township of Lower Frankford	742	209	28%	0	0%	700	94%	2	0	0%	0	0%	2	100%
Township of Lower Mifflin	768	432	56%	0	0%	607	79%	6	6	100%	0	0%	3	50.0%
Borough of Mechanicsburg	4,834	4,279	89%	2,878	60%	4,834	100%	49	45	91.8%	43	87.8%	49	100%
Township of Middlesex	3,435	1,753	51%	103	3%	3,435	100%	50	39	78.0%	17	34.0%	50	100%
Township of Monroe	2,834	1,782	63%	301	11%	2,834	100%	14	11	78.6%	2	14.3%	14	100%
Borough of Mt Holly Springs	926	795	86%	588	63%	605	65%	17	17	100%	5	29.4%	11	64.7%
Borough of New Cumberland	3,365	3,165	94%	1,036	31%	3,365	100%	21	21	100%	15	71.4%	21	100%
Borough of Newburg	137	137	100%	0	0%	137	100%	2	2	100%	0	0%	2	100%

Table 4.3.16-3: Addressed units and critical facilities within 0.25 mi of major roads (interstates, US highways, state highways) and rail lines and within 5 miles of an airport (Cumberland County GIS, 2024).

Municipality	Total Addressed Units	Structures Addressed Units Within 0.25 mi of Major Roads	Percent of Units Within 0.25 mi of Major Roads	Structures Addressed Units Within 0.25 mi of rail lines	Percent of Units within 0.25 mi of rail lines	Structures Addressed Units Within 5 mi of Airport/	Percent of Units Within 5 mi of Airport	Total Critical Facilities in Municipality	Critical Facilities within 0.25 mi of Major Roads	Percent Critical Facilities within 0.25 mi of Major Roads	Total Critical Facilities within 0.25 mi of rail lines	Percent Critical Facilities within 0.25 mi of rail lines	Critical Facilities within 5 mi of Airport/	Percent of Critical Facilities within 5 mi of Airport
Borough of Newville	766	766	100%	0	0%	766	100%	16	16	100%	0	0%	16	100%
Township of North Middleton	5,807	3,305	57%	474	8%	5,805	100%	45	40	88.9%	9	20.0%	45	100%
Township of North Newton	939	709	76%	14	1%	939	100%	13	12	92.3%	1	7.7%	13	100%
Township of Penn	1,200	756	63%	178	15%	775	65%	14	9	64.3%	3	21.4%	9	64.3%
Borough of Shippensburg	2,233	2,162	97%	877	39%	272	12%	24	23	95.8%	14	58.3%	4	16.7%
Township of Shippensburg	1,392	1,223	88%	183	13%	496	36%	23	20	87.0%	5	21.7%	15	65.2%
Borough of Shiremanstown	801	801	100%	685	86%	801	100%	9	9	100%	9	100%	9	100%
Township of Silver Spring	9,062	4,959	55%	1,024	11%	9,062	100%	67	46	68.7%	15	22.4%	67	100%
Township of South Middleton	7,433	4,365	59%	537	7%	6,826	92%	74	64	86.5%	9	12.2%	72	97.3%
Township of South Newton	536	378	71%	224	42%	533	99%	6	5	83.3%	5	83.3%	6	100%
Township of Southampton	3,364	2,338	70%	462	14%	2,162	64%	20	11	55.0%	4	20.0%	18	90.0%
Township of Upper Allen	8,998	5,413	60%	636	7%	8,908	99%	44	42	95.5%	2	4.5%	44	100%
Township of Upper Frankford	1,026	472	46%	0	0%	854	83%	8	7	87.5%	0	0%	5	62.5%
Township of Upper Mifflin	573	388	68%	0	0%	573	100%	3	1	33.3%	0	0%	3	100%
Township of West Pennsboro	2,345	1,230	52%	0	0%	2,344	100%	16	9	56.3%	0	0%	16	100%
Borough of Wormleysburg	1,590	1,231	77%	1,153	73%	1,590	100%	4	4	100%	4	100%	4	100%
TOTAL	**116,446**	**82,149**	**70.5%**	**23,315**	**20.0%**	**109,010**	**93.6%**	**1010**	**869**	**86.0%**	**306**	**30.3%**	**952**	**94.3%**

Approximately 232,411 people in Cumberland County live within five miles of at least one airport in or adjacent to Cumberland County. Population totals within these high-risk areas are listed in Table 4.3.16-4. Data from the 2020 U.S. Census was used to populate the table instead of recent American Community Survey estimates, because it is more reliable and accurate. In addition, New Cumberland Borough and East Pennsboro Township are located beneath routine flight paths for Harrisburg International and Capital City airports.

Table 4.3.16-4: Population within 5-miles of airports located in and adjacent to Cumberland County (Cumberland County GIS, 2025; U.S. Census, 2020).

Municipality	Total Population (2020 Census)	Population within 5 miles of airport	Percent of Population within 5 miles of airport
Borough of Camp Hill	7,926	7,926	100.00%
Borough of Carlisle	19,188	19,188	100.00%
Township of Cooke	180	-	0.00%
Township of Dickinson	5,366	3,004	55.98%
Township of East Pennsboro	21,496	21,046	97.91%
Township of Hampden	30,486	30,486	100.00%
Township of Hopewell	3,256	2,451	75.29%
Borough of Lemoyne	4,635	4,543	98.02%
Township of Lower Allen	19,659	19,659	100.00%
Township of Lower Frankford	1,910	1,675	87.69%
Township of Lower Mifflin	1,577	1,388	88.04%
Borough of Mechanicsburg	8,977	8,977	100.00%
Township of Middlesex	7,457	6,521	87.45%
Township of Monroe	6,074	6,074	100.00%
Borough of Mt Holly Springs	2,037	1,307	64.17%
Borough of New Cumberland	7,305	7,305	100.00%
Borough of Newburg	326	326	100.00%
Borough of Newville	1,231	1,231	100.00%
Township of North Middleton	11,714	11,714	100.00%
Township of North Newton	2,526	2,498	98.91%
Township of Penn	2,995	1,966	65.66%
Borough of Shippensburg	4,592	456	9.92%
Township of Shippensburg	5,312	826	15.55%
Borough of Shiremanstown	1,611	1,560	96.85%
Township of Silver Spring	17,850	17,850	100.00%
Township of South Middleton	15,478	14,634	94.55%
Township of South Newton	1,201	1,201	100.00%
Township of Southampton	7,019	4,842	68.98%
Township of Upper Allen	20,272	20,272	100.00%
Township of Upper Frankford	1,931	1,747	90.46%
Township of Upper Mifflin	1,256	1,256	100.00%

Table 4.3.16-4: Population within 5-miles of airports located in and adjacent to Cumberland County (Cumberland County GIS, 2025; U.S. Census, 2020).			
Municipality	**Total Population (2020 Census)**	**Population within 5 miles of airport**	**Percent of Population within 5 miles of airport**
Township of West Pennsboro	5,613	5,531	98.53%
Borough of Wormleysburg	3,031	2,950	97.33%
TOTAL	**251,487**	**232,411**	**85%**

Table 4.3.16-5 identifies the number of addressed residential and non-residential units vulnerable to aviation incidents due to being located within 5 miles of an airport. The vast majority of these structures are residential (100,419 of 109,010).

Table 4.3.16-5: Structures Vulnerable to Aviation Incidents by Generalized Structure Type (Cumberland County GIS, 2024).								
Municipality	**Total Addressed Units in Municipality**	**Total Non-Residential Addressed Units**	**Non-Residential Units Within 5-mi of Airports**	**Percent of Non-Residential Units Within 5-mi of Airports**	**Total Residential Addressed Units**	**Residential Addressed Units Within 5-mi of Airports**	**Percent Residential Units Within 5-mi of Airports**	**Total Addressed Units Within 5-mi of Airports**
Borough of Camp Hill	3,748	355	355	100%	3,393	3,393	100%	3,748
Borough of Carlisle	9,209	1,423	1,423	100%	7,786	7,786	100%	9,209
Township of Cooke	421	22	0	0%	399	0	0%	0
Township of Dickinson	2,329	92	47	51.1%	2,237	1,249	55.8%	1,296
Township of East Pennsboro	9,331	538	538	100%	8,793	8,793	100%	9,331
Township of Hampden	14,623	961	961	100%	13,662	13,662	100%	14,623
Township of Hopewell	937	43	43	100%	894	894	100%	937
Borough of Lemoyne	2,235	390	390	100%	1,845	1,845	100%	2,235
Township of Lower Allen	8,507	879	877	99.8%	7,628	7,531	98.7%	8,408
Township of Lower Frankford	742	17	16	94.1%	725	684	94.3%	700
Township of Lower Mifflin	768	31	21	67.7%	737	586	79.5%	607
Borough of Mechanicsburg	4,834	636	636	100%	4,198	4,198	100%	4,834
Township of Middlesex	3,435	238	238	100%	3,197	3,197	100%	3,435
Township of Monroe	2,834	97	97	100%	2,737	2,737	100%	2,834
Borough of Mt Holly Springs	926	96	70	72.9%	830	535	64.5%	605
Borough of New Cumberland	3,365	267	267	100%	3,098	3,098	100%	3,365
Borough of Newburg	137	11	11	100%	126	126	100%	137
Borough of Newville	766	157	157	100%	609	609	100%	766
Township of North Middleton	5,807	375	375	100%	5,432	5,430	100%	5,805
Township of North Newton	939	58	58	100%	881	881	100%	939
Township of Penn	1,200	53	35	66.0%	1,147	740	64.5%	775
Borough of Shippensburg	2,233	346	40	11.6%	1,887	232	12.3%	272

Table 4.3.16-5: Structures Vulnerable to Aviation Incidents by Generalized Structure Type (Cumberland County GIS, 2024).								
Municipality	**Total Addressed Units in Municipality**	**Total Non-Residential Addressed Units**	**Non-Residential Units Within 5-mi of Airports**	**Percent of Non-Residential Units Within 5-mi of Airports**	**Total Residential Addressed Units**	**Residential Addressed Units Within 5-mi of Airports**	**Percent Residential Units Within 5-mi of Airports**	**Total Addressed Units Within 5-mi of Airports**
Township of Shippensburg	1,392	182	93	51.1%	1,210	403	33.3%	496
Borough of Shiremanstown	801	81	81	100%	720	720	100%	801
Township of Silver Spring	9,062	473	473	100%	8,589	8,589	100%	9,062
Township of South Middleton	7,433	474	459	96.8%	6,959	6,367	91.5%	6,826
Township of South Newton	536	31	31	100%	505	502	99.4%	533
Township of Southampton	3,364	97	80	82.5%	3,267	2,082	63.7%	2,162
Township of Upper Allen	8,998	399	397	99.5%	8,599	8,511	99.0%	8,908
Township of Upper Frankford	1,026	29	17	58.6%	997	837	84.0%	854
Township of Upper Mifflin	573	27	27	100%	546	546	100%	573
Township of West Pennsboro	2,345	108	107	99.1%	2,237	2,237	100%	2,344
Borough of Wormleysburg	1,590	171	171	100%	1,419	1,419	100%	1,590
TOTAL	**116,446**	**9,157**	**8,591**	**93.8%**	**107,289**	**100,419**	**93.6%**	**109,010**

4.3.16.6 Equity in Vulnerable Communities

Lower-income communities may be at a higher risk of transportation incidents as infrastructure may be outdated or poorly maintained, increasing the risk of severe outcomes from transportation incidents. This includes Southampton Township, Newville Borough, and Carlisle Borough as they have areas with the highest populations below the poverty level. Rural areas may also have disproportionate effects due to their secluded locations which could affect access to timely and effective emergency response services. Areas such as Carlisle Borough, East Pennsboro Township, Hampden Township, Lower Allen Township, and Upper Allen Township (see Table 4.3.14-2 in Section 4.3.14.6) with higher shares of households without vehicle access may be more vulnerable from a pedestrian perspective.

4.3.17. Urban Fire and Explosions

4.3.17.1 Location and Extent

Urban fire and explosion hazards include vehicle and building/structure fires as well as overpressure rupture, overheating, or other explosions that do not ignite. This hazard occurs in denser, more urbanized areas statewide and most often occurs in residential structures. In 2022, there were an estimated 503,800 fires in both residential and nonresidential buildings, resulting in 2,860 deaths and over $14.5 billion in damage (U.S. Fire Administration, 2024b & 2024c). Urban fires can more easily spread from building to building in denser areas. Furthermore, urban fires are a more significant threat in the many areas of the Commonwealth with a significant proportion of buildings built before 1970. Electrical equipment is often a major cause of fire in areas with older buildings, yet cooking has been found be the most common cause of structural fires nationally (U.S. Fire Administration, 2024d). Urban fires and explosions often begin as a result of other hazards, particularly storms, lightning strikes, drought, transportation accidents, hazardous materials releases, criminal activity (arson), and terrorism. An example of a local urban fire is provided in Figure 4.3.17-1.

Figure 4.3.17-1: Fire at Northside Village Apartments in Carlisle on March 31, 2024. Six apartments caught fire and 130 residents were evacuated with 50 requiring temporary housing as a result (Photograph courtesy of Carlisle Fire & Rescue Services / *CBS 21 News,* 2024).

4.3.17.2 Range of Magnitude

Fire safety in urban areas is impacted by many factors, including demographics, street layouts, building codes, and more. In general, the extensive networks of roads and streets coupled with the number of local fire departments should provide swift access to fire events. It is anticipated that blockage by damage, debris, and operations will be localized and temporary. However, urban fires have the potential to cause extensive damage to residential, commercial, or public property. Damage ranges from minor smoke and/or water damage to the destruction of buildings. People are often displaced for several months to years depending on the magnitude of the event. Urban fires and explosions can also cause injuries and death.

In Pennsylvania, the fire mortality rate is approximately 3.5 deaths and 7.3 injuries per 1,000 fires. This is higher than the national average, which is 2.1 deaths and 6.4 injuries per 1,000 fires. The casualty rate for residential structure fires is greater, with 7.6 deaths and 14.7 injuries per 1,000 fires in Pennsylvania and a national average of 6.1 deaths and 19.8 injuries. Structural fires, including residential and nonresidential buildings, caused 84.2% of deaths, 84.1% of injuries, and 90.6% of firefighter injuries in 2022 (U.S Fire Administration, 2024a).

There may be environmental impacts related to hazardous materials when a fire event or explosion releases dangerous materials. Economic consequences related to this hazard may also occur. Urban fires and explosions may result in lost wages due to temporary or permanently closed businesses, destruction and damage involving business and personal assets, loss of tax base, recovery costs, and lost investments in destroyed property.

The secondary effects of urban fire and explosion events relate to the ability of public, private, and non-profit entities to provide post-incident relief. Human services agencies (community support programs, health and medical services, public assistance programs and social services) can be affected by urban fire and explosion events as well. Effects may consist of physical damage to facilities and equipment, disruption of emergency communications, loss of health and medical facilities and supplies, and an overwhelming load of victims who are suffering from the effects of the urban fire or explosion, including loss of their home or place of business. A potential worst-case scenario could involve an urban fire or explosion affecting critical facilities, numerous attached residences, or a large employer.

The potential impacts of urban fire and explosion on community lifelines are as follows:

Table 4.3.17-1: Most Likely Lifelines Impacted by Urban Fire and Explosions.

LIFELINES	NOTES
Safety and Security	Government personnel will need to respond where community safety is threatened.
Food, Hydration, Shelter	Shelter is at risk as fires and explosions have a direct impact on houses and other forms of shelter.

Table 4.3.17-1: Most Likely Lifelines Impacted by Urban Fire and Explosions.	
LIFELINES	**NOTES**
	Medical personnel may be needed for response and recovery.

4.3.17.3 Past Occurrence

Cumberland County experiences a number of urban fires every year, most of which are small and affect one to a few structures (See Table 4.3.17-2). However, a list of previous significant urban fires is included in Table 4.3.17-3, and a photograph of a major fire event is provided in Figure 4.3.17-2. Cumberland County has not experienced any explosions since 2013 (See Table 4.3.17-2).

Table 4.3.17-2: Urban Fire and Explosion Events in Cumberland County: 2013 – 2024 (PEMA PEIRS, 2024; PEMA – KC, 2018)

	Structure Fires	Vehicle Fires	Explosions	Total
2013	3	1	0	4
2014	6	3	0	9
2015	12	2	0	14
2016	25	2	0	27
2017	31	0	0	31
2018	4	0	0	4
2019	3	0	0	3
2020	12	0	0	12
2021	10	1	0	11
2022	15	3	0	18
2023	9	0	0	9
2024	1	0	0	1
Total	**131**	**12**	**0**	**143**

Table 4.3.17-3: List of previous significant urban fire events in Cumberland County (Cumberland County DPS, 2024).

Date	Location	Agency Action
September 2018	Hampden Township (Apartment Complex)	Red Cross assisted with relocation of 14 persons
June 2018	Hampden Township (Zenith Energy Fuel Terminal)	None
May 2012	Borough of Carlisle (Leer Corporation)	None
May 2011	Carlisle Waste Water Treatment Plant	None
September 2009	Mechanicsburg Borough (4 row house fire at Market & Allen Streets)	None
July 2009	York (block of row houses on Chestnut Street)	Small Business Administration Loans made available
May 2007	Shippensburg Borough (King Street)	None
November 2001	Borough of Lemoyne (Market Street)	Small Business Administration Loan applied for, but not accepted
December 1999	Borough of Carlisle	Small Business Administration Loan received
February 1999	Borough of Lemoyne (West Shore Farmer's Market)	Small Business Administration Loan received
December 1993	Borough of Carlisle (Bartolli's Warehouse)	Small Business Administration Loan received

Figure 4.3.17-2: A fire destroyed half of Motel 6 in Upper Allen Township, displacing about 25 people. The fire started from a nearby mobile home on February 3rd, 2023 (Wise, 2023b) (Photograph courtesy of Sean Simmers / PennLive, 2023).

4.3.17.4 Future Occurrence

Based on historical events, Cumberland County is expected to experience three to four significant urban fire events per decade. Note that this estimate is based on the occurrence of past events over a short period of time and is not the result of detailed statistical sampling. The probability of future significant urban fires can be considered *moderately likely* according to the Risk Factor Methodology (see Table 4.5.2-1).

Climate change could potentially impact the future of urban fire risk by impacting the availability of water resources for fire departments and by creating more favorable conditions for fires to both start and burn. While research typically focuses on wildfires, air becoming hotter and drier can lead to higher amounts of moisture drawn from the surrounding environment, increasing the flammability of certain materials (NOAA DOC, 2023). Prolonged periods of low precipitation combined with hotter temperatures can create more favorable conditions for fires to start and may increase the likelihood that a fire spreads.

4.3.17.5 Vulnerability Assessment

Areas where large buildings are located or development is densely spaced should be considered more vulnerable to urban fire events. In order to adequately assess vulnerability to urban fires, detailed information on the design specifications, specifically fires codes, used for construction of individual buildings is required. All 33 municipalities have adopted the Uniform Construction Code which assures buildings are designed to address structure fire hazards. However, these regulations will only affect new construction, as well as additions and renovations to existing structures. Older buildings that do not meet the criteria established in modern fire codes continue to remain vulnerable.

In response to the Evaluation of Identified Hazards and Risk, David Lindenmuth, a Local Emergency Coordinator from the Shippensburg area, mentioned a decrease in active volunteer firefighters. He identified this as a potential factor impacting the County's fire and traffic accident mitigation. As discussed in Section 4.3.8.5, Cumberland County does not have any career fire departments. The 29 fire companies in the County are staffed by volunteers. However, there are several fire companies that have paid staff on duty for 24 hours and 7 days a week to report to calls and drive fire apparatus. Cumberland County has seen an increase in municipalities utilizing their public works and other municipal employees to support fire company staffing in recent years (Cumberland County Department of Public Safety, October 17, 2024, personal communication).

4.3.17.6 Equity in Vulnerable Communities

Municipalities with an older housing stock may be at a higher risk for urban fires and explosions. Low-income communities oftentimes live in neighborhoods where inadequate building maintenance is common or near industrial areas due to historic zoning laws. This includes Southampton Township, Newville Borough, and Carlisle Borough as they have areas with the highest populations below the poverty level. Residential areas in rural areas may also be at a heightened risk due to their seclusion affecting response times. Individuals with disabilities or limited mobility may face additional challenges during a fire or explosion. Ensuring that emergency services are equipped to assist people with diverse needs.

4.3.18. Utility Interruption

4.3.18.1 Location and Extent

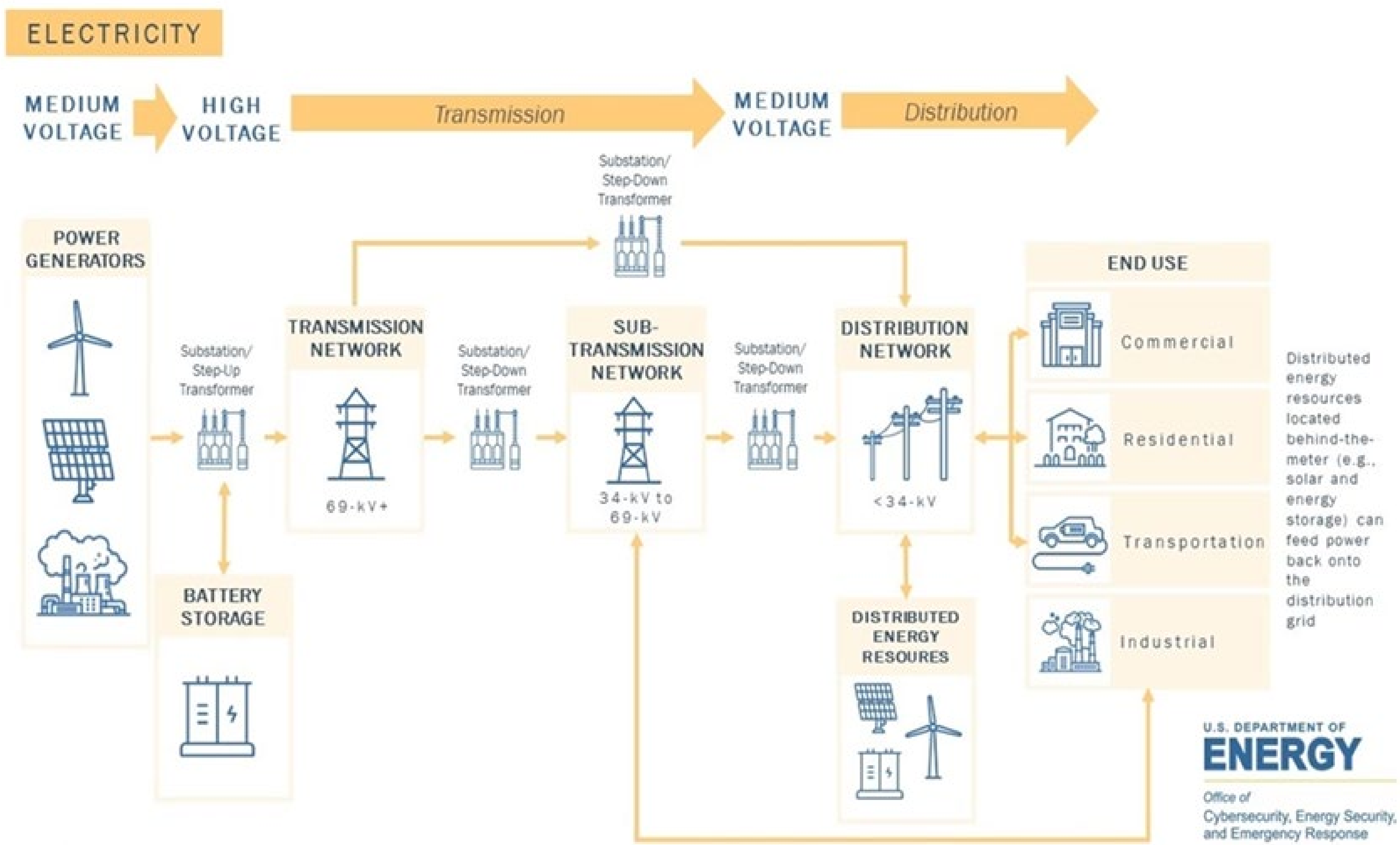
Utility interruption includes any impairment of the functioning of telecommunication, gas, electric, water, or waste networks. These interruptions or outages occur because of geomagnetic storms, fuel or resources shortage, electromagnetic pulses, information technology failures, transmission facility or linear utility accident, and major energy, power, or utility failure. Utility interruptions and power failures can take place anywhere in the County. Utility interruptions in Cumberland County focus primarily on power failures which are often a cascading impact of another hazard event. For example, severe thunderstorms or winter storms could bring down power lines and cause widespread disruptions in electricity service. Strong heat waves may result in rolling blackouts where power may not be available for an extended period of time. Local outages may be caused by traffic accidents or wind damage.

Figure 4.3.18-1 shows the different parts of the electric grid, with the three main sections being generation, transmission, and distribution. Outages often occur in the distribution grid, which is part of the reason that interruptions are usually small scale and localized.

During the 2014 HMP update, South Middleton Township's Local Emergency Management Coordinator, Ron Hamilton, stated that power companies in the area will not do preventative maintenance (tree trimming) but will only respond after a tree has damaged a power line. However, in 2024, power companies have started contracting to have trees cutback from power lines (Cumberland County Department of Public Safety, personal communication, October 17, 2024).

An emerging utility concern is the overall dependence on internet access. Telecommunications companies operate throughout the County; each of these is subject to outages of a few minutes to weeks.

Figure 4.3.18-1: Parts of the Electric Grid (USDOE, 2022).



4.3.18.2 Range of Magnitude

The most severe utility interruptions will be regional or widespread power and telecommunications outages. With the loss of power, electrically powered equipment and systems will not be operational. Examples may include lighting; HVAC and ancillary support equipment; communication (e.g., public-address systems, telephone, computer servers, and peripherals); ventilation systems; fire and security systems; refrigerators, sterilizers, trash compactors, office equipment; and medical equipment. Power outages can cause food spoilage, loss of heat or air conditioning, basement flooding (sump pump failure), lack of light, loss of water (well pump failure), lack of phone service, or lack of internet service. However, this is most often a short-term nuisance rather than a catastrophic hazard. The most significant impact associated with utility interruptions is when the interruption involves a release of hazardous materials. This hazardous material may be released in a pipeline accident or when a material is in transit. For a complete discussion on the impacts of a hazardous materials release, see Section 4.3.12. Utility pipelines carrying flammable materials also have the possibility of exploding or starting a fire.

There are a number of secondary impacts associated with utility interruptions. First, interruptions could affect the ability of the government to function, especially if backup power generation/supply is inadequate or unavailable. Utility interruptions also can reduce the efficient and effective communication that is essential to first responders. Heating loss and severe cold can also impact the health and safety of at-risk populations like young children, the elderly and disabled individuals.

