HAZARD MITIGATION PLAN

Dauphin County, Pennsylvania

March 2025

Prepared By:
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EXECUTIVE SUMMARY

The 2025 update to the Dauphin County Hazard Mitigation Plan (HMP) was prepared in accordance with the Disaster Mitigation Act of 2000 (DMA 2000). DMA 2000 requires states and local governments to prepare HMPs to remain eligible to receive pre-disaster mitigation grant funds and funds made available in the wake of federally declared disasters. Additionally, DMA 2000 effectively improves the disaster planning process by increasing hazard mitigation planning requirements for hazard events. DMA 2000 requires participating municipalities to (1) document their hazard mitigation planning process and (2) identify hazards; potential losses; and mitigation needs, goals, and strategies.

Hazard mitigation is the use of long-term and short-term policies, programs, projects, and other activities to minimize the loss of life, injury, and property damage that can result from a disaster. Communities, residents, and businesses across the United States have been faced with continually increasing costs associated with natural and human-caused hazards. Hazard mitigation is the first step in reducing risk and is the most effective way to reduce hazard costs. Implementing hazard mitigation measures can build community resilience.

This plan is an update to the County's 2021 HMP and builds upon the data and actions previously identified while integrating new knowledge, data, and information since the approval of the 2021 HMP. The updated HMP (also referred to as "the plan") includes countywide analysis and assessment of hazards, risks, and capabilities.

The plan complies with federal and state hazard mitigation planning requirements to establish the County and participating partners' eligibility for funding under Federal Emergency Management Agency (FEMA) grant programs. FEMA has issued guidelines for the development of multi-jurisdictional hazard mitigation plans. The Pennsylvania Emergency Management Agency (PEMA) supports plan development for jurisdictions in the Commonwealth of Pennsylvania.

The Dauphin County HMP represents the work of citizens, elected and appointed government officials, business leaders, and volunteer and nonprofit groups to protect community assets, preserve the community's economic viability, and save lives. DMA 2000 regulations require formal updates and adoptions of local plans every 5 years, reassessing risks, and updating local strategies to manage and mitigate those risks. To comply, Dauphin County and inclusive jurisdictions actively participated in updating the county HMP. Extensive outreach efforts by the Dauphin County Planning Commission resulted in full participation by 10 of the county's 40 municipalities. Upon completion and approval of the HMP, participating jurisdictions will continue to address and implement the findings and recommendations of this plan update. This 2025 version is an update of the county HMP, with the previous HMP developed in 2021.

Table ES-1 identifies 10 municipal governments that fully participated in the HMP update process.

Table ES-1. Participating Jurisdictions in the 2025 Dauphin County HMP Update

Participating Jurisdictions				
• Dauphin County	• Derry Township	• Elizabethville Borough	• Harrisburg City	• Londonderry Township
• Lower Paxton Township	• Middletown Borough	• Paxtang Borough	• Royalton Borough	• Steelton Borough
• Conewago Township	• Dauphin Borough	• East Hanover Township	• Halifax Borough	• Halifax Township
• Highspire Borough	• Jackson Township	• Jefferson Township	• Lower Swatara Township	• Lykens Borough
• Middle Paxton Township	• Mifflin Township	• Millersburg Borough	• Penbrook Borough	• Reed Township

• Rush Township	• South Hanover Township	• Susquehanna Township	• Swatara Township	• Upper Paxton Township
• Washington Township	• Wayne Township	• West Hanover Township	• Williams Township	
Non-Participating Jurisdictions				
• Berrysburg Borough	• Gratz Borough	• Lykens Township	• Wiconisco Township	• Williamstown Borough

During the plan update process, Dauphin County and its participating municipalities engaged in the following planning process steps:

1. Identified and prioritized hazards that may affect the county and its municipalities.
2. Assessed the county's and each municipality's vulnerabilities to these hazards.
3. Identified mitigation actions that can reduce those vulnerabilities.
4. Developed a strategy for implementing those actions, including identifying the agency (or agencies) responsible for each implementation.

Throughout the planning process, the public was provided an opportunity to comment on the existing HMP and provide suggestions for the updated version. The county hosted two Planning Teams sessions, one in the morning and one in the evening, meetings that were open to the public, during which residents could provide input on the HMP.

The following hazards were identified by the Planning Team as presenting the highest risk to the county and its municipalities:

- Flood, Flash Flood, Ice Jam
- Cyber Attack
- Drought
- Opioid Addiction Response
- Subsidence and Sinkholes
- Winter Storm
- Tornado, Windstorm
- Transportation Accident
- Utility Interruption
- Environmental Hazards – Hazardous Materials Releases
- Invasive Species
- Pandemic and Infectious Disease
- Hurricane, Tropical Storm, Nor'easter
- Wildfire

This HMP also includes hazard profiles for the following hazards (listed in order of risk factor analysis ranking):

- Radon Exposure
- Building and Structure Collapse
- Dam Failure
- Environmental Hazards – Gas and Liquid Pipelines
- Landslide

To mitigate the effects of those hazards, the Planning Team identified the following goals for hazard mitigation over the next 5 years:

1. **Goal 1:** Protect life, property, the environment, and critical infrastructure from natural and human-made hazards, preventing injury, death, and damage.

2. **Goal 2:** Increase public awareness and education on the impacts of natural hazards and promote activities to mitigate these risks.
3. **Goal 3:** Protect and restore natural resources to strengthen environmental resilience.
4. **Goal 4:** Reduce the risk of natural hazards for socially vulnerable populations and underserved communities.
5. **Goal 5:** Develop and improve infrastructure to better protect citizens and both public and private properties from hazards.

Objectives and actions to be implemented are discussed in the Mitigation Action Plan in Section 6.1 of this HMP.

Additionally, Planning Team members will meet annually to evaluate the status of plan implementation and prepare a summary report of HMP status and any needed updates. The mitigation evaluation will address changes as new hazard events occur, as the area develops, and as more information becomes available pertaining to hazards and their impacts. The evaluation will include an assessment of whether the planning process and actions have been effective, whether development or other issues warrant changes to the HMP or its priorities, whether progress toward the communities' goals is satisfactory, and whether changes are warranted. The public is encouraged to give feedback (1) by directly contacting the County Hazard Mitigation Plan Coordinator, (2) during recurring review meetings, and (3) during the 5-year revision process.

To request information or provide comments regarding this plan, please contact the Dauphin County Planning Specialist – Office of Emergency Management. Contact information is provided below.

Mailing Address:	Hazard Mitigation Plan Coordinator Dauphin County Department of Public Safety Office of Emergency Management 911 Gibson Boulevard Steelton, Pennsylvania 17113
Contact Name:	Alexis Passaro, Planning Specialist
E-mail Address:	DauphinEMA@dauphincounty.gov
Telephone:	(717) 558-6821

CERTIFICATION OF ANNUAL REVIEW

The Dauphin County Hazard Mitigation Steering Committee and Planning Team have reviewed this Hazard Mitigation Plan (HMP). See Section 7 of this document for further details regarding this certification section. The HMP Coordinator hereby certifies the review.

Year	Date of Meeting	Public Outreach Addressed?*	Signature
2022	11/17/2022	Yes	
2023	11/26/2023	Yes	
2024	11/22/2024	Yes	
2025			

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

RECORD OF CHANGES

Date	Description of Change Made, Mitigation Action Completed, or Public Outreach Performed	Change Made By (Print Name)	Change Made By (Signature)

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

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SECTION 1 INTRODUCTION

This section presents background information, describes the purpose, and defines the scope of the 2025 update of the Dauphin County Hazard Mitigation Plan (HMP).

1.1 BACKGROUND

Across the United States, natural and human-caused disasters have led to increasing levels of deaths, injuries, property damage, and interruptions of business and government services. The time, money, and effort spent to recover from these disasters exhaust resources, diverting attention from important public programs and private efforts.

Dauphin County, Pennsylvania, has been included in a significant number of commonwealth-wide or county-specific disaster declarations since 1955. The emergency management community, citizens, elected officials, and other stakeholders in Dauphin County recognize the impact of disasters on their community and have concluded that proactive efforts must be taken to reduce the impact of natural and human-caused hazards. For that purpose, Dauphin County is committed to updating and maintaining the Dauphin County HMP.

"Hazard mitigation" describes actions taken to prevent, reduce, or eliminate the long-term risks to life and property caused by a disaster. Pre-disaster mitigation actions are taken in advance of a hazard event. These actions are a key component to breaking the typical disaster cycle. Most communities sustain damage from storm events, rebuild the same way, and undergo damage again. With careful selection, mitigation actions can be long-term, cost-effective measures taken to reduce the risk of loss.

The Dauphin County Hazard Mitigation Planning Team and Steering Committee (HMSC) have participated in this HMP update. The Steering Committee was composed of officials from Dauphin County, the Tri-County Regional Planning Commission, municipalities, stakeholder organizations, and commonwealth and federal agencies. The Planning Team was composed of additional Dauphin County officials, municipal representatives, emergency responders, and representatives from utility companies, and commonwealth and federal agencies. Dauphin County contracted Tetra Tech, Inc. (Tetra Tech) to prepare the 2025 HMP update.

The HMP update is the result of several months of collaboration between the county's citizens and officials and Tetra Tech's representatives to develop a pre-disaster, multi-hazard mitigation plan that will guide the county toward greater resilience while respecting the character and needs of the community.

1.2 PURPOSE

The purpose of this HMP is to minimize the effects that natural, technological, and man-made hazards have on the people, property, environment, and business operations within Dauphin County. This document provides the background information and rationale for the mitigation actions that the Planning Team, HMSC, and municipal and district representatives have chosen to implement across the county.

The document is governed by the Disaster Mitigation Act of 2000 (DMA 2000) and its implementing regulations (Title 44 Code of Federal Regulations [CFR] Part 201, published February 26, 2002). Local jurisdictions must comply with DMA 2000 and the regulations in 44 CFR §201.6 to remain eligible for funding and technical assistance from commonwealth and federal hazard mitigation programs.

1.3 SCOPE

The implementation actions outlined within this HMP apply to Dauphin County and any municipalities and districts within the county that adopt this plan. Only those jurisdictions that have participated in the plan update process may adopt this plan and will be eligible for commonwealth and federal hazard mitigation funding. For the purpose of this plan, jurisdictional participation was defined as the completion and submission of an

Evaluation of Identified Hazards Worksheet, Capability Assessment Survey, National Flood Insurance Program (NFIP) Survey, and/or Mitigation Strategy 5-Year Plan Review Worksheet, and attendance by an official municipal representative at a planning or public meeting, or participation in individual outreach conducted as part of the planning process.

1.4 AUTHORITY AND REFERENCE

This HMP was prepared in accordance with the following regulations and guidance:

- *Local Mitigation Planning Policy Guide*, Federal Emergency Management Agency (FEMA). April 19, 2022.
- *Local Mitigation Planning Handbook*. FEMA, May 2023
- *Integrating Hazard Mitigation into Local Planning*. FEMA, March 1, 2013
- *Plan Integration: Linking Local Planning Efforts*. FEMA, July 2015
- *Local Mitigation Plan Review Guide*. October 1, 2011
- DMA 2000 (Public Law 106-390). October 30, 2000
- 44 CFR Parts 201 and 206 (including Feb. 26, 2002, October 1, 2002, October 28, 2003, and September 13, 2004, Interim Final Rules)
- *How-To Guide for Using HAZUS-MH for Risk Assessment (Document No. 433)*. FEMA, February 2004
- Mitigation Planning How-To Series (FEMA 386-1 through 4). FEMA, 2002. Available online at: http://www.fema.gov/fima/planhowto.shtm.
- *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards*. FEMA, January 2013
- *Pennsylvania Hazard Mitigation Plan Standard Operating Guide*. 2020

Appendix A contains a full set of references used in updating this HMP.

SECTION 2 COUNTY PROFILE

Section 2 of the Dauphin County Hazard Mitigation Plan (HMP) discusses the geography and environment, community facts, population and demographics, and land use and development in Dauphin County.

2.1 GEOGRAPHY AND ENVIRONMENT

Dauphin County is located in the southcentral portion of Pennsylvania and encompasses approximately 525 square miles. The county has 40 municipalities and is home to the state capital of Harrisburg. Dauphin County is bordered to the north by Northumberland County, east by Lebanon and Schuylkill Counties, south by Lancaster and York Counties, and west by Cumberland and Perry Counties. Dauphin County is naturally bordered to the west by the Susquehanna River.

Dauphin County has a scenic landscape characterized by individual unique communities and farmlands. Dauphin County has a rich amount of natural resources, including the Susquehanna River, streams, tributaries, mountains, and wetlands (Tri-County Regional Planning Commission 2017). Human impacts, such as urbanized areas and farming, along with varying topography and limestone (karst) geology contribute to the health of waterways in Dauphin County, ranging from good to poor (Dauphin County Conservation District 2010).

Dauphin County has an extensive transportation network. Transportation routes in the northern portion of the county are concentrated on U.S. Route 209 and PA Routes 25, 147, 225, and 325. The southern portion of Dauphin County contains major population centers, such as Harrisburg, interconnected by U.S. Interstates 76, 81, 83, and 283 and U.S. Routes 22, 322, and 422. PA Routes in the southern portion include 39, 230, 283, and 441. The Dauphin County base map can be found in Figure 2.1-1 below.

2.1.1 Topography and Geology

The geology of Dauphin County includes two physiographic provinces with five physiographic sections east of the Appalachian Mountain Range. These include the Ridge Valley Province Sections - Susquehanna Lowland, Anthracite Upland, Blue Mountain, Great Mountain, and in the Piedmont Province Section – Gettysburg-Newark Lowland (Pennsylvania Department of Conservation and Natural Resources n.d.).