The severity of a utility interruption can be compounded with extreme weather events, especially winter weather events. Interruptions can also be more severe for special needs populations that are dependent on electronic medical equipment. Utility interruptions can significantly hamper first responders in their efforts to provide aid in a compound disaster situation, especially with losses of telecommunications and wireless capabilities. Telecommunications interruptions will also hinder first responders' efforts. Additionally, an internet outage could be crippling to the economy of the state, especially as recent industry changes have led to significant increases in employees working from home.

In a possible worst-case scenario, a winter storm event causes widespread power outages, leaving citizens without heat in the midst of subzero temperatures. The power outage also means that elderly populations or others at risk of health problems due to the lack of heat are unable to call for assistance or leave their homes. Power lines are unable to be repaired because of the magnitude of the storm, and the power outage lasts for several days.

The potential impacts of utility interruption on the community lifelines are as follows:

Table 4.3.18-1: Most Likely Lifelines Impacted by Utility Interruption.

LIFELINES	NOTES
Safety and Security	Government facilities may be impacted directly and the capability to administer services diminished.

Table 4.3.18-1: Most Likely Lifelines Impacted by Utility Interruption.	
LIFELINES	**NOTES**
	Water and electrical utilities in homes and potentially different aspects of the food supply chain will be impacted.
	Healthcare facilities may be impacted directly and therefore the capacity to deal with patients is diminished.
	Fuel usage may increase as a result of electricity no longer being available for an extended period of time.

4.3.18.3 Past Occurrence

Cumberland County experiences a number of utility interruptions every year, as displayed in Table 4.3.18-2. Significant utility interruption events are discussed below.

Table 4.3.18-2: Utility Interruption Events in Cumberland County: 2018– 2023 (PEMA PEIRS, 2024)

Year	Power Outage	Water Shortage / Outage	Water Supply Contamination	Phone / Communications Outage	Underground Utility	Other
2018	0	2	0	0	0	0
2019	2	9	2	0	1	0
2020	0	9	13	4	1	0
2021	2	6	4	2	0	1
2022	1	8	3	1	1	3
2023	0	4	0	1	1	1
TOTAL	**5**	**38**	**22**	**8**	**4**	**5**

One significant outage occurred on December 16, 2007. Approximately 75,000 Pennsylvania Power and Lighting customers were without power across south-central Pennsylvania due to heavy icing. Some customers were without power for up to three days. Another significant outage was caused by Winter Storms Riley and Quinn which occurred successively on March 1st and March 7th, 2018. High winds, up to 60 mph gusts for Riley, and heavy snow resulted in downed trees and power lines around the state. Customers that experienced electrical outages due to the two storms totaled over 1.4 million. Most customers had power restored by March 5th, but Winter Storm Riley complicated restoration efforts for some, who were without electricity until March 13th (PUC, 2019).

More recently, a nor'easter deposited heavy snow throughout the Mid-Atlantic and New England on February 13th, 2024. The wet heavy snow and gusty winds caused tree branches and wires to fall, resulting in about 150,000 Pennsylvanians without power, including over 15,000 outages in Cumberland County (DeLetter, 2024). About 2,500 people in Cumberland County were still without power the following day, with some needing to wait until February 15th, 2024, to regain power again (Miller, 2024). Figure 4.3.18-2 illustrates this event.

Figure 4.3.18-2: Downed trees and powerline following the 2024 winter storm in West Fairview (Photograph courtesy of East Pennsboro Township, 2024).

Another utility interruption, unrelated to power, occurred from August 9th to August 13th, 2024. Tropical Storm Debby caused the water main break in Pennsylvania American Water's Mechanicsburg system on August 9th, prompting a boil water advisory for 42,000 customers. These residents were left with low water pressure or no water at all. As a result, Cumberland County Board of Commissioners declared a disaster emergency on August 10th (Vigna, 2024). The areas affected included Camp Hill, Lemoyne, New Cumberland, Shiremanstown, West Fairview and Wormleysburg boroughs and East Pennsboro, Hampden, Lower Allen, Silver Spring Townships and portions of Middlesex and Upper Allen Townships. A loss of positive water pressure creates conditions that could allow contamination to enter the distribution system through back-flow by back pressure or back siphonage. Therefore, residents were urged to use boiled water or bottled water for drinking, making ice, washing dishes, brushing teeth and food preparation (Hall, 2024). The Pennsylvania American Water Company provided customers with free bottled water (see Figure 4.3.18-2) until the water system was repaired (Vigna, 2024). Water pressure was repaired the night of August 11th, and the boil water advisory was lifted after two samples passed testing on August 13th (Wise, 2024).

Figure 4.3.18-2: Residents were supplied with free water by Pennsylvania American Water following a water main break due to Tropical Storm Debby (Photograph courtesy of Sean Simmers / PennLive, 2024).

4.3.18.4 Future Occurrence

Minor power failure events (i.e., short outage) may occur several times a year for any given area in the County, while major (i.e., widespread, long outage) events typically take place once every few years. Power failures are likely occurrences during severe weather and therefore should be expected during those events. These interruptions should be anticipated, and first responders should be prepared during severe weather events. Research by the NOAA suggests that climate change may cause more extreme storms, like the March 2018 nor'easters, to occur in Pennsylvania (NOAA, 2018).

Aging infrastructure also adds to the risk of potential utility interruptions. Population growth, urbanization and climate change can put strain on existing assets used to deliver utilities. The boom in natural gas production is a perfect example of this, as new pipeline projects have needed to be started to handle the increased load on the existing system, which over half the transmission pipeline miles are at least 45 years old (ASCE, 2018). In addition to gas transmission lines, electricity infrastructure is also aging. Most of the transmission and distribution infrastructure in the state was built in the 1950s and 60s, with lines dating back as far as the 1920s (ASCE, 2018).

As this equipment ages, it deteriorates from the constant wear and tear of service. And eventually reaches a point at which it will either fail on its own or as a result of outside forces (storms, loads it was designed to handle but no longer can, etc.). These failures cause service interruptions and can require expensive emergency repairs, the timing of which is also impacted by the age of the infrastructure (DTN, 2021). The wholesale replacement of a system is not a feasible solution for utility companies, as it would require the interruption of services as well as accessing the existing system (which may lay under roads, private property, or other inconvenient places). As a result, there is often a mix of new and old equipment along the line because companies choose repair and not replacement to resolve an issue. However, when the PA Public Utility Commission reported record outage incidents in 2021, they noted that most of the issues were from storm events and not necessarily aging infrastructure (PUC, 2022). As infrastructure continues to age, this may change. The 2022 ASCE Report Card for Pennsylvania Infrastructure listed weatherization and resilience efforts amongst their recommendations for how to raise the grade given to the energy infrastructure, which was a C. (ASCE, 2022).

West Pennsboro Township, North Middleton Township, South Newton Township, Newville Borough, Dickinson Township, and Carlisle Borough all noted the increase in utility interruptions over the past few years on the Evaluation of Identified Hazards and Risk Worksheet on SurveyMonkey. Overall, the probability of future utility interruption events can be considered *highly likely* according to the Risk Factor Methodology (see Table 4.5.2-1).

4.3.18.5 Vulnerability Assessment

All jurisdictions are vulnerable on some level to utility interruptions, but because this hazard often occurs in conjunction with other hazards, jurisdictions that have been identified as more vulnerable to winter storms, windstorms, tornadoes, flooding, and other natural hazard events may be more vulnerable to a utility interruption.

Emergency medical facilities, including retirement homes and senior centers are particularly vulnerable to power outages. While back-up power generators are often used at these facilities, loss of electricity may result in hot or cold temperatures for which elderly populations are particularly vulnerable. Appendix E provides a list of where those facilities are located in Cumberland County. Conservation and improved technology have resulted in more efficient use of energy sources. The increasing use of alternative fuel supplies, such as kerosene heaters, wood burning stoves, coal burners, etc., has also decreased our vulnerability to future shortages. However, severe weather extremes, accidents, labor strikes, terrorism, or nationwide shortages could cause significant energy shortage problems.

Some municipalities have identified evacuation shelters in case of loss of heat or air conditioning. If a municipality does not have an identified warming or cooling shelter, a request would be made to the Cumberland County Department of Public Safety and forwarded to the American Red Cross, which would then work with PEMA to resolve (Cumberland County Department of Public Safety, personal communication, October 17, 2024).

PP&L and First Energy (Penelec and Met-Ed) utilize online portals to provide residents with estimates for outage times. Results for outage times are reported in real-time. In addition, PP&L and First Energy (Penelec and Met-Ed) have online portals and emergency phone numbers, so that 9-1-1 may report life safety issues and receive updated information. Adams Electric in the County does not have these capabilities; however, they do provide publicly advertised phone numbers (Cumberland County Department of Public Safety, personal communication, October 17, 2024).

4.3.18.6 Equity in Vulnerable Communities

Utility interruptions can disproportionately affect vulnerable populations, including the elderly, individuals with disabilities, and those with chronic health issues who rely on electricity for medical equipment. Camp Hill Borough, East Pennsboro Township, Hampden Township, Lower Allen Township, North Middleton Township, Silver Spring Township, South Middleton Township, and Upper Allen Township (see Table 4.3.10-3 in Section 4.3.10.5) have the highest populations over 65 years of age. Adequate preparedness for these groups prioritizes these groups by ensuring that backup power systems, such as generators. Additionally, low-income communities often face challenges related to aging or poorly maintained infrastructure, which can increase the likelihood and duration of utility interruptions. Adequate mitigation should focus on improving infrastructure resilience.

4.4 Cascading Hazards

Cascading hazards are hazard events that occur as a direct or indirect result of an initial hazard event. Many of the hazards profiled in the 2025 HMP have the potential to cascade and cause the occurrence of another hazard. For example, a traffic accident on a major roadway could cause a hazardous material spill that when ignited creates a wildfire. Tornados and hurricanes could cause wide-spread utility interruptions, transportation accidents and flooding. Thus, the direct impacts of hazards should be considered in addition to the indirect impacts that may be caused from the cascading effects of an initial event.

The following table analyzes the cascading effects of the hazards profiled in this plan. The hazards are evaluated with one another in Table 4.4-1 and rated on a scale from 0 (will not create cascading effect) – 4 (likely to create cascading effect) based upon the likelihood of creating a cascading effect. Occurrences of hazards with a high total score are the most likely to trigger another cascading hazard.

Table 4.4-1: Cascading Hazard Analysis.

Hazard	Civil Disturbance	Dam Failure	Drought	Earthquake	Environmental Hazard	Flood, Flash Flood, Ice Jam	Hurricane, Tropical Storm, Nor’ easter	Nuclear Incident	Pandemic	Subsidence, Sinkhole	Terrorism	Tornado, Wind Storm	Transportation Accident	Urban Fire and Explosion	Utility Interruption	Wildfire	Winter Storm	Extreme Temperature	TOTAL
Civil Disturbance	n/a	0	0	0	1	0	0	0	0	0	3	0	2	3	1	0	0	**0**	**10**
Dam Failure	0	n/a	0	0	2	2	0	1	0	1	0	0	2	1	3	0	0	**0**	**12**
Drought	0	0	n/a	0	0	0	0	0	1	0	0	0	0	1	0	2	0	**3**	**4**
Earthquake	0	2	0	n/a	3	0	0	1	0	0	0	0	2	3	3	0	0	**0**	**14**
Environmental Hazard	0	0	0	0	n/a	0	0	1	0	0	0	0	2	3	1	0	0	**0**	**7**
Flood, Flash Flood, Ice Jam	0	2	0	0	2	n/a	0	1	0	1	0	0	3	0	4	0	0	**2**	**13**
Hurricane, Tropical Storm, Nor’easter	0	2	0	0	2	4	n/a	1	0	0	0	3	3	0	4	0	4	**2**	**23**
Nuclear Incident	2	0	0	0	4	0	0	n/a	0	0	1	0	3	3	2	1	0	**0**	**16**
Pandemic	1	0	0	0	1	0	0	0	n/a	0	1	0	1	0	0	0	0	**0**	**4**
Subsidence, Sinkhole	0	1	0	0	1	0	0	1	0	n/a	0	0	2	1	1	0	0	**0**	**7**
Terrorism	4	2	0	0	2	0	0	2	0	0	n/a	0	3	3	3	0	0	**0**	**19**
Tornado, Wind Storm	0	1	0	0	3	0	0	1	0	0	0	n/a	3	2	3	0	0	**1**	**13**
Transportation Accident	1	0	0	0	4	0	0	2	0	0	1	0	n/a	3	2	2	0	**0**	**15**

Table 4.4-1: Cascading Hazard Analysis.

Hazard	Civil Disturbance	Dam Failure	Drought	Earthquake	Environmental Hazard	Flood, Flash Flood, Ice Jam	Hurricane, Tropical Storm, Nor' easter	Nuclear Incident	Pandemic	Subsidence, Sinkhole	Terrorism	Tornado, Wind Storm	Transportation Accident	Urban Fire and Explosion	Utility Interruption	Wildfire	Winter Storm	Extreme Temperature	TOTAL
Urban Fire and Explosion	1	0	0	0	2	0	0	1	0	0	1	0	1	n/a	2	0	0	**0**	**8**
Utility Interruption	2	0	0	0	1	0	0	1	0	0	2	0	2	2	n/a	0	0	**0**	**10**
Wildfire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	n/a	0	**0**	**1**
Winter Storm	0	1	0	0	1	3	0	0	0	0	0	0	4	2	4	0	n/a	**4**	**15**
Extreme Temperature	0	0	4	0	1	3	2	0	0	0	0	2	4	2	4	2	4	n/a	**28**
TOTAL	**11**	**11**	**0**	**0**	**29**	**9**	**0**	**13**	**1**	**2**	**9**	**3**	**33**	**27**	**34**	**5**	**4**	**12**	

0 HAZARD WILL NOT CREATE A CASCADING IMPACT
1 VERY SMALL CHANCE OF CASCADING IMPACTS.
2 POSSIBLE CHANCE OF CASCADING IMPACTS
3 SIGNIFICANT CHANCE OF CASCADING IMPACTS
4 LIKEY WILL CREATE CASCADING IMPACTS

4.5 Hazard Vulnerability Summary

4.5.1. Methodology

Ranking hazards helps communities set goals and priorities for mitigation based on their vulnerabilities. A Risk Factor (RF) is a tool used to measure the degree of risk for identified hazards in a particular planning area. The RF can also 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, general consensus opinions 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.

Risk Factor values were obtained by assigning varying degrees of risk to five categories for each of the hazards profiled in the 2025 HMP. 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 agreed upon by the planning team is shown in Table 4.5.1-1.

All 33 municipalities completed an online survey to obtain risk values. Some of the hazards do not apply to every municipality and were selected as not applicable (N/A). All of the input, including N/A, was utilized to determine an average risk value for each category within each hazard. 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 4.5.1-1 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 4.5.1-1: 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% & 49.9% ANNUAL PROBABILITY	**2**	
	LIKELY	BETWEEN 50% & 90% ANNUAL PROBABILITY	**3**	
	HIGHLY LIKELY	GREATER THAN 90% ANNUAL PROBABILTY	**4**	
IMPACT *In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?*	**MINOR**	VERY FEW INJURIES, IF ANY. ONLY MINOR PROPERTY DAMAGE & MINIMAL DISRUPTION ON QUALITY OF LIFE. TEMPORARY SHUTDOWN OF CRITICAL FACILITIES.	**1**	**30%**
	LIMITED	MINOR INJURIES ONLY. MORE THAN 10% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR MORE THAN ONE DAY.	**2**	
	CRITICAL	MULTIPLE DEATHS/INJURIES POSSIBLE. MORE THAN 25% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR MORE THAN ONE WEEK.	**3**	
	CATASTROPHIC	HIGH NUMBER OF DEATHS/INJURIES POSSIBLE. MORE THAN 50% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR 30 DAYS OR MORE.	**4**	
SPATIAL EXTENT *How large of an area could be impacted by a hazard event? Are impacts localized or regional?*	**NEGLIGIBLE**	LESS THAN 1% OF AREA AFFECTED	**1**	**20%**
	SMALL	BETWEEN 1 & 10.9% OF AREA AFFECTED	**2**	
	MODERATE	BETWEEN 11 & 25% OF AREA AFFECTED	**3**	
	LARGE	GREATER 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**	

4.5.2. Ranking Results

Using the methodology described in Section 4.5.1, Table 4.5.2-1 lists the Risk Factor calculated for each of the seventeen potential hazards identified in the 2025 HMP. Hazards identified as *high* risk have risk factors greater than 2.0. Risk Factors ranging from 1.5 to 2.0 were deemed *moderate* risk hazards. Hazards with Risk Factors less than 1.5 are considered *low* risk.

Table 4.5.2-1: Ranking results by hazard for Cumberland County using the Risk Factor methodology.

Hazard Natural(N) Or Human-Made(M)	Risk Assessment Category					Risk Factor (RF)
	Probability	Impact	Spatial Extent	Warning Time	Duration	
Winter Storm (N)	3.0	1.9	3.1	1.5	2.6	**2.5**
Utility Interruption (M)	2.9	1.7	2.5	3.5	2.0	**2.4**
Tornado, Wind Storm (N)	2.4	2.1	2.3	2.7	2.0	**2.3**
Transportation Accident (M)	2.9	1.8	1.9	3.5	1.5	**2.3**
Hurricane, Tropical Storm, Nor'easter (N)	2.2	1.8	2.6	1.6	2.4	**2.1**
Flood, Flash Flood, Ice Jam (N)	2.3	1.6	2.0	2.0	2.4	**2.0**
Environmental Hazard (M)	2.0	1.6	2.0	2.6	2.2	**2.0**
Drought (N)	2.2	1.3	2.4	1.1	3.3	**2.0**
Pandemic (N)	1.6	1.6	2.5	1.2	2.9	**1.9**
Subsidence, Sinkhole (N)	2.2	1.2	1.2	2.8	2.1	**1.7**
Urban Fire and Explosion (M)	1.8	1.4	1.3	2.8	1.3	**1.7**
Extreme Temperature (N)	1.8	1.4	1.3	2.8	1.3	**1.7**
Terrorism (M)	1.2	1.5	1.7	2.6	1.7	**1.6**
Wildfire (N)	1.6	1.1	1.3	2.5	1.3	**1.5**
Earthquake (N)	1.1	1.1	1.5	2.9	1.4	**1.4**
Nuclear Incident (M)	0.7	1.1	1.5	1.7	1.6	**1.2**
Civil Disturbance (M)	1.2	1.0	1.1	2.4	1.0	**1.2**
Dam Failure (M)	0.6	0.7	0.8	1.2	1.2	**0.8**

Based on these results, there are five *high* risk hazards, eight *moderate* risk hazards and four *low* risk hazards in Cumberland County. Mitigation actions were developed for all high, moderate, and low risk hazards (see Section 6.4). The threat posed to life and property for moderate and high risk hazards is considered significant enough to warrant the need for establishing hazard-specific mitigation actions. Mitigation actions related to future public outreach and emergency service activities are identified to address low risk hazard events (i.e., , earthquake, nuclear incident, civil disturbance and dam failure).

Per the 2020 Standard Operating Guide, a jurisdictional risk comparison matrix has been completed as Table 4.5.2-2 to indicate whether each municipality's level of risk for each hazard is greater than (>), less than (<), or equal to (=) the county risk factor. This exercise was completed via the online hazard survey completed by all 33 municipalities.

Table 4.5.2-2: Jurisdictional Risk Comparison Matrix

Jurisdiction	Identified Hazard and Corresponding Countywide Risk Factor																
	Winter Storm (N)	Utility Interruption (M)	Transportation Accident (M)	Tornado, Wind Storm (N)	Hurricane, Tropical Storm, Nor’ easter (N)	Flood, Flash Flood, Ice Jam (N)	Environmental Hazard (M)	Drought (N)	Pandemic (N)	Subsidence, Sinkhole (N)	Urban Fire and Explosion (M)	Terrorism (M)	Wildfire (N)	Earthquake (N)	Nuclear Incident (M)	Civil Disturbance (M)	Dam Failure (M)
Cumberland County	**2.5**	**2.4**	**2.3**	**2.3**	**2.1**	**2.0**	**2.0**	**2.0**	**1.9**	**1.7**	**1.7**	**1.6**	**1.5**	**1.4**	**1.2**	**1.2**	**0.8**
Borough of Camp Hill	=	=	=	=	>	>	=	>	=	>	=	=	<	=	=	=	<
Borough of Camp Hill	>	>	>	>	>	>	>	>	=	>	=	=	=	=	=	=	=
Borough of Carlisle	=	>	>	=	=	=	=	>	=	=	=	=	=	=	=	=	<
Borough of Carlisle	<	>	=	=	=	=	=	=	=	<	=	=	<	=	=	=	=
Township of Cooke	=	=	=	=	=	=	=	=	<	<	<	=	=	=	<	=	=
Township of Dickinson	<	>	>	=	=	>	=	=	<	=	<	<	=	<	<	<	>
Township of East Pennsboro	>	>	>	>	>	>	>	>	>	=	>	>	>	>	=	>	=
Township of Hampden	>	=	>	>	=	=	=	=	=	=	>	=	=	>	<	>	=
Township of Hampden	=	=	>	=	=	=	=	=	=	=	=	=	=	<	=	>	=
Township of Hopewell	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=

Table 4.5.2-2: Jurisdictional Risk Comparison Matrix

Jurisdiction	Identified Hazard and Corresponding Countywide Risk Factor																
	Winter Storm (N)	Utility Interruption (M)	Transportation Accident (M)	Tornado, Wind Storm (N)	Hurricane, Tropical Storm, Nor' easter (N)	Flood, Flash Flood, Ice Jam (N)	Environmental Hazard (M)	Drought (N)	Pandemic (N)	Subsidence, Sinkhole (N)	Urban Fire and Explosion (M)	Terrorism (M)	Wildfire (N)	Earthquake (N)	Nuclear Incident (M)	Civil Disturbance (M)	Dam Failure (M)
Cumberland County	**2.5**	**2.4**	**2.3**	**2.3**	**2.1**	**2.0**	**2.0**	**2.0**	**1.9**	**1.7**	**1.7**	**1.6**	**1.5**	**1.4**	**1.2**	**1.2**	**0.8**
Borough of Lemoyne	<	=	=	<	=	>	=	=	>	<	>	=	<	<	=	>	<
Township of Lower Allen	=	=	=	=	=	=	=	=	=	=	=	=	=	=	<	>	=
Township of Lower Allen	=	=	=	=	=	=	=	=	=	=	=	=	=	=	<	=	=
Township of Lower Allen	=	=	=	>	>	>	=	>	=	=	=	=	=	=	<	=	=
Township of Lower Frankford	=	=	=	=	=	=	=	=	=	=	=	=	=	=	<	=	=
Township of Lower Mifflin	>	>	=	<	=	=	<	=	<	<	<	<	<	<	<	<	=
Borough of Mechanicsburg	>	=	=	>	>	>	=	=	=	=	=	=	=	=	=	=	<
Township of Middlesex	=	=	>	=	=	=	=	=	>	=	=	=	=	=	=	=	=
Township of Monroe	=	=	=	=	>	>	=	=	=	=	=	=	=	=	=	=	=

Table 4.5.2-2: Jurisdictional Risk Comparison Matrix

Jurisdiction	Identified Hazard and Corresponding Countywide Risk Factor																
	Winter Storm (N)	Utility Interruption (M)	Transportation Accident (M)	Tornado, Wind Storm (N)	Hurricane, Tropical Storm, Nor' easter (N)	Flood, Flash Flood, Ice Jam (N)	Environmental Hazard (M)	Drought (N)	Pandemic (N)	Subsidence, Sinkhole (N)	Urban Fire and Explosion (M)	Terrorism (M)	Wildfire (N)	Earthquake (N)	Nuclear Incident (M)	Civil Disturbance (M)	Dam Failure (M)
Cumberland County	**2.5**	**2.4**	**2.3**	**2.3**	**2.1**	**2.0**	**2.0**	**2.0**	**1.9**	**1.7**	**1.7**	**1.6**	**1.5**	**1.4**	**1.2**	**1.2**	**0.8**
Borough of Mount Holly Springs	>	=	=	>	>	>	>	>	>	=	=	=	=	=	=	>	<
Borough of New Cumberland	<	=	=	=	>	=	>	>	>	=	=	=	=	=	<	=	=
Borough of Newburg	=	=	=	=	=	=	=	=	=	=	=	<	=	<	=	<	<
Borough of Newville	=	=	=	=	=	=	=	=	=	=	=	=	=	=	<	<	=
Borough of Newville	=	>	=	=	=	=	=	=	<	=	=	>	=	=	<	=	=
Township of North Middleton	=	>	>	=	=	>	=	>	=	=	=	>	=	=	=	=	=
Township of North Middleton	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=	=
Township of North Newton	=	=	=	=	=	=	=	=	=	=	<	=	=	=	=	=	=
Township of North Newton	<	=	=	=	=	=	=	=	=	=	<	=	=	<	<	=	=

Table 4.5.2-2: Jurisdictional Risk Comparison Matrix																	
Jurisdiction	**Identified Hazard and Corresponding Countywide Risk Factor**																
	Winter Storm (N)	**Utility Interruption (M)**	**Transportation Accident (M)**	**Tornado, Wind Storm (N)**	**Hurricane, Tropical Storm, Nor' easter (N)**	**Flood, Flash Flood, Ice Jam (N)**	**Environmental Hazard (M)**	**Drought (N)**	**Pandemic (N)**	**Subsidence, Sinkhole (N)**	**Urban Fire and Explosion (M)**	**Terrorism (M)**	**Wildfire (N)**	**Earthquake (N)**	**Nuclear Incident (M)**	**Civil Disturbance (M)**	**Dam Failure (M)**
Cumberland County	**2.5**	**2.4**	**2.3**	**2.3**	**2.1**	**2.0**	**2.0**	**2.0**	**1.9**	**1.7**	**1.7**	**1.6**	**1.5**	**1.4**	**1.2**	**1.2**	**0.8**
Township of Penn	<	=	=	=	=	=	=	=	<	=	<	=	=	=	<	=	>
Borough of Shippensburg	=	=	=	=	=	=	=	=	=	=	<	=	<	<	<	<	<
Township of Shippensburg	=	=	>	=	=	=	=	=	=	=	=	=	=	=	=	>	<
Borough of Shiremanstown	=	=	=	>	>	=	>	>	=	=	=	>	<	=	=	=	<
Township of Silver Spring	=	=	=	=	=	=	=	>	<	=	=	=	=	=	<	<	<
Township of Silver Spring	=	=	>	=	>	>	=	>	>	=	=	=	=	=	=	=	<
Township of Silver Spring	=	=	>	=	=	=	=	>	>	=	=	=	=	=	=	>	=
Township of Silver Spring	<	<	>	=	=	=	=	<	<	<	<	<	<	<	<	<	<
Township of South Middleton	=	=	>	<	=	>	<	=	<	=	>	=	>	<	<	<	<
Township of South Middleton	=	>	>	>	>	>	>	>	>	<	>	=	>	=	=	=	=

Table 4.5.2-2: Jurisdictional Risk Comparison Matrix

Jurisdiction	Identified Hazard and Corresponding Countywide Risk Factor																
	Winter Storm (N)	Utility Interruption (M)	Transportation Accident (M)	Tornado, Wind Storm (N)	Hurricane, Tropical Storm, Nor' easter (N)	Flood, Flash Flood, Ice Jam (N)	Environmental Hazard (M)	Drought (N)	Pandemic (N)	Subsidence, Sinkhole (N)	Urban Fire and Explosion (M)	Terrorism (M)	Wildfire (N)	Earthquake (N)	Nuclear Incident (M)	Civil Disturbance (M)	Dam Failure (M)
Cumberland County	**2.5**	**2.4**	**2.3**	**2.3**	**2.1**	**2.0**	**2.0**	**2.0**	**1.9**	**1.7**	**1.7**	**1.6**	**1.5**	**1.4**	**1.2**	**1.2**	**0.8**
Township of South Newton	=	>	>	>	=	>	=	>	=	=	=	=	=	=	=	=	<
Township of Southampton	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Township of Upper Allen	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Township of Upper Frankford	=	=	=	>	=	=	=	>	=	=	=	=	=	=	<	=	<
Township of Upper Mifflin	=	>	>	=	=	>	>	>	>	=	=	<	=	=	=	=	=
Township of West Pennsboro	=	>	=	>	=	>	=	>	=	=	=	=	>	=	<	>	=
Borough of Wormleysburg	=	=	=	=	=	=	<	=	>	<	>	>	<	<	<	>	<

4.5.3. Potential Loss Estimates

Potential loss estimates for hazard events help a community understand the monetary value of what might be at stake during a hazard event. 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. Based on available data, general loss estimates were established for flood, winter storm, tornado and windstorm events. The potential losses incurred by hurricanes and tropical storms are associated with the impacts of flooding and high wind. Estimates provided in this section are based on previous events, cumulative assessed values for property located in high-risk areas, and geospatial analysis. As discussed in Section 2.5, the structures dataset used to assess vulnerability throughout this section are based on the Cumberland County Tax Assessment assessed property and structure values.