Figure 2.1-1 Base Map of Dauphin County, PA

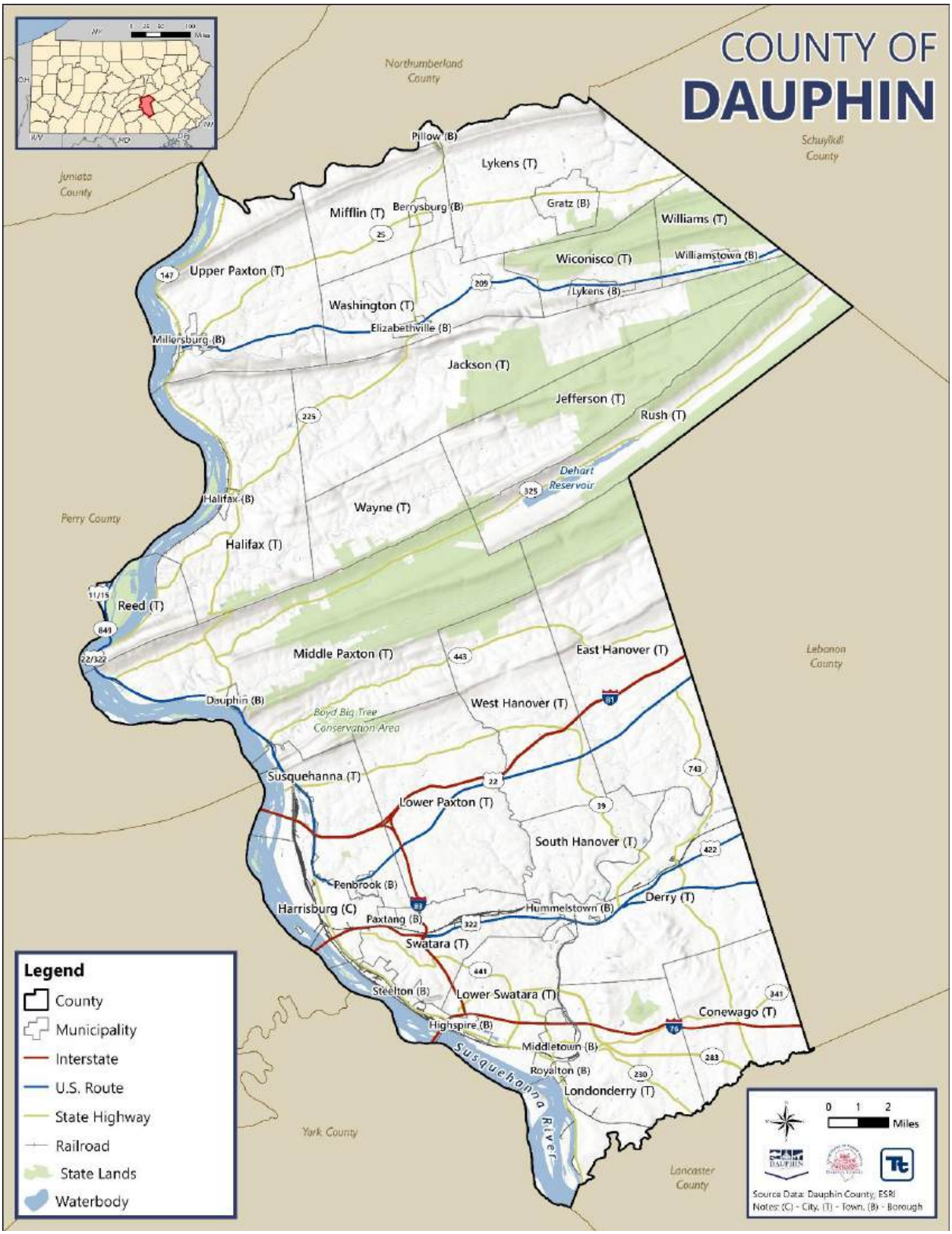
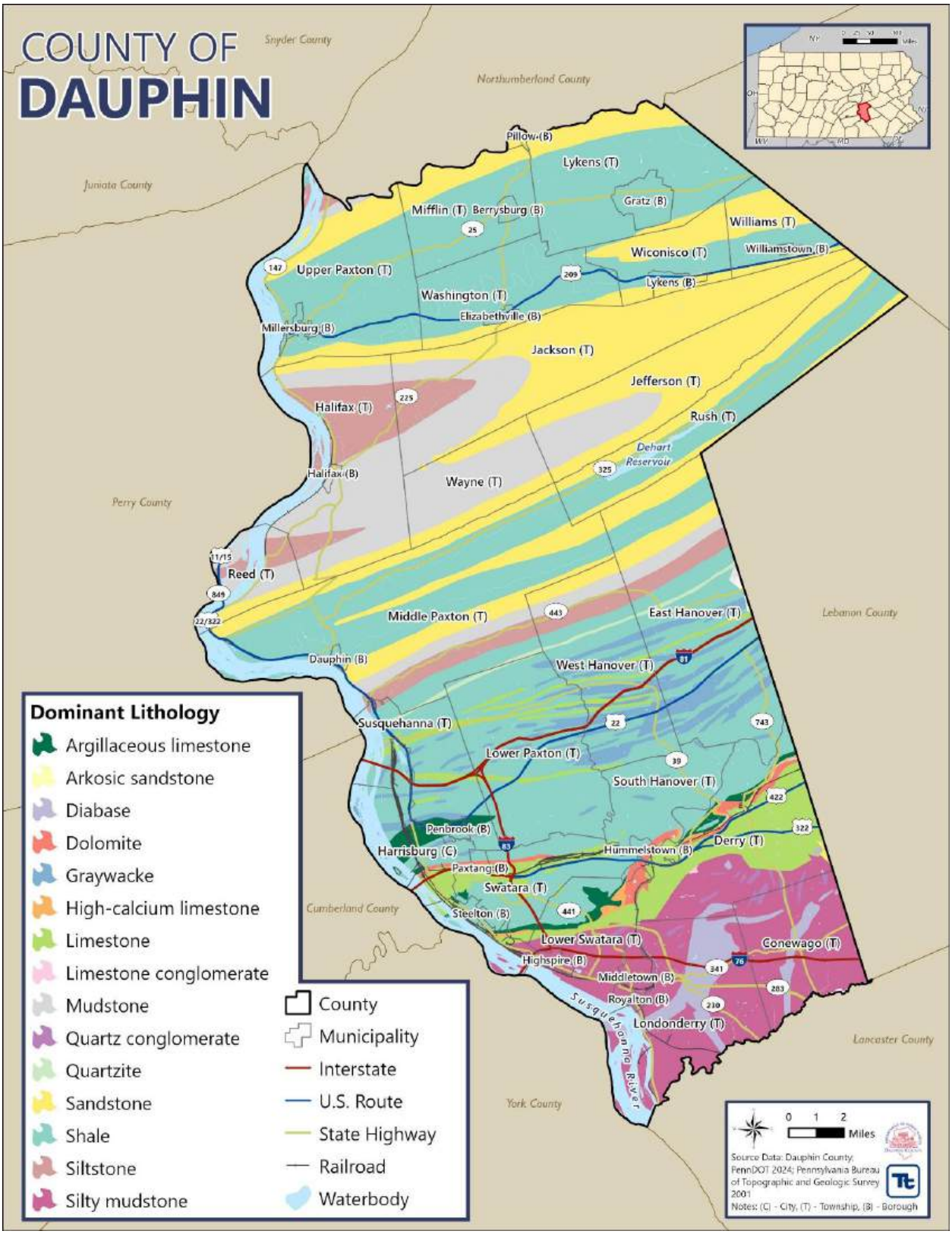


Figure 2.1-2. Geology of the Dauphin County Planning Area



2.1.2 Hydrography and Hydrology

Dauphin County is bordered by the Susquehanna River in the west and is part of the larger Susquehanna River Basin, the largest tributary of the Chesapeake Bay. The Susquehanna River Basin has six subbasins; Dauphin County resides in the Lower Susquehanna Subbasin, the subbasin at the mouth of the River Basin that terminates at the Chesapeake Bay (Susquehanna River Basin Commission 2024).

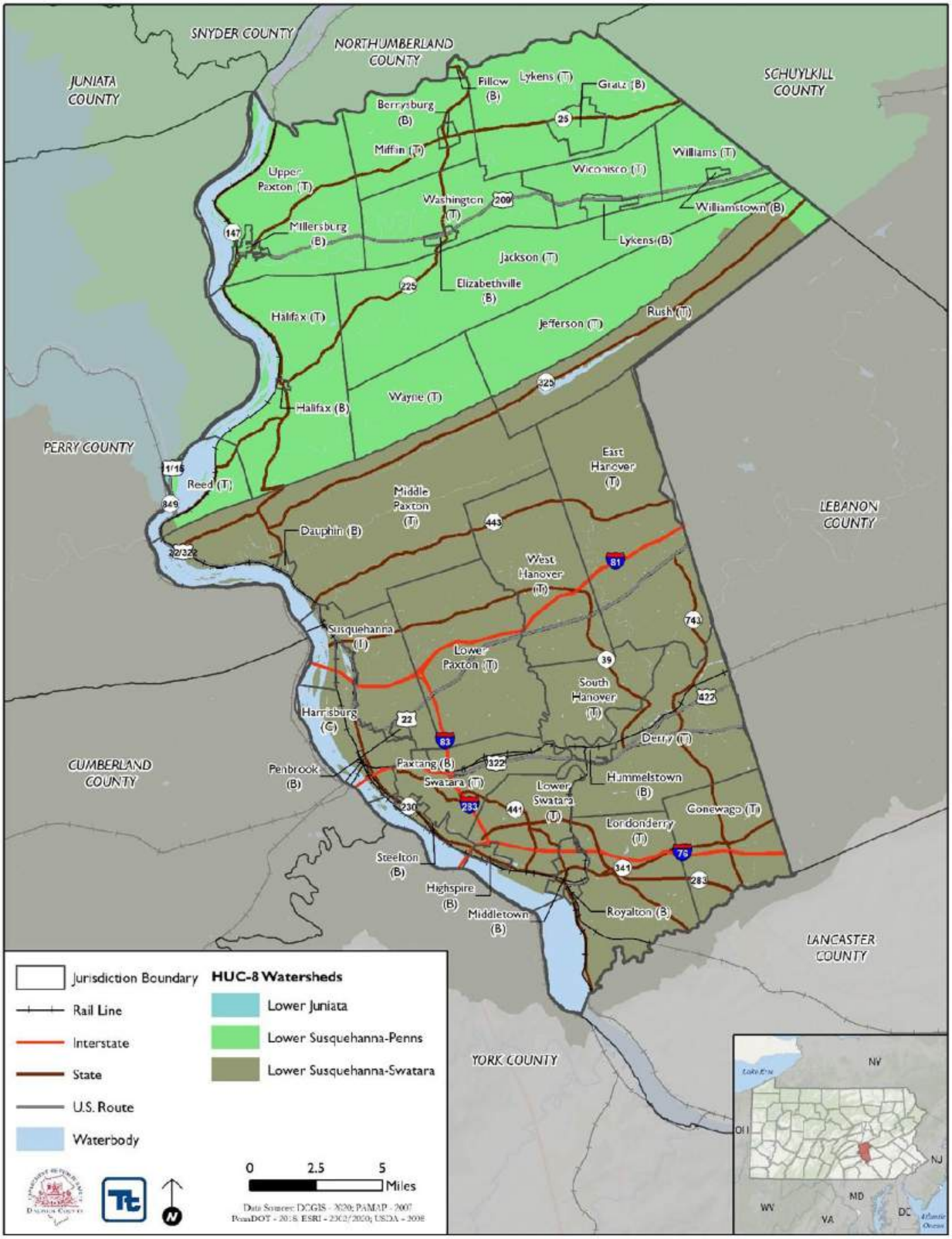
Watersheds

A watershed is an area of land that drains into a body of water, such as a river, lake, stream, or bay. It is separated from other systems by high points in the area, such as hills or slopes. It includes not only the waterway itself but also the entire land area that drains into it. For example, a lake's watershed would include not only the streams entering the lake but also the land area that drains into those streams and eventually the lake. The county has numerous streams and creeks constituting nineteen watersheds (Dauphin County Conservation District 2010). The county's watersheds include Conewago Creek, Spring Creek (East), Swatara Creek, Laurel Run, Bow Creek, Manada Creek, Beaver Creek, Spring Creek (West), Kellock Run, Paxton Creek, Fishing Creek, Stony Creek, Clark Creek, Powell Creek, Armstrong Creek, Gurdy Run, Wiconisco Creek, Mahantango Creek, and the Susquehanna River (Dauphin County Conservation District 2010).

2.1.3 Climate

Dauphin County has a humid continental climate. The annual average temperature is between 45 and 63 degrees, with an average mean temperature of 54 degrees based on data from the Northeast Regional Climate Center. The average high temperature in the summer months of June to August is 75 degrees and the average low December to February is 33 degrees. On average, the county receives 44 inches of rainfall annually (Northeast Regional Climate Center n.d.).

Figure 2.1-3. Watersheds Located Within Dauphin County



2.1.4 Community Facts

Dauphin County consists of 40 municipalities: 23 townships, 16 boroughs, and the City of Harrisburg. Dauphin County's seat is Harrisburg, and the City's population (50,099) represents 17.5% of the County's total population. (U.S. Census Bureau 2020 Decennial).

Dauphin County's economy and settlement patterns have historically been guided and supported by the rich natural resources in the region. Like many other American communities, settlement originally occurred along waterways, followed by rail lines and the interstate highway system in more recent history.

Dauphin County has a strong economy due to the diversity of industries in the region (Tri-County Regional Planning Commission 2017). Health care and social assistance form the largest workforce in Dauphin County, employing over 36,000 workers. The second-largest workforce is in the transportation and trade industries, employing over 35,000 workers. Public administration forms the third largest workforce, with over 22,000 workers. Other larger employment industries include education, accommodation and food, and manufacturing (PA Department of Labor and Industry 2024).

2.1.5 FEMA Lifeline Facilities

Supporting the County are hundreds of critical facilities, and all are essential for the health, safety, and economic stability of the community, especially during emergencies. FEMA defines Community Lifelines as essential services that enable the continued functioning of communities during an emergency. They are categorized into seven primary lifelines:

Safety and Security

- **Law Enforcement:** Local police departments, the Dauphin County Sheriff's Office, and the Pennsylvania State Police barracks in the county.
- **Fire and Emergency Services:** Fire stations throughout the county, including Harrisburg Bureau of Fire, and volunteer fire companies.
- **Emergency Management:** Dauphin County Emergency Management Agency (EMA) oversees coordination and response in conjunction with municipal emergency management capabilities.

Food, Water, Shelter

- **Water Supply Facilities:** Capital Region Water, PA American Water, Veolia PA, and other municipal water authorities ensure potable water.
- **Food Distribution Centers:** Warehouses and distribution hubs for food supplies.
- **Sheltering Locations:** Designated Red Cross and county shelter locations, including schools and community centers.

Health and Medical

- **Hospitals and Medical Facilities:** Penn State Health Milton S. Hershey Medical Center, UPMC Harrisburg, Community Osteopath Hospital, and other local clinics.
- **Emergency Medical Services (EMS):** Ambulance services, University of Pittsburg Medical Center (UPMC) Life Lion, Life Team, South Central EMS, Susquehanna Township EMS, and local EMS providers.

Energy (Power and Fuel)

- **Electric Grid Infrastructure:** Substations operated by PPL Electric Utilities, First Energy and MetEd, and regional power providers.
- **Fuel Facilities:** Gasoline and propane distribution centers.

Communications

- **Emergency Communications Systems:** 911 dispatch centers and radio tower infrastructure.
- **Telecommunications Providers:** Verizon, Comcast, and other local ISPs for phone and internet services.

Transportation

- **Roadways and Bridges:** Major routes such as I-81, I-83, and the Pennsylvania Turnpike, along with critical bridges over the Susquehanna River.
- **Public Transit:** RabbittTransit provides bus services.
- **Airports:** Harrisburg International Airport (HIA) for passenger and cargo transport.
- **Railroad Services:** Includes both passenger and freight transportation services as well as the Rockville Bridge.

Hazardous Material (Management)

- **Chemical Facilities:** Sites registered under the Emergency Planning and Community Right-to-Know Act (EPCRA).
- **Nuclear Facility:** Three Mile Island (monitoring facilities post-decommissioning).
- **Hazardous Materials:** Transported hazardous materials on rail and roadways.

Additional Critical Facilities

- **Schools and Daycare Centers:** Essential for community sheltering and continuity of education.
- **Government Facilities:** Dauphin County Courthouse, Commonwealth of PA Facilities, administrative buildings, and municipal offices.
- **Wastewater Treatment Plants:** Ensuring proper sanitation during emergencies.

This overview highlights the interconnectedness of critical infrastructure, emphasizing the need for coordination among public and private partners to ensure resilience during emergencies.