Potential loss estimates have four basic components, including:

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

Potential loss estimates provided in the 2025 HMP update are based on parcel values provided in the county tax assessment database. The reported values are representative of replacement value alone and an estimate of content loss which was set at 75% of building value. Functional loss and displacement cost are not included.

Flood

Cumberland County maintains a GIS dataset representing addressed structures. This dataset includes the street address, latitude and longitude coordinates, and other information. A tool was developed that cycled through each municipality in the County and selected all addressed structures that were within the preliminary FEMA floodplain dataset. When a structure is visible in orthoimagery, the feature is placed on the structure. If no structure is visible, the feature is placed in the center of the tax parcel. For each municipality, records from the Tax Parcels GIS database were selected that contained Address Points that were within the preliminary FEMA floodplains dataset. The land, building, and total assessed values for these Tax Parcel records were summed up to create the values shown in Table 4.5.3-1.

Table 4.5.3-1: Potential Flooding Loss Estimates (Cumberland County GIS, 2025).				
Municipality	**Total Assessed Land Value in the SFHA**	**Total Assessed Building Value in the SFHA**	**Estimated Content Loss Value (75% of Building Assessment)**	**Total Assessed Value in the SFHA**
Borough of Camp Hill	$892,400	$3,032,800	$2,274,600	$3,925,200
Borough of Carlisle	$5,699,200	$14,506,600	$10,879,950	$20,205,800
Township of Cooke	$0	$632,800	$474,600	$632,800
Township of Dickinson	$1,219,300	$1,785,800	$1,339,350	$3,005,100
Township of East Pennsboro	$2,879,100	$7,120,900	$5,340,675	$10,000,000
Township of Hampden	$9,941,600	$19,054,600	$14,290,950	$28,996,200
Township of Hopewell	$481,400	$673,700	$505,275	$1,155,100
Borough of Lemoyne	$0	$0	$0	$0
Township of Lower Allen	$9,080,300	$11,503,900	$8,627,925	$20,584,200
Township of Lower Frankford	$263,100	$393,700	$295,275	$656,800
Township of Lower Mifflin	$1,219,200	$1,094,600	$820,950	$2,313,800
Borough of Mechanicsburg	$55,000	$0	$0	$55,000
Township of Middlesex	$4,469,400	$8,925,500	$6,694,125	$13,394,900
Township of Monroe	$4,777,600	$14,303,200	$10,727,400	$19,080,800
Borough of Mt Holly Springs	$3,906,000	$10,382,300	$7,786,725	$14,288,300
Borough of New Cumberland	$3,750,100	$12,676,100	$9,507,075	$16,426,200
Borough of Newburg	$0	$0	$0	$0
Borough of Newville	$30,000	$75,000	$56,250	$105,000
Township of North Middleton	$8,345,500	$96,894,800	$72,671,100	$105,240,300
Township of North Newton	$203,800	$324,500	$243,375	$528,300
Township of Penn	$189,700	$398,500	$298,875	$588,200
Borough of Shippensburg	$3,166,800	$7,984,000	$5,988,000	$11,150,800
Township of Shippensburg	$1,022,800	$2,019,700	$1,514,775	$3,042,500
Borough of Shiremanstown	$0	$0	$0	$0
Township of Silver Spring	$4,689,700	$14,886,900	$11,165,175	$19,576,600
Township of South Middleton	$7,048,800	$12,030,700	$9,023,025	$19,079,500
Township of South Newton	$1,073,400	$2,221,600	$1,666,200	$3,295,000
Township of Southampton	$4,319,500	$7,442,400	$5,581,800	$11,761,900
Township of Upper Allen	$2,680,000	$6,774,700	$5,081,025	$9,454,700
Township of Upper Frankford	$563,100	$441,800	$331,350	$1,004,900
Cumberland County	**$84,869,300**	**$267,803,900**	**$200,852,925**	**$352,673,200**

Using this method, buildings with an assessed value of $267,803,900.00 could be subject to damage. Contents valued at $200,852,925.00 would likewise be subject to loss to create a total potential economic loss of over $352 million for from a countywide 1 percent-annual-chance flood. Actual losses will vary upon the severity and location of flooding events. This analysis is used to show the illustrative damage that could be sustained by the 1 percent-annual-chance flood to assist in local hazard mitigation planning efforts.

Tornado, Windstorm

Since 1960, tornado events in Cumberland County are estimated to have caused $1,217,000 in damage. Accurate loss estimates for previous general windstorms are currently not available. A significant portion of dollar losses from windstorms and tornadoes are often a result of damage to mobile homes. These structures are typically made of lightweight materials. Without adequate anchoring, they are particularly vulnerable to high winds. Table 4.5.3-2 shows the distribution by municipality of cumulative assessed value for mobile home and mobile home park parcels. Note that Table 4.3.8-4 in the Tornado and Windstorm profile is related to mobile home structures rather than parcels.

Table 4.5.3-2: Mobile homes parcel value per jurisdiction (Cumberland County GIS, 2024).

Municipality	Mobile Homes	Assessed Land Value	Assessed Building Value	Total Assessed Value
Borough of Camp Hill	0	$0	$0	$0
Borough of Carlisle	15	$112,500	$397,200	$509,700
Township of Cooke	4	$239,700	$352,500	$592,200
Township of Dickinson	186	$7,943,900	$8,077,500	$16,021,400
Township of East Pennsboro	64	$2,251,400	$3,491,400	$5,742,800
Township of Hampden	519	$10,895,200	$7,308,400	$18,203,600
Township of Hopewell	77	$4,712,100	$5,742,400	$10,454,500
Borough of Lemoyne	0	$0	$0	$0
Township of Lower Allen	80	$1,065,800	$1,495,900	$2,561,700
Township of Lower Frankford	171	$6,218,800	$8,305,100	$14,523,900
Township of Lower Mifflin	257	$6,815,200	$6,376,000	$13,191,200
Borough of Mechanicsburg	0	$0	$0	$0
Township of Middlesex	771	$11,578,600	$14,275,000	$25,853,600
Township of Monroe	177	$2,754,100	$3,515,100	$6,269,200
Borough of Mt Holly Springs	120	$1,690,000	$1,582,100	$3,272,100
Borough of New Cumberland	0	$0	$0	$0
Borough of Newburg	0	$0	$0	$0
Borough of Newville	12	$332,500	$606,800	$939,300
Township of North Middleton	515	$9,081,700	$14,168,900	$23,250,600
Township of North Newton	58	$3,021,500	$3,886,800	$6,908,300
Township of Penn	102	$5,561,200	$5,580,100	$11,141,300
Borough of Shippensburg	4	$115,700	$156,700	$272,400

Table 4.5.3-2: Mobile homes parcel value per jurisdiction (Cumberland County GIS, 2024).				
Municipality	**Mobile Homes**	**Assessed Land Value**	**Assessed Building Value**	**Total Assessed Value**
Township of Shippensburg	281	$2,257,800	$3,514,900	$5,772,700
Borough of Shiremanstown	0	$0	$0	$0
Township of Silver Spring	395	$7,535,700	$8,768,600	$16,304,300
Township of South Middleton	446	$12,345,000	$14,174,000	$26,519,000
Township of South Newton	28	$1,556,500	$1,906,300	$3,462,800
Township of Southampton	488	$22,118,100	$21,590,300	$43,708,400
Township of Upper Allen	124	$7,936,000	$12,631,400	$20,567,400
Township of Upper Frankford	408	$8,156,100	$8,947,600	$17,103,700
Township of Upper Mifflin	100	$5,277,800	$7,020,700	$12,298,500
Township of West Pennsboro	250	$5,012,600	$5,364,900	$10,377,500
Borough of Wormleysburg	0	$0	$0	$0
TOTAL	**5,652**	**$146,585,500**	**$169,236,600**	**$315,822,100**

4.5.4. Future Development and Vulnerability

Cumberland County's population grew by more than 25,000 residents from 2010 to 2020. By 2043, the county's total population could be more than 330,000 residents. The county's land area is 352,000 acres, an extent that, unlike its population, will not grow in the future. Thus, the county must accommodate future growth within that established land area, the entirety of which is not available to support development. Permanently preserved public lands, prime farmland, steep slopes, floodplains, and environmentally sensitive areas provide important services to residents and businesses and should not be altered to accommodate new growth. Other areas served by public water, sewer, utilities, and highways are particularly well suited to all types of development but may have limited infrastructure capacity.

The Cumberland County Planning Department collects information from every subdivision and / or land development plan that is submitted in the county. Final subdivision and land development plans submitted to the County Planning Department show proposed residential units and commercial/industrial facilities that will be constructed in the future.

Table 4.5.4-1 shows the proposed development in Cumberland County since January 1, 2020. From 2020 through 2023, 223 commercial/industrial units and 6,271 residential units were proposed. Many of these proposals have been constructed while others have not progressed from the plan submission stage. While the progress of every proposed development is beyond the scope of this plan, this table is useful in showing where future growth will occur.

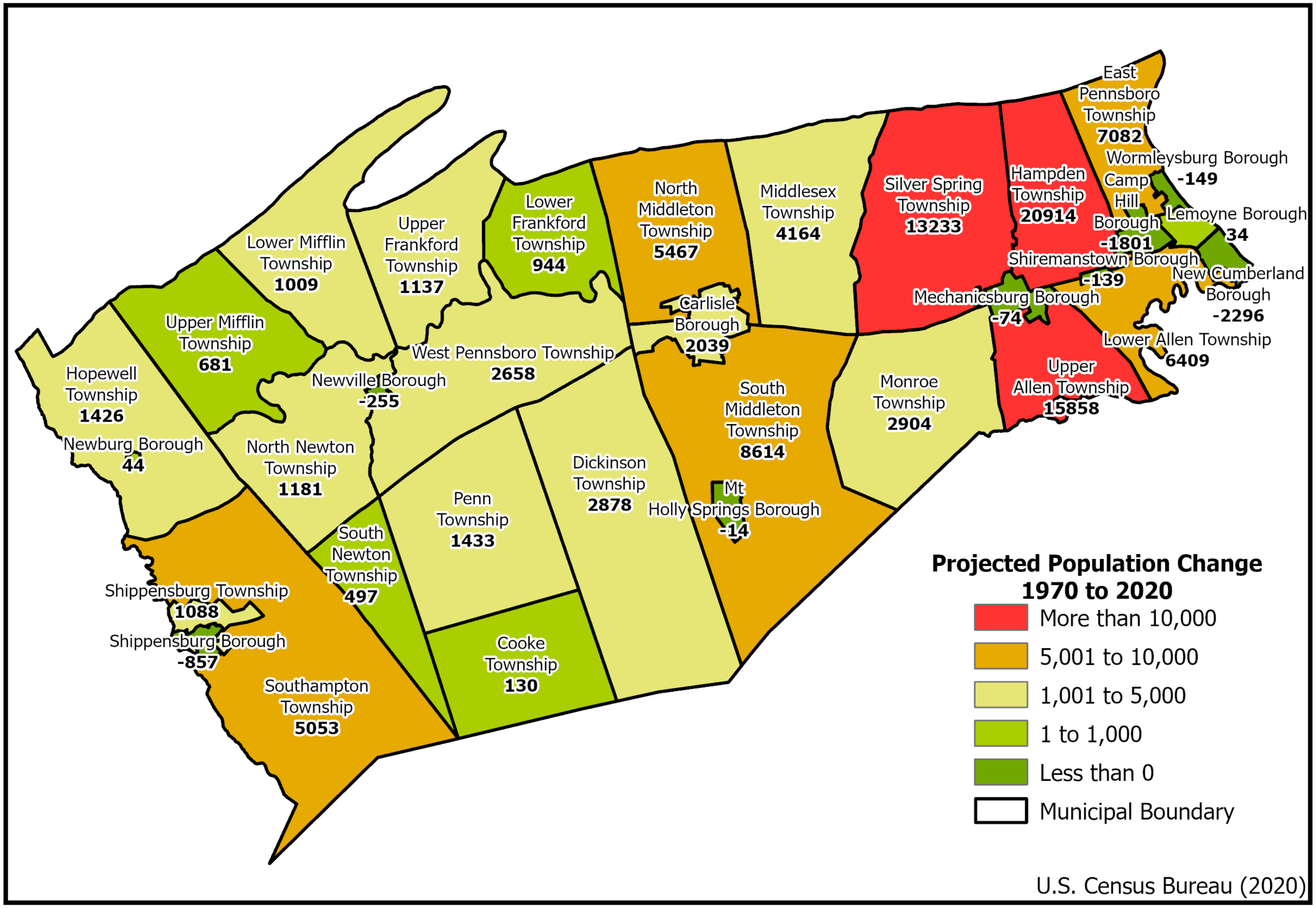
Table 4.5.4-1: Proposed Development (final plans) 2020-2023.		
Municipality	**Proposed Commercial / Industrial Units**	**Proposed Residential Units**
	1/1/2020 – 12/31/2023	**1/1/2020 – 12-31/2023**
Borough of Camp Hill	1	7
Borough of Carlisle	10	146
Township of Cooke	0	0
Township of Dickinson	0	4
Township of East Pennsboro	10	982
Township of Hampden	47	655
Township of Hopewell	2	12
Borough of Lemoyne	4	75
Township of Lower Allen	25	192
Township of Lower Frankford	0	3
Township of Lower Mifflin	0	5
Borough of Mechanicsburg	1	365
Township of Middlesex	11	781
Township of Monroe	1	233
Borough of Mount Holly Springs	1	0
Borough of New Cumberland	1	4
Borough of Newburg	0	0
Borough of Newville	0	1
Township of North Middleton	6	394
Township of North Newton	2	2
Township of Penn	1	0
Borough of Shippensburg	6	52
Township of Shippensburg	11	0
Borough of Shiremanstown	0	0
Township of Silver Spring	33	304
Township of South Middleton	18	1,092
Township of South Newton	0	2
Township of Southampton	6	431
Township of Upper Allen	14	451
Township of Upper Frankford	0	14
Township of Upper Mifflin	1	5
Township of West Pennsboro	8	54
Borough of Wormleysburg	1	0
TOTAL	**223**	**6,271**

Figure 4.5.4-1 (in conjunction with Table 2.3-1) shows that the eastern part of Cumberland County has sustained the most growth. This area will continue to grow in the future. The combination of available, infrastructure, transportation options, housing choice, and economic opportunity in eastern Cumberland County make this area particularly attractive for new development as well as redevelopment of existing parcels of land.

Municipalities including Hampden, Silver Spring, Lower Allen, South Middleton and Upper Allen Townships account for over 61% of the total proposed non-residential development in the County from 2020-2023. Residential growth includes over 6,200 new units between 2020-2023 with South Middleton, East Pennsboro, Middlesex and Hampden Townships leading the way by accommodating over 500 new units each.

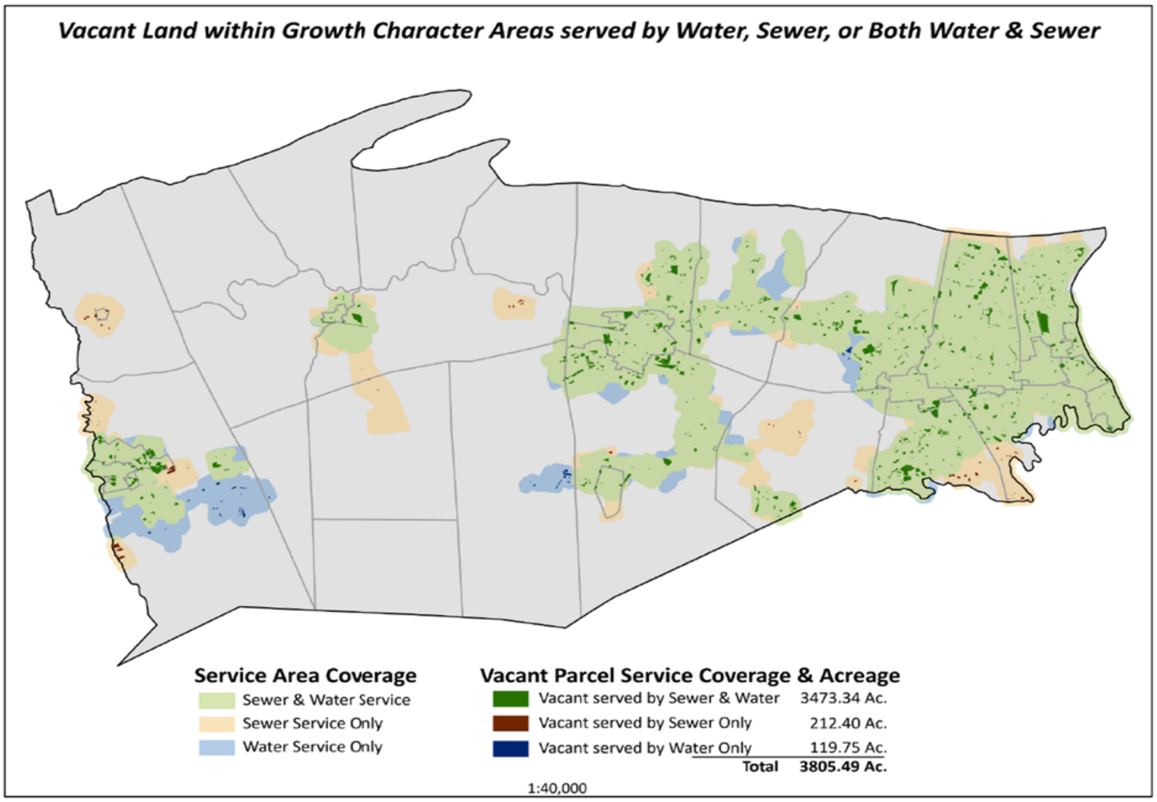
With the exception of the Shippensburg and Southampton Township area, the western part of Cumberland County has not experienced rapid growth, nor is such growth projected in the future. Much of this area of the County lacks public infrastructure needed to accommodate future growth but has the prime agriculture soils that support the agriculture industry. The County's farmland preservation efforts center upon western Cumberland County and do not promote new development in that area.

Figure 4.5.4-1: Population changes for municipalities in Cumberland County from 1970 to 2020. This image is a screen capture from the Cumberland County Hazard Mitigation Plan Map Series. Please hold the CTRL key and select the map below for the Hazard Mitigation Plan Map Series.



An analysis of county land use data revealed that approximately 108,000 of the county's 352,000 acres, include the basic water or sewer infrastructure required for future growth. Of those 108,000 acres, only 3,800 acres remain undeveloped. Those undeveloped, infrastructure served areas shown on Figure 4.5.4-2 are generally located east of Carlisle with South Middleton Township, Silver Spring Township, and Hampden Township having the most acreage available to support future growth. In addition, development opportunities exist in unoccupied and under-occupied buildings throughout the county.

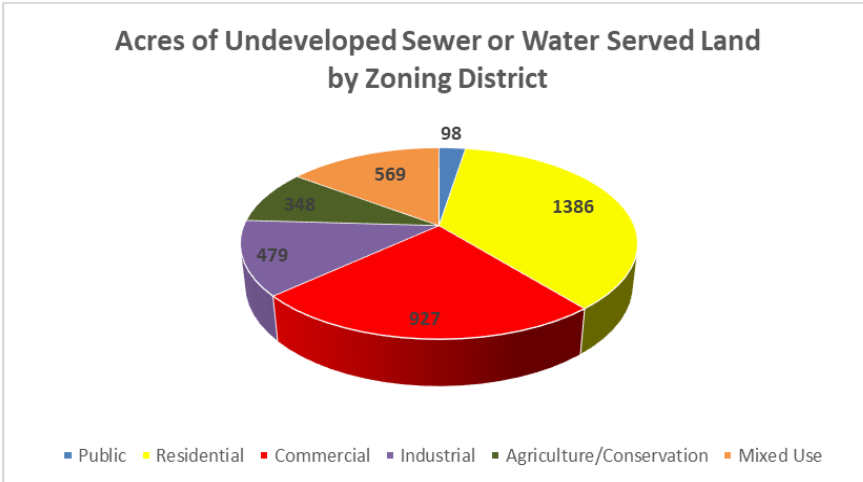
Figure 4.5.4-2



Service areas are a key factor for development opportunities. However, development can still be hindered by a lack of sewer capacity. A survey of the county's wastewater treatment plants revealed that approximately 22 million gallons per day of sewer treatment capacity remains available across all wastewater facilities in the county. Figure 4.5.4-3 shows the zoning district designations where available land and public sewer are present. The zoning districts and the level of sewer capacity, absent major upgrades, will govern the county's future growth.

Thus, the county must strategically plan how future growth is accommodated using its limited land area and infrastructure capacity. Available land must be efficiently used to accommodate higher amounts of growth on smaller tracts of land. Redevelopment and reuse policies should be to create new developable acreage within established communities suitable for new growth. Infrastructure improvements must be made to increase the capacity of aging sewer and water systems while extensions, when necessary, must be planned to have growth occur in the right locations and at proper intensity consistent with local plans.

Figure 4.5.4-3



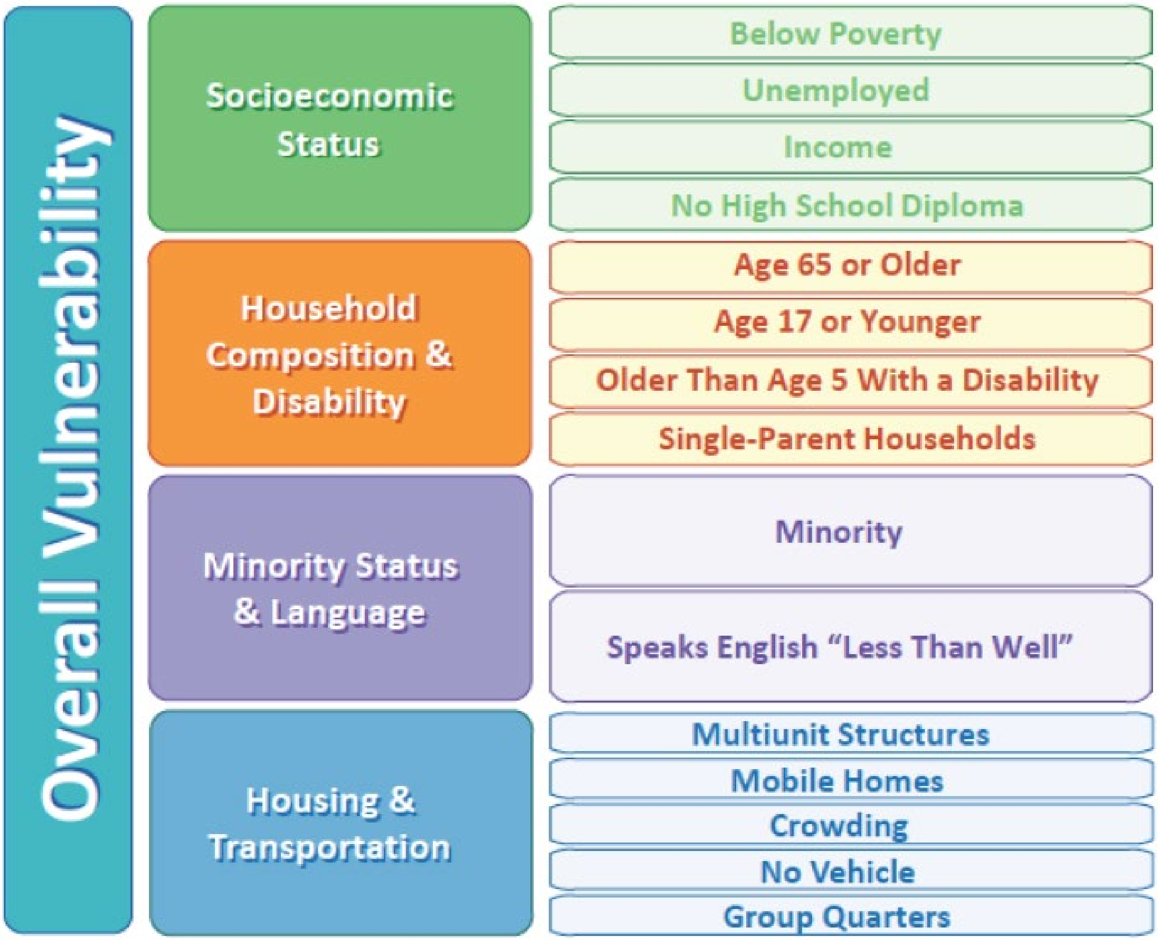
Increases in developed areas drive vulnerability to the hazards profiled in this plan. Awareness and proactive planning can help to make sure that new development occurs in locations and according to standards that improve resilience to the impacts of natural and manmade hazards. As Cumberland County's population grows and development occurs, the planning department will work with municipal decision-makers to grow smarter and healthier thus avoiding impacts from natural and human-made hazards.

Social Vulnerability, Resilience and Equity

Social vulnerability is the susceptibility of social groups to the adverse impacts of natural or man-made hazards, including disproportionate death, injury, loss, or disruption of livelihood. Socially vulnerable populations may be less resilient and in turn, experience disproportionate impacts from hazards. Similarly, those same communities may have inequitable access to resources and protections against natural and man-made hazards, that result in further disproportionate consequences.

Cumberland County used the Social Vulnerability Index (SVI) to assess the social vulnerability of its population. The SVI is a free, web-based tool created by the Center for Disease Control (CDC) to help emergency managers and planners identify and map communities that are most likely to need support before, during, and after a hazard. The SVI uses county and census tract level data from the U.S. Census and the American Community Survey for 15 variables grouped into 4 thematic categories. The categories identify places with high proportions of residents considered to be socially vulnerable to public health emergencies because of socioeconomic status, household composition and disability, race, ethnicity, and English language proficiency, and housing type and transportation access (Climate Change in Cumberland County Background paper, Neil Leary and Grace Messimer, 2023). The factors identified in Figure 4.5.4-4 help to identify the socially vulnerable populations found throughout Cumberland County. Using these factors, the county can better identify the location of socially vulnerable populations and develop plans to improve the preparedness, resilience, and emergency response in those communities.

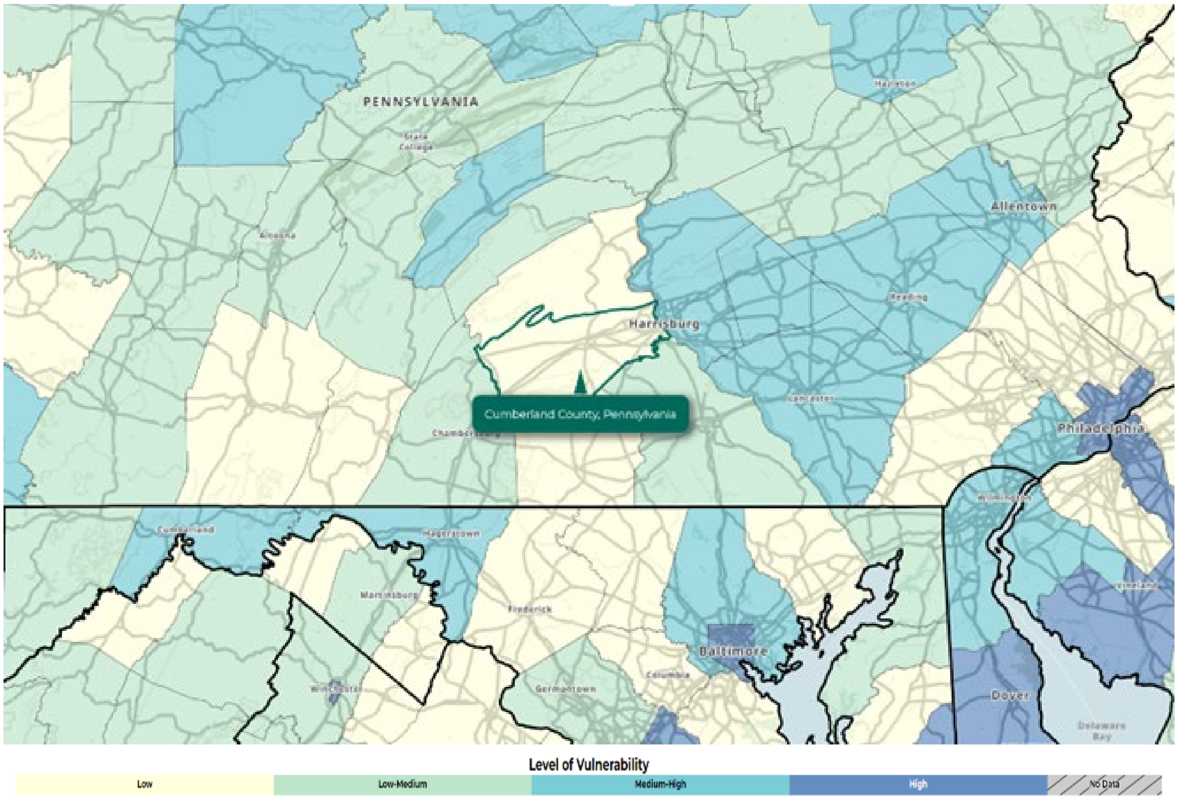
Figure 4.5.4-4



Source: CDC/ATSDR Social Vulnerability Index 2022

Possible scores on the SVI index can range from 0 (lowest vulnerability) to 1 (highest vulnerability) as compared to nationwide rankings. When ranked against other counties, Cumberland County has a 2022 national overall SVI score of 0.2068 which is considered a low vulnerability. Figure 4.5.4-5 compares the overall SVI score to other counties in the region around Cumberland County.

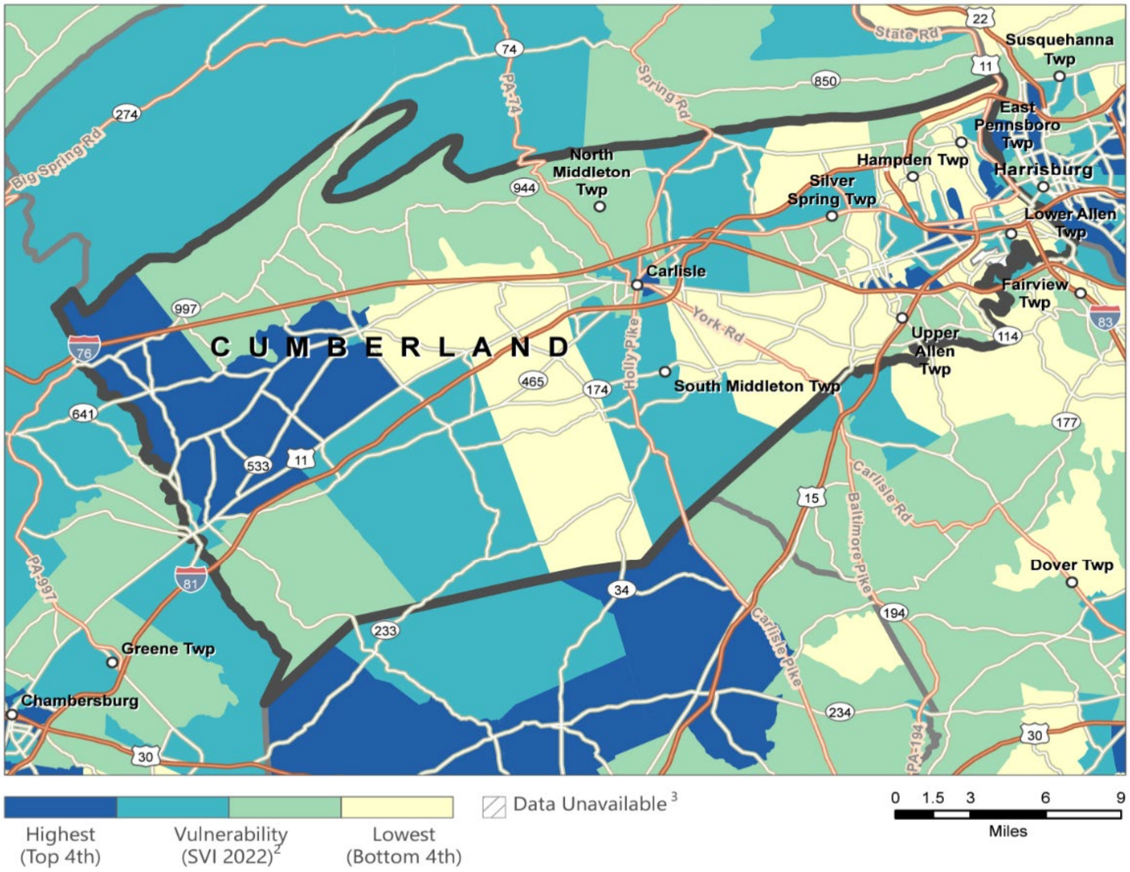
Figure 4.5.4-5



Source: CDC/ATSDR Social Vulnerability Index 2022

In addition to the county data, the SVI provides more specific social vulnerability data for the census tracts within Cumberland County. The overall SVI for the census tracts in Cumberland County reveals higher overall vulnerability in areas in Hopewell Township, northern Southampton Township, Shippensburg, Carlisle, Upper Allen Township, Hampden Township and East Pennsboro Township as shown on Figure 4.5.4-6.

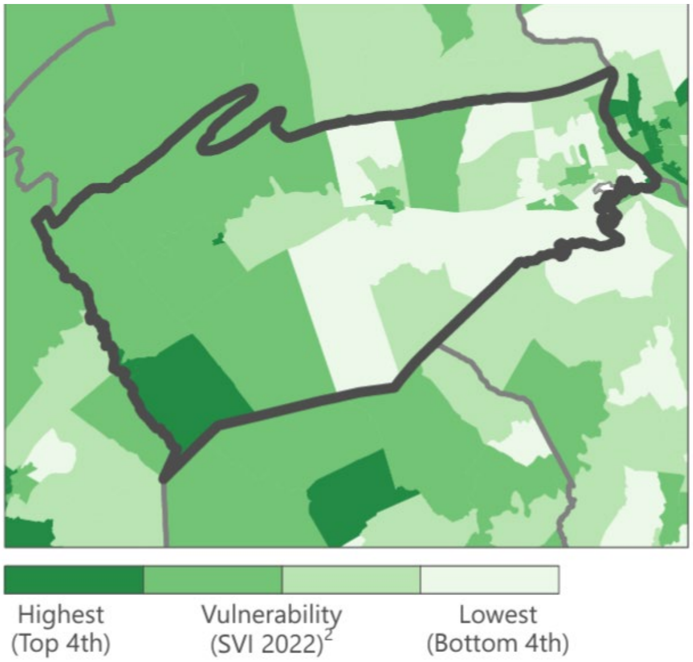
Figure 4.5.4-6



Source: CDC/ATSDR Social Vulnerability Index 2022

The census tract vulnerability maps can be further analyzed to identify the specific social vulnerability factors present in each community. Figures 4.5.4-7 through 4.5.4-10 analyze Cumberland County census tracts based on the 4 categories established by CDC, socioeconomic status, household characteristics, racial and ethnic minority status and housing type / transportation.

Figure 4.5.4-7

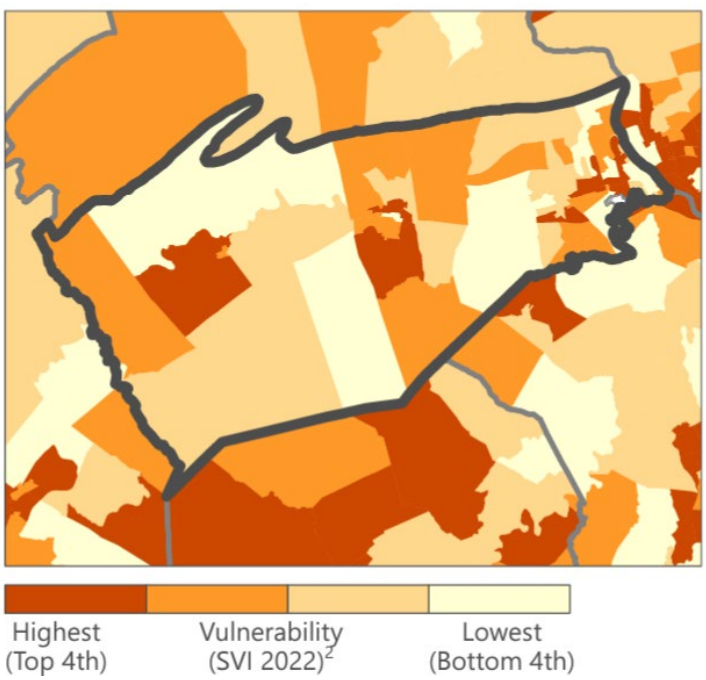


Socioeconomic Status

Areas ranked in the highest quartile for socioeconomic vulnerability are found south of Shippensburg, in parts of the Borough of Newville, and in parts of the Borough of Carlisle.

Socioeconomic Status: Below 150% Poverty, Unemployed, Housing Costs Burden, No High School Diploma, No Health Insurance.

Figure 4.5.4-8



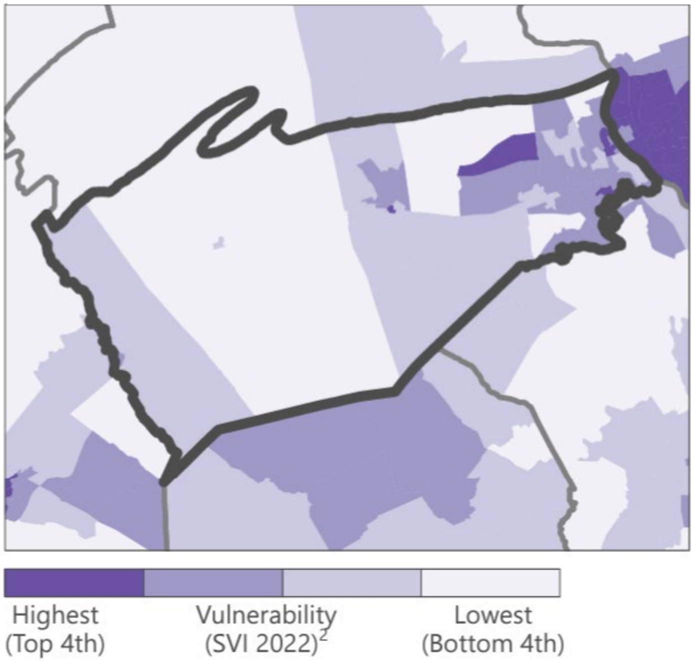
Source: CDC/ATSDR Social Vulnerability

Household Composition and Disability

Areas ranked in the highest quartile for household characteristics vulnerability are found in North Newton Township, South Middleton Township, Upper Allen Township, Camp Hill, East Pennsboro Township, and the Borough of Wormleysburg.

Household Characteristics: Aged 65 and Older, Aged 17 and Younger, Civilian with a Disability, Single-Parent Household, English Language Proficiency.

Figure 4.5.4-9



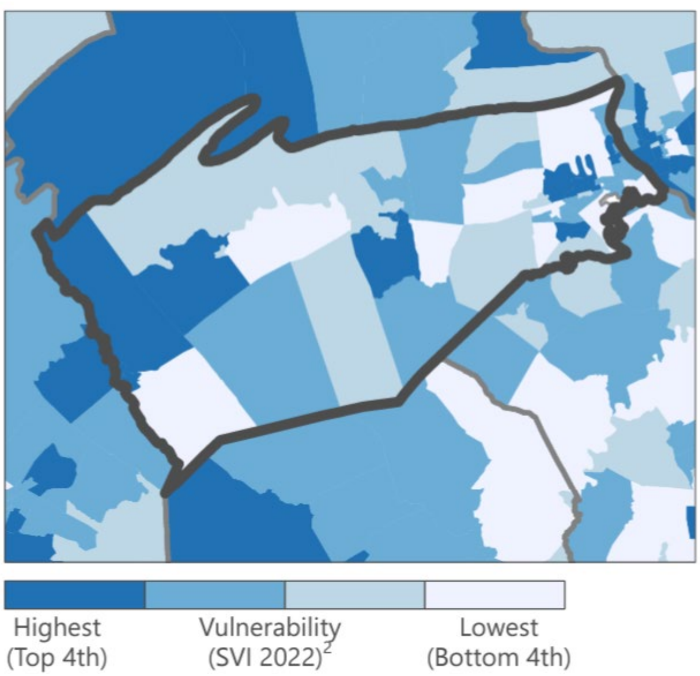
Source: CDC/ATSDR Social Vulnerability

Racial and Ethnic Minority Status

Areas ranked in the highest quartile for racial and ethnic minority vulnerability are found in the Borough of Carlisle, Silver Spring Township, East Pennsboro Township, the Borough of Wormleysburg and Lower Allen Township.

<u>Race/Ethnicity</u>: Hispanic or Latino (of any race); Black and African American, Not Hispanic or Latino; American Indian and Alaska Native, Not Hispanic or Latino; Asian, Not Hispanic or Latino; Native Hawaiian and Other Pacific Islander, Not Hispanic or Latino; Two or More Races, Not Hispanic or Latino; Other Races, Not Hispanic or Latino.

Figure 4.5.4-10



Source: CDC/ATSDR Social Vulnerability

Housing Type / Transportation

Areas ranked in the highest quartile for housing type / transportation vulnerability are found in Hopewell Township, Southampton Township, Shippensburg, North Newton Township, South Middleton Township, Hampden Township and Lower Allen Township.

<u>Housing Type/Transportation</u>: Multi-Unit Structures, Mobile Homes, Crowding, No Vehicle, Group Quarters.

The preceding maps provide a geographic context for the presence of socially vulnerable populations in the county. The natural and manmade hazards analyzed in this plan will disproportionately impact the socially vulnerable population in varying degrees. Each hazard profile in section 4.3 includes a discussion on its impacts to socially vulnerable populations. The action strategies included in the plan recommend steps the county and partner agencies can take in response to the needs of socially vulnerable populations.

5. Capability Assessment

5.1 Update Process Summary

Cumberland County has a number of resources it can access to implement hazard mitigation initiatives including emergency response measures, local planning and regulatory tools, administrative assistance and technical expertise, fiscal capabilities, and participation in local, regional, state and federal programs. The presence of these resources enables community resiliency through actions taken before, during and after a hazard event.

The 2020 HMP identified the presence of local plans, ordinances and codes in each municipality. It also specified local, state and federal resources available for mitigation efforts. Through responses to the *Capability Assessment Survey* distributed to all municipalities and input from the HMSC, the 2020 HMP provided an updated inventory of the most critical local planning tools available within each municipality and a summary of the fiscal and technical capabilities available through programs and organizations outside of the County. It also identified emergency management capabilities, and the processes used for implementation of the National Flood Insurance Program.

The capability assessment information was updated for the 2025 HMP through the *Capability Assessment Worksheet* and the *NFIP Worksheet* (included in Appendix C). Note that the 2025 capability assessment has been organized to match the outline provided in PEMA's 2020 Standard Operating Guide and FEMA's 2023 Local Mitigation Planning Guidance.

Municipal officials were then invited via email to complete and return the *Capability Assessment Worksheet* and the *NFIP Worksheet* to County officials. This email was sent following the kick-off meeting on June 4, 2024, and municipal officials had until October 31, 2024, to finish the forms.

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

5.2 Capability Assessment Findings

5.2.1. Planning and Regulatory Capability

5.2.1.1 Local Plans and Ordinances

Some of the most important planning and regulatory capabilities that can be utilized for hazard mitigation include comprehensive plans, building codes, floodplain ordinances, subdivision and land development ordinances, zoning ordinances, and emergency operations plans. These tools provide mechanisms for the implementation of adopted mitigation strategies. Tables 5.2-1 and 5.2-2 summarizes their presence within each municipality.

Table 5.2-1: Summary of planning tools adopted by each municipality in Cumberland County (Cumberland County Planning Department and Cumberland County Department of Public Safety, 2025).						
Community	**Comprehensive Plan**	**Building Code (UCC)**	**Floodplain Ordinance – NFIP Participant**	**Subdivision & Land Development Ordinance**	**Zoning Ordinance**	**EOP**
Borough of Camp Hill	Yes	Yes	Yes	Yes	Yes	Yes
Borough of Carlisle	Yes	Yes	Yes	Yes	Yes	Yes
Township of Cooke	Yes	Yes	Yes	Yes	No	Yes
Township of Dickinson	Yes	Yes	Yes	Yes	Yes	Yes
Township of East Pennsboro	Yes	Yes	Yes	Yes	Yes	Yes
Township of Hampden	Yes	Yes	Yes	Yes	Yes	Yes
Township of Hopewell	Yes	Yes	Yes	Yes	Yes	Yes
Borough of Lemoyne	Yes	Yes	Yes	Yes	Yes	Yes
Township of Lower Allen	Yes	Yes	Yes	Yes	Yes	Yes
Township of Lower Frankford	Yes	Yes	Yes	Yes	Yes	Yes
Township of Lower Mifflin	Yes	Yes	Yes	Yes	Yes	Yes
Borough of Mechanicsburg	Yes	Yes	Yes	Yes	Yes	Yes
Township of Middlesex	Yes	Yes	Yes	Yes	Yes	Yes
Township of Monroe	Yes	Yes	Yes	Yes	Yes	Yes
Borough of Mount Holly Springs	Yes	Yes	Yes	Yes	Yes	Yes
Borough of New Cumberland	Yes	Yes	Yes	Yes	Yes	Yes
Borough of Newburg	No	Yes	Yes	Yes	Yes	Yes
Borough of Newville	Yes	Yes	Yes	Yes	Yes	Yes
Township of North Middleton	Yes	Yes	Yes	Yes	Yes	Yes
Township of North Newton	Yes	Yes	Yes	Yes	Yes	Yes
Township of Penn	Yes	Yes	Yes	Yes	Yes	Yes
Township of Shippensburg	Yes	Yes	Yes	Yes	Yes	Yes
Borough of Shippensburg	Yes	Yes	Yes	Yes	Yes	Yes
Borough of Shiremanstown	Yes	Yes	Yes	Yes	Yes	Yes
Township of Silver Spring	Yes	Yes	Yes	Yes	Yes	Yes
Township of South Middleton	Yes	Yes	Yes	Yes	Yes	Yes
Township of South Newton	Yes	Yes	Yes	Yes	Yes	Yes
Township of Southampton	Yes	Yes	Yes	Yes	Yes	Yes
Township of Upper Allen	Yes	Yes	Yes	Yes	Yes	Yes
Township of Upper Frankford	Yes	Yes	Yes	Yes	No	Yes
Township of Upper Mifflin	Yes	Yes	Yes	Yes	No	Yes
Township of West Pennsboro	Yes	Yes	Yes	Yes	Yes	Yes
Borough of Wormleysburg	Yes	Yes	Yes	Yes	Yes	Yes

Table 5.2-2: Summary of floodplain and planning tools by each municipality in Cumberland County (Cumberland County Planning Department and Cumberland County Department of Public Safety, 2025).

Community	Floodplain Administrator	Certified Floodplain Manager	NFIP CRS Participation	Continuity of Government Plan	Continuity of Operations Plan
Borough of Camp Hill	Yes	No	No	Yes	Yes
Borough of Carlisle	Yes	No	No	Yes	Yes
Township of Cooke	Yes	No	No	Yes	Yes
Township of Dickinson	Yes	No	No	No	No
Township of East Pennsboro	Yes	Yes	No	No	No
Township of Hampden	Yes	No	No	Yes	No
Township of Hopewell	Yes	Yes	No	No	No
Borough of Lemoyne	Yes	Yes	No	No	No
Township of Lower Allen	Yes	No	No	Yes	Yes
Township of Lower Frankford	Yes	No	No	No	No
Township of Lower Mifflin	Yes	No	No	No	No
Borough of Mechanicsburg	Yes	No	No	Yes	Yes
Township of Middlesex	Yes	No	No	Yes	Yes
Township of Monroe	Yes	No	No	No	Yes
Borough of Mount Holly Springs	Yes	No	No	Yes	Yes
Borough of New Cumberland	Yes	No	No	No	No
Borough of Newburg	Yes	No	No	No	No
Borough of Newville	Yes	No	No	No	No
Township of North Middleton	Yes	No	No	No	No
Township of North Newton	Yes	No	No	No	No
Township of Penn	Yes	No	No	No	No
Township of Shippensburg	Yes	No	No	No	No
Borough of Shippensburg	Yes	No	No	No	No
Borough of Shiremanstown	No	No	No	No	No
Township of Silver Spring	Yes	No	No	No	No
Township of South Middleton	Yes	Yes	No	Yes	Yes
Township of South Newton	Yes	Yes	No	Yes	No
Township of Southampton	Yes	No	No	No	No
Township of Upper Allen	Yes	No	No	Yes	Yes
Township of Upper Frankford	Yes	No	No	No	No
Township of Upper Mifflin	Yes	No	No	No	No
Township of West Pennsboro	Yes	No	No	No	No
Borough of Wormleysburg	Yes	No	No	No	No

Local comprehensive plans provide a vision for the physical design and development of a community, and the principles in comprehensive plans are typically implemented through zoning ordinances, subdivision regulations, and capital improvement programs. Integrating hazard mitigation into the comprehensive plan helps to guide the community's development in a way that does not lead to increased hazard vulnerability and can encourage whole community, smart and safe' growth. The existing countywide Comprehensive Plan for Cumberland County was developed in 2017 and has not been updated as of 2025. In addition, all but one municipality (the Borough of Newburg) have adopted local Comprehensive Plans.

Building codes regulate construction standards for new construction and substantially renovated buildings. The Uniform Construction Code (UCC) is the statewide building code (Act 45 of 1999) that took effect in Pennsylvania in April of 2004 and was amended most recently in 2018. 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. All 33 municipalities in Cumberland County have adopted the UCC. The 2015 International Codes issued by the International Code Council is currently in use under the UCC. Since all municipalities in Cumberland County have adopted the UCC, they are required to administer and enforce the 2015 building code regulations, using their own employees or via certified third-party agencies, for all building permits submitted on or after October 1, 2018.

Through administration of floodplain ordinances, municipalities can ensure that all new construction or substantial improvements to existing structures located in the floodplain are flood-proofed, dry-proofed, or built above anticipated flood elevations. Floodplain ordinances may also prohibit development in certain areas altogether. The NFIP establishes minimum ordinance requirements which must be met in order for that community to participate in the program. However, a community is permitted and in fact, encouraged, to adopt standards which exceed NFIP requirements. Through participation in the NFIP, all municipalities within the County have a floodplain ordinance in place. For more information on floodplain management and participation in the NFIP in Cumberland County, see Section 5.2.1.2.

Subdivision and land development ordinances are intended to regulate the development of housing, commercial, industrial or other uses, including associated public infrastructure, as land is subdivided into buildable lots for sale or future development. Within these ordinances, guidelines on how land will be divided, the placement and size of roads and the location of infrastructure can reduce exposure of development to hazard events. All jurisdictions within Cumberland County have adopted and enforced a subdivision and land development ordinance.