Figure 2.1-4. FEMA Safety and Security Lifelines in Dauphin County, PA

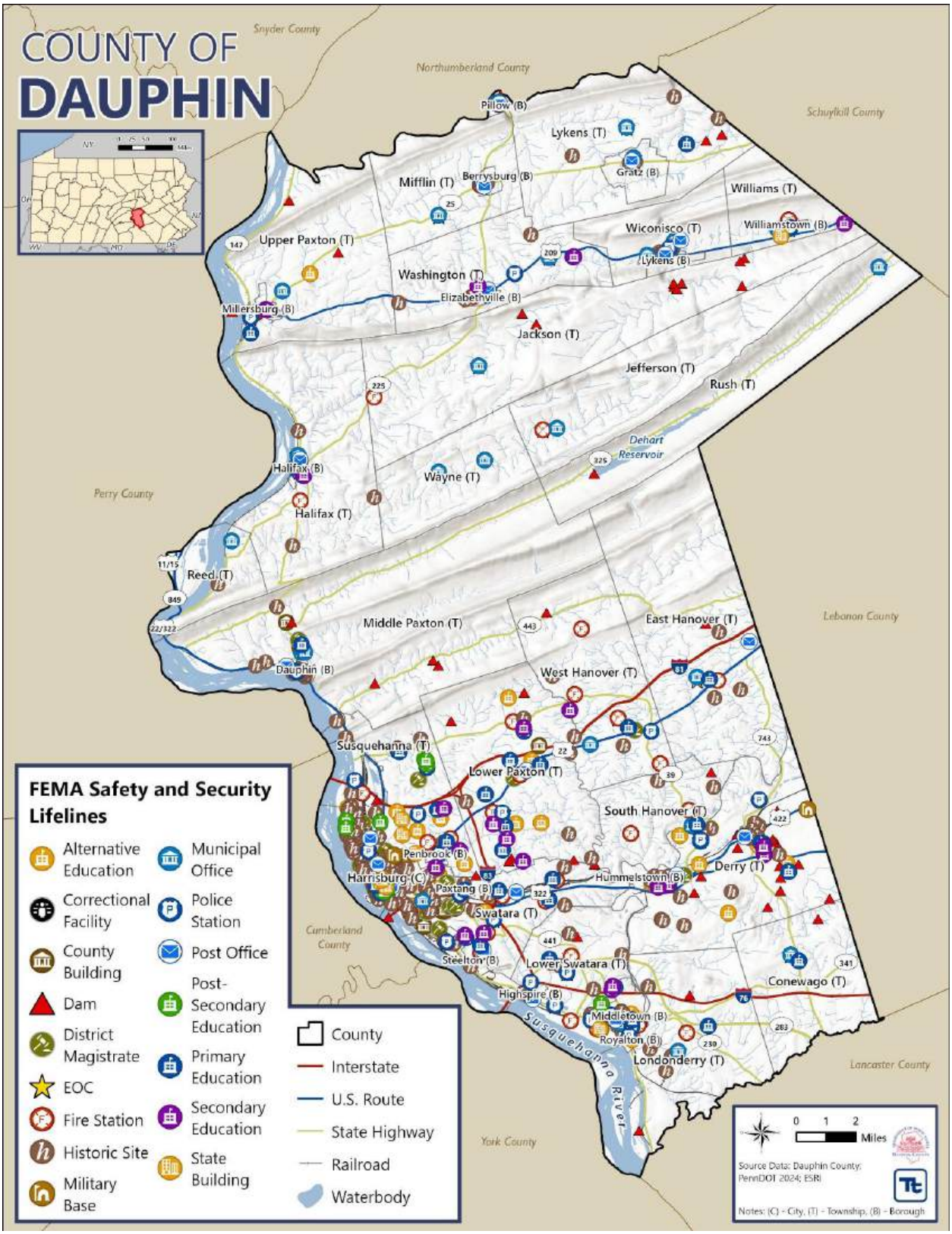


Figure 2.1-5. FEMA Food, Hydration, Shelter Lifelines in Dauphin County, PA

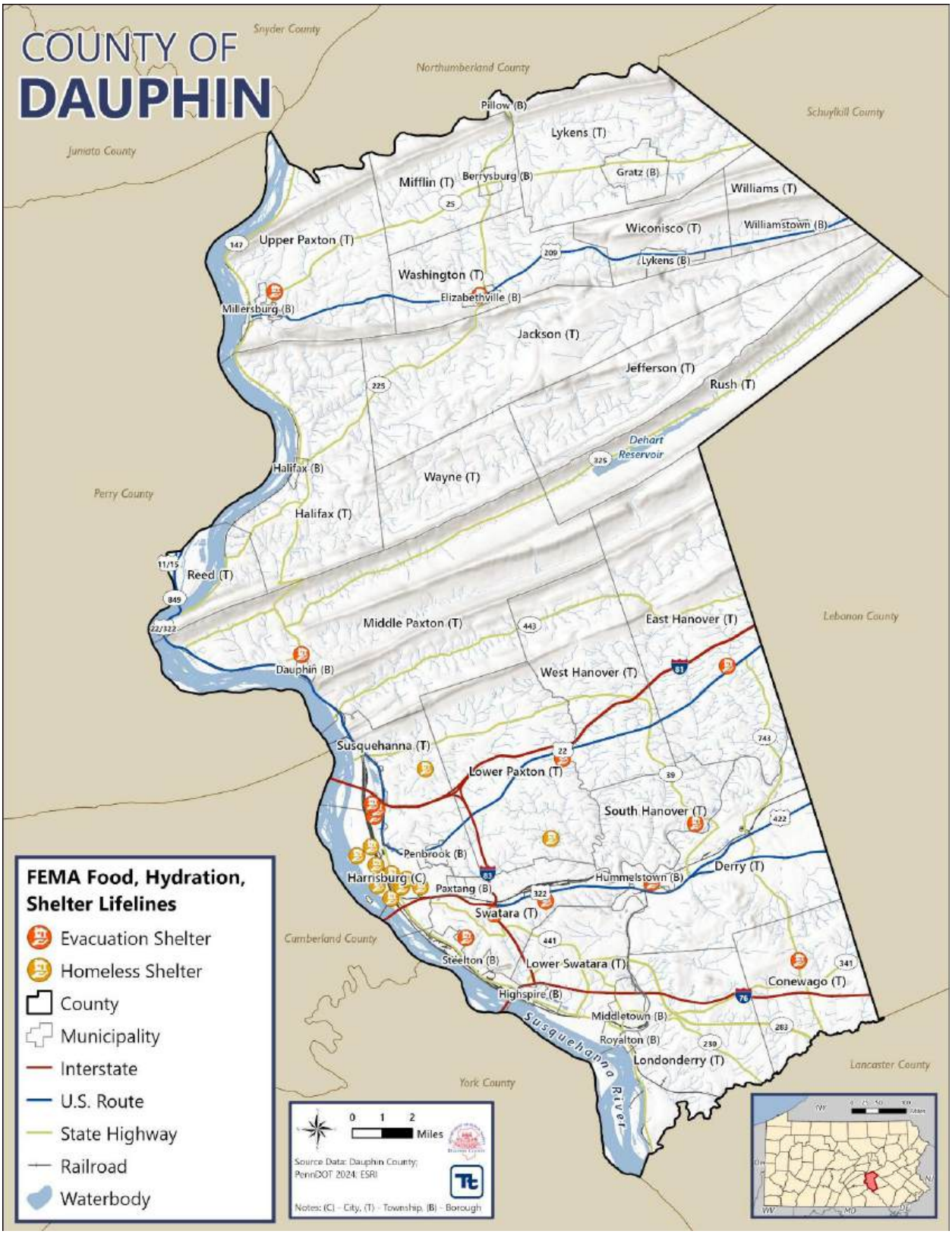


Figure 2.1-6. FEMA Health and Medical Lifelines in Dauphin County, PA

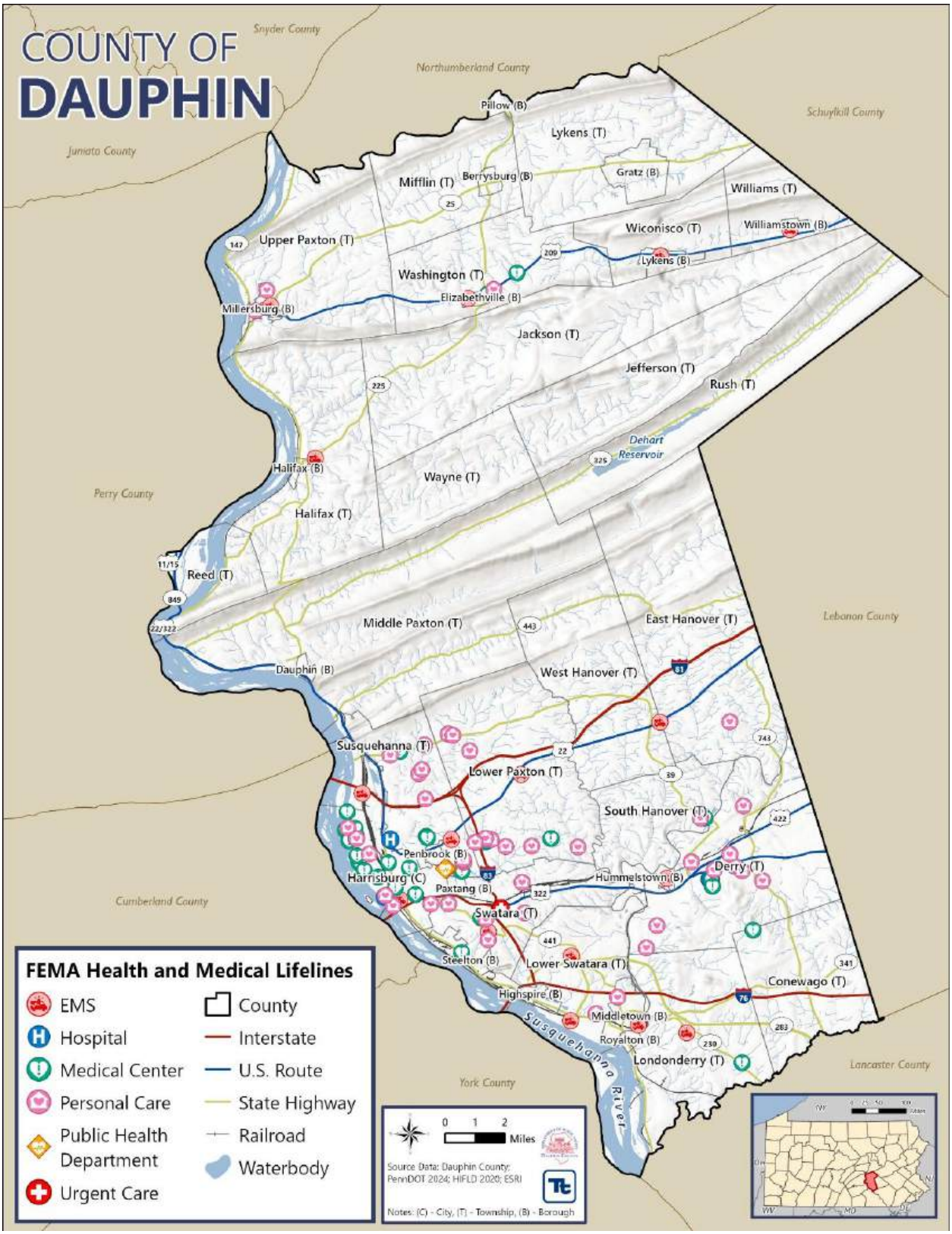


Figure 2.1-7. FEMA Energy Lifelines in Dauphin County, PA

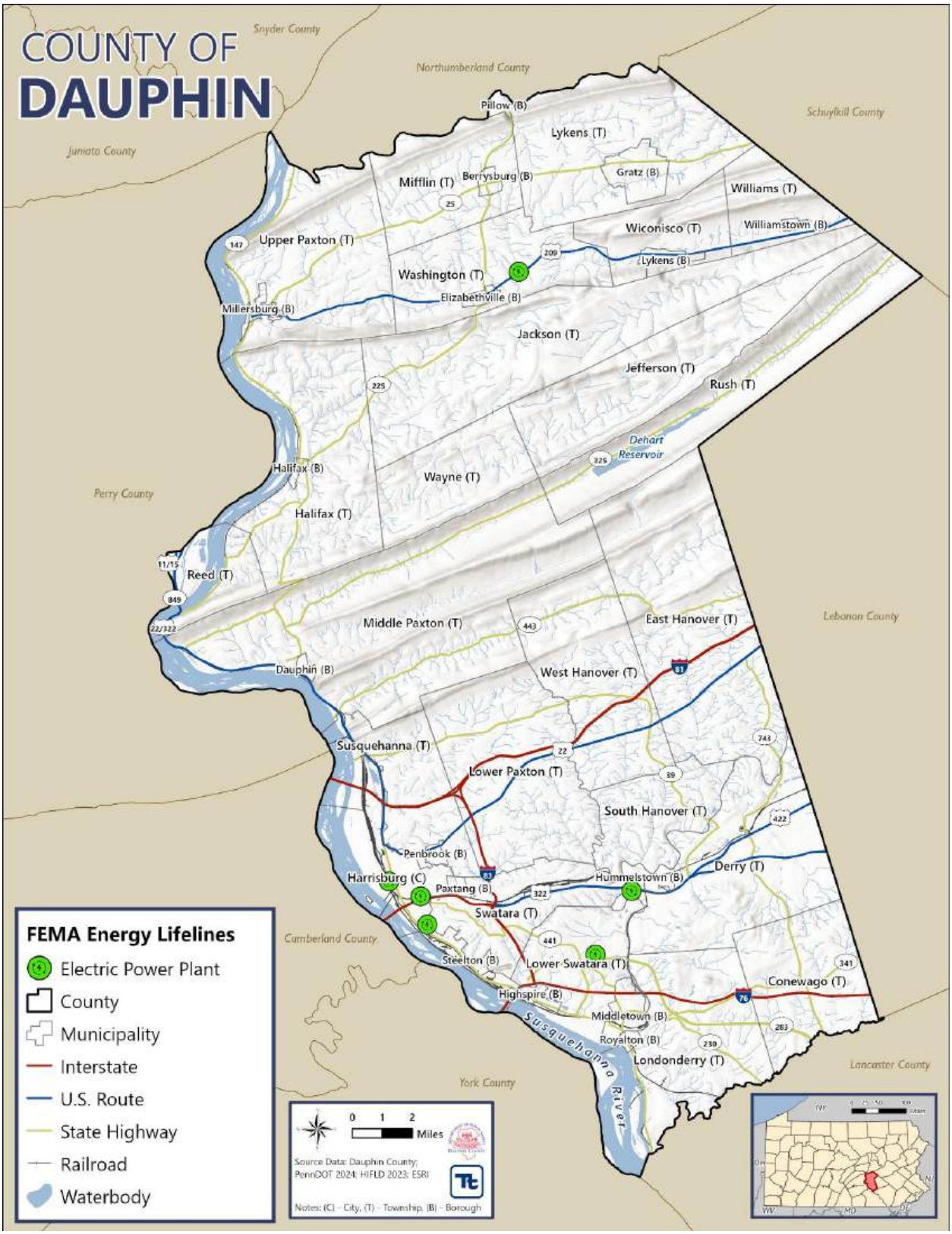


Figure 2.1-8. FEMA Communications Lifelines in Dauphin County, PA

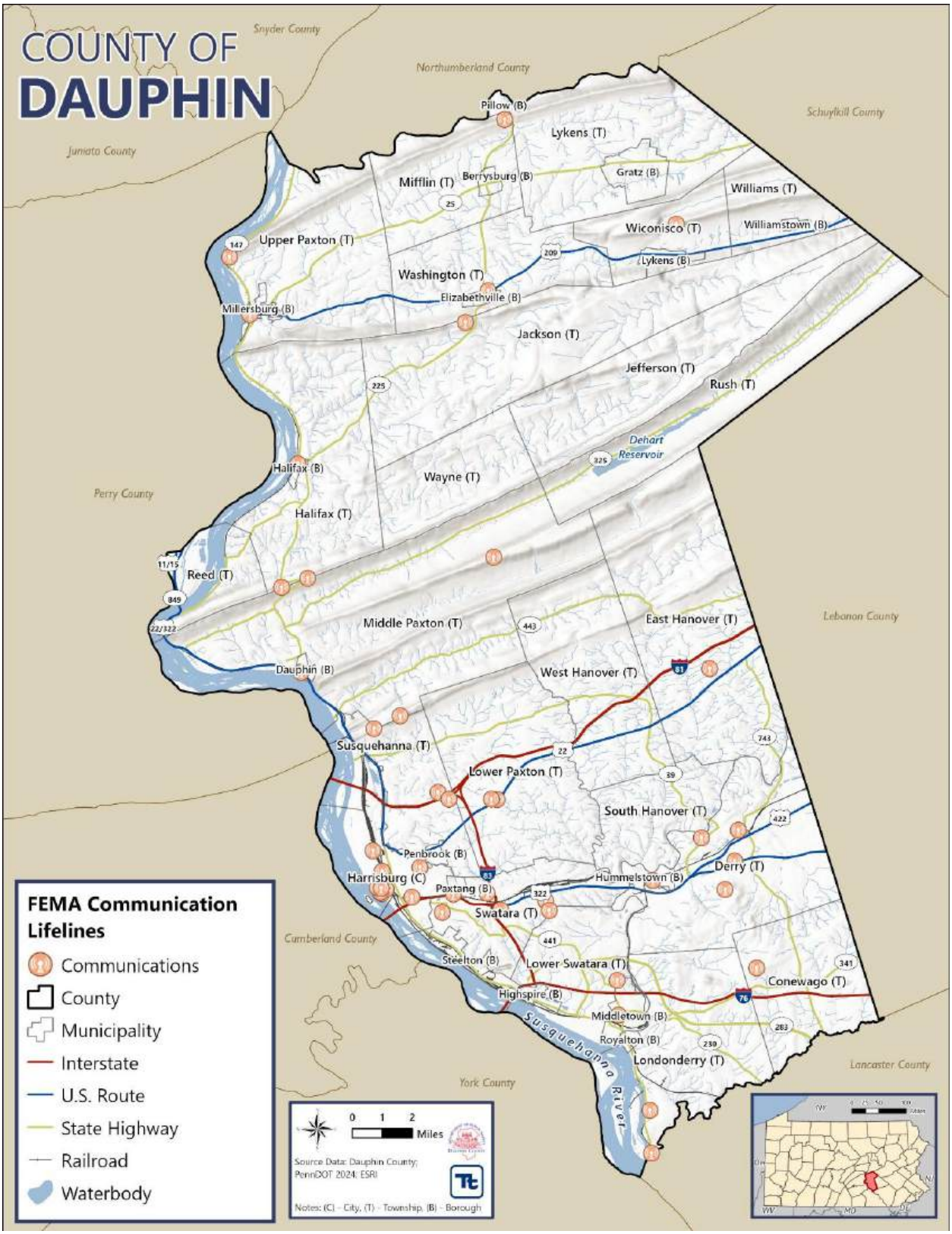


Figure 2.1-9. FEMA Transportation Lifelines in Dauphin County, PA

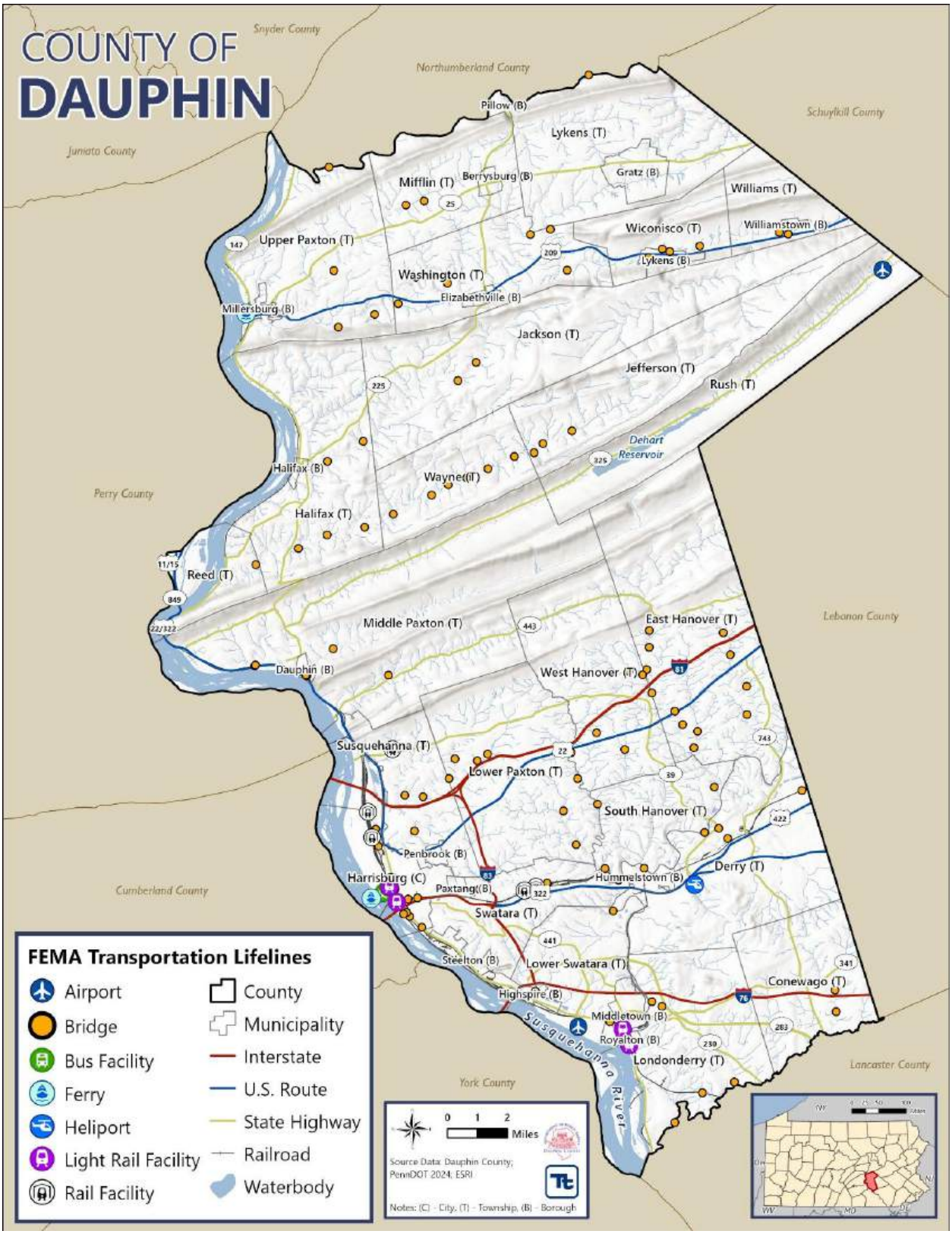


Figure 2.1-10. FEMA Hazardous Materials (Management) Lifelines in Dauphin County, PA

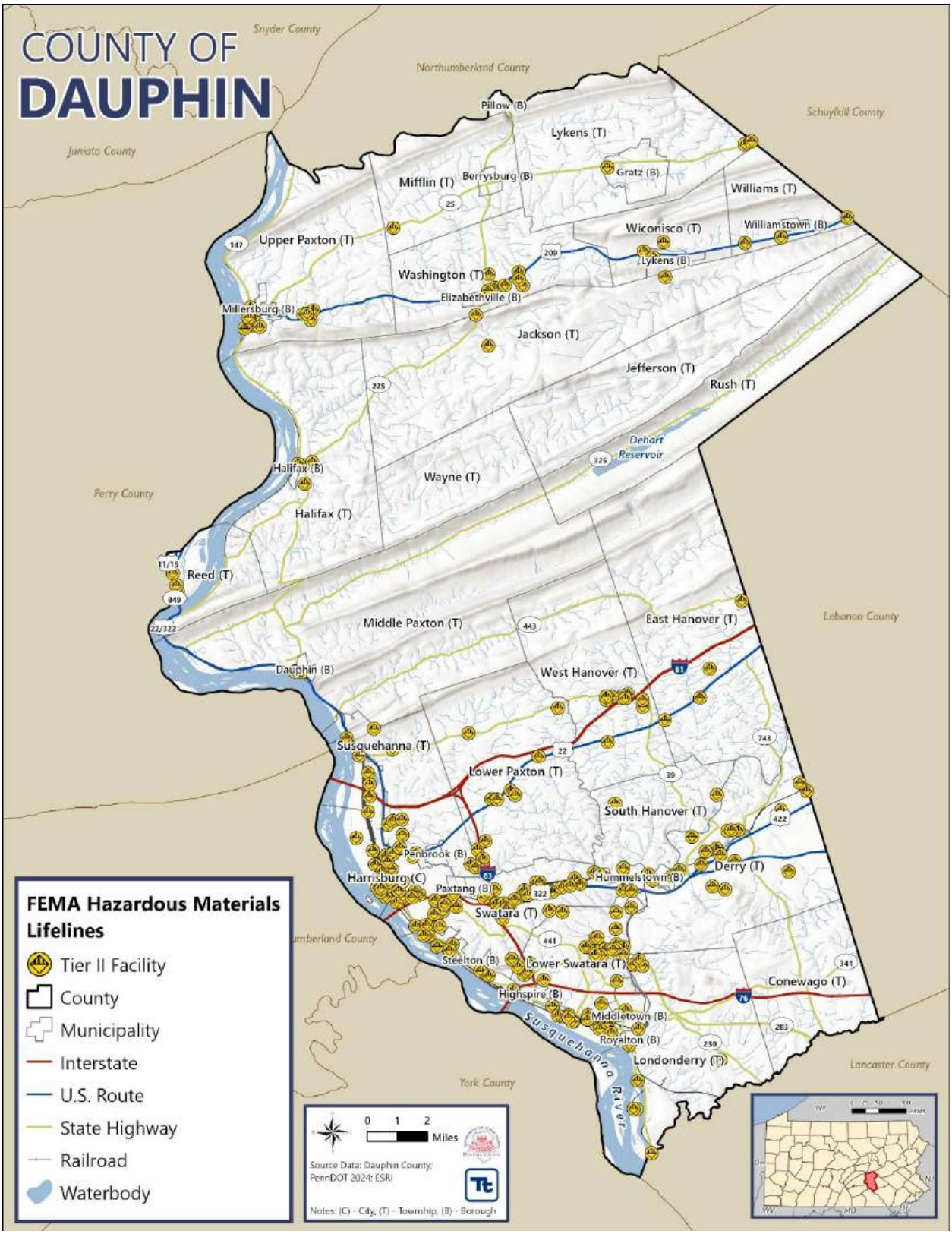
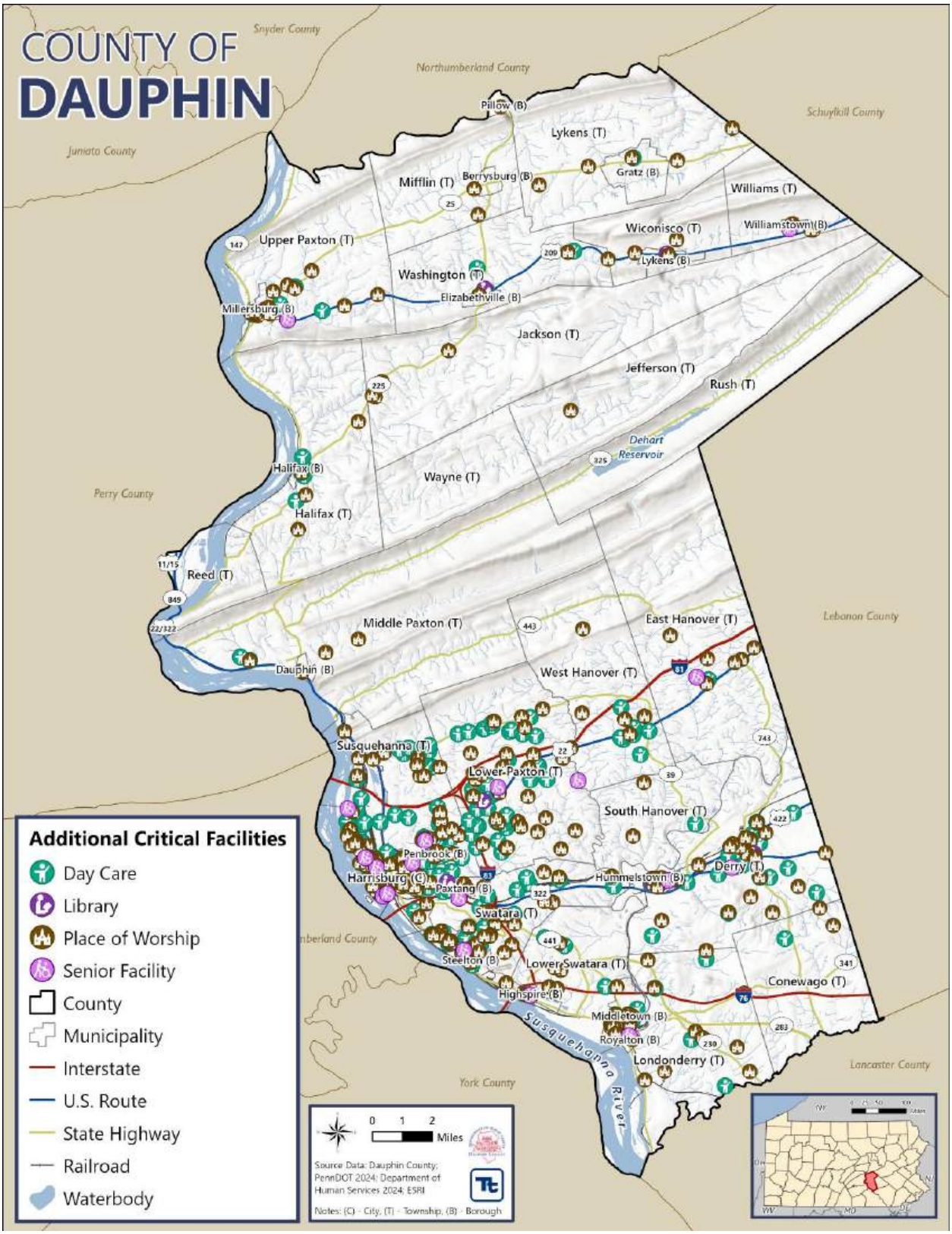


Figure 2.1-11. Additional Critical Facilities in Dauphin County, PA



2.2 POPULATION AND DEMOGRAPHICS

Population and demographic data provide baseline information about residents. Changes in demographics or population may be used to identify higher-risk populations. Maintaining up-to-date data on demographics will allow the county to better assess magnitudes of hazards and develop more specific mitigation plans. According to the 2020 U.S. Census, Dauphin County had a total population of 286,401, which represents a 6.8 percent increase since the 2010 U.S. Census. Population demographics are then summarized in Table 2.2-1.

Table 2.2-1. Dauphin County Population Statistics

Jurisdiction	2000 Census	2010 Census	2020 Census	Population Change 2000-2020	Population Change 2000-2020 (%)	Population Density Per Square Mile
Berrysburg (B)	354	368	326	-28	-8%	538
Conewago (T)	2,847	2,997	2,952	105	4%	178
Dauphin (B)	773	791	795	22	3%	1,904
Derry (T)	21,273	24,679	24,715	3,442	16%	920
East Hanover (T)	5,322	5,718	6,019	697	13%	152
Elizabethville (B)	1,344	1,510	1,357	13	1%	2,487
Gratz (B)	676	765	743	67	10%	247
Halifax (B)	875	841	796	-79	-9%	4,534
Halifax (T)	3,329	3,483	3,349	20	1%	121
Harrisburg (C)	48,950	49,528	50,099	1,149	2%	6,271
Highspire (B)	2,720	2,399	2,741	21	1%	4,022
Hummelstown (B)	4,360	4,538	4,544	184	4%	3,606
Jackson (T)	1,728	1,941	1,827	99	6%	46
Jefferson (T)	327	362	360	33	10%	15
Londonderry (T)	5,224	5,235	4,899	-325	-6%	216
Lower Paxton (T)	44,424	47,360	53,501	9,077	20%	1,911
Lower Swatara (T)	8,149	8,268	9,531	1,382	17%	771
Lykens (B)	1,937	1,779	1,873	-64	-3%	1,557
Lykens (T)	1,095	1,618	1,559	464	42%	60
Middle Paxton (T)	4,823	4,976	5,048	225	5%	93
Middletown (B)	9,242	8,901	9,533	291	3%	4,725
Mifflin (T)	662	784	816	154	23%	53
Millersburg (B)	2,562	2,557	2,545	-17	-1%	3,417
Paxtang (B)	1,570	1,561	1,648	78	5%	4,289
Penbrook (B)	3,044	3,008	3,274	230	8%	7,666
Pillow (B)	304	298	292	-12	-4%	565
Reed (T)	182	239	230	48	26%	39
Royalton (B)	963	907	1,138	175	18%	3,593
Rush (T)	180	231	228	48	27%	10
South Hanover (T)	4,793	6,248	7,209	2,416	50%	634
Steelton (B)	5,858	5,990	6,263	405	7%	3,418
Susquehanna (T)	21,895	24,036	26,736	4,841	22%	1,991

Jurisdiction	2000 Census	2010 Census	2020 Census	Population Change 2000-2020	Population Change 2000-2020 (%)	Population Density Per Square Mile
Swatara (T)	22,661	23,362	27,824	5,163	23%	2,129
Upper Paxton (T)	3,930	4,161	4,010	80	2%	157
Washington (T)	2,047	2,268	2,129	82	4%	122
Wayne (T)	1,184	1,341	1,266	82	7%	92
West Hanover (T)	6,505	9,343	10,697	4,192	64%	466
Wiconisco (T)	1,168	1,210	1,159	-9	-1%	120
Williams (T)	1,135	1,112	1,067	-68	-6%	121
Williamstown (B)	1,433	1,387	1,303	-130	-9%	5,085
Dauphin County (Total)	251,848	268,100	286,401	34,553	14%	550

Source: (US Census Bureau 2020)*;* (Dauphin County 2021)
Notes: (B)=Borough; (C)=City; (T)=Township

Using the 2020 Decennial data, the population density of Dauphin County averages about 550 persons per square mile, which is considerably higher than the Pennsylvania statewide average of 290 persons per square mile (U.S. Census Bureau 2020). Penbrook Borough has the highest population density of all the municipalities in the county (7,666 persons per square mile). 23 municipalities have population densities greater than the statewide average, while the remaining 17 fall below. A low population density means that people are spread throughout the county rather than clustered in groups. Dispersing information, instructions, and resources to residents in low-density areas during a disaster response effort is more difficult than in densely populated areas because individuals are not centralized.

While low-density areas provide challenges to disseminating hazard mitigation information, a low population density also means that hazards will not affect as many people. For example, diseases may not spread as quickly because citizens are in contact with fewer people. Similarly, fires are less likely to spread to other structures because of the large distances between them. The magnitude of an event is typically smaller in a less-populated area because each event affects fewer people and properties.