Table 5.2-3: NFIP policies and coverage (FEMA Community Information System, 2018 vs. 2025).						
Community	**Number of NFIP Policies 2018**	**Number of NFIP Policies 2025**	**Percent Change**	**Total Coverage ($) 2018**	**Total Coverage ($) 2025**	**Percent Change**
Borough of Camp Hill	24	15	-37.5%	$5,518,900.00	$4,074,000.00	-26.2%
Borough of Carlisle	98	38	-61.2%	$22,894,000.00	$9,812,000.00	-57.1%
Township of Cooke	N/A	N/A	N/A	N/A	N/A	N/A
Township of Dickinson	23	8	-65.2%	$3,848,600.00	$1,896,000.00	-50.7%
Township of East Pennsboro	87	47	-46.0%	$18,089,100.00	$10,702,000.00	-40.8%
Township of Hampden	162	69	-57.4%	$33,648,700.00	$15,255,000.00	-54.7%
Township of Hopewell	2	1	-50.0%	$465,000.00	$121,000.00	-74.0%
Borough of Lemoyne	4	2	-50.0%	$392,000.00	$294,000.00	-25.0%
Township of Lower Allen	57	24	-57.9%	$13,790,000	$6,260,000.00	-54.6%
Township of Lower Frankford	8	4	-50.0%	$1,561,700.00	$1,050,000.00	-32.8%
Township of Lower Mifflin	4	N/A	N/A	$894,200.00	N/A	N/A
Borough of Mechanicsburg	9	7	-22.2%	$2,023,400.00	$1,575,000.00	-22.2%
Township of Middlesex	14	7	-50.0%	$2,605,000.00	$1,585,000.00	-39.2%
Township of Monroe	47	17	-63.8%	$9,573,300.00	$3,845,000.00	-59.8%
Borough of Mount Holly Springs	53	21	-60.4%	$6,621,500.00	$2,441,000.00	-63.1%
Borough of New Cumberland	75	29	-61.3%	$11,928,700.00	$5,300,000.00	-55.6%
Borough of Newburg	1	1	0.0%	$90,200.00	$90,000.00	-0.2%
Borough of Newville	1	N/A	N/A	$10,000.00	N/A	N/A
Township of North Middleton	41	27	-34.1%	$8,421,000.00	$6,435,000.00	-23.6%
Township of North Newton	2	N/A	N/A	$353,000.00	N/A	N/A
Township of Penn	4	N/A	N/A	$830,500.00	N/A	N/A
Township of Shippensburg	12	4	-66.7%	$5,580,300.00	$2,060,000.00	-63.1%
Borough of Shippensburg	22	4	-81.8%	$4,432,800.00	$587,000.00	-86.8%
Borough of Shiremanstown	2	1	-50.0%	$700,000.00	$350,000.00	-50.0%
Township of Silver Spring	44	22	-50.0%	$9,325,400.00	$5,518,000.00	-40.8%
Township of South Middleton	56	29	-48.2%	$10,735,600.00	$6,057,000.00	-43.6%
Township of South Newton	4	2	-50.0%	$677,000.00	$297,000.00	-56.1%
Township of Southampton	35	12	-65.7%	$4,758,500.00	$2,033,000.00	-57.3%
Township of Upper Allen	50	17	-66.0%	$10,830,900.00	$4,331,000.00	-60.0%
Township of Upper Frankford	5	3	-40.0%	$649,700.00	$436,000.00	-32.9%
Township of Upper Mifflin	1	N/A	N/A	$200,000.00	N/A	N/A
Township of West Pennsboro	10	6	-40.0%	$2,034,400.00	$1,178,000.00	-42.1%
Borough of Wormleysburg	81	42	-48.1%	$17,116,800.00	$9,671,000.00	-43.5%
TOTAL	**1038**	**459**	**-55.8%**	**$210,600,200.00**	**$103,253,000.00**	**-51.0%**

Zoning ordinances allow for local communities to regulate the use of land in order to protect the interest and safety of the general public. Zoning ordinances can be designed to address unique conditions or concerns within a given community. They may be used to create buffers between structures and high-risk areas, limit the type or density of development and/or require land development to consider specific hazard vulnerabilities. All but three jurisdictions within Cumberland County have adopted and enforced a zoning ordinance.

Numerous other plans and organizations are also in place at the municipal and county level for topics such as open space management, Act 167 stormwater management, natural resources protection, capital improvements, economic development, historic preservation, and farmland preservation. Details are provided on the *Capability Assessment Survey* included in Appendix C.

5.2.1.2 Participation in the National Flood Insurance Program (NFIP)

All municipalities in Cumberland County are participants in the NFIP. Community participation in the NFIP allows for property owners to obtain flood insurance. Flood insurance provides a means for homeowners, renters and business owners to financially protect themselves. This capability greatly improves resilience after a flood hazard event by allowing residents to repair and rebuild. Table 5.2-3 provides a comparison of Cumberland County municipalities with the number of flood insurance policies and coverage in 2018 versus 2025 that exist in that municipality.

The NFIP program is managed by local municipalities participating in the program through ordinance adoption and floodplain regulation while the County provides an oversight and coordination role. Similarly, permitting processes needed for building construction and development in the floodplain are implemented at the municipal level through various ordinances (e.g. zoning, subdivision/land development and floodplain ordinances). All compliance and enforcement mechanisms are instituted through municipal codes and enforced by local zoning officers. The only Certified Floodplain Managers exist in East Pennsboro Township, Hopewell Township, Lemoyne Borough, Southampton Township, and South Middleton Township (see Table 5.2-2). A Floodplain Administrator exists in each municipality. Table 5.2-4 below showcases the designated individual or agency responsible for implementing the requirements of the NFIP for each municipality.

Table 5.2-4: Floodplain Administrator for Each Municipality (PA DCED, 2025)

Community	Designee Or Agency
Borough of Camp Hill	Lester Lanman
Borough of Carlisle	Jared Woolston
Township of Cooke	Andre Weltman
Township of Dickinson	Nicholas Nagy
Township of East Pennsboro	William Baker
Township of Hampden	Jon Powers
Township of Hopewell	Municipal Contact
Borough of Lemoyne	Trisha Rafferty

Township of Lower Allen	Marcus Brandt
Township of Lower Frankford	Greg Alleman
Township of Lower Mifflin	John Bailey
Borough of Mechanicsburg	Luke Arnold
Township of Middlesex	Mark D. Carpenter
Township of Monroe	Gregory Rogalski
Borough of Mount Holly Springs	Jason J Bonawitz
Borough of New Cumberland	Nathaniel J. Dysard
Borough of Newburg	Earl Baer - Commonwealth Code
Borough of Newville	Robert Sabatini
Township of North Middleton	Ruben Lao Jr
Township of North Newton	Dustin Durf
Township of Penn	Tim Knepp
Township of Shippensburg	Angela Hockenberry
Borough of Shippensburg	Kevin Plasterer
Borough of Shiremanstown	Jodi Alloway
Township of Silver Spring	CHELSEA LEIBY
Township of South Middleton	Kelly Kurtas
Township of South Newton	David E. Durff
Township of Southampton	Larry E. Hinkle
Township of Upper Allen	Jennifer Boyer
Township of Upper Frankford	Dawn Armold
Township of Upper Mifflin	Secretary
Township of West Pennsboro	Larry Barrick Jr
Borough of Wormleysburg	Lori Schmidt

FEMA Region III makes available to communities an ordinance review checklist which lists required provisions for floodplain management ordinances. This checklist helps communities develop an effective floodplain management ordinance that meets federal requirements for participation in the NFIP. As mentioned above, the Pennsylvania DCED provides communities, based on their 44 CFR 60.3 level of regulations, with a suggested ordinance document to assist municipalities in meeting the minimum requirements of the NFIP and the Pennsylvania Flood Plain Management Act (Act 166). Act 166 mandates municipal participation in and compliance with the NFIP. It also establishes higher regulatory standards for hazardous materials and high-risk land uses. As new DFIRMs are published, the Pennsylvania State NFIP Coordinator at DCED works with communities to ensure the timely and successful adoption of an updated floodplain management ordinance by reviewing and providing feedback on existing and draft ordinances. In addition, DCED provides guidance and technical support through Community Assistance Contacts (CAC) and Community Assistance Visits (CAV).

The release of the updated countywide Digital Flood Insurance Rate Map on September 7, 2023, greatly enhanced mitigation capabilities as they relate to identifying flood hazards. The digital flood hazard information provided by FEMA is based on engineering studies and detailed elevations. This is a significant improvement to the previously effective Flood Insurance Rate

Maps, some of which did not include detailed studies. Residents and municipal officials are provided with mapping assistance from the Cumberland County GIS Department, Cumberland County Planning Department and the Cumberland County Department of Public Safety upon request. All municipalities have adopted an updated local floodplain management ordinance as a result of the updated FIRMs. Table 5.2-5 below shows the adoption date of the new ordinances.

Table 5.2-5: New Floodplain Management Ordinance Adoption Date for Each Municipality

Community	Date of Adoption
Borough of Camp Hill	4/18/2023
Borough of Carlisle	9/6/23
Township of Cooke	7/3/23
Township of Dickinson	8/21/23
Township of East Pennsboro	8/2/2023
Township of Hampden	7/27/23
Township of Hopewell	8/23/23
Borough of Lemoyne	5/18/23
Township of Lower Allen	8/28/23
Township of Lower Frankford	8/28/23
Township of Lower Mifflin	3/30/23
Borough of Mechanicsburg	5/2/23
Township of Middlesex	8/25/23
Township of Monroe	5/11/23
Borough of Mount Holly Springs	8/14/23
Borough of New Cumberland	6/14/23
Borough of Newburg	5/1/23
Borough of Newville	8/29/23
Township of North Middleton	7/20/23
Township of North Newton	7/11/23
Township of Penn	8/17/23
Township of Shippensburg	7/1/23
Borough of Shippensburg	8/15/23
Borough of Shiremanstown	7/10/23
Township of Silver Spring	7/26/23
Township of South Middleton	8/31/23
Township of South Newton	5/16/23
Township of Southampton	5/22/23
Township of Upper Allen	7/19/23
Township of Upper Frankford	7/10/23
Township of Upper Mifflin	12/9/2023
Township of West Pennsboro	8/28/23
Borough of Wormleysburg	8/8/23

There are a few existing limitations to flood mitigation in Cumberland County. There are no communities in Cumberland County participating in the NFIP Community Rating System (CRS) (see Table 5.2-2). Participation in the CRS system has been discussed at various county meetings. The administrative burden combined with limited municipal resources has prevented movement within this program. At the same time, though, all municipalities in the County are flood prone. The NFIP's CRS credits community efforts beyond those minimum standards by providing discounts on flood insurance premiums for the community's property owners. CRS discounts on flood insurance premiums range from 5% up to 45% based on the participating community's CRS class. A community's CRS class is determined by credit points that are awarded to communities. Credit points can be obtained by undertaking public information, mapping and regulations, flood damage reduction and flood preparedness activities (FEMA, 2023).

Also, numerous roads and intersections where flooding issues repeatedly occur were identified in Section 4.3.3.3. Some of these roads and intersections are state routes. The County and local municipalities face challenges in mitigating flood events on state routes since these roads are owned and maintained by the Commonwealth of Pennsylvania. Local municipalities do not have the authority to independently carry out a mitigation project. In these situations, the Pennsylvania Department of Transportation must decide to undertake the project. Since the Department of Transportation is often most concerned with larger, critical transportation routes, smaller state roads and intersections which significantly affect a local community may not get the attention they need for the Commonwealth to take on a mitigation project.

For communities that participate in the NFIP, substantial damage determinations are required by local floodplain management ordinances. These provisions must be in place for residents of a community to purchase flood insurance through the NFIP. The determination about whether a structure is "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 local municipalities in conjunction with Cumberland County officials after a disaster 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 in order to stay in compliance with the NFIP. A total of 16 municipalities completed and returned the *Checking in with the NFIP Program* form. These forms can be found in Appendix C and includes more information regarding substantial damages for the municipalities.

5.2.1.3 Emergency Management

The Cumberland County Department of Public Safety coordinates countywide emergency management efforts. Each municipality has a designated local emergency management coordinator who possesses a unique knowledge of the impact hazard events have on their community. A significant amount of information used to develop this plan was obtained from the emergency management coordinators as well as County staff. The Emergency Management Services Code (PA Title 35) requires that all municipalities in the Commonwealth have a Local Emergency Operations Plan (EOP) which is updated every two years. As of February 2025, all municipalities in Cumberland County have or are in the process of updating their local EOP. A countywide EOP also exists and is dated February 2024. Municipalities are not required to sign on to the County EOP, because county staff prefers to keep municipal emergency management coordinators actively engaged at a more local level.

Additionally, Cumberland County has a Continuity of Operations Plan in place. Camp Hill Borough, Carlisle Borough, Cooke Township, Lower Allen Township, Mechanicsburg Borough, Middlesex Township, Monroe Township, Mount Holly Springs Borough, Southampton Township, Upper Allen Township, Carlisle Barracks, and the Naval Support Activity have also all adopted a Continuity of Operations Plan (see Table 5.2-2).

Further, several municipalities have adopted a Continuity of Government Plan. These municipalities include Camp Hill Borough, Carlisle Borough, Cooke Township, Hampden Township, Lower Allen Township, Mechanicsburg Borough, Middlesex Township, Mount Holly Springs Borough, Southampton Township, South Middleton Township, Upper Allen Township. Along with this, Carlisle Barracks, and the Naval Support Activity have also adopted a Continuity of Government Plan (see Table 5.2-2).

In addition to local emergency management efforts, the South Central Task Force (SCTF) is a regional all-hazards emergency preparedness task force for nine counties in South Central Pennsylvania. The task force encompasses Adams, Cumberland, Dauphin, Franklin, Lancaster, Lebanon, Perry, Schuylkill and York Counties. SCTF's preparedness activities address planning, prevention and response. It enhances regional coordination capabilities in case of incidents that exceed the capabilities of a single county or jurisdiction. Emphasis is also placed on collaborating with the private sector to endure the security and resilience of privately owned businesses and infrastructure, especially those critical to countywide public health and operational continuity such as the energy, telecommunications, food processing and transportation sectors. Though SCTF is an all-hazards group, it began as a counter-terrorism organization and maintains an extensive training program to mitigate the threat of terrorism for local emergency response entities as well as for the private sector.

5.2.2. Administrative and Technical Capability

Administrative capability is described by an adequacy of departmental and personnel resources for the implementation of mitigation-related activities. Technical capability relates to an adequacy of knowledge and technical expertise of local government employees or the ability to contract outside resources for this expertise in order to effectively execute mitigation activities. Common examples of skill sets and technical personnel needed for hazard mitigation include: planners with knowledge of land development/management practices, engineers or professionals trained in construction practices related to buildings and/or infrastructure (e.g. building inspectors), planners or engineers with an understanding of natural and/or human caused hazards, emergency managers, floodplain managers, land surveyors, scientists familiar with hazards in the community, staff with the education or expertise to assess community vulnerability to hazards, personnel skilled in geographic information systems, resource development staff or grant writers, and fiscal staff to handle complex grant application processes.

Based on the 2024 *Capability Assessment Worksheet* results, municipalities in Cumberland County have adequate administrative and technical staff needed to conduct hazard mitigation-activities. However, there seems to be a common lack of personnel for in house civil engineers and grant writers related to community hazards. This result is not necessarily surprising since these tasks would typically be contracted to outside providers. The County GIS Department is also able to provide these services. Additionally, County staff members are experienced with grant writing and are able to assist municipalities upon request. All municipalities in the County have an identified emergency management coordinator, some of whom are responsible for more than one jurisdiction. The only Certified Floodplain Managers among municipal Floodplain Administrators/NFIP Coordinators in the county are staff of East Pennsboro Township, Hopewell Township, Lemoyne Borough, Southampton Township, and South Middleton Township.

Furthermore, there was concern in the capability assessment surveys regarding staff turnover and difficulty filling positions in municipal governments. This was primarily focused on public safety positions related to Law Enforcement, Fire and EMS.

Local organizations that could act as partners for future mitigation activities include the Capital Region COG (formerly West Shore COG) and the Western Cumberland COG, non-profit environmental organizations such as the Susquehanna River Basin Commission, local watershed associations, LeTort Regional Authority, business development organizations such as the Chamber of Commerce and Rotary Club, and historical or cultural agencies such as the Cumberland County Historical Society.

State and multi-agency programs in Pennsylvania which can provide technical assistance for mitigation activities 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 Transportation
- Pennsylvania Emergency Management Agency
- Pennsylvania Silver Jackets (volunteer-based)

Federal agencies which can provide technical assistance for mitigation activities include, but are not limited to:

- Army Corp of Engineers
- Department of Agriculture
- Department of Housing and Urban Development
- Economic Development Administration
- Emergency Management Institute
- Environmental Protection Agency
- Federal Emergency Management Agency

- Small Business Administration

Additional details on these state and federal technical assistance programs can be found in the *Pennsylvania 2023 Standard State All-Hazard Mitigation Plan*.

5.2.3. Financial Capability

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

Local programs which may provide financial support for mitigation activities include, but are not limited to:

- Water and sewer fees (municipal authorities);
- Stormwater utility fees (Hampden Township, Carlisle Borough, others currently considering);
- Development impact fees; and
- General obligation, revenue, and/or special tax bonds (for example through the County Industrial Development Authority).

State programs which may provide financial support for mitigation activities include, but are not limited to:

- Department of Community and Economic Development (DCED) Business Financing
- DCED H2O PA Program
- DCED Local Municipal Resources and Development Program (LMRDP)
- DCED Municipal Assistance Program (MAP)
- DCED Urban Development Program (UDP)
- Department of Drug and Alcohol Programs (DDAP) Pennsylvania's Recovery Housing Program
- DDAP Regional Recovery Hubs Grant Program
- DDAP Services to BIPOC Communities Grant Program
- DCNR Community Conservation Partnership Program
- DCNR Community & Watershed Forestry Program
- DCNR Pennsylvania Rivers Conservation Program
- DEP Dam Safety Program
- DEP Flood Protection Program
- DEP Mine Subsidence Insurance (MSI)
- DEP Nonpoint Source Implementation Program
- DEP Stream Improvement Program
- Department of Human Services (DHS) Emergency Rental Assistance Program (ERAP)
- DHS Human Services Block Grant Program

- DHS Heating Assistance/Low-Income Home Energy Assistance Program (LIHEAP)
- DOH Environmental Health Capacity Program (EHC)
- DOH Health Assessment Program
- DOH Pennsylvania Substance Use Navigation Program (PA-SUN)
- Pennsylvania Broadband Development Authority (PBDA) Affordable Connectivity Program
- PBDA COVID-19 ARPA PA Broadband Infrastructure Program
- Pennsylvania Infrastructure Investment Authority (PENNVEST)
- State Conservation Commission (SCC) Dirt and Gravel Road Maintenance Program
- SCC Resource Enhancement & Protection Program
- SCC Conservation Excellence Grant Program

Federal programs which may provide financial support for mitigation activities include, but are not limited to:

- Department of Energy Weatherization Assistance Program
- Department of Homeland Security Grant Program (HSGP)
- FEMA Building Resilient Infrastructure and Communities Program (BRIC)
- FEMA Community Assistance Program – State Support Services Element (CAP-SSSE)
- FEMA Community Disaster Loan Program
- FEMA Community Rating System (CRS)
- FEMA Emergency Management Performance Grants (EMPG)
- FEMA Environmental Planning and Historic Preservation Program (EHP)
- FEMA Fire Management Assistance Grant (FMAG).
- FEMA Flood Mitigation Assistance Program (FMA)
- FEMA Hazard Mitigation Grant Program (HMGP)
- FEMA Individuals and Households Program (IHAP)
- FEMA National Dam Safety Program (NDSP)
- FEMA National Flood Insurance Program (NFIP)
- FEMA Public Assistance Program (PA)
- FEMA Regional Catastrophic Preparedness Grant Program (RCPGP)
- FEMA Risk MAP
- FEMA Safeguarding Tomorrow Revolving Loan Fund Program (RLF)
- HUD Community Development Block Grants (CDBG)
- National Oceanic and Atmosphere Administration (NOAA) StormReady Program
- Natural Resources Conservation Service (NRCS) easement programs
- Small Business Administration Disaster Loan Programs
- United States Army Corps of Engineers (USACE) General Investigation (GI)
- USACE Continuing Authorities Program (CAP)
- USACE Flood Plain Management Services Program (FPMS)
- USACE Inspection of Completed Works Program (ICW)
- USACE National Levee Safety Program
- USACE Planning Assistance to States

- USACE Rehabilitation and Inspection Program (RIP)
- USDA/NRCS Emergency Watershed Protection Program

Additional details on these state and federal financial resources can be found in the *Pennsylvania 2023 Standard State All-Hazard Mitigation Plan*. Furthermore, The Silver Jackets Flood Mitigation Program Guide is a comprehensive list of all federal programs and funding mechanisms that support flood risk management activities. The latest guide was published in March 2022 and can be found at: https://www.iwr.usace.army.mil/Portals/70/docs/silverjackets/PA%20Mitigation%20Program%20Guide%20Final%20Mar2022.pdf?ver=kNeAzcLUleg6jx6uwkX_Vg%3D%3D.

Limited funding is a critical barrier to the implementation of hazard mitigation activities. The county will need to rely on regional, state and federal partnerships for financial assistance.

5.2.4. Education and Outreach

Cumberland County is very active with education and outreach related to hazard mitigation and emergency management. Department of Public Safety staff participates in natural disaster or safety related school programs. Staff from the Public Safety and Planning departments as well as the County Cooperative Extension, provide ongoing public education programs such as responsible water use, fire safety, household preparedness, and environmental education. The Public Safety Department and the South Central Task Force have a public-private partnership to address terrorism. Finally, local citizen groups or non-profit organizations in Cumberland County focused on environmental protection (LeTort Regional Authority, Clean Air Board of Central PA, various watershed protection groups, etc.) assist with education.

There are numerous communities identified as vulnerable to wildfire hazards. The Pennsylvania Firewise Community Program assists planned and existing communities in implementing management practices which reduce the risk of wildfire events. FireWise is a multi-organizational initiative designed to include not only fire safety professionals, but also homeowners, community leaders, developers, and others in localized efforts to reduce susceptibility of homes, communities, and structures to wildfire through cooperative education and mitigation techniques. This program aims to teach homeowners how to prepare their homes for wildfires as well as hold safety committee meetings and other fire and safety educational training programs to better educate residents and first responders. Improved participation in this program would reduce the loss of lives, property and resources to wildfires by building and maintaining communities using practices that are compatible with their natural surroundings.

Similarly, only Cumberland County and currently participate in the *StormReady* program, although all of the municipalities would benefit from participation. Dickinson College and Mechanicsburg Borough are *StormReady* Supporters. Furthermore, ten of the municipalities in Cumberland County have adopted a Continuity of Operations Plan, along with Carlisle Barracks and Naval Support Activity.

5.2.5. Plan Integration

Plan integration ensures that hazard mitigation planning is woven into each municipality's planning and regulatory documents. These include the 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 (FEMA, 2013).

While not all regulatory tools are relevant to every municipality in Cumberland 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 use development ordinances with respect to 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.

Integrating hazard mitigation into the comprehensive plan helps to guide the community's development in a way that does not lead to increased hazard vulnerability. For instance, future development can be guided away from areas with known hazards, and design standards to withstand potential hazards can be created for new or improved construction. Furthermore, comprehensive plans promote sound land use and regional cooperation among local governments to address planning issues. These plans serve as the official policy guide for influencing the location, type and extent of future development by establishing the basis for decision-making and review processes on zoning matters, subdivision and land development, land uses, public facilities and housing needs over time.

The existing countywide Comprehensive Plan for Cumberland County was adopted in 2017. In addition, all but one municipality (the Borough of Newburg) have adopted local comprehensive plans. County governments are required by law to adopt a comprehensive plan, while local municipalities may do so at their option. Table 5.2-3 shows several Actions from the 2025 Hazard Mitigation Plan that considers strategies found in the 2017 Cumberland County Comprehensive Plan. The 2017 Comprehensive Plan was referenced for the 2025 HMP Action items. Future comprehensive plan updates and improvements will continue to consider HMP findings.

Table 5.2-3: Cumberland County 2017 Comprehensive Plan and 2025 HMP Strategies and Action Items.

Planning Theme	2017 Cumberland County Comprehensive Plan Strategies	2025 Hazard Mitigation Plan Action Item
Natural Resource Protection	Conserve Page 8, Objective 4 Strategy A: Partner with FEMA to update floodplain maps and studies on a regular basis.	Goal 1, Action Item 9: Assist all municipalities in updating floodplain management regulations that meet or exceed minimum standards in the NFIP.

Table 5.2-3: Cumberland County 2017 Comprehensive Plan and 2025 HMP Strategies and Action Items.		
Planning Theme	**2017 Cumberland County Comprehensive Plan Strategies**	**2025 Hazard Mitigation Plan Action Item**
HMP Implementation	Conserve Page 8, Objective 4, Strategy C: Maintain and implement the Cumberland County HMP	Goal 3, Action Item 95: Conduct annual HMP meetings to review implementation progress
Education and Outreach	Conserve Page 8, Objective 5, Strategy A: Conduct educational workshops and training	Goal 3, Action Item 93: Provide technical assistance/training to municipal EMCs/FPMs who have no or limited experience with floodplains
Growth and Development	Grow Page 9, Objective 2, Strategy B: Encourage innovative planning techniques and incentives that direct development away from important environmental features.	Goal 1, Action Item 9: Assist all municipalities in updating floodplain management regulations that meet or exceed minimum standards in the NFIP.
Emergency Operations Center	Grow Page 18, Objective 2, Strategy B: Maintain the County Emergency Operations Center	Goal 2, Action Item 81: Continue implementation of an early warning or alert systems that utilize cloud-based (IPAWS, Wireless Emergency Alerts) communications technologies to distribute information to the public during emergencies.
Hazardous Material Response	Grow Page 18, Objective 2, Strategy C: Respond and mitigate the impact of hazardous materials release and other community risk incidents	Goal 1, Action Item 39: Maintain emergency hazardous materials response capabilities via certified team and continue to offer training to first responders.
Emergency Services Staff Training	Grow Page 19, Objective 2, Strategy D: Train emergency first responders and special teams.	Goal 2, Action Item 80: Continue to participate in the South Central Task Force activities, including training and planning activities.
Transportation Improvement	Connect Page 6, Objective 4, Strategy A: Identify transportation projects throughout Cumberland County for inclusion on the HATS Regional Transportation Plan and Transportation Improvement Plan.	Goal 1, Action Item 51: Identify and pursue funding for transportation projects through participation in the Harrisburg Area Transportation Study's highway, bridge and railway planning initiatives.
Federal Coordination	Connect Page 10, Objective 1, Strategy B: Encourage regular coordination with federal and state agencies.	Goal 3, Action Item 95: Conduct annual HMP meetings to review implementation progress.