Figure 2.2-1. Total Population by Census Tract in Dauphin County, PA

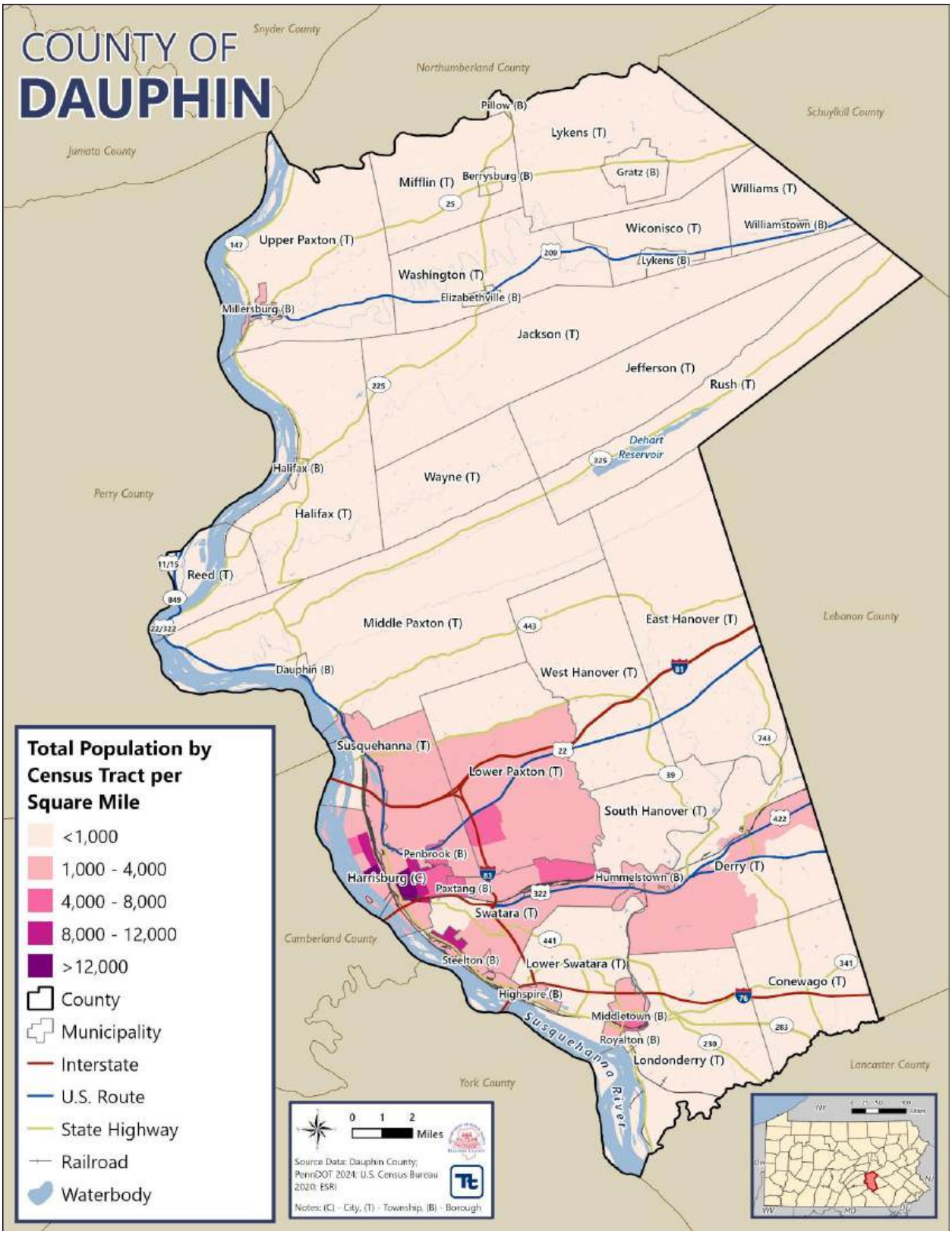


Table 2.2-2. Demographics for Dauphin County

Demographics	2010 Census	2020 Census	2022 ACS 5-Year Estimate
Total Population	268,100	286,401	286,108
Male	129,619	139,248	139,108
Female	138,481	147,153	146,120
Median age (years)	39.4	39.8	39.4
Under 5 years	16,794	16,354	17,208
18 years and over	205,885	224,493	222,515
65 years and over	35,844	50,339	49,936
Total households	120,406	116,761	126,567
Group quarters population	6,780	6,581	N/A

Source: (US Census Bureau 2020)

Based upon Table 2.2-2, it is estimated that roughly 2.5 percent of Dauphin County's population lives in group quarters. The term "group quarters" refers to people living in communal settings, which can include inmates in a prison, students in a dorm, or elderly or mentally disabled individuals living in group care homes. Residents living in group quarters are often access and functional needs populations. It is important to ensure that each group quarter facility has its emergency plan to account for the unique needs of its residents during a hazard event.

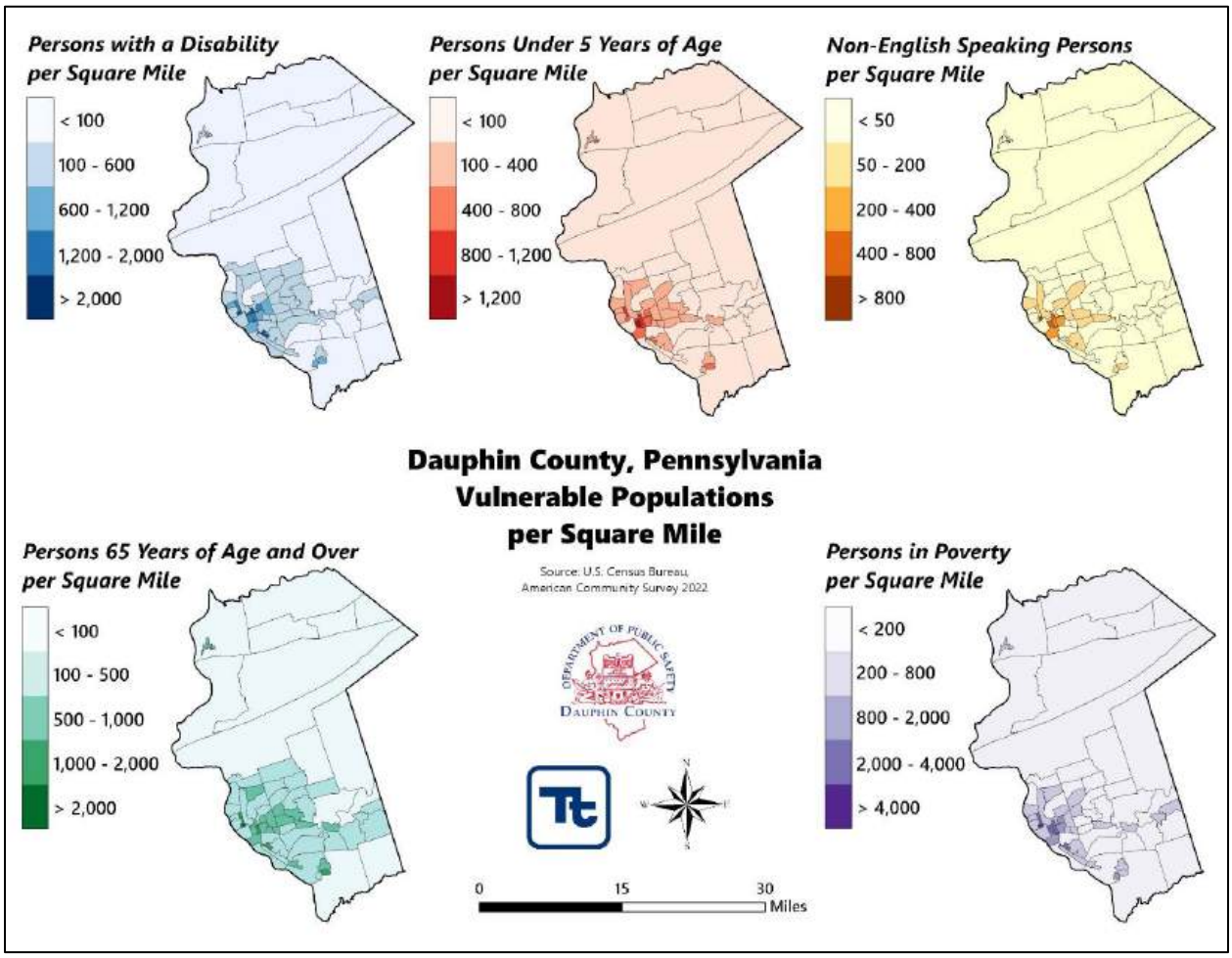
2.2.1 Vulnerable Populations

The DMA 2000 requires HMPs to consider socially vulnerable populations, which are populations or groups who have access and functional needs, including, but not limited to people without vehicles, people with disabilities, older adults, and people with limited English proficiency (Centers for Disease Control and Prevention 2022). These populations can be more susceptible to hazard events based on a number of factors, including their physical and financial ability to react or respond to a hazard and the location and construction quality of their housing.

Identifying concentrations of vulnerable populations can assist communities in targeting preparedness, response, and mitigation actions. Populations with a higher level of vulnerability may be more seriously affected during an emergency or disaster. For example, differences in age, income, disabilities, and English proficiency affect people's ability to cope with the effects of disasters. Individuals may also face compounding barriers because they may fall within multiple categories of vulnerability.

For this plan, information collected through the National Risk Index (NRI), Centers for Disease Control and Prevention (CDC)/Agency for Toxic Substances and Disease Registry (ATSDR) Social Vulnerability Index (SVI), U.S. Census Bureau Decennial Census and American Community Survey (ACS), and other sources characterizes Dauphin Country's vulnerable populations and barriers contributing to social vulnerability. It is important to note there are multiple resources available to assess social vulnerability and more specific barriers and challenges.

Figure 2.2-2. Vulnerable Populations in Dauphin County, PA

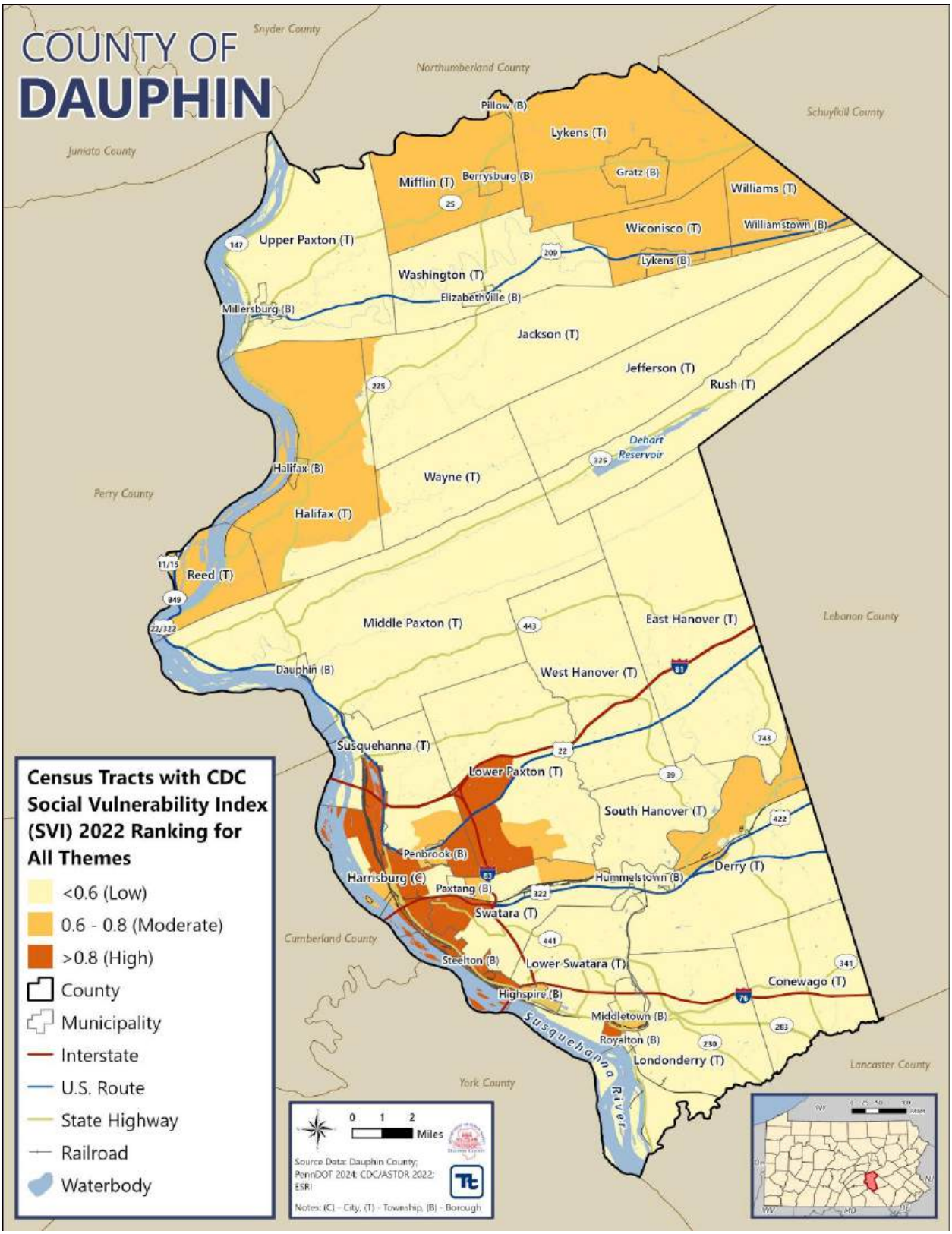


National Risk Index (NRI)

The NRI is a resource made available by FEMA to provide data to communities for 18 natural hazards. This index defines risk as the potential for negative impacts as a result of a natural hazard. The tool incorporates expected annual loss from natural hazards, social vulnerability, and community resilience. Within the NRI tool, a social vulnerability score and rating represents the relative level of a community's social vulnerability compared to all other communities at the same level; the score is measured on a national percentile starting at zero and increasing to 100, with 100 being the highest (FEMA 2021). Dauphin County's overall NRI social vulnerability is 53.15, meaning social vulnerability in the County is greater than 53.15 percent of all U.S. communities. A score is also calculated for each census tract.

Figure 2.2-3 depicts the social vulnerability score for census tracts in Dauphin County. A majority of the County is within the relatively low to moderate vulnerability categories, whereas areas surrounding Harrisburg display very high social vulnerability.

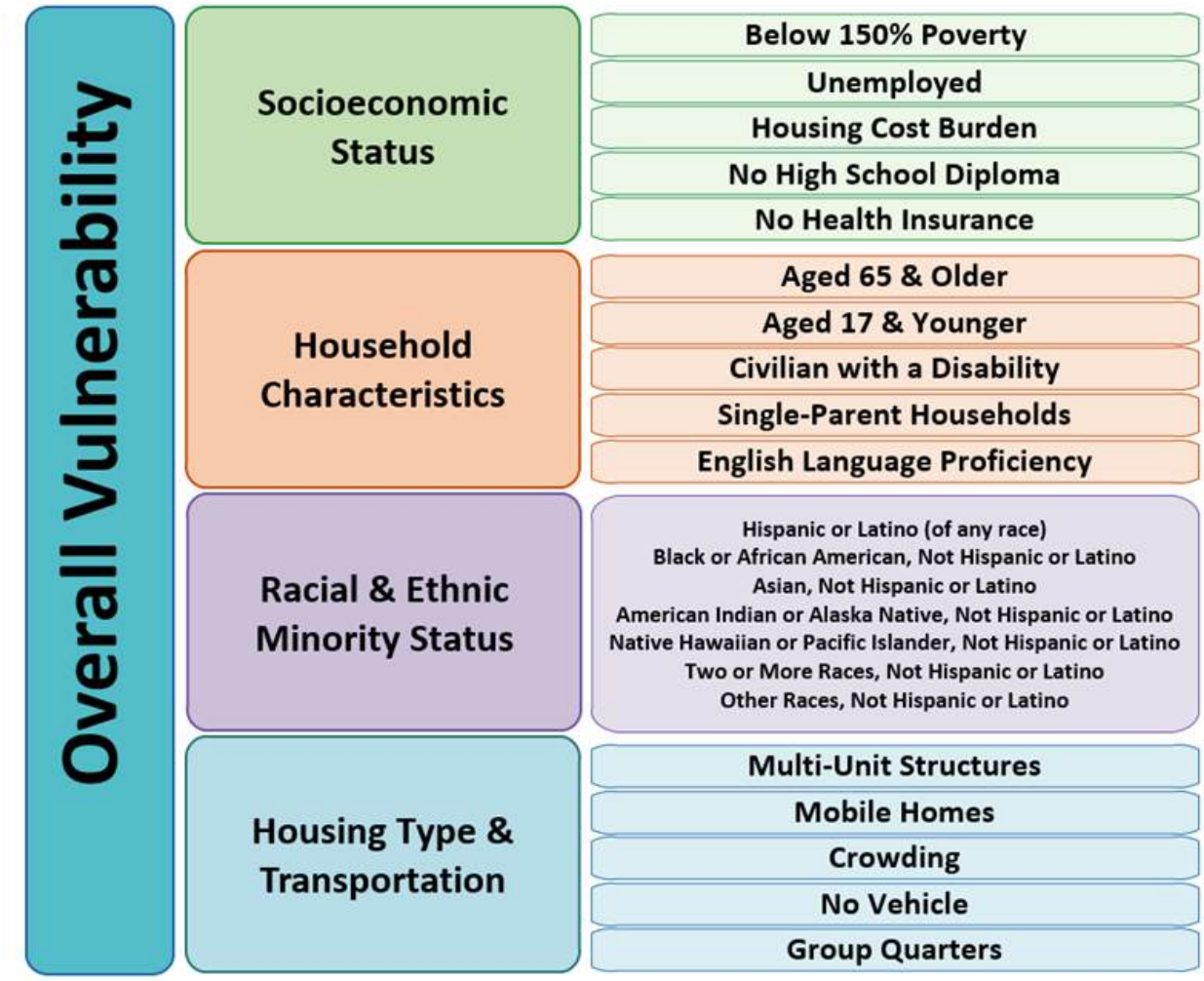
Figure 2.2-3. CDC Social Vulnerability Index (SVI) in Dauphin County, PA



Social Vulnerability Index

The CDC/ATSDR SVI is a combination of 16 different social factors that contribute to social vulnerability as shown in Figure 2.2-4. These social factors are grouped into four themes to indicate social vulnerability concerning socioeconomic status, household characteristics, racial and ethnic minority status, and housing type and transportation. The vulnerability index is established by combining all the factors. The SVI data provides a visualization of geographic areas with higher social vulnerability.

Figure 2.2-4. CDC/ATSDR SVI Social Factors



Source: CDC/ATSDR 2020

U.S. Decennial Census and American Community Survey

When assessing social vulnerability, an individual may be categorized into one or more populations that experience a disproportionately higher vulnerability to emergencies and disasters. Quantitative data indicates what proportion of the community they represent, but applying a qualitative lens of intersectionality illuminates how and why these individuals may be impacted disproportionately by disasters. It is important to recognize that this data only accounts for those individuals who participated and responded to the 2020 U.S. Decennial Census and 2017-2022 ACS. Census data may be incomplete and not provide a full depiction of the County's population due to multiple factors, including distrust of government officials or programs, immigration status, or other factors.

Within Dauphin County, there are many individuals and groups who may experience one or more factors that contribute to heightened vulnerability. Approximately 17.4 percent of the county's population is over the age of 65, accounting for 49,936 individuals. The second highest percentage of individuals experiencing heightened social vulnerability are those individuals with a disability, representing 12.7 percent of the County's total population. The following sections provide a brief overview of how different factors of social vulnerability contribute to a heightened risk of hazards.

Age

Children are considered vulnerable to hazard events because they are dependent on others to safely access resources during emergencies and may experience increased health risks from hazard exposure. Older adults are more apt to lack the physical and economic resources necessary to respond to hazard events and are more likely to suffer health-related consequences. Those older adults living on their own may have more difficulty evacuating their homes. Older adults are also more likely to live in senior care and living facilities where emergency preparedness occurs at the discretion of facility operators.

According to the 2022 American Community Survey 5-Year Estimate, the median age in Dauphin County was 39 years. Approximately 17.4 percent of the County's total population is aged 65 and older. Older residents may have access and functional needs that require particular mitigation actions to address. For example, many older residents may be unable to drive, and special evacuation plans may be necessary for this population. They may also have hearing or vision impairments that could make receiving emergency instructions difficult.

Additionally, 6.0 percent of the County's total population is under the age of five. Both older and younger populations have higher risks of contracting certain diseases. The County's combined population under five years of age and over 65 years of age represents approximately 23.4 percent of its total population.

Income

The 2022 American Community Survey 5-Year Estimates indicate that the median household income in Dauphin County was $74,159 and the poverty rate was 12.9 percent (U.S. Census 2023). The U.S. Census Bureau identifies households with two adults and two children with an annual household income below $30,900 per year as living in poverty (U.S. Census 2024).

Household income has many implications for disaster preparedness and post-disaster recovery. Households and individuals that are low-income may struggle to afford disaster preparedness measures, such as purchasing flood insurance for their homes (SAMHSA 2017). Low-income households may have a more difficult time evacuating during hazard events due to financial and employment barriers. Additionally, low-income and impoverished individuals and households often live in lower-quality housing that is in more hazard-prone areas than their higher-income peers (SAMHSA 2017).

Race and Ethnicity

Black, Indigenous, and People of Color (BIPOC) often experience more profound short- and long-term impacts from disasters than their white peers. A meta-analysis of recent research found that "multiple studies of heat, extreme cold, hurricanes, flooding, and wildfires find evidence that people of color, including Black, Latinx, Native American, Pacific Islander, and Asian communities are at higher risk of climate-related health impacts than Whites… Studies of adults have found evidence of racial disparities related to climatic changes with respect to mortality, respiratory and cardiovascular disease, mental health, and heat-related illness… and infants and children of color have experienced adverse perinatal outcomes, occupational heat stress, and increases in emergency department visits associated with extreme weather" (Berberian, Gonzalez and Cushing 2022).

Dauphin County has a growing population of BIPOC residents, increasing from 25.7 percent of the total population in 2010 to 33.5 percent of the population in 2022. As the County's demographics continue to shift, future mitigation actions should account for the particular needs of communities of color.

Table 2.2-3. Race and Ethnicity Population Summary for Dauphin County, PA

Race and Ethnicity	2020	% of Population	2022	% of Population
One race	264,899	92.5%	270,193	94.4%
White	180,980	63.2%	190,327	66.5%
Black or African American	50,868	17.8%	52,798	18.5%
American Indian and Alaska Native	799	0.3%	769	0.3%
Asian	17,277	6.0%	16,319	5.7%
Native Hawaiian and Other Pacific Islander	109	0.0%	335	0.1%
Some other race	14,866	5.2%	9,645	3.4%
Two or more races	21,502	7.5%	15,915	5.6%
Foreign born	22,625	7.9%	24,838	8.7%
Speak a language other than English	31,383	12.1%	36,995	13.0%
Hispanic or Latino	31,251	10.9%	29,871	10.4%

Source: U.S. Census Bureau 2020 Decennial; U.S. Census Bureau 2022 ACS Vulnerable Population Totals

Access and Functional Needs

Persons with a disability include those who have physical, sensory, or cognitive impairment that might limit a major life activity (Centers for Disease Control and Prevention 2020). These impairments may increase the level of difficulty that individuals may face during an emergency. Cognitive impairments may reduce an individual's capacity to receive, process, and respond to emergency information or warnings. Individuals with a physical or sensory disability may face issues of mobility, sight, and hearing, or rely on specialized medical equipment or supplies that may become inaccessible during a hazard event. According to the 2022 American Community Survey 5-Year Estimates, 12.7 percent of residents of Dauphin County are living with a disability.

Limited-English Proficiency

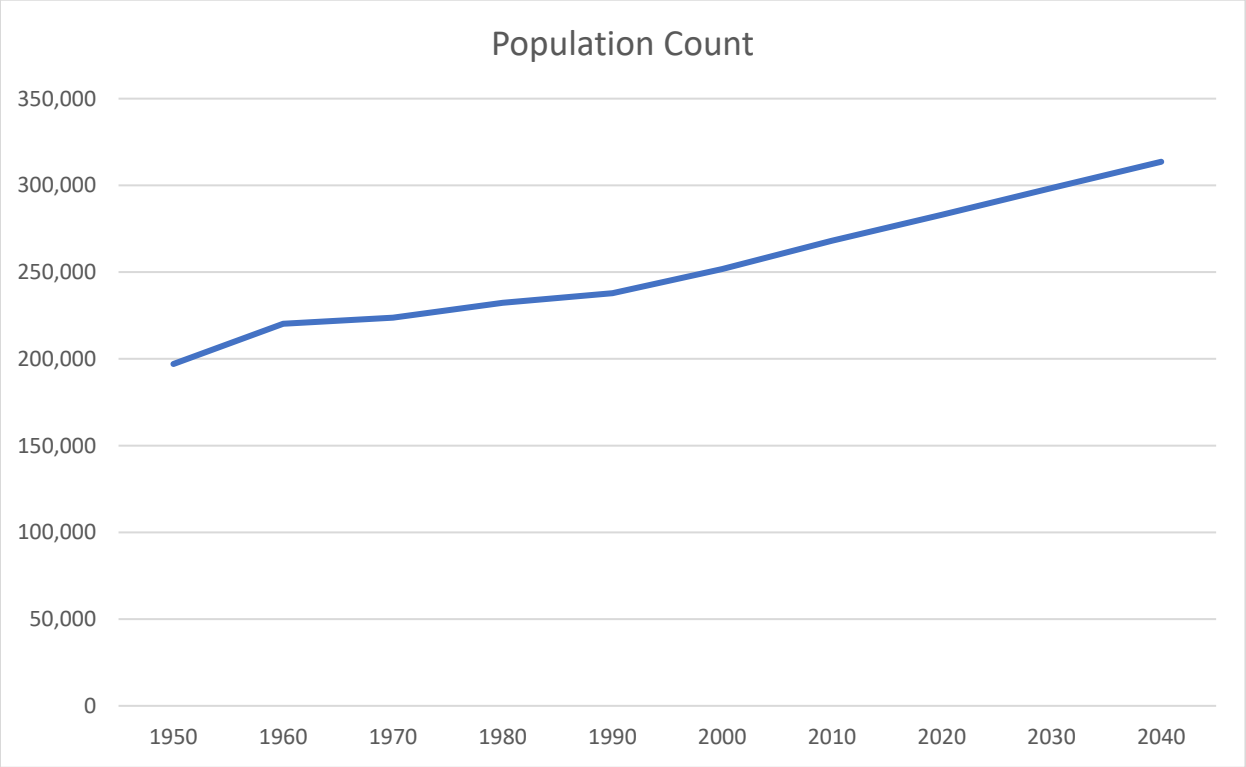
Individuals who are not fluent or do not possess a working proficiency in English are vulnerable because they may have difficulty understanding the information being conveyed to them. Cultural differences can also add complexity to how information is being conveyed to populations with limited proficiency in English (Centers for Disease Control and Prevention 2021). According to the 2022 American Community Survey 5-Year Estimates, 13.1 percent of residents over the age of five primarily speak a language other than English at home. Of the 16,744 individuals who reported speaking English less than "very well," 47.4 percent speak Spanish, 47.6 percent speak other Indo-European languages, 51.9 percent speak Asian and Pacific Island Languages, and 39.6 percent speak other languages (U.S. Census 2022). Future hazard mitigation strategies should consider addressing language barriers to ensure that all residents can receive emergency instructions. Table 2.2-4 summarizes race and ethnicity population information, including English proficiency, for Dauphin County.

Population and Demographic Trends

This section discusses population trends to use as a basis for estimating future changes that could result from the seasonal character of the population and significantly change the character of the area. Population trends can provide a basis for making decisions on the type of mitigation approaches to consider and the locations in which these approaches should be applied. This information can also be used to support planning decisions regarding

future development in vulnerable areas. Various Census Bureau products were used as sources for the population trends section. The Decennial Census is the official population count taken every 10 years. In addition to the U.S. Census historic counts, the population projections from the Pennsylvania State Data Center and the Pennsylvania Department of Environmental Protection were utilized to provide insight into future population trends. The county's population experienced a gradual increase in the mid to late 20th century and continued to grow steadily through the first three decades of the 21st century. The population is projected to continuously increase through 2040.

Figure 2.2-5. Dauphin County Population Change, 1950 - 2040



Source: Pennsylvania State Data Center for the Center for Rural Pennsylvania 2013, Pennsylvania Department of Environmental Protection 2012, 2000 U.S. Census Bureau 2000, 2010 U.S. Census Bureau 2010, and 2020 U.S. Census Bureau

Population changes at the municipal level are also important to capture to better understand changing populations within the county and where the concentration of population resides. Table 2.2-5 provides population change and projections in population for each municipality. The population of the entire county is projected to be 313,620 by the year 2040, which represents a net population increase of 45,520 people in 30 years. As shown in the table below, 60 percent of municipalities in Dauphin County are projected to see an increase in population. The table also shows that 16 municipalities are projected to see a decrease in population. It should be noted that changes in population or demographics may be used to identify higher-risk populations. Maintaining up-to-date data on demographics will allow Dauphin County to better assess magnitudes of hazards and develop more specific mitigation plans and strategies.

Table 2.2-4. Dauphin County Population Projections by Municipality

Municipality	2000 Census	2010 Census	2020 Census	2030 Projection	2040 Projection	Population Change Estimate	Projected Population Change 2010- 2040 (%)
Berrysburg (B)	354	368	326	367	365	-3	-1%
Conewago (T)	2,847	2,997	2,952	3,187	3,279	282	9%
Dauphin (B)	773	791	795	775	762	-29	-4%
Derry (T)	21,273	24,679	24,715	31,049	34,222	9,543	39%
East Hanover (T)	5,322	5,718	6,019	6,801	7,351	1,633	29%
Elizabethville (B)	1,344	1,510	1,357	1,606	1,647	137	9%
Gratz (B)	676	765	743	854	896	131	17%
Halifax (B)	875	841	796	771	737	-104	-12%
Halifax (T)	3,329	3,483	3,349	3,567	3,603	120	3%
Harrisburg (C)	48,950	49,528	50,099	47,415	46,266	-3,262	-7%
Highspire (B)	2,720	2,399	2,741	2,085	1,935	-464	-19%
Hummelstown (B)	4,360	4,538	4,544	5,058	5,323	785	17%
Jackson (T)	1,728	1,941	1,827	2,137	2,228	287	15%
Jefferson (T)	327	362	360	356	351	-11	-3%
Londonderry (T)	5,224	5,235	4,899	5,491	5,626	391	7%
Lower Paxton (T)	44,424	47,360	53,501	55,131	59,070	11,710	25%
Lower Swatara (T)	8,149	8,268	9,531	9,288	9,820	1,552	19%
Lykens (B)	1,937	1,779	1,873	1,552	1,441	-338	-19%
Lykens (T)	1,095	1,618	1,559	2,071	2,286	668	41%
Middle Paxton (T)	4,823	4,976	5,048	4,886	4,833	-143	-3%
Middletown (B)	9,242	8,901	9,533	8,488	8,289	-612	-7%
Mifflin (T)	662	784	816	917	980	196	25%
Millersburg (B)	2,562	2,557	2,545	2,415	2,340	-217	-8%
Paxtang (B)	1,570	1,561	1,648	1,527	1,509	-52	-3%
Penbrook (B)	3,044	3,008	3,274	3,172	3,261	253	8%
Pillow (B)	304	298	292	261	241	-57	-19%
Reed (T)	182	239	230	244	243	4	2%
Royalton (B)	963	907	1,138	758	683	-224	-25%
Rush (T)	180	231	228	274	294	63	27%
South Hanover (T)	4,793	6,248	7,209	8,107	9,006	2,758	44%
Steelton (B)	5,858	5,990	6,263	6,723	7,102	1,112	19%
Susquehanna (T)	21,895	24,036	26,736	29,231	31,854	7,818	33%
Swatara (T)	22,661	23,362	27,824	26,659	28,359	4,997	21%
Upper Paxton (T)	3,930	4,161	4,010	4,639	4,878	717	17%
Washington (T)	2,047	2,268	2,129	2,718	2,943	675	30%
Wayne (T)	1,184	1,341	1,266	1,769	1,986	645	48%

Municipality	2000 Census	2010 Census	2020 Census	2030 Projection	2040 Projection	Population Change Estimate		Projected Population Change 2010- 2040 (%)
West Hanover (T)	6,505	9,343	10,697	12,678	14,312	4,969		53%
Wiconisco (T)	1,168	1,210	1,159	1,093	1,029	-181		-15%
Williams (T)	1,135	1,112	1,067	1,076		1,058	-54	-5%
Williamstown (B)	1,433	1,387	1,303	1,271		1,212	-175	-13%
Dauphin County (Total)	**251,848**	**268,100**	**286,401**	**298,465**	**313,620**	**45,520**		**15%**

Sources: U.S. Census Bureau, Dauphin County 2021

Dauphin County has an estimated 128,573 housing units. These properties may be vulnerable to various natural hazards, particularly those located in defined hazard areas. Damage to residential properties is not only costly to repair or rebuild but devastating to the displaced residents.

According to the U.S. Census, approximately 5.3 percent of the county's residential properties are vacant. Vacant buildings are particularly vulnerable to arson and criminal activity. Because vacant properties are not inhabited year-round or may not be adequately maintained, many are structurally deficient and at risk of collapse.

Approximately 37.9 percent of the county's housing units are renter-occupied. Because renters are more transient than homeowners, communicating with renters may be more difficult than communicating with homeowners. Similarly, communications with tourists would be harder during an emergency event. Communication strategies should be developed to ensure that these populations receive proper notifications. Table 2.2-5 summarizes the characteristics of the residential properties in Dauphin County.

Table 2.2-5. Housing Characteristics in Dauphin County

Housing Characteristics	2010	2023
Total housing units	120,406	128,573
Owner-occupied housing units	71,491	75,592
Renter-occupied housing units	38,944	46,181
Vacant housing units	9,971	6,800
Median value (dollars)	158,800	239,800
Housing units with a mortgage	47,210	46,028
Housing units without a mortgage	23,231	29,564

Source: U.S. Census Bureau 2010, U.S. Census, ACS 1-Year Estimates 2023

In 2023, the median household income in the county was $74,170, which was lower than the Commonwealth of Pennsylvania's estimated median household income of $76,081 (U.S. Census 2023). Approximately 9.2 percent of families' incomes in Dauphin County were below the poverty level, and 13.3 percent of its individuals' incomes were below the poverty level. Emergency responders may have difficulty connecting with individuals within this economic bracket for several reasons, including less access to the Internet within these communities. Additionally, some low-income families and individuals may not own vehicles and therefore could be more vulnerable during an evacuation. Table 2-2.6 summarizes the economic characteristics of Dauphin County's population and the population distribution of residents with incomes below the poverty level.