6. Mitigation Strategy

6.1 Update Process Summary

The mitigation strategy for the 2025 Cumberland County HMP serves as a blueprint for reducing or avoiding long-term vulnerabilities to hazards identified in the Risk Assessment (see Chapter 4). Typically, the Mitigation Strategy includes a list of goals and objectives, with mitigation actions that address those goals and objectives, that are then prioritized based on community needs. Table 6.1-1 includes a list of the goals and objectives provided in the 2020 HMP, while Table 6.2-1 provides the 2025 goals and objectives.

The following definitions based on FEMA's *State and Local Mitigation Planning How-To Guide* were used:

- *Goals* are long-term policy statements and global visions that support the mitigation strategy.
- *Objectives* define specific and measurable strategies or implementation steps that must be implemented in order to attain identified goals.
- *Mitigation Actions* are more specific than objectives, and have identified responsible parties, timeframes, and potential funding sources. They are the specific actions to achieve goals and objectives.

There were 3 goals and 21 objectives identified in the 2020 Cumberland County Hazard Mitigation Plan. A list of these goals and objectives is included in Table 6.1-1. The proposed changes in the 2025 HMP were based on responses received from communities to the *Action and Goal Progress Worksheet* and comments received from county officials. Municipal officials were invited to provide feedback on the proposed 2020 goals and objectives via email and phone call. Appendix C includes a summary of responses to the *Action and Goal Progress Worksheet*. The 2025 HMP goals, objectives and action items are all linked in the same table and each hazard is specifically identified on table 6.2-2.

Table 6.1-1: List of 2020 mitigation strategy goals and objectives.

Goal	Objective(s)
Goal 1: Reduce potential injury, death, and damage to community assets due to natural and human hazards threatening Cumberland County.	**Objective 1A:** Develop advanced preparations for potential civil disturbance incidents.
	Objective 1B: Reduce the impacts of drought through capital investments and enhanced planning.
	Objective 1C: Decrease ongoing exposure to dam failure and improve emergency preparedness.
	Objective 1D: Protect property from flooding events through proactive planning, improved land use and capital investment.
	Objective 1E: Design infrastructure to withstand earthquake events.
	Objective 1F: Prevent and limit the impacts of environmental hazards through proactive planning and training.
	Objective 1G: Monitor the decommissioning of TMI and update nuclear incident preparedness accordingly.
	Objective 1H: Eliminate or slow the spread of pandemic diseases through monitoring, training, and active response.

Table 6.1-1: List of 2020 mitigation strategy goals and objectives.	
Goal	**Objective(s)**
	Objective 1I: Avoid sinkholes through early detection and occurrence monitoring.
	Objective 1J: Decrease the number and severity of transportation accidents through long range planning and capital investment in the transportation system.
	Objective 1K: Recognize and/or respond to acts of terrorism.
	Objective 1L: Proactively prepare residents for tornadoes, hurricanes, and other windstorm events.
	Objective 1M: Implement urban fire prevention and suppression activities.
	Objective 1N: Minimize and prevent utility disruption through improved development standards and provider coordination.
	Objective 1O: Decrease susceptibility to wildfire on South and North Mountain.
	Objective 1P: Improve safety during winter storm events through planning activities with municipal and state partners.
Goal 2: Improve hazard awareness and response through communication and coordination with residents, governmental agencies, and other hazard mitigation stakeholders.	**Objective 2A:** Enhance emergency management warning and response capabilities and procedures to better protect the public.
	Objective 2B: Maintain current, relevant data on hazards facing the county.
	Objective 2C: Coordinate communication among municipal officials on HMP issues.
Goal 3: Improve HMP implementation.	**Objective 3A:** Encourage and support implementation of the HMP by municipal partners.
	Objective 3B: Monitor HMP implementation and adjust priorities as needed.

Actions provide more detailed descriptions of specific work tasks to help the County, and its municipalities achieve prescribed goals and objectives. There were 62 actions identified in the 2020 Cumberland County Hazard Mitigation Plan. A list of these actions as well as a review and summary of their progress is included in Table 6.1-2.

Each 2020 mitigation action has been assigned one of the following categories:

- "Completed" – Actions that were completed since the adopted 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 continual basis by the department.

The majority of existing mitigation actions have been carried over into this 2025 HMP as many actions are continuous or have not yet been completed. The status of each action was evaluated with the intent of creating a usable mitigation action plan for 2025 with actions and projects that could be completed over the next five years. Appendix C includes responses provided by stakeholders on the Mitigation Action Progress Form.

Table 6.1-2: List of 2020 Mitigation Action items and Review.						
#	2020 Mitigation Action	Lead Agency/ Department	STATUS			
			Completed	Canceled	Deferred	Ongoing
1.	Evaluate requests to use county facilities for public gatherings and coordinate with law enforcement as needed to secure events.	Cumberland County Department of Public Safety				X
2.	Partner with Lower Allen Township, the PSP, and the Camp Hill Prison to keep emergency response plans current.	Cumberland County Department of Public Safety				X
3.	Support municipal efforts to fund investments in water and stormwater collection and delivery systems.	Cumberland County Planning Department				X
4.	Integrate green infrastructure concepts into municipal zoning and subdivision ordinances.	Cumberland County Planning Department				X
5.	Develop a water supply study in coordination with the Susquehanna River Basin Commission and county municipalities.	Cumberland County Planning Department				X

Table 6.1-2: List of 2020 Mitigation Action items and Review.

#	2020 Mitigation Action	Lead Agency/ Department	STATUS			
			Completed	Canceled	Deferred	Ongoing
6.	Monitor and track new development in inundation areas	Cumberland County Planning Department				X
7.	Continue to participate in EAP meetings with dam owners. Recommend that dam owners update the Dam Failure Emergency Action Plan.	Cumberland County Department of Public Safety				X
8.	Host a countywide workshop to encourage participation in the Community Rating System program to reduce NFIP rates.	Cumberland County Planning Department	X			
9.	Maintain 100% municipal participation in the NFIP.	Cumberland County Planning Department				X
10.	Conduct outreach to municipalities and owners of RLP and SRLP to inform them of buyout options, elevation and mitigation reconstruction strategies.	Cumberland County Planning Department				X

Table 6.1-2: List of 2020 Mitigation Action items and Review.

#	2020 Mitigation Action	Lead Agency/ Department	STATUS			
			Completed	Canceled	Deferred	Ongoing
11.	Assist all 33 municipalities in updating floodplain management regulations to meet or exceed the minimum standards required by the NFIP.	Cumberland County Planning Department	X			X
12.	Monitor and remove debris jams, as applicable, on the Yellow Breeches Creek and Conodoguinet Creek in partnership with municipal and state governments and private property owners.	Cumberland County Planning Department, Municipalities				X
13.	Collect current flood elevation and extent data to support ongoing development of a predictive flood intensity indicator model for the county.	Cumberland County Planning Department, Cumberland County GIS Department	X			X
14.	Collect relevant structure information through the subdivision/land development process and recording processes to assist in determining flooding impacts to structures.	Cumberland County Planning Department, Cumberland County GIS Department				X
15.	Recommend that municipalities exclude or add foundation inspection requirements for mobile homes in a Special Flood Hazard Area.	Cumberland County Planning, Municipalities				X

Table 6.1-2: List of 2020 Mitigation Action items and Review.						
#	2020 Mitigation Action	Lead Agency/ Department	STATUS			
			Completed	Canceled	Deferred	Ongoing
16.	Zion Bridge Project, Widen Bridge over the stream and make 2 lanes in Lower Frankford Township	Lower Frankford Township, Cumberland County Planning Department				X
17.	Opossum Creek Culvert Project, replacement of culvert into a larger opening to handle flooding. Lower Frankford Township	Lower Frankford Township, Cumberland County Planning Department				X
18.	Cloverdale Run Stormwater Drainage Project, replacement of under-sized and deteriorated drainage pipe (110 lf), headwall and inlet. Rich Street and Sharp Street, Newville Borough	Newville Borough, Cumberland County Planning Department			X	
19.	Cloverdale Run Stormwater Drainage Project, installation of new 36” elliptical RCP and headwall, swale cleaning and bank stabilization Broad Street, Newville Borough	Newville Borough, Cumberland County Planning Department			X	
20.	Cloverdale Run Stormwater Drainage Project, demolition and removal of an existing box culvert and new pipe installation Pennsylvania Avenue Box Culvert, Newville Borough	Newville Borough, Cumberland County Planning Department			X	

Table 6.1-2: List of 2020 Mitigation Action items and Review.						
#	2020 Mitigation Action	Lead Agency/ Department	STATUS			
			Completed	Canceled	Deferred	Ongoing
21.	Cloverdale Run Stormwater Drainage, replacement of box culvert and installation of pipe. Parsonage Street Box Culvert, Newville Borough	Newville Borough, Cumberland County Planning Department			X	
22.	Cloverdale Run Stormwater Drainage, improvement of impoundment basin, headwall improvement and safety fencing. Newville Community Park headwall and retention pond, Newville Borough	Newville Borough, Cumberland County Planning Department			X	
23.	Cloverdale Run Stormwater Drainage, box culvert and pipe installation with 3 stormwater inlets. North Corporation Street Box Culvert, Newville Borough	Newville Borough, Cumberland County Planning Department			X	
24.	Cloverdale Run Stormwater Drainage, box culvert replacement, new pipe, debris screen and rip rap. Cove Avenue Box Culvert, Newville Borough	Newville Borough, Cumberland County Planning Department			X	
25.	Flood Inundation Mapping	Cumberland County GIS Department				X

Table 6.1-2: List of 2020 Mitigation Action items and Review.						
#	2020 Mitigation Action	Lead Agency/ Department	STATUS			
			Completed	Canceled	Deferred	Ongoing
26.	Broad Street Drainage Improvements. Installation of stormwater collection, implementation of BMPs.	Mechanicsburg Borough, Cumberland County Planning Department				X
27.	Pine Road Flooding. Property purchase, demolition of house and stormwater control.	South Middleton Township, Cumberland County Planning Department		X		
28.	Sewer Plant Grinder Pump Replacement	Mount Holly Springs Borough, Cumberland County Planning Department				X
29.	Conduct seismic analyses for new or rehabilitated transportation infrastructure in the County.	Cumberland County Department of Public Safety, Municipalities				X
30.	Maintain emergency hazardous materials response capabilities via certified team and continue to offer training to first responders.	Cumberland County Department of Public Safety				X

Table 6.1-2: List of 2020 Mitigation Action items and Review.						
#	2020 Mitigation Action	Lead Agency/ Department	STATUS			
			Completed	Canceled	Deferred	Ongoing
31.	Maintain and implement the Cumberland County Hazardous Materials Commodity Flow Study.	Cumberland County Department of Public Safety				X
32.	Encourage municipalities to prohibit SARA facilities in wellhead or source water protection areas.	Cumberland County Department of Public Safety, Cumberland County Planning Department				X
33.	Meet with TMI officials on a quarterly basis to receive decommissioning updates.	Cumberland County Department of Public Safety				X
34.	Continue to Participate in radiological emergency response training and exercises.	Cumberland County Department of Public Safety				X
35.	Continue to collaborate with Pa. Dept. of Health for mass distribution of medical countermeasures preparedness efforts.	Cumberland County Department of Public Safety				X

Table 6.1-2: List of 2020 Mitigation Action items and Review.						
#	2020 Mitigation Action	Lead Agency/ Department	STATUS			
			Completed	Canceled	Deferred	Ongoing
36.	Establish a core County team to continue participation in pandemic (including the Coronavirus in 2020) exercises, education, preparedness, and response.	Cumberland County Department of Public Safety				X
37.	Monitor mosquito populations and conduct spraying programs to reduce vulnerability to vector borne diseases.	Cumberland County Planning Department				X
38.	Inventory sinkhole events as part of HMP GIS system.	Cumberland County GIS Department				X
39.	Integrate sinkhole detection requirements into municipal subdivision and development requirements	Cumberland County Planning Department				X
40.	Identify and pursue funding for transportation projects through participation in the Harrisburg Area Transportation Study's highway, bridge, and railway planning initiatives.	Cumberland County Planning Department				X

Table 6.1-2: List of 2020 Mitigation Action items and Review.						
#	2020 Mitigation Action	Lead Agency/ Department	STATUS			
			Completed	Canceled	Deferred	Ongoing
41.	Implement the Cumberland County Bridge Capital Improvement Plan.	Cumberland County Planning Department	X			X
42.	Evaluate using the county's $5 Local Use Fee to support local and regional transportation projects.	Cumberland County Planning Department	X			X
43.	Continue to maintain relationships with local, state and federal partners to sustain awareness and/or detection of threat capabilities.	Cumberland County Department of Public Safety				X
44.	Maintain StormReady Certification via NWS. Continue to support and encourage municipal participation of the program.	Cumberland County Department of Public Safety				X
45.	Continue to support the ARC efforts on installation of residential detectors; Promote residents usage of fire extinguishers.	Cumberland County Department of Public Safety				X

Table 6.1-2: List of 2020 Mitigation Action items and Review.						
#	**2020 Mitigation Action**	**Lead Agency/ Department**	**STATUS**			
			Completed	**Canceled**	**Deferred**	**Ongoing**
46.	Encourage municipal participation in the NFPA Firewise program.	Cumberland County Department of Public Safety				X
47.	Use municipal subdivision and land development ordinances to protect above ground infrastructure from trees through setbacks and easements.	Cumberland County Planning Department	X			X
48.	Require underground utilities through municipal subdivision and land development regulations.	Cumberland County Planning Department				X
49.	Coordinate with utility providers to resolve utility issues during outage events.	Cumberland County Department of Public Safety, Cumberland County Planning Department				X
50.	Promote the NFPA's Firewise Program with appropriate municipalities.	Cumberland County Department of Public Safety				X

Table 6.1-2: List of 2020 Mitigation Action items and Review.						
#	2020 Mitigation Action	Lead Agency/ Department	STATUS			
			Completed	Canceled	Deferred	Ongoing
51.	Continue to Participate in statewide severe storm exercises with PEMA as appropriate.	Cumberland County Department of Public Safety				X
52.	Continue to participate in PennDOT Winter Preparedness Stakeholder meetings and maintain partnership.	Cumberland County Department of Public Safety				X
53.	Continue to work with ARC to identify shelters for short-term evacuation(s).	Cumberland County Department of Public Safety				X
54.	Continue to Participate in the South Central Task Force activities, including training and planning activities.	Cumberland County Department of Public Safety				X
55.	Continue implementation of an early warning or alert systems that utilize cloud-based (IPAWS, Wireless Emergency Alerts) communications technologies to distribute pertinent information to the public during emergencies.	Cumberland County Department of Public Safety				X

Table 6.1-2: List of 2020 Mitigation Action items and Review.						
#	**2020 Mitigation Action**	**Lead Agency/ Department**	**STATUS**			
			Completed	**Canceled**	**Deferred**	**Ongoing**
56.	Maintain the Cumberland County Hazard Mitigation GIS story map online.	Cumberland County GIS Department				X
57.	Monitor the impacts of climate change on the frequency and severity of hazard impacts in the county.	Cumberland County Planning Department, Cumberland County Department of Public Safety				X
58.	Continue to coordinate quarterly meetings/training with the local emergency management and related officials.	Cumberland County Department of Public Safety				X
59.	Provide HMP related agenda items for Municipal Advisory Board meetings	Cumberland County Department of Public Safety				X
60.	Provide technical assistance/training to municipal EMCs/FPMs who have no or limited experience with floodplains.	Cumberland County Planning Department				X

Table 6.1-2: List of 2020 Mitigation Action items and Review.						
#	**2020 Mitigation Action**	**Lead Agency/ Department**	**STATUS**			
			Completed	**Canceled**	**Deferred**	**Ongoing**
61.	Assist municipalities to identify and submit grant applications for federal, state, and county programs that support HMP goals, objectives, and actions.	Cumberland County Planning Department				X
62.	Conduct annual HMP meetings to review implementation progress.	Cumberland County Planning Department, Cumberland County Department of Public Safety, Cumberland County GIS Department				X

6.2 Mitigation Goals and Objectives

The 2025 actions are measurable, achievable and focus on activities that will likely see implementation. Table 6.2-1 shows the goals and objectives established for the 2025 HMP. A new goal was added for HHPDs to reflect the changes in priorities since the 2020 HMP. Table 6.2-2 summarizes the goals, objectives, and mitigation action items for the 2025 HMP. At least one action item was established for each hazard in Cumberland County. More than one action is identified for several hazards. Each mitigation action is intended to address one or more of the goals and objectives. Each community has at least one mitigation action in the 2025 Mitigation Strategy. Mitigation projects were also added to the list of action items and included in Appendix C. Appendix C includes a summary of responses to the *Action and Goal Progress Worksheet*.

Table 6.2-1: List of 2025 mitigation strategy goals and objectives.

Goal	Objective(s)
Goal 1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures	**Objective 1A:** Develop advanced preparations for potential civil disturbance incidents.
	Objective 1B: Reduce the impacts of drought through capital investments and enhanced planning.
	Objective 1C: Protect property from flooding events through proactive planning, improved land use and capital investment.
	Objective 1D: Design infrastructure to withstand earthquake events.
	Objective 1E: Prevent and limit the impacts of environmental hazards through proactive planning and training.
	Objective 1F: Monitor the decommissioning of TMI and update nuclear incident preparedness accordingly.
	Objective 1G: Eliminate or slow the spread of pandemic diseases through monitoring, training, and active response.
	Objective 1H: Avoid sinkholes through early detection and occurrence monitoring.
	Objective 1I: Decrease the number and severity of transportation accidents through long range planning and capital investment in the transportation system.
	Objective 1J: Recognize and/or respond to acts of terrorism.
	Objective 1K: Proactively prepare residents for tornadoes, hurricanes, and other windstorm events.
	Objective 1L: Implement urban fire prevention and suppression activities.
	Objective 1M: Minimize and prevent utility disruption through improved development standards and provider coordination.
	Objective 1N: Decrease susceptibility to wildfire on South and North Mountain.
	Objective 1O: Improve safety during winter storm events through planning activities with municipal and state partners.
	Objective 1P: Protect Public Health and safety to reduce heat and cold related illnesses and deaths**.**

Table 6.2-1: List of 2025 mitigation strategy goals and objectives.	
Goal	**Objective(s)**
Goal 2: Improve all hazards awareness and response through communication and coordination with residents, governmental agencies, and other hazard mitigation stakeholders.	**Objective 2A:** Enhance emergency management warning and response capabilities and procedures to better protect the public for all hazards.
	Objective 2B: Maintain current and future data on all hazards facing the county.
	Objective 2C: Coordinate communication among municipal officials on HMP issues.
Goal 3: Improve the implementation of the all hazards mitigation plan.	**Objective 3A:** Encourage and support implementation of the HMP by municipal partners.
	Objective 3B: Monitor HMP implementation and adjust priorities as needed.
Goal 4: Reduce the possibility of damage and loss to existing community assets including structures, critical facilities, and infrastructure due to High Hazard Potential Dams (HHPD).	**Objective 4A:** Promote partnerships between the municipalities, the County, PA DEP, and the U.S. Army Corps of Engineers to develop a comprehensive approach to reducing the possibility of losses due to dam failures.
	Objective 4B: Encourage and facilitate the development or revision of local comprehensive plans and land use ordinances to limit development in high hazard and inundation areas
	Objective 4C: Decrease ongoing exposure to dam failure and improve emergency preparedness.

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.

Objective	Action Items	Community	Category	Lead Agency /Department	Cost/Funding Source	Timeframe
Develop advanced preparations for potential civil disturbance incidents.	1. Evaluate requests to use county facilities for public gatherings and coordinate with law enforcement as needed to secure events.	Cumberland County, All municipalities	• Structure and Infrastructure • Education and Awareness	Cumberland County Department of Public Safety	County staff time.	1-2 years
	2. Partner with Lower Allen Township, the PSP, and the Camp Hill Prison to keep emergency response plans current.	Cumberland County, Lower Allen, Upper Allen, Mechanicsburg, Shiremanstown, Hampden, Camp Hill, Lemoyne, York County	• Local Plans and Regulations • Education and Awareness	Cumberland County Department of Public Safety	County staff time.	1-2 Years
Reduce the impacts of drought through capital investments and enhanced planning.	3. Support municipal efforts to fund investments in water and stormwater collection and delivery systems.	Cumberland County, All municipalities	• Natural Systems Protection • Education and Awareness	Cumberland County Planning Department	County staff time.	Ongoing
	4. Integrate green infrastructure concepts into municipal zoning and subdivision ordinances.	Cumberland County, All municipalities	• Local Plans and Regulations • Structure and Infrastructure • Natural Systems Protection	Cumberland County Planning Department	TBD, depending upon extent of update.	Ongoing

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.						
Objective	**Action Items**	**Community**	**Category**	**Lead Agency /Department**	**Cost/Funding Source**	**Timeframe**
			• Education and Awareness			
	5. Develop a water supply study in coordination with the Susquehanna River Basin Commission and county municipalities.	Cumberland County, All municipalities	• Local Plans and Regulations • Structure and Infrastructure • Education and Awareness	Cumberland County Planning Department	$50K-$100K	5-10 years
Protect property from flooding events through proactive planning, improved land use and capital investment.	6. Host a countywide workshop to encourage participation in the Community Rating System program to reduce NFIP rates.	Cumberland County, All municipalities	• Education and Awareness	Cumberland County Planning Department	County staff time.	Ongoing
	7. Maintain 100% municipal participation in the NFIP.	Cumberland County, All municipalities	• Local Plans and Regulations • Education and Awareness	Cumberland County Planning Department	TBD, dependent upon level of municipal compliance work.	Ongoing
	8. Conduct outreach to municipalities and owners of all properties within the SFHA, including RLP and SRLP, to inform them of buyout options, elevation and mitigation reconstruction strategies.	Cumberland County, Camp Hill, Carlisle, Cooke, Dickinson, East Pennsboro, Hampden, Hopewell, Lemoyne, Lower Allen, Lower	• Education and Awareness	Cumberland County Planning Department	County staff time.	Ongoing

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.						
Objective	**Action Items**	**Community**	**Category**	**Lead Agency /Department**	**Cost/Funding Source**	**Timeframe**
		Frankford, Lower Mifflin, Mechanicsburg, Middlesex, Monroe, Mount Holly Springs, New Cumberland, Newburg, Newville, North Middleton, North Newton, Penn, Shippensburg Township, Shippensburg Borough, Shiremanstown, Silver Spring, South Middleton, South Newton, Southampton, Upper Allen, Upper Frankford, Upper Mifflin, West Pennsboro, and Wormleysburg				
	9. Assist all 33 municipalities in updating floodplain management regulations to meet or exceed the minimum	Cumberland County, All municipalities	• Local Plans and Regulations	Cumberland County Planning Department	$5K-$15 per municipality	Ongoing

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.						
Objective	**Action Items**	**Community**	**Category**	**Lead Agency /Department**	**Cost/Funding Source**	**Timeframe**
	standards required by the NFIP.		• Education and Awareness		depending upon level of update.	
	10. Monitor and remove debris jams, as applicable, on the Yellow Breeches Creek and Conodoguinet Creek in partnership with municipal and state governments and private property owners.	Cumberland County, All municipalities	• Natural Systems Protection	Cumberland County Planning Department, Municipalities	TBD, depending upon size of jam.	Ongoing
	11. Collect current flood elevation and extent data to support ongoing development of a predictive flood intensity indicator model for the county.	Cumberland County, Camp Hill, Carlisle, Cooke, Dickinson, East Pennsboro, Hampden, Hopewell, Lemoyne, Lower Allen, Lower Frankford, Lower Mifflin, Mechanicsburg, Middlesex, Monroe, Mount Holly Springs, New Cumberland, Newburg, Newville, North Middleton, North Newton, Penn, Shippensburg Township,	• Education and Awareness	Cumberland County Planning Department, Cumberland County GIS Department	County staff time.	10-20 years

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.						
Objective	**Action Items**	**Community**	**Category**	**Lead Agency /Department**	**Cost/Funding Source**	**Timeframe**
		Shippensburg Borough, Shiremanstown, Silver Spring, South Middleton, South Newton, Southampton, Upper Allen, Upper Frankford, Upper Mifflin, West Pennsboro, and Wormleysburg				
	12. Collect relevant structure information through the subdivision/land development process and recording processes to assist in determining flooding impacts to structures.	Cumberland County, Camp Hill, Carlisle, Cooke, Dickinson, East Pennsboro, Hampden, Hopewell, Lemoyne, Lower Allen, Lower Frankford, Lower Mifflin, Mechanicsburg, Middlesex, Monroe, Mount Holly Springs, New Cumberland, Newburg, Newville, North Middleton,	• Local Plans and Regulations • Structure and Infrastructure • Education and Awareness	Cumberland County Planning Department, Cumberland County GIS Department	County staff time.	Ongoing

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.						
Objective	**Action Items**	**Community**	**Category**	**Lead Agency /Department**	**Cost/Funding Source**	**Timeframe**
		North Newton, Penn, Shippensburg Township, Shippensburg Borough, Shiremanstown, Silver Spring, South Middleton, South Newton, Southampton, Upper Allen, Upper Frankford, Upper Mifflin, West Pennsboro, and Wormleysburg				
	13. Recommend that municipalities exclude or add foundation inspection requirements for mobile homes in a Special Flood Hazard Area.	Cumberland County	• Local Plans and Regulations • Education and Awareness	Cumberland County Planning, Municipalities	County Staff Time	Ongoing
	14. Zion Bridge Project, Widen Bridge over the stream and make 2 lanes in Lower Frankford Township	Cumberland County, Lower Frankford	• Structure and Infrastructure	Lower Frankford Township, Cumberland County Planning Department	$387,715.00	10-20 years

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.