Table 2.2-6. Economic Characteristics in Dauphin County

Economic Characteristics	2010 Census	2023 ACS 5-Year Estimate
Median household income	$52,177	$74,170
Median family income	$62,499	$95,433
Per capita income	$28,031	$41,034
Families with income below the poverty level	10.9%	9.2%
Individuals with income below the poverty level	14.4%	13.3%

Source: Dauphin County 2021; U.S. Census 2023

Figure 2.2-6. Total Residential Cost Value(RCV) per Census Tract in Dauphin County, PA

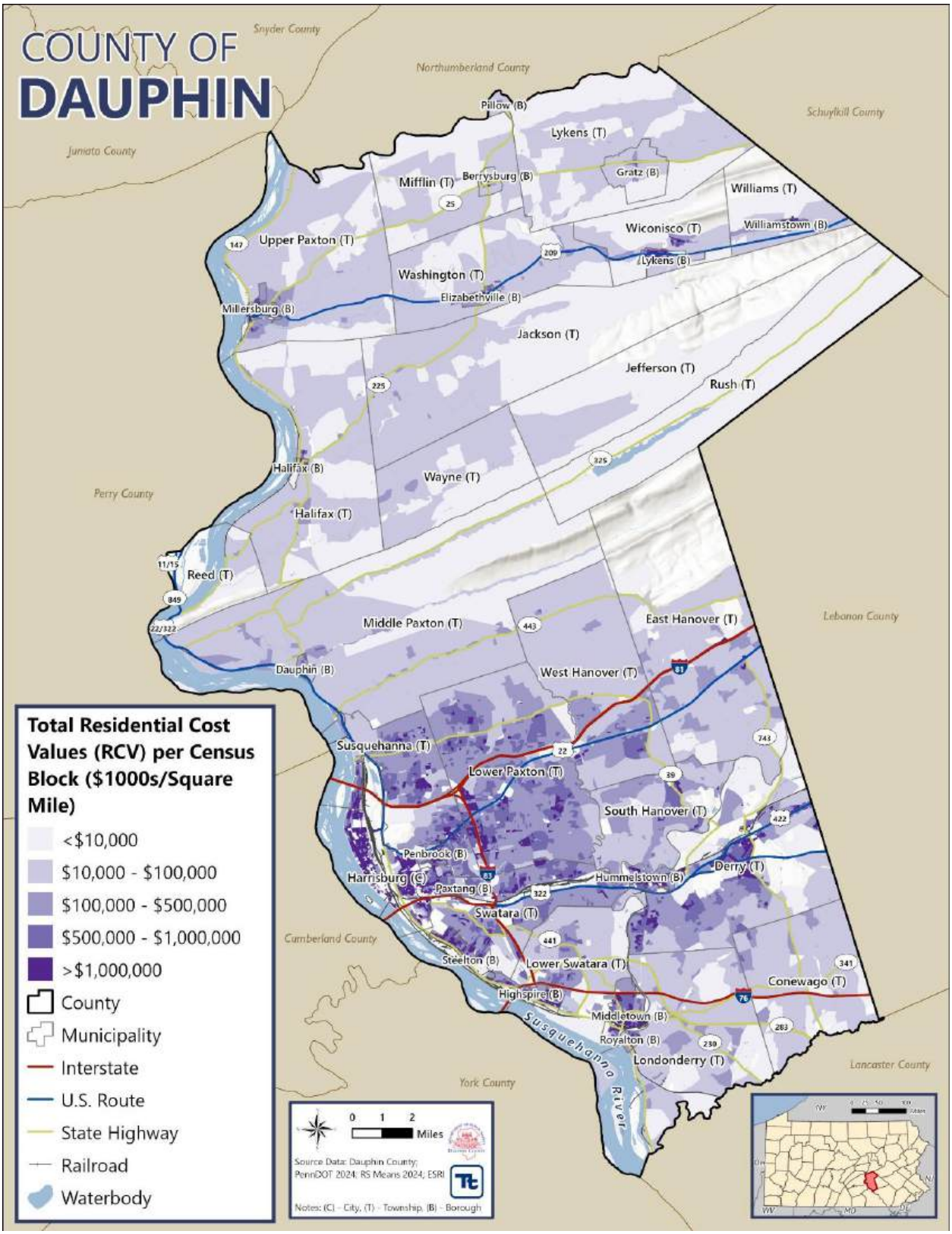


Figure 2.2-7. Total Commercial Cost Value(RCV) per Census Block in Dauphin County, PA

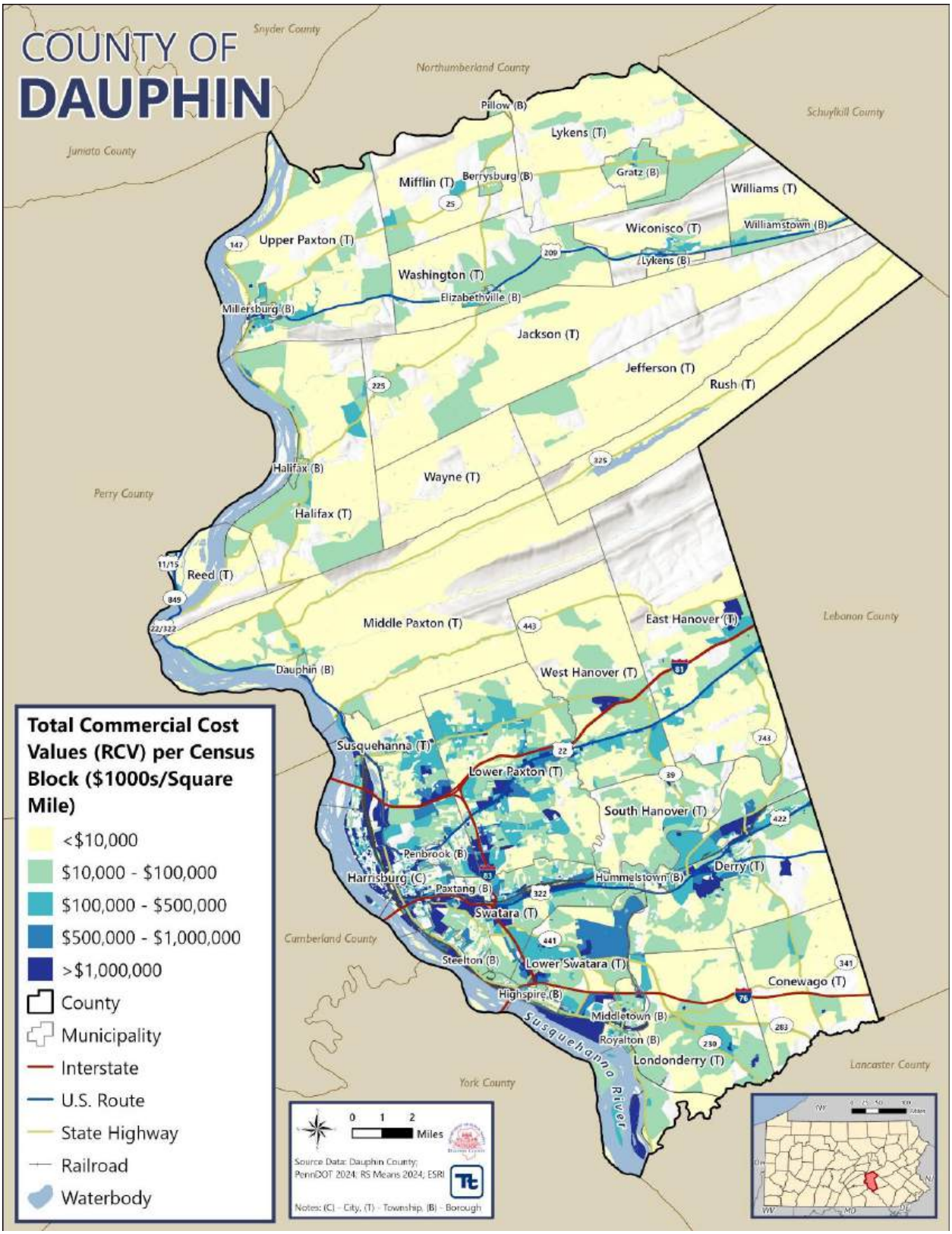
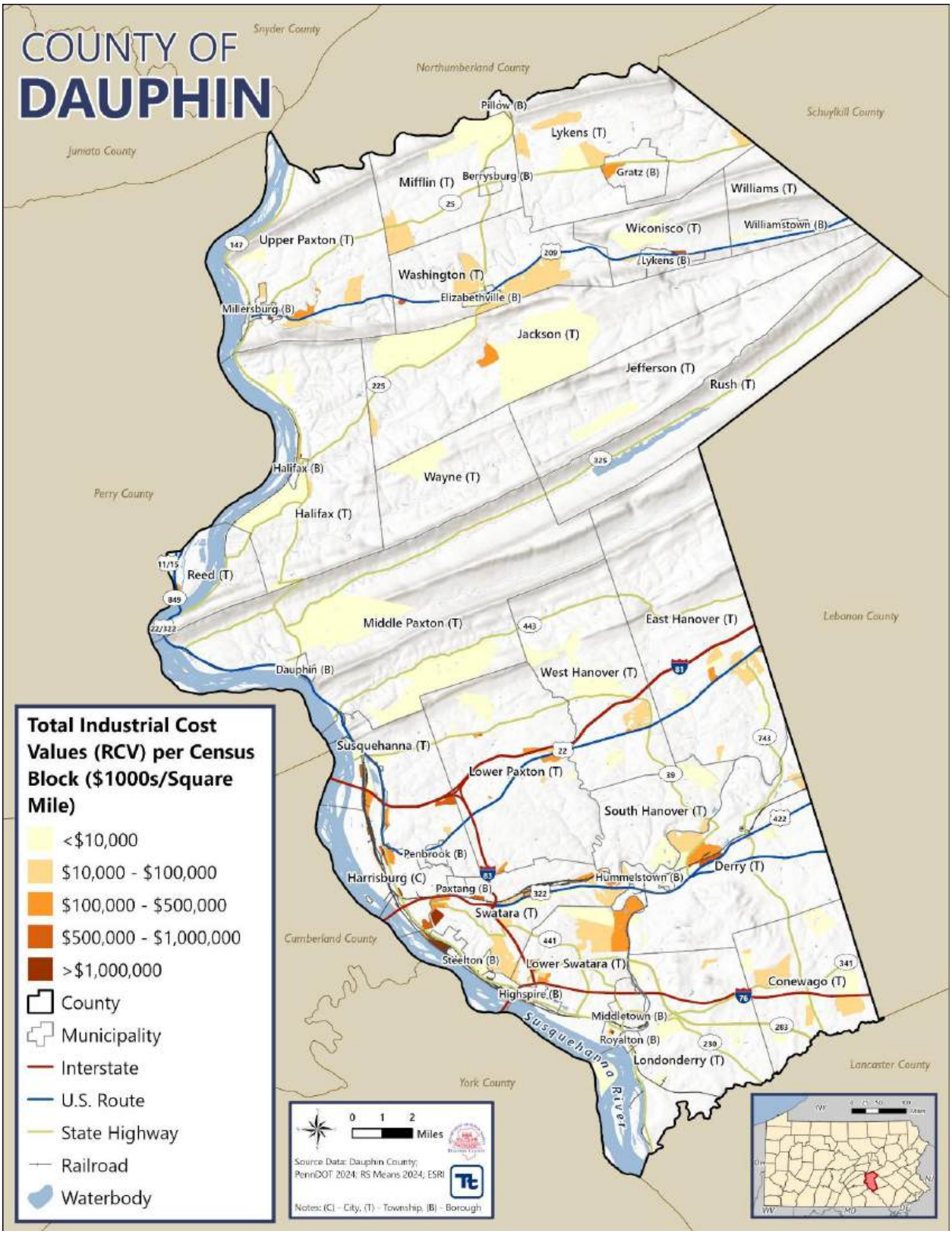


Figure 2.2-8. Total Industrial Cost Value (RCV) per Census Tract in Dauphin County, PA



2.3 LAND USE AND DEVELOPMENT

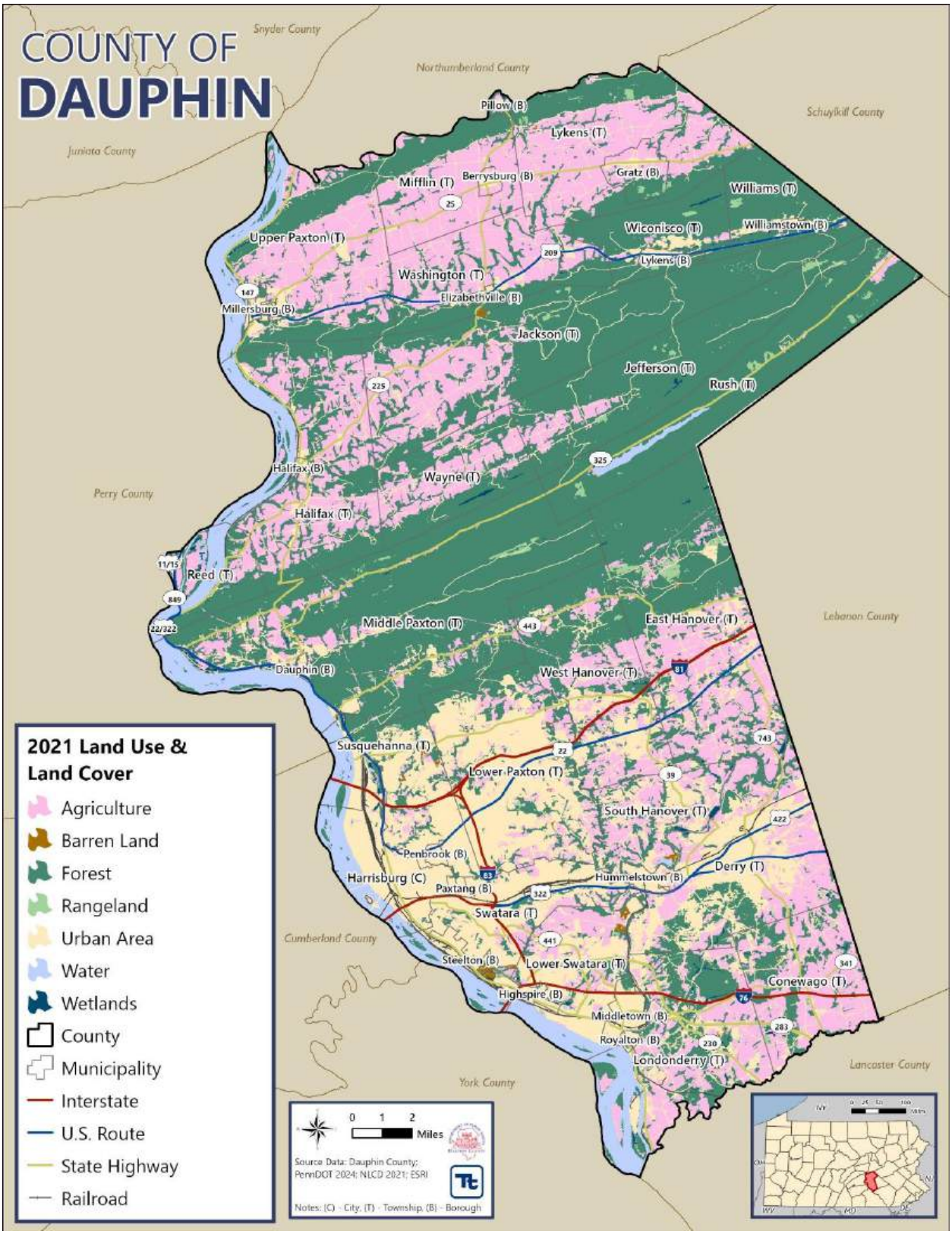
Dauphin County is a rural, agricultural community with urbanized centers along major waterways, including the Susquehanna River. In the completion of the 2017 Dauphin County Comprehensive Plan, the county states historical, cultural, and agricultural importance by establishing "growing our communities" while "growing within our environment" (TCRPC 2020). The county understands the historical and agricultural importance of growing economically through its designated growth areas.

The northern, southern, and portions of the eastern part of the county contain a significant amount of agricultural activity. The county contains prime farmland and Soil Capability Class II and III land, which are classifications given by the Commonwealth for land that is still farmland of importance. The county contains over 91,000 acres of farmland spread across both the northern and southern parts of the county. While much of the county is considered urban, most urban development in the county is in the southern half. Agricultural lands and forests make up over 70 percent of the county. Land use in Dauphin County is listed in Table 2.3-1 and illustrated in Figure 2.3-1.