Objective	Action Items	Community	Category	Lead Agency /Department	Cost/Funding Source	Timeframe
	15. Opossum Creek Culvert Project, replacement of culvert into a larger opening to handle flooding. Lower Frankford Township	Cumberland County, Lower Frankford	• Structure and Infrastructure	Lower Frankford Township, Cumberland County Planning Department	$210,939.00	10-20 years
	16. Cloverdale Run Stormwater Drainage Project, replacement of under-sized and deteriorated drainage pipe (110 lf), headwall and inlet. Rich Street and Sharp Street, Newville Borough	Cumberland County, Newville	• Structure and Infrastructure	Newville Borough, Cumberland County Planning Department	$65,775.00	10-20 years
	17. Cloverdale Run Stormwater Drainage Project, installation of new 36” elliptical RCP and headwall, swale cleaning and bank stabilization Broad Street, Newville Borough	Cumberland County, Newville	• Structure and Infrastructure	Newville Borough, Cumberland County Planning Department	$57,670.00	10-20 years
	18. Cloverdale Run Stormwater Drainage Project, demolition and removal of an existing box culvert and new pipe installation Pennsylvania Avenue Box Culvert, Newville Borough	Cumberland County, Newville	• Structure and Infrastructure	Newville Borough, Cumberland County Planning Department	$82,900.00	10-20 years
	19. Cloverdale Run Stormwater Drainage, replacement of box culvert and installation of pipe. Parsonage Street Box Culvert, Newville Borough	Cumberland County, Newville	• Structure and Infrastructure	Newville Borough, Cumberland County Planning Department	$38,900.00	10-20 years

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.						
Objective	**Action Items**	**Community**	**Category**	**Lead Agency /Department**	**Cost/Funding Source**	**Timeframe**
	20. Cloverdale Run Stormwater Drainage, improvement of impoundment basin, headwall improvement and safety fencing. Newville Community Park headwall and retention pond, Newville Borough	Cumberland County, Newville	• Structure and Infrastructure	Newville Borough, Cumberland County Planning Department	$60,000.00	10-20 years
	21. Cloverdale Run Stormwater Drainage, box culvert and pipe installation with 3 stormwater inlets. North Corporation Street Box Culvert, Newville Borough	Cumberland County, Newville	• Structure and Infrastructure	Newville Borough, Cumberland County Planning Department	$83,100.00	10-20 years
	22. Cloverdale Run Stormwater Drainage, box culvert replacement, new pipe, debris screen and rip rap. Cove Avenue Box Culvert, Newville Borough	Cumberland County, Newville	• Structure and Infrastructure	Newville Borough, Cumberland County Planning Department	$975,000.00	10-20 years
	23. Flood Inundation Mapping	Cumberland County	• Education and Awareness	Cumberland County GIS Department	TBD	Ongoing
	24. Broad Street Drainage Improvements. Installation of stormwater collection, implementation of BMPs.	Cumberland County, Mechanicsburg	• Structure and Infrastructure	Mechanicsburg Borough, Cumberland County Planning Department	$2,278,410.02	10-20 years

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.						
Objective	**Action Items**	**Community**	**Category**	**Lead Agency /Department**	**Cost/Funding Source**	**Timeframe**
	25. Sewer Plant Grinder Pump Replacement	Cumberland County, Mount Holly Springs Borough	• Structure and Infrastructure	Mount Holly Springs Borough, Cumberland County Planning Department	$90,000	10-20 years
	26. Support and educate municipalities about the NFIP Compliance Audit Program.	Cumberland County, All municipalities	• Education and Awareness	Cumberland County Department of Public Safety, Cumberland County Planning Department	N/A	3-5 Years
	27. Storm Sewer Infrastructure and Roadway Replacement on Susquehanna Avenue.	East Pennsboro Township	• Structure and Infrastructure	East Pennsboro Township Stormwater Authority and Public Works	$1.1 Million - Liquid fuels, Stormwater budget expenditure, grants	10-20 years
	28. Railroad x Northside Storm Sewer System Repair and Upgrades.	Mechanicsburg Borough	• Structure and Infrastructure	Mechanicsburg Borough	$800,000 - FEMA and PEMA funding, Chesapeake Bay funding	10-20 years
	29. Earn Storm Ready Certification for Mechanicsburg Borough.	Mechanicsburg Borough	• Education and Awareness	Emergency Management Coordinator/Public Safety Officer	$100,000	10-20 years

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.						
Objective	**Action Items**	**Community**	**Category**	**Lead Agency /Department**	**Cost/Funding Source**	**Timeframe**
	30. Harvard Run Stormwater Management Project.	Camp Hill Borough	• Structure and Infrastructure	Camp Hill Stormwater Authority	$690,400 – Stormwater Authority fee	10-20 years
	31. Digitize High Hazard Dam Inundation Areas.	Cumberland County	• Education and Awareness	Cumberland County GIS, Cumberland County Planning Department	TBD – HMGP	5-10 years
	32. Stormwater infrastructure analysis and upgrades on Lower Allen Drive.	Lower Allen Township	• Structure and Infrastructure	PennDOT/Lower Allen Township	No cost estimates available currently. – Municipal capital fund, grant funding	10-20 years
	33. Stormwater infrastructure analysis and upgrades on Seneca, Saint Johns, and Oneida Road.	Lower Allen Township	• Structure and Infrastructure	PennDOT/Lower Allen Township	No cost estimates currently – Municipal capital fund, grant funding	10-20 years
	34. Mobile Home Flood Mitigation - Construct floodproofing measure, elevate existing mobile homes and/or property buy out in Monroe Township.	Monroe Township	• Structure and Infrastructure	Monroe Township	$3,000,000 – Hazard Mitigation funding	10-20 years
	35. Hempt Property Floodplain Restoration.	Silver Spring Township	• Structure and Infrastructure • Natural Systems Protection	Silver Spring Township	$2.5 million - FEMA, grants	5-15 years

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.

Objective	Action Items	Community	Category	Lead Agency /Department	Cost/Funding Source	Timeframe
	36. Ladnor Lane Bridge Replacement.	South Middleton Township	• Structure and Infrastructure	South Middleton Township	$945,000 - County funding	10-20 years
	37. Ground Mounted Solar Array.	Cumberland County	• Structure and Infrastructure	Cumberland County	$8-10 million	10-20 years
	38. Lower Allen Shopping Center Flooding Mitigation	Lower Allen Township	• Structure and Infrastructure	Lower Allen Township	$50,000 to $75,000 for design, bidding, contract administration, construction oversight. $250,000-$350,000 for implementation. Funding is to be determined - Federal grants, State funding, and Local contributions.	5-15 years
	39. 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.	Cumberland County, All municipalities	• Education and Awareness	Cumberland County Planning Department and Cumberland County Department of Public Safety	To be determined.	3-5 years
	40. Provide wet and dry floodproof technique training on non-residential structures	Cumberland County, All municipalities	• Education and Awareness	Cumberland County Planning	To be determined.	Ongoing

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.						
Objective	**Action Items**	**Community**	**Category**	**Lead Agency /Department**	**Cost/Funding Source**	**Timeframe**
	for municipalities based on FEMA's Technical Bulletin 3 (Non-Residential Floodproofing Requirements and Certifications), Technical Bulletin 7 (Wet Floodproofing Requirements and Limitations), and Technical Bulletin 11 (Crawlspace Construction for Buildings Located in Special Flood Hazard Areas). Encourage the implementation of wet and dry floodproofing techniques on non-residential structures throughout municipalities.			Department and Cumberland County Department of Public Safety		
Design infrastructure to withstand earthquake events.	41. Conduct seismic analyses for new or rehabilitated transportation infrastructure in the County.	Cumberland County, All municipalities	• Structure and Infrastructure • Education and Awareness	Cumberland County Department of Public Safety, Municipalities	$15K - $20K depending upon bridge.	10-20 years
Prevent and limit the impacts of environmental hazards through	42. Maintain emergency hazardous materials response capabilities via certified team and continue to offer training to first responders.	Cumberland County, All municipalities	• Education and Awareness	Cumberland County Department of Public Safety	County staff time.	Yearly

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.

Objective	Action Items	Community	Category	Lead Agency /Department	Cost/Funding Source	Timeframe
proactive planning and training.	43. Maintain and implement the Cumberland County Hazardous Materials Commodity Flow Study.	Cumberland County, All municipalities	• Local Plans and Regulations • Education and Awareness	Cumberland County Department of Public Safety	$10K -$15K per update.	1 year
	44. Encourage municipalities to prohibit SARA facilities in wellhead or source water protection areas.	Cumberland County, All municipalities	• Local Plans and Regulations • Structure and Infrastructure • Natural Systems Protection • Education and Awareness	Cumberland County Department of Public Safety, Cumberland County Planning Department	TBD, depending upon level of update required in municipal ordinances.	2-3 years
	45. Fuel Spill Prevention - Replace old below ground tanks with new above ground tanks in Lower Allen Township.	Lower Allen Township	• Structure and Infrastructure	Lower Allen Township Authority	$250,000 - Authority Capital Funds, Grants	5-15 years
Monitor the decommissioning of TMI and update <u>nuclear incident</u> preparedness accordingly.	46. Meet with TMI officials on a quarterly basis to receive decommissioning updates.	Cumberland County, all municipalities	• Structure and Infrastructure • Education and Awareness	Cumberland County Department of Public Safety	County staff time.	Quarterly
	47. Continue to Participate in radiological emergency	Cumberland County, all municipalities	• Education and Awareness	Cumberland County	County staff time.	Yearly

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.						
Objective	**Action Items**	**Community**	**Category**	**Lead Agency /Department**	**Cost/Funding Source**	**Timeframe**
	response training and exercises.			Department of Public Safety		
Eliminate or slow the spread of pandemic diseases through monitoring, training, and active response.	48. Continue to collaborate with Pa. Dept. of Health for mass distribution of medical countermeasures preparedness efforts.	Cumberland County, all municipalities	• Education and Awareness	Cumberland County Department of Public Safety	County staff time.	Yearly
	49. Establish a core County team to continue participation in pandemic (including the Coronavirus in 2020) exercises, education, preparedness, and response.	Cumberland County, all municipalities	• Education and Awareness	Cumberland County Department of Public Safety	County staff time.	Yearly
	50. Monitor mosquito populations and conduct spraying programs to reduce vulnerability to vector borne diseases.	Cumberland County, all municipalities	• Education and Awareness	Cumberland County Planning Department	$200K per year.	Ongoing
Avoid sinkholes through early detection and occurrence monitoring.	51. Inventory sinkhole events as part of HMP GIS system.	Cumberland County, All municipalities	• Natural Systems Protection • Education and Awareness	Cumberland County GIS Department	County staff time.	5-15 years
	52. Integrate sinkhole detection requirements into municipal subdivision and development requirements	Cumberland County, Camp Hill, Carlisle, Cooke, Dickinson, East Pennsboro, Hampden, Hopewell, Lemoyne, Lower	• Local Plans and Regulations • Education and Awareness	Cumberland County Planning Department	TBD, depending upon level of ordinance update required.	5-20 years

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.						
Objective	**Action Items**	**Community**	**Category**	**Lead Agency /Department**	**Cost/Funding Source**	**Timeframe**
		Allen, Lower Frankford, Lower Mifflin, Mechanicsburg, Middlesex, Monroe, Mount Holly Springs, New Cumberland, North Middleton, North Newton, Penn, Shippensburg Township, Shippensburg Borough, Shiremanstown, Silver Spring, South Middleton, South Newton, Southampton, Upper Allen, Upper Frankford, Upper Mifflin, and West Pennsboro				
	53. Tory Circle Storm Sewer Lining.	East Pennsboro Township	• Structure and Infrastructure	East Pennsboro Township Stormwater Authority and Public Works	$2.2 Million - Liquid fuels, Stormwater budget expenditure, grants	10-20 years

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.

Objective	Action Items	Community	Category	Lead Agency /Department	Cost/Funding Source	Timeframe
Decrease the number and severity of transportation accidents through long range planning and capital investment in the transportation system.	54. Identify and pursue funding for transportation projects through participation in the Harrisburg Area Transportation Study's highway, bridge, and railway planning initiatives.	Cumberland County, All municipalities	• Structure and Infrastructure • Education and Outreach	Cumberland County Planning Department	County staff time, cost of transportation improvements variable.	10-20 years
	55. Implement the Cumberland County Bridge Capital Improvement Plan.	Cumberland County, All municipalities	• Structure and Infrastructure • Local Plans and Regulations	Cumberland County Planning Department	$40M total.	Ongoing
	56. Evaluate using the county's $5 Local Use Fee to support local and regional transportation projects.	Cumberland County, All municipalities	• Structure and Infrastructure • Education and Outreach	Cumberland County Planning Department	$1.2M per year.	Ongoing
	57. Conduct Active Transportation Network Development in Mechanicsburg Borough.	Mechanicsburg Borough	• Structure and Infrastructure	Luke Arnold / Layne Thompson	$2,000,000 (+)	10-20 years
	58. Provide Pedestrian Sidewalks and Safety Crossing Signal Alerting Devices from the Shippensburg Borough line to Conestoga Drive in Shippensburg Township.	Shippensburg Township	• Structure and Infrastructure	Shippensburg Township	$1,000,000 - Capital Fund with Grant Assistance	5-15 years

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.

Objective	Action Items	Community	Category	Lead Agency /Department	Cost/Funding Source	Timeframe
	59. To put a bypass around the Borough of Shippensburg and to put a second entrance to the Intermediate School which sits in Shippensburg Township.	Shippensburg Township, Southampton Township, Shippensburg Borough	• Structure and Infrastructure	Shippensburg Township, Southampton Township, Shippensburg Borough	Phase 1= $4.200,000 Phase 2 = $1,782,537 Phase 3 = $3,900,000 estimate Possible grant funding and general funds.	5-15 years
	60. Provide Pedestrian Safety Crossing Signal Alerting Devices at three critical intersections within Shippensburg Borough.	Shippensburg Borough	• Structure and Infrastructure	Shippensburg Borough	$90,000 - Capital Fund with Grant Assistance	5-15 years
Recognize and/or respond to acts of terrorism.	61. Continue to maintain relationships with local, state and federal partners to sustain awareness and/or detection of threat capabilities.	Cumberland County, All municipalities	• Education and Awareness	Cumberland County Department of Public Safety	County staff time.	Quarterly
Proactively prepare residents for tornadoes, hurricanes, and other windstorm events.	62. Maintain StormReady Certification via NWS. Continue to support and encourage municipal participation of the program.	Cumberland County, All municipalities	• Education and Awareness	Cumberland County Department of Public Safety	TBD, depending upon the municipality and work necessary to achieve StormReady status.	Every 4 years
Implement urban fire prevention and	63. Continue to support the ARC efforts on installation of residential detectors;	Cumberland County, All municipalities	• Local Plans and Regulations	Cumberland County	County staff time, under $20 per detector/extinguisher.	Depends on ARC budget

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.						
Objective	**Action Items**	**Community**	**Category**	**Lead Agency /Department**	**Cost/Funding Source**	**Timeframe**
suppression activities.	Promote residents usage of fire extinguishers.		• Education and Awareness	Department of Public Safety		
	64. Encourage municipal participation in the NFPA Firewise program.	Cumberland County, All municipalities	• Education and Awareness	Cumberland County Department of Public Safety	TBD, depending upon the municipality and work necessary to achieve Firewise status.	2-3 years
Minimize and prevent utility disruption through improved development standards and provider coordination.	65. Use municipal subdivision and land development ordinances to protect above ground infrastructure from trees through setbacks and easements.	Cumberland County, All municipalities	• Local Plans and Regulations • Structure and Infrastructure	Cumberland County Planning Department	TBD, depending upon level of update required.	Ongoing
	66. Require underground utilities through municipal subdivision and land development regulations.	Cumberland County, All municipalities	• Local Plans and Regulations • Structure and Infrastructure	Cumberland County Planning Department	TBD, depending upon level of update required.	Ongoing
	67. Coordinate with utility providers to resolve utility issues during outage events.	Cumberland County, All municipalities	• Structure and Infrastructure	Cumberland County Department of Public Safety, Cumberland County Planning Department	County staff time.	Yearly

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.

Objective	Action Items	Community	Category	Lead Agency /Department	Cost/Funding Source	Timeframe
	68. Install backup power generator in Public Works Emergency facility in East Pennsboro Township.	East Pennsboro Township	• Structure and Infrastructure	East Pennsboro Township	Cost is dependent upon the use of the building and critical/essential functions present. Funding provided by General Fund / Capital Improvement Program / Grants	5-20 years
	69. Install backup generator for traffic signals in Shippensburg Township.	Shippensburg Township	• Structure and Infrastructure	Shippensburg Township	$60,000 (12 x $5,000) - Capital Fund with Grant Assistance	10-20 years
	70. Supply power to municipal buildings in Southampton Township.	Southampton Township	• Structure and Infrastructure	Southampton Township	Cost is dependent upon the use of the building and the critical essential functions present – Capital funds	5-20 years
	71. Install an emergency backup power generator in West Pennsboro Township.	West Pennsboro Township	• Structure and Infrastructure	West Pennsboro Township	$140,000.00	5-20 years
	72. Identify areas of stormwater inflow and infiltration into the wastewater system and conduct remediation	Wormleysburg Borough	• Structure and Infrastructure	Wormleysburg Borough	No cost estimate available. - Grant Funding	5-20 years

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.						
Objective	**Action Items**	**Community**	**Category**	**Lead Agency /Department**	**Cost/Funding Source**	**Timeframe**
	measures for Wastewater Pump Station #1 in Wormleysburg Borough.					
	73. Sewer Capital Improvements – Security Upgrades for Mechanicsburg Borough.	Mechanicsburg Borough	• Structure and Infrastructure	Curtis Huey, Sewer Plant Superintendent	$125,000	10-20 years
	74. Provide funding for a backup generator for Public Works facility in Shippensburg Borough.	Shippensburg Borough	• Structure and Infrastructure	Shippensburg Borough	$50,000 - Shippensburg Borough and Water Authority, Grant Opportunities	10-20 years
	75. Provide funding for a backup generator for Veterans Stadium in Shippensburg Borough.	Shippensburg Borough	• Structure and Infrastructure	Shippensburg Borough	No cost estimate available. - Capital Fund, Shippensburg Community Park Recreation Authority, potential grants.	10-20 years
Decrease susceptibility to wildfire on South and North Mountain.	76. Promote the NFPA's Firewise Program with appropriate municipalities.	Cumberland County and local municipalities considered at high risk from wildfire hazards including Southampton, South Newton, Cooke,	• Natural Systems Protection • Education and Awareness	Cumberland County Department of Public Safety	County staff time.	Yearly

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.						
Objective	**Action Items**	**Community**	**Category**	**Lead Agency /Department**	**Cost/Funding Source**	**Timeframe**
		Dickinson, South Middleton, Monroe, Penn, Upper Mifflin, Hopewell, Lower Mifflin, Lower Frankford, North Middleton, Middlesex, Silver Spring, Hampden, East Pennsboro and Dickinson.				
Improve safety during winter storm events through planning activities with municipal and state partners.	77. Continue to Participate in statewide severe storm exercises with PEMA as appropriate.	Cumberland County, All municipalities	• Education and Awareness	Cumberland County Department of Public Safety	County staff time.	2 times per Year
	78. Continue to participate in PennDOT Winter Preparedness Stakeholder meetings and maintain partnership.	Cumberland County, All municipalities	• Education and Awareness	Cumberland County Department of Public Safety	County staff time.	Yearly
	79. Creek Road Stormwater Management Project	Camp Hill Borough	• Structure and Infrastructure	Camp Hill Stormwater Authority	$227,000	10-20 years
Protect Public Health and safety to reduce heat and cold related	80. Utilize a variety of strategies to reduce urban heating including (1) Tree canopy development, (2) solar parking arrays, (3) returning unused paved areas back to	Mechanicsburg Borough	• Structure and Infrastructure	Mechanicsburg Borough	$750,000 – DCNR Grants, IRA Funding	Ongoing

Table 6.2-2: Goal #1: Reduce potential injury, death, and damage to community assets due to the following natural and human hazards threatening Cumberland County; civil disturbance, drought, flooding, earthquakes, environmental hazards or hazardous materials release, nuclear incidents, pandemics, sinkholes, transportation accidents, terrorism, tornadoes, hurricanes, and windstorms, utility disruption, wildfires, winter storms, and extreme temperatures.

Objective	Action Items	Community	Category	Lead Agency /Department	Cost/Funding Source	Timeframe
illnesses and deaths.	grass in Mechanicsburg Borough.					
	81. Encourage municipalities to establish or expand cooling and warming centers for residents	Cumberland County, All municipalities	• Structure and Infrastructure	Cumberland County Department of Public Safety	No cost estimate available.	Yearly

Table 6.2-2: Goal 2: Improve all hazard awareness and response through communication and coordination with residents, including populations at risk (PAR), governmental agencies, and other hazard mitigation stakeholders.

Objective	Action Items	Community	Category	Lead Agency /Department	Cost/Funding Source	Timeframe
Enhance emergency management warning and response capabilities and procedures to better protect the public for all hazards.	82. Continue to work with ARC to identify shelters for short-term evacuation(s).	Cumberland County, All municipalities	• Education and Awareness	Cumberland County Department of Public Safety	County staff time.	Yearly
	83. Continue to Participate in the South Central Task Force activities, including training and planning activities.	Cumberland County, All municipalities	• Education and Awareness	Cumberland County Department of Public Safety	County staff time.	Monthly
	84. Continue implementation of an early warning or alert systems that utilize cloud-based (IPAWS, Wireless Emergency Alerts) communications technologies to distribute pertinent information to the public during emergencies.	Cumberland County, All municipalities	• Education and Awareness • Structure and Infrastructure	Cumberland County Department of Public Safety	$50K	Complete

Table 6.2-2: Goal 2: Improve all hazard awareness and response through communication and coordination with residents, including populations at risk (PAR), governmental agencies, and other hazard mitigation stakeholders.						
Objective	**Action Items**	**Community**	**Category**	**Lead Agency /Department**	**Cost/Funding Source**	**Timeframe**
	85. Purchase Type I – Type II Folding Barricades for Southampton Township.	Southampton Township	• Structure and Infrastructure	Southampton Township	$5,000 – Capital funds	5-15 years
	86. Purchase Message Boards for Special Events and Hazard Notification for Shippensburg Borough.	Shippensburg Borough	• Education and Awareness	Shippensburg Borough	$ 60,000 - Capital Funds and available grants	5-15 years
	87. Educate departments/leaders at the Cargill Facility on the Spanish language due to a high population of Spanish speaking employees. Being unable to communicate could cause potential risk or misunderstandings so specific departments/leaders learned the basics of Spanish to better communicate.	Cargill, Camp Hill	• Education and Awareness	Cargill, Camp Hill Human Resources department	$7,240.00 – Cargill budget	Ongoing
	88. Educate workforce on the English language at Cargill Facility a high population of Spanish speaking employees. Being unable to communicate could cause potential risk or misunderstandings so better communication is key.	Cargill, Camp Hill	• Education and Awareness	Cargill, Camp Hill Human Resources department	$7,240.00 – Cargill budget	Ongoing

Table 6.2-2: Goal 2: Improve all hazard awareness and response through communication and coordination with residents, including populations at risk (PAR), governmental agencies, and other hazard mitigation stakeholders.

Objective	Action Items	Community	Category	Lead Agency /Department	Cost/Funding Source	Timeframe
	89. Cargilll wants an emergency exercise drill for hazard release of ammonia with the Cumberland County Local Emergency Planning Committee and Lower Allen township fire/EMS for hazardous mitigation.	Cargill, Camp Hill	• Education and Awareness	Cargill, Camp Hill Environmental Health & Safety Dep	$2,360 – Cargill budget	5-15 years
	90. Cargill wants an emergency Exercise drill for hazard release of ammonia with the Cumberland County Local Emergency Planning Committee and Lower Allen township fire/EMS for hazardous mitigation.	Cargill, Camp Hill	• Education and Awareness	Cargill, Camp Hill Environmental Health & Safety Dept.	$10,000 – Cargill budget	5-15 years
	91. Provide a wellness check for employees, including a quick test for cholesterol, lipids, and blood glucose. Provide education of effects of elevated levels of the above along with recommendations of lifestyle changes and medical management.	Cargill, Camp Hill	• Education and Awareness	Cargill Health Services Department	$3,543.24 – Cargill budget	Ongoing

Table 6.2-2: Goal 2: Improve all hazard awareness and response through communication and coordination with residents, including populations at risk (PAR), governmental agencies, and other hazard mitigation stakeholders.						
Objective	**Action Items**	**Community**	**Category**	**Lead Agency /Department**	**Cost/Funding Source**	**Timeframe**
Maintain current and future data on all hazards facing the county.	92. Maintain the Cumberland County Hazard Mitigation GIS story map online.	Cumberland County	• Local Plans and Regulations	Cumberland County GIS Department	County staff time.	Ongoing
	93. Monitor the impacts of climate change on the frequency and severity of hazard impacts in the county.	Cumberland County	• Education and Awareness	Cumberland County Planning Department, Cumberland County Department of Public Safety	$20K-$50K for plan development and additional county staff time.	10-15 Years
Coordinate communication among municipal officials on HMP issues.	94. Continue to coordinate quarterly meetings/training with the local emergency management and related officials.	Cumberland County, All municipalities	• Education and Awareness	Cumberland County Department of Public Safety	County staff time.	Quarterly
	95. Provide HMP related agenda items for Municipal Advisory Board meetings	Cumberland County, All municipalities	• Education and Awareness	Cumberland County Department of Public Safety	County staff time.	Every 3 months

Table 6.2-2: Goal 3: Improve the implementation of the all hazards mitigation plan.						
Objective	**Action Items**	**Community**	**Category**	**Lead Agency /Department**	**Cost/Funding Source**	**Timeframe**
Encourage and support implementation of the HMP by municipal partners	96. Provide technical assistance/training to municipal EMCs/FPMs who have no or limited experience with floodplains. Also, offer training to achieve CFM status for local floodplain administrators.	Cumberland County, All municipalities	• Education and Outreach	Cumberland County Planning Department	County staff time.	Ongoing

Table 6.2-2: Goal 3: Improve the implementation of the all hazards mitigation plan.						
Objective	**Action Items**	**Community**	**Category**	**Lead Agency /Department**	**Cost/Funding Source**	**Timeframe**
	97. Assist municipalities to identify and submit grant applications for federal, state, and county programs that support HMP goals, objectives, and actions.	Cumberland County, All municipalities	• Education and Outreach	Cumberland County Planning Department	County staff time.	Ongoing
Monitor HMP implementation and adjust priorities as needed.	98. Conduct annual HMP meetings to review implementation progress.	Cumberland County, all municipalities	• Education and Outreach	Cumberland County Planning Department, Cumberland County Department of Public Safety, Cumberland County GIS Department	County staff time.	Yearly
Identify sources of funding and financing for mitigation project implementation.	99. Develop and maintain a comprehensive set of available public financing and funding sources for all municipalities.	Cumberland County, all municipalities	• Education and Outreach	Cumberland County Planning Department and Cumberland County Department of Public Safety	County staff time.	2-3 years

Table 6.2-2: Goal 4: Reduce the possibility of damage and loss to existing community assets including structures, critical facilities, and infrastructure due to High Hazard Potential Dams (HHPD).						
Objective	**Action Items**	**Community**	**Category**	**Lead Agency /Department**	**Cost/Funding Source**	**Timeframe**
Promote partnerships between the municipalities, the County, PA DEP, and the U.S. Army Corps of Engineers to develop a comprehensive approach to reducing the possibility of losses due to dam failures.	100. Encourage and cooperate with dam owners to complete preventative maintenance projects and removal actions.	Cumberland County	• Education and Outreach	Cumberland County	County staff time.	2-3 years
	101. Continue to participate in EAP meetings with dam owners and maintain current copies of all dam EAPs.	Cumberland County and local municipalities downstream of high-hazard dams, including South Middleton, North Middleton, Cook, Lower Frankford, Dickinson, Mount Holly Springs, West Pennsboro, and Monroe	• Education and Awareness • Local Plans and Regulations	Cumberland County Department of Public Safety	County staff time.	Every 5 years
	102. Encourage dam owners to make regular updates to their Dam Failure Emergency Action Plans and provide their inundation maps in a digital spatial format (i.e., GIS) to support effective vulnerability analyses. This should also include considerations regarding evacuation plans, plans for flood fighting, and community response.	Cumberland County and local municipalities	• Education and Awareness • Local Plans and Regulations	Cumberland County	No cost estimate available.	Yearly
	103. Once structures in dam hazard areas are identified, support mitigation projects that will result in the	Cumberland County, Carlisle Borough, Cooke Township, Dickinson Township,	• Structure and Infrastructure	Cumberland County Planning and Development	No cost estimate available. - FEMA HHPD, PA DCED PDFAP	Ongoing

Table 6.2-2: Goal 4: Reduce the possibility of damage and loss to existing community assets including structures, critical facilities, and infrastructure due to High Hazard Potential Dams (HHPD).						
Objective	**Action Items**	**Community**	**Category**	**Lead Agency /Department**	**Cost/Funding Source**	**Timeframe**
	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	East Pennsboro Township, Hampden Township, Hopewell Township, Lower Allen Township, Lower Frankford Township, Lower Mifflin Township, Monroe Township, Newville Borough, North Middleton Township, Penn Township, Southampton Township, South Middleton Township, Upper Allen Township, West Pennsboro Township				
	104. Continue to identify opportunities and provide technical assistance for dam structure rehabilitating and/or removal.	Cumberland County	• Structure and Infrastructure	Cumberland County	N/A	Ongoing
Encourage and facilitate the development or revision of local comprehensive plans and land use ordinances to limit development in high hazard and inundation areas	105. Monitor and track new development in inundation areas	Cumberland County and local municipalities downstream of high-hazard dams, including South Middleton, North Middleton, Cook, Lower Frankford, Dickinson, Mount Holly Springs, West	• Education and Awareness • Structure and Infrastructure	Cumberland County Planning Department	County staff time.	10-20 years

Table 6.2-2: Goal 4: Reduce the possibility of damage and loss to existing community assets including structures, critical facilities, and infrastructure due to High Hazard Potential Dams (HHPD).

Objective	Action Items	Community	Category	Lead Agency /Department	Cost/Funding Source	Timeframe
		Pennsboro, and Monroe				
	106. Integrate the Cumberland County Comprehensive Plan's and its "Cumberland Principles" and particularly the "Adapt and Stay Safe" principle into local planning and land use regulation updates.	Cumberland County and local municipalities	• Local Plans and Regulations	Cumberland County	N/A	Ongoing
	107. Continue to provide technical and financial support for local land use regulation development and enforcement.	Cumberland County	• Education and Awareness • Local Plans and Regulations	Cumberland County	N/A	Ongoing

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 April 2023 Local Mitigation Handbook, and PEMA, through the October 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 also 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.

Table 6.2-2 provides a column identifying the mitigation techniques used for each hazard in the County and specific actions associated with these techniques. Mitigation projects are included in the table and in Appendix C.

6.4 Mitigation Action Plan

The 2025 mitigation actions are based on comments received from municipalities and county officials and the counties updates to the *Action and Goal Progress Worksheet*. Because Cumberland County acts as a central repository for such information, county officials updated the list of actions by indicating progress made and whether any actions were being added, canceled, or deferred. Municipal officials were then invited to provide feedback on the proposed 2020 actions via email and phone call. Appendix C includes a summary of responses to the *Action and Goal Progress Worksheet*.

Table 6.2-2 includes 107 mitigation actions established for the 2025 Hazard Mitigation Plan, many of which will require substantial time commitments from staff at the County and local municipalities. Those that participated in the development of the 2025 HMP believe that each of these actions is attainable and could potentially be implemented over the next five-year cycle.

While most of these activities will be pursued over the next five years, the reality of limited time and resources requires the identification of high priority mitigation actions. Prioritization allows the individuals and organizations involved to focus their energies and ensure progress on mitigation activities. Evaluating mitigation actions involves judging each action against certain criteria to determine its feasibility and potential impact. Actions were evaluated and prioritized by applying the Multi-Objective Mitigation Action Prioritization criteria. 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 highest 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 6.4-1 presents the cumulative results of the prioritization of mitigation actions.

Table 6.4-1: Mitigation Action Prioritization.							
Mitigation Actions		Multi-Objective Mitigation Action Prioritization Criteria					
		Low = 0-1.8 Medium = 1.9-2.4 High = 2.5-3.0					
No.	Name	Effectiveness (20% weight)	Efficiency (30% weight)	Multi-Hazard Mitigation (20% weight)	Addresses High Risk Hazard (15% weight)	Addresses Communications / Critical Infrastructure (15% weight)	Total Weighted Score
1	Evaluate requests to use county facilities for public gatherings and coordinate with law enforcement as needed to secure events.	1	2	1	1	1	1.3
2	Partner with Lower Allen Township, the PSP, and the Camp Hill Prison to keep emergency response plans current.	3	2	1	1	3	2.0
3	Support municipal efforts to fund investments in water and stormwater collection and delivery systems.	2	2	2	3	1	2.0
4	Integrate green infrastructure concepts into municipal zoning and subdivision ordinances.	2	1	2	3	1	1.7

5	Develop a water supply study in coordination with the Susquehanna River Basin Commission and county municipalities.	3	3	1	2	1	2.2
6	Host a countywide workshop to encourage participation in the Community Rating System program to reduce NFIP rates.	1	2	1	3	1	1.6
7	Maintain 100% municipal participation in the NFIP.	3	3	1	3	1	2.3
8	Conduct outreach to municipalities and owners of all properties within the SFHA, including RLP and SRLP, to inform them of buyout options, elevation and mitigation reconstruction strategies.	3	3	1	3	1	2.3
9	Assist all 33 municipalities in updating floodplain management regulations to meet or exceed the minimum standards required by the NFIP.	3	3	1	3	1	2.3

10	Monitor and remove debris jams, as applicable, on the Yellow Breeches Creek and Conodoguinet Creek in partnership with municipal and state governments and private property owners.	2	2	1	3	1	1.8
11	Collect current flood elevation and extent data to support ongoing development of a predictive flood intensity indicator model for the county.	2	2	2	3	1	2.0
12	Collect relevant structure information through the subdivision/land development process and recording processes to assist in determining flooding impacts to structures.	2	2	2	3	1	2.0
13	Recommend that municipalities exclude or add foundation inspection requirements for mobile homes in a Special Flood Hazard Area.	2	2	2	3	1	2.0

14	Zion Bridge Project, Lower Frankford Township	2	2	2	3	1	2.0
15	Opossum Creek Culvert Project, Lower Frankford Township	2	2	2	3	1	2.0
16	Cloverdale Run Stormwater Drainage Project, Rich Street and Sharp Street, Newville Borough	2	2	2	3	1	2.0
17	Cloverdale Run Stormwater Drainage Project, Broad Street, Newville Borough	2	2	2	3	1	2.0
18	Cloverdale Run Stormwater Drainage Project, Pennsylvania Avenue Box Culvert, Newville Borough	2	2	2	3	1	2.0

19	Cloverdale Run Stormwater Drainage, Parsonage Street Box Culvert, Newville Borough	2	2	2	3	1	2.0
20	Cloverdale Run Stormwater Drainage, Newville Community Park headwall and retention pond, Newville Borough	2	2	2	3	1	2.0
21	Cloverdale Run Stormwater Drainage, North Corporation Street Box Culvert, Newville Borough	2	2	2	3	1	2.0
22	Cloverdale Run Stormwater Drainage, Cove Avenue Box Culvert, Newville Borough	2	2	2	3	1	2.0
23	Flood Inundation Mapping	2	2	2	3	1	2.0

24	Broad Street Drainage Improvements	2	2	2	3	1	2.0
25	Sewer Plant Grinder Pump Replacement	2	1	1	2	3	1.7
26	Support and educate municipalities about the NFIP Compliance Audit Program.	2	2	1	2	1	1.7
27	Storm Sewer Infrastructure and Roadway Replacement on Susquehanna Avenue	2	2	2	3	2	2.2
28	Railroad x Northside Storm Sewer System Repair and Upgrades	2	2	2	3	2	2.2

29	Earn Storm Ready Certification for Mechanicsburg Borough.	2	2	2	3	1	2.0
30	Harvard Run Stormwater Management Project	2	2	2	3	2	2.2
31	Digitize High Hazard Dam Inundation Areas	2	2	2	3	1	2.0
32	Stormwater infrastructure analysis and upgrades on Lower Allen Drive	2	2	2	3	2	2.2
33	Stormwater infrastructure analysis and upgrades on Seneca, Saint Johns, and Oneida Road	2	2	2	3	2	2.2

34	Mobile Home Flood Mitigation - Construct floodproofing measure, elevate existing mobile homes and/or property buy out in Monroe Township.	2	2	3	3	2	2.4
35	Hempt Property Floodplain Restoration	2	2	2	3	2	2.2
36	Ladnor Lane Bridge Replacement	2	2	2	3	2	2.2
37	Ground Mounted Solar Array	2	2	3	3	2	2.4
38	Lower Allen Shopping Center Flooding Mitigation	2	2	2	3	1	2.0

39	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
40	Provide wet and dry floodproof technique training on non-residential structures for municipalities based on FEMA's Technical Bulletin 3 (Non-Residential Floodproofing Requirements and Certifications), Technical Bulletin 7 (Wet Floodproofing Requirements and Limitations), and Technical Bulletin 11 (Crawlspace Construction for Buildings Located in Special Flood Hazard Areas). Encourage the implementation of wet and dry floodproofing techniques on non-residential structures	2	3	1	2	2	2.1

	throughout municipalities.						
41	Conduct seismic analyses for new or rehabilitated transportation infrastructure in the County.	2	2	2	1	1	1.7
42	Maintain emergency hazardous materials response capabilities via certified team and continue to offer training to first responders.	2	2	2	3	1	2.0
43	Maintain and implement the Cumberland County Hazardous Materials Commodity Flow Study.	2	2	2	3	2	2.2
44	Encourage municipalities to prohibit SARA facilities in wellhead or source water protection areas.	3	2	1	3	2	2.2
45	Fuel Spill Prevention - Replace old below ground tanks with new above ground tanks in Lower Allen Township.	2	2	1	2	1	1.7

46	Meet with TMI officials on a quarterly basis to receive decommissioning updates.	1	2	1	2	2	1.6
47	Continue to Participate in radiological emergency response training and exercises.	3	2	2	2	2	2.2
48	Continue to collaborate with Pa. Dept. of Health for mass distribution of medical countermeasures preparedness efforts.	2	2	1	2	1	1.7
49	Establish a core County team to continue participation in pandemic (including the Coronavirus in 2020) exercises, education and preparedness.	3	2	1	2	1	1.9
50	Monitor mosquito populations and conduct spraying programs to reduce vulnerability to vector borne diseases.	2	2	1	2	1	1.7

51	Inventory sinkhole events as part of HMP GIS system.	2	2	2	2	1	1.9
52	Integrate sinkhole detection requirements into municipal subdivision and development requirements	2	2	2	2	1	1.9
53	Tory Circle Storm Sewer Lining.	2	2	2	2	2	2.0
54	Identify and pursue funding for transportation projects through participation in the Harrisburg Area Transportation Study's highway, bridge, and railway planning initiatives.	3	2	3	3	3	2.7
55	Implement the Cumberland County Bridge Capital Improvement Plan.	3	2	2	3	2	2.4

56	Evaluate using the county's $5 Local Use Fee to support local and regional transportation projects.	3	2	3	3	3	2.7
57	Conduct Active Transportation Network Development in Mechanicsburg Borough.	2	2	1	2	3	2.0
58	Provide Pedestrian Sidewalks and Safety Crossing Signal Alerting Devices from the Shippensburg Borough line to Conestoga Drive in Shippensburg Township.	2	2	1	2	3	2.0
59	To put a bypass around the Borough of Shippensburg and to put a second entrance to the Intermediate School which sits in Shippensburg Township.	2.5	3	2.5	2	2	2.5
60	Provide Pedestrian Safety Crossing Signal Alerting Devices at three critical intersections within Shippensburg Borough.	2	2	1	2	3	2.0

61	Continue to maintain relationships with local, state and federal partners to sustain awareness and/or detection of threat capabilities.	2	2	1	2	2	1.8
62	Maintain StormReady Certification via NWS. Continue to support and encourage municipal participation of the program.	2	2	2	3	1	2.0
63	Continue to support the ARC efforts on installation of residential detectors; Promote residents usage of fire extinguishers.	2	2	1	1	1	1.5
64	Encourage municipal participation in the NFPA Firewise program.	2	2	1	2	1	1.7
65	Use municipal subdivision and land development ordinances to protect above ground infrastructure from trees through setbacks and easements.	2	2	2	3	2	2.2

66	Require underground utilities through municipal subdivision and land development regulations.	2	2	2	3	3	2.3
67	Coordinate with utility providers to resolve utility issues during outage events.	1	2	1	3	3	1.9
68	Install backup power generator in Public Works Emergency facility in East Pennsboro Township.	2	2	1	3	2	2.0
69	Install backup generator for traffic signals in Shippensburg Township.	2	2	1	3	3	2.1
70	Supply power to municipal buildings in Southampton Township.	2	2	1	3	2	2.0

71	Install an emergency backup power generator in West Pennsboro Township.	2.7	3	1	3	2.7	2.5
72	Identify areas of stormwater inflow and infiltration into the wastewater system and conduct remediation measures for Wastewater Pump Station #1 in Wormleysburg Borough.	3	2.5	1	3	3	2.5
73	Sewer Capital Improvements – Security Upgrades for Mechanicsburg Borough.	2	1	1	2	3	1.7
74	Provide funding for a backup generator for Public Works facility in Shippensburg Borough.	2	2	1	3	2	2.0
75	Provide funding for a backup generator for Veterans Stadium in Shippensburg Borough.	2	2	1	2	2	1.8

76	Promote the NFPA's Firewise Program with appropriate municipalities.	2	2	1	2	1	1.7
77	Continue to Participate in statewide severe storm exercises with PEMA as appropriate.	2	2	3	3	1	2.2
78	Continue to participate in PennDOT Winter Preparedness Stakeholder meetings and maintain partnership.	2	2	1	3	1	1.8
79	Creek Road Stormwater Management Project	2	2	2	3	2	2.2
80	Utilize a variety of strategies to reduce urban heating including (1) Tree canopy development, (2) solar parking arrays, (3) returning unused paved areas back to grass in Mechanicsburg Borough.	2	1.5	1	2	2	1.7

81	Encourage municipalities to establish or expand cooling and warming centers for residents	1.5	1	3	1	2	1.7
82	Continue to work with ARC to identify shelters for short-term evacuation(s).	3	2	2	2	1	2.1
83	Continue to Participate in the South Central Task Force activities, including training and planning activities.	2	2	3	3	2	2.4
84	Continue implementation of an early warning or alert systems that utilize cloud-based (IPAWS, Wireless Emergency Alerts) communications technologies to distribute pertinent information to the public during emergencies.	3	3	3	3	3	3.0
85	Purchase Type I – Type II Folding Barricades for Southampton Township.	2	2	2	1	1	1.7

86	Purchase Message Boards for Special Events and Hazard Notification for Shippensburg Borough.	2	2	2	1	1	1.7
87	Educate departments/leaders at the Cargill Facility on the Spanish language due to a high population of Spanish speaking employees. Being unable to communicate could cause potential risk or misunderstandings so specific departments/leaders learned the basics of Spanish to better communicate.	2	2	2	1.5	1	1.8
88	Educate workforce on the English language at Cargill Facility a high population of Spanish speaking employees. Being unable to communicate could cause potential risk or misunderstandings so better communication is key.	2	2	2	1.5	1	1.8

89	Cargilll wants an emergency exercise drill for hazard release of ammonia with the Cumberland County Local Emergency Planning Committee and Lower Allen township fire/EMS for hazardous mitigation.	2	2	1	3	2	2.0
90	Cargill wants an emergency Exercise drill for hazard release of ammonia with the Cumberland County Local Emergency Planning Committee and Lower Allen township fire/EMS for hazardous mitigation.	2	2	1	3	2	2.0
91	Provide a wellness check for employees, including a quick test for cholesterol, lipids, and blood glucose. Provide education of effects of elevated levels of the above along with recommendations of lifestyle changes and medical management.	2	2	1	3	2	2.0

92	Maintain the Cumberland County Hazard Mitigation GIS story map online.	1	2	3	3	1	2.0
93	Monitor the impacts of climate change on the frequency and severity of hazard impacts in the county.	1	2	3	3	1	2.0
94	Continue to coordinate quarterly meetings/training with the local emergency management and related officials.	2	2	3	3	2	2.4
95	Provide HMP related agenda items for Municipal Advisory Board meetings	1	2	2	2	1	1.7
96	Provide technical assistance/training to municipal EMCs/FPMs who have no or limited experience with floodplains. Also, offer training to achieve CFM status for local floodplain administrators.	2	2	1	3	1	1.8

97	Assist municipalities to identify and submit grant applications for federal, state, and county programs that support HMP goals, objectives, and actions.	3	2	2	3	1	2.2
98	Conduct annual HMP meetings to review implementation progress.	1	2	3	3	1	2.0
99	Develop and maintain a comprehensive set of available public financing and funding sources for all municipalities.	1	2	3	3	1	2.0
100	Encourage and cooperate with dam owners to complete preventative maintenance projects and removal actions.	2.5	2.5	2	3	3	2.6
101	Continue to participate in EAP meetings with dam owners and maintain current copies of all dam EAPs.	2	2	3	3	1	2.2

102	Encourage dam owners to make regular updates to their Dam Failure Emergency Action Plans and provide their inundation maps in a digital spatial format (i.e., GIS) to support effective vulnerability analyses. This should also include considerations regarding evacuation plans, plans for flood fighting, and community response.	1.5	2	2	2	1	1.8
103	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	3	1	2	3	3	2.2

	buildings, facilities, and infrastructure						
104	Continue to identify opportunities and provide technical assistance for dam structure rehabilitating and/or removal.	2	2	3	3	1	2.0
105	Monitor and track new development in inundation areas	2.5	2	1	3	1	1.9
106	Integrate the Cumberland County Comprehensive Plan's and its "Cumberland Principles" and particularly the "Adapt and Stay Safe" principle into local planning and land use regulation updates.	1.5	1.5	3	1	2	1.8
107	Continue to provide technical and financial support for local land use regulation development and enforcement.	2	2	3	2	2	2.2

7. Plan Maintenance

7.1 Update Process Summary

Monitoring, evaluating and updating this plan are critical to maintaining its value and success in Cumberland 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. In order to review and update the 2020 HMP, annual review meetings were held on February 22, 2022, and July 25, 2023.

Meetings were also held in 2024 to begin updating the HMP for 2025. Meeting documentation is included as Appendix C. The 2025 HMP will be reviewed as deemed necessary by the HMSC during its annual meeting, but no fewer than once every two years.

7.2 Monitoring, Evaluating and Updating the Plan

Municipal officials within Cumberland County recognize that the HMP is not a static document and requires regular review and evaluation. The plan will be monitored for changes in the conditions under which the plan was developed, such as new or revised state laws, major disaster declarations, or availability of funding. Chaired by Kirk Stoner, Director of Planning for the Cumberland County Planning Department, the HMSC established for the 2025 HMP is designated to lead monitoring, evaluation and future update efforts with support and representation from all participating municipalities. The HMSC will coordinate maintenance efforts, but the input needed for effective periodic evaluations will come from community representatives, local emergency management coordinators and planners, the general public and other important stakeholders. The HMSC will oversee the progress made on the implementation of action items identified in the 2025 HMP and modify actions, as needed, to reflect changing conditions. The HMSC will meet annually to discuss specific coordination efforts that may be needed with other stakeholders. Updates to the 2025 HMP will be made as deemed necessary and appropriate. In addition, it will also serve in an advisory capacity to the Cumberland County Board of Commissioners and the Cumberland County Planning Commission.

Each municipality will designate a community representative to monitor mitigation activities and hazard events within their respective communities. The local emergency management coordinator would be suitable for this role. This individual will be asked to work with the HMSC to provide updates on applicable mitigation actions and feedback on changing hazard vulnerabilities within their community.

Periodic evaluations of the 2025 HMP will take place as deemed necessary by the HMSC during its annual meeting, but no fewer than once every two years. Evaluations 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. 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 in light of new developments in the community. Progress will be documented by the HMSC for use in the next HMP update and submitted to the Board of Commissioners.

Upon each HMP evaluation, the HMSC will consider whether applications should be submitted for existing mitigation grant programs. A decision to apply for funding will be based on appropriate eligibility and financial need requirements. The HMSC will also support local and county officials in applying for post-disaster mitigation funds when they are available. All state and federal mitigation funding provided to the County or local municipalities will be reported in subsequent plan updates.

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 Cumberland 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 this 2025 HMP, the HMSC will involve the public during annual meetings or periodic evaluations of the HMP by providing an opportunity to submit comments. The public will have access to the current HMP through their local municipal office or the Cumberland County Planning Department. Additionally, a copy of the adopted plan will be posted to the County website (https://www.cumberlandcountypa.gov/) for five years so that the public has electronic access to the plan. The website includes an easy-to-access feedback option so that residents, business owners, and others who read the plan will be able to provide a comment about the plan or about the mitigation strategies.

Information on upcoming events related to the HMP, such as annual mitigation plan evaluation meetings or solicitation for comments, will be announced via newsletters, newspapers, mailings or the County website. The public is encouraged to submit comments on the HMP at any time. All comments received will be maintained and considered by the HMSC when updating the HMP.

The County Mitigation Officer will document the number of people who participate in the annual meetings and the results of the meeting for inclusion in the plan when it is next updated. In this way, the public will have an opportunity to become involved in the planning process and to influence mitigation planning decisions.

Comprehensive Plans, Capital Improvements Programs, Building Codes, Municipal Floodplain Management Regulations, Emergency Operations Plans, and Zoning Ordinances are identified for incorporation of hazard mitigation actions once the 2025 HMP 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.

8. Plan Adoption

The Plan was submitted to the Pennsylvania State Hazard Mitigation Officer on August 21, 2025. It was forwarded to FEMA for final review and approval-pending-adoption on November 14, 2025. FEMA granted approval-pending-adoption on November 18, 2025.

This section of the plan includes copies of the local adoption resolutions passed by Cumberland County and its municipal governments; the completed Local Mitigation Plan Review Tool can be found in Appendix B. Adoption resolution templates are provided to assist the County and municipal governments with recommended language for future adoption of the HMP.

Cumberland County 2025 Hazard Mitigation Plan

County Adoption Resolution
Resolution No. ___________________
Cumberland County, Pennsylvania

WHEREAS, the municipalities of Cumberland County, Pennsylvania are most vulnerable to natural and human-made hazards which may result in loss of life and property, economic hardship, and threats to public health and safety, and

WHEREAS, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) requires state and local governments to develop and submit for approval to the President a mitigation plan that outlines processes for identifying their respective natural hazards, risks, and vulnerabilities, and

WHEREAS, Cumberland 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 Cumberland County 2025 Hazard Mitigation Plan has been developed by the Cumberland County Department of Planning and the Cumberland County Department of Public Safety in cooperation with other county departments, local municipal officials, and the citizens of Cumberland County, and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted to develop the Cumberland County 2025 Hazard Mitigation Plan, and

WHEREAS, the Cumberland County 2025 Hazard Mitigation Plan recommends mitigation activities that will reduce losses to life and property affected by both natural and human-made hazards that face the County and its municipal governments,

NOW THEREFORE BE IT RESOLVED by the governing body for the County of Cumberland that:

- The Cumberland 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 Cumberland County 2025 Hazard Mitigation Plan are hereby directed to implement the recommended activities assigned to them.

ADOPTED, this __________ day of _________________, 20__

ATTEST: **CUMBERLAND COUNTY COMMISSIONERS**

____

By _________________________________

By _________________________________

By _________________________________

Cumberland County 2025 Hazard Mitigation Plan

Municipal Adoption Resolution

Resolution No. ___________________

<*Borough/Township of Municipality Name*>, Cumberland County, Pennsylvania

WHEREAS, the <*Borough/Township of Municipality Name*>, Cumberland County, Pennsylvania is most vulnerable to natural and human-made hazards which may result in loss of life and property, economic hardship, and threats to public health and safety, and

WHEREAS, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) requires state and local governments to develop and submit for approval to the President a mitigation plan that outlines processes for identifying their respective natural hazards, risks, and vulnerabilities, and

WHEREAS, the <*Borough/Township of Municipality Name*> acknowledges the requirements of Section 322 of DMA 2000 to have an approved Hazard Mitigation Plan as a prerequisite to receiving post-disaster Hazard Mitigation Grant Program funds, and

WHEREAS, the Cumberland County 2025 Hazard Mitigation Plan has been developed by the Cumberland County Department of Planning and the Cumberland County Department of Public Safety in cooperation with other county departments, and officials and citizens of <*Borough/Township of Municipality Name*>, and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted to develop the Cumberland County 2025 Hazard Mitigation Plan, and

WHEREAS, the Cumberland County 2025 Hazard Mitigation Plan recommends mitigation activities that will reduce losses to life and property affected by both natural and human-made hazards that face the County and its municipal governments,

NOW THEREFORE BE IT RESOLVED by the governing body for the <*Borough/Township of Municipality Name*>:

- The Cumberland County 2025 Hazard Mitigation Plan is hereby adopted as the official Hazard Mitigation Plan of the <*Borough/Township*>, and
- The respective officials and agencies identified in the implementation strategy of the Cumberland County 2025 Hazard Mitigation Plan are hereby directed to implement the recommended activities assigned to them.

ADOPTED, this _________ day of ________________, 20__

ATTEST: ***<BOROUGH/TOWNSHIP OF MUNICIPALITY NAME>***

___________________________ By ______________________________

By ______________________________

By ______________________________