Table 2.3-1. Land Use Area in Dauphin County

Land Use Category	Total Acres	Percent of Total
Agricultural	91,437	25.8%
Barren Land	632	0.2%
Forest	161,523	45.5%
Urban Area	76,717	21.6%
Wetland	1,516	0.4%
Total	**355,034**	**100.0%**

Figure 2.3-1. Dauphin County Land Use and Land Cover



2.4 DATA SOURCES AND LIMITATIONS

The County Profile section of this HMP was developed with information from the following sources:

1. American Community Survey. 2019. *2015 - 2019 American Community Survey 5-Year Estimates.*
2. Berberian, A.G., D.J.X. Gonzalez, and L.J. Cushing. 2022. "Racial Disparities in Climate Change-Related Health Effects in the United States." *Curr Envir Health Rpt* 9: 451–464. https://doi.org/10.1007/s40572-022-00360-w.
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Data sources used to develop the HMP in general are listed in Appendix A. Data sources used to perform geographic information system (GIS) analysis for the risk assessment are listed in Section 4.4. These sources were key in understanding the current demographic makeup of the community as well as in framing the foundation of the Plan. The sources listed provided the underlying context of the Plan and allowed the Planning Team to understand critical vulnerabilities in the County. Throughout the planning process, the Planning Team continually sought additional data sources to augment the information included in the Plan. The Planning Team made multiple requests for existing jurisdictional documents (e.g., jurisdictional hazard mitigation plans and other relevant information). Despite multiple requests for municipal documents, the response was somewhat limited.

SECTION 3 PLANNING PROCESS

A successful planning process builds partnerships and brings together members representing government agencies, the public, and other stakeholders to reach a consensus on ways the community will prepare for and respond to those hazards most likely to occur. Applying a comprehensive and transparent process adds validity to the Hazard Mitigation Plan (HMP). Participants involved in the HMP planning process gained a better understanding of problems and issues and helped devise solutions and actions for the community—resulting in a revised set of common community values and widespread support for directing financial, technical, and human resources to agreed-upon actions.

The planning process was an integral part of updating the Dauphin County HMP. This section describes the planning process used to update the HMP, with participation from the county's 40 municipalities. This section also describes the hazard mitigation and multi-jurisdictional planning implemented by the Steering Committee and Planning Team in meetings and documentation with public and stakeholder participation, during the HMP update process. Additional details about the process of updating each section of this HMP appear at the beginning of each section.

3.1 UPDATE PROCESS AND PARTICIPATION SUMMARY

In accordance with the Disaster Mitigation Act of 2000 (DMA 2000) requirements, this plan documents the following topics:

- Planning process
- Hazard identification
- Risk assessment
- Mitigation strategy: goals, actions, and projects
- Formal adoption by the participating jurisdictions
- Pennsylvania Emergency Management Agency (PEMA) and Federal Emergency Management Agency (FEMA) approval

The PEMA All-Hazard Mitigation Planning Standard Operating Guide lays out the standard planning process in Pennsylvania to create and update HMPs (including this HMP) and is cited in Appendix A, under Authorities and References. Section 4 (Risk Assessment) describes hazard vulnerabilities, and the risk assessment and Section 6 (Mitigation Strategy) describes the mitigation strategy for this HMP.

Public participation and planning meetings served as the main forum for gathering information to update the HMP. The Steering Committee and Planning Team were afforded access to information in relevant and approved plans, policies, and procedures for Dauphin County. Opportunities for public participation included public meetings, distribution of information at municipal meetings, and chances to review and comment on the draft HMP update. To develop all sections of the HMP, the Planning Team used meetings, e-mail correspondence, and teleconferences to solicit input from county, municipal, and other stakeholders, including members of the general public. Information was also gathered through the use of three online surveys which are further discussed in Section 3.4. Most information received for this update came from Dauphin County, its municipalities, and the Steering Committee, while any additional information came through extensive desktop research. Through this planning process, the county established a comprehensive approach to reduce the effects of hazards on the county and its municipalities.

3.2 THE PLANNING TEAM

For the 2025 Dauphin County HMP Update, the Planning Team was assembled which included two primary groups of participants – the Steering Committee and the Planning Partnership. Both groups are described below.

3.2.1 Steering Committee

Recognizing the need to manage risk within the county, and to meet the requirements of the DMA 2000, the Dauphin County Department of Public Safety led the update to the 2021 HMP. Ms. Lexi Passaro, a Planning Specialist, developed a Steering Committee that was charged with providing guidance and oversight of the planning process on behalf of the general planning partnership. They also attended and participated in Steering Committee meetings as well as provided assistance with the development and completion of certain planning elements, including:

- Reviewing and updating the hazards of concern
- Developing a public and stakeholder outreach program
- Assuring that the data and information used in the plan update process are the best available
- Reviewing and updating the hazard mitigation goals
- Identifying and screening appropriate mitigation strategies and activities
- Reviewing and commenting on plan documents prior to submission to PEMA and FEMA

The Steering Committee helped to ensure that the resulting document will be embraced both politically and by the constituency within the planning area. Ms. Passaro served as chair of the Steering Committee as well as the lead planner and point of contact throughout the planning process. The Steering Committee is identified in Table 3-1 and this group was charged with the following:

Table 3-1. Steering Committee Members for the 2025 Dauphin County HMP Update

Name	Title	Jurisdiction/Affiliation
Andrew Megonnell	Training Specialist	Dauphin County OEM
Andrew Verbos	Lieutenant	Susquehanna Township Police Department
Bill Haig	Director of Environmental Services	West Hanover Township
Bonnie Kent	Operations Manager / Community Liaison	Northern Dauphin Human Services Center
Chris Eaton	EM Coordinator	Hershey Medical Center
Chris Fisher	Deputy Director, EM Coordinator	OEM, Dauphin County Department of Public Safety
Doug Brown	Deputy Director	Dauphin County Community & Economic Development
Eric Naguski	Manager	Dauphin County Agriculture and Natural Resources Center
Lexi Passaro	Planning Specialist	OEM, Dauphin County DPS
Mark Stronbraker	Public Safety Director	Highspire Borough
Matt Weber		Dauphin County DPS / Dauphin County Community Organizations Active in Disaster
Robert Stout	EM Specialist	Dauphin County Department of Public Safety

3.2.2 Planning Partnership

The Planning Partnership is a combined group consisting of the Steering Committee and at least one representative from each municipality. Municipal Representatives provide direct input to jurisdictional-specific sections (annexes) of the plan regarding capabilities, hazard event history, and project development. The jurisdictions in Dauphin County have differing levels of capabilities and resources available to apply to the plan update process, and further, have differing exposure and vulnerability to the natural hazard risks being considered in this plan. Dauphin County's intent is to encourage participation by all-inclusive jurisdictions and

to accommodate their specific needs and limitations while still meeting the intents and purpose of plan update participation. Such accommodations have included the establishment of a Steering Committee, engaging a contract consultant to assume certain elements of the plan update process on behalf of the jurisdictions, and the provision of additional and alternative mechanisms to meet the purposes and intent of mitigation planning.

This group was assembled to represent each of the municipalities participating in the HMP update, and Table 3-2 below identifies the Planning Partnership which includes 40 municipalities (Dauphin County, 2025), six educational institutions, as well as 13 other departments, agencies, or community organizations within the County. Each of those listed was invited to participate.

Table 3-2. Planning Partnership in the 2025 Dauphin Co. HMP Update

Dauphin County Municipalities*			
Dauphin County	Harrisburg City	Middletown Borough	Steelton Borough
Berrysburg Borough	Highspire Borough	Mifflin Township	Susquehanna Township
Conewago Township	Hummelstown Borough	Millersburg Borough	Swatara Township
Dauphin Borough	Jackson Township	Paxtang Borough	Upper Paxton Township
Derry Township	Jefferson Township	Penbrook Borough	Washington Township
East Hanover Township	Londonderry Township	Pillow Borough	Wayne Township
Elizabethville Borough	Lower Paxon Township	Reed Township	West Hanover Township
Gratz Borough	Lower Swatara Township	Royalton Borough	Wiconisco Township
Halifax Borough	Lykens Borough	Rush Township	Williams Township
Halifax Township	Middle Paxton Township	South Hanover Township	Williamstown Borough
Educational Institutions			
Central Dauphin School District	Harrisburg City School District	Lower Dauphin School District	
Derry Township School District	Londonderry Schools	Millersburg Area School District	
Other Agencies, Organizations			
American Red Cross	Dauphin County DPS	Pennsylvania American Water	
Capital Region Water	Dauphin County Communications	Rabbit Transit	
Cumberland County	Harrisburg Redevelopment Authority	South Central PA Task Force	
Dauphin County Community Organizations Active in Disasters	Penn State Hershey Medical Center	Tri-County Regional Planning Commission	

** municipalities as reflected on the County's website*

Appendices C, D, and E include complete lists of individual invitees and participants, attendance at meetings, completion of worksheets, and submittal of comments.

The Planning Team acknowledged that important steps in developing a comprehensive HMP included identifying hazards that specifically affect Dauphin County, and assessing their likelihood of occurrence, along with potential damage to the people, property, and environment of the county. The Planning Team chose to focus on an all-hazards approach rather than a narrower approach that focused on natural disasters only.

As the contract consultant, Tetra Tech guided the Steering Committee and Planning Team through the HMP update planning process. More specifically, Tetra Tech was tasked with:

- Assisting with the organization of a Steering Committee and Planning Team.

- Assisting with the development and implementation of a public and stakeholder outreach program.
- Collecting data.
- Facilitating and recording attendance at meetings.
- Assisting with the review, update, and ranking of the hazards of concern, hazard profiling, and risk assessment.
- Assisting with the review and update of mitigation planning goals and objectives.
- Assisting with the review of the progress of past mitigation strategies.
- Assisting with the screening of mitigation actions and the identification of appropriate actions.
- Assisting with the prioritization of mitigation actions.
- Authoring of the draft and final HMP documents.

3.3 MEETINGS AND DOCUMENTATION

Tetra Tech assisted the county in drafting planning documents, preparing meeting materials, and facilitating meetings. The Steering Committee reviewed documentation, provided validation, and acted as an advocate for the HMP update. Table 3-3 lists dates and descriptions of meetings held by the Dauphin County Steering Committee and Planning Team as part of the process of updating the 2025 Dauphin County HMP.

Table 3-3. Public and Planning Meetings

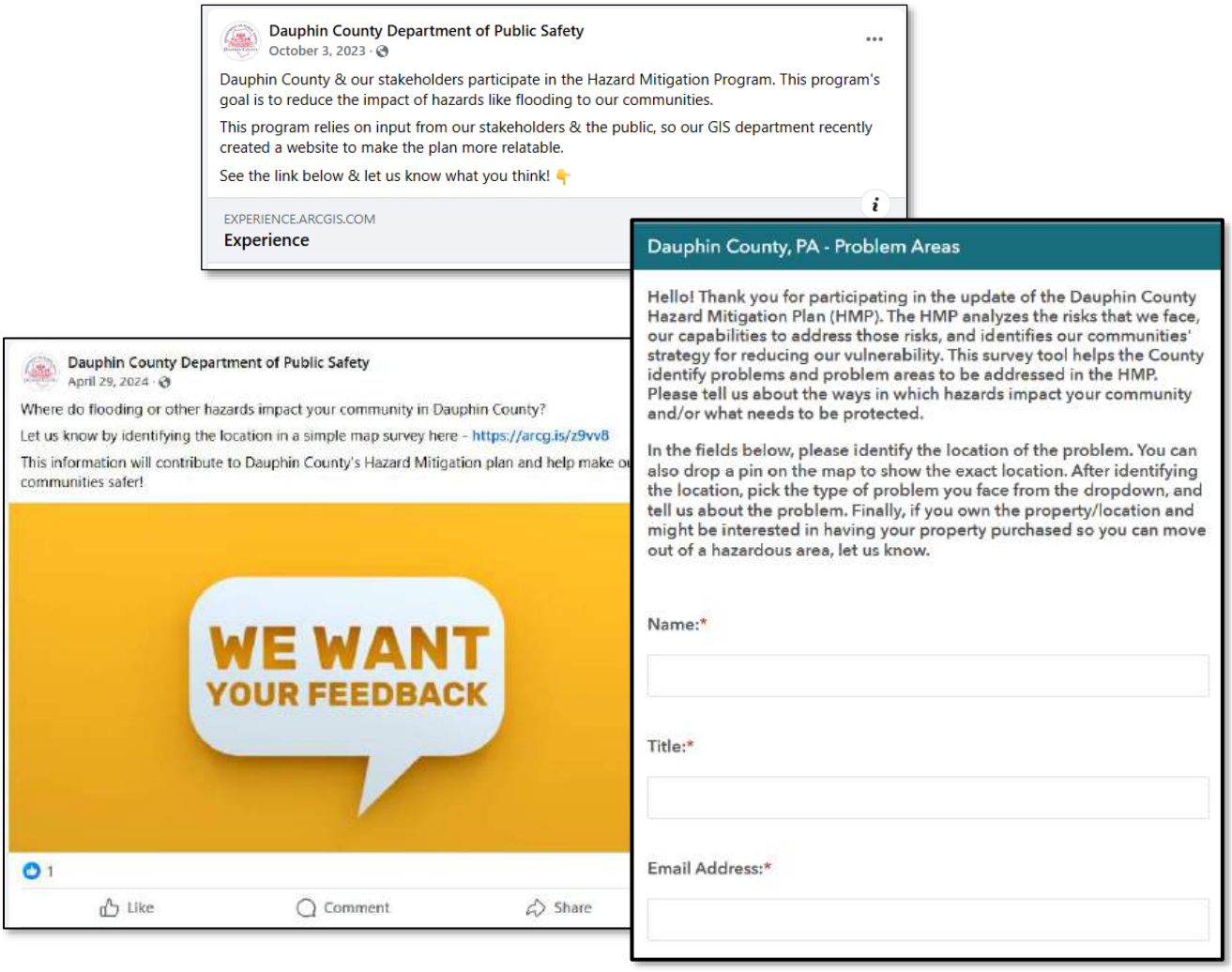
Date	Description of Meeting / Workshop
February 12, 2024	**Kickoff meeting with the Steering Committee**
April 11, 2024	**Planning Team Kickoff Meetings (2)** To maximize participation, two Planning Team Kickoff meetings were held, one at the Dauphin County DPS headquarters and the other at the Dauphin County Hazardous Materials Response Team Station 77. Discussions included topics like the 5-year HMP review and plan update process, the evaluation of identified hazards of concern, the capability assessment overview, and a review of the mitigation strategy.
April 29, 2024	**Facebook post soliciting feedback on flooding problem areas in the County**
November 2023 – March 2025	**Direct outreach and phone calls/conference calls with municipalities to garner as much participation and buy-in as possible**
August 22, 2024	The Dauphin County HMP Website* was updated with upcoming Risk Assessment meeting dates, invitations, and meeting details.
September 23, 2024	**Risk Assessment and Capability Assessment Workshop**
January 7, 2025	**Mitigation Strategy Workshops (2) – t**o offer as much opportunity for involvement, community members were invited to participate in the mitigation strategy discussions which included conversations about mitigation goals, objectives, and actions.
January 27, 2025	**Planning Partnership HMP Draft Review –** members from the Steering Committee as well as the Planning Partnership were invited to review and comment on the 2025 HMP Draft.
February 2025	Public HMP Draft Review Meeting to receive comments on the 2025 HMP Draft

** https://dauphincountyhmp.com/*

The Steering Committee followed up each meeting with meeting notes that documented all agenda topics, as well as presentation slideshows, and any meeting material presented. Appendix C contains documentation from all meetings. Dauphin County residents were informed of the planning process through various sources,

including newspaper articles, email communications from Steering Committee members, social media announcements, as well as through Workshop Meeting discussions. Figure 3.3-1 shows the public announcements made on social media platforms, like the Dauphin County Department of Public Safety Facebook account. In addition, to these posts, links were provided to educate the public about what hazard mitigation means and why it is important to their community. Links shown in these posts included ones for the Dauphin County, PA - Problem Area Survey as well as the Dauphin County Hazard Mitigation Application which was designed to raise awareness about the County's ongoing mitigation efforts. Appendix E includes those articles. Any subsequent supporting documentation provided by county residents will be included in Appendix E (Public and Stakeholder Participation).

Figure 3.3-1. Social Media Posts Soliciting Public Feedback/Support for the 2025 HMP Update



3.4 PUBLIC AND STAKEHOLDER PARTICIPATION

To maximize the effectiveness of the HMP, the Planning Team fostered continual public and stakeholder engagement. Input was encouraged and collected through a variety of methods. Five worksheets/surveys— the Hazard/Risk Identification Survey, Municipal Risk Factor Analysis, Capabilities Assessment Survey, NFIP Survey, and Mitigation Strategy 5-Year Plan Review Worksheet (Mitigation Review Worksheet) —were given to representatives from each municipality in Dauphin County. Of the county and its 40 municipalities, 30 completed worksheets so that their input could be reviewed and incorporated into the updated HMP.

The following entities with a vested interest in the development of the updated HMP were given the opportunity to participate in the planning process by attending a Planning Team or public meeting, or by offering comments on the project website: local, state, and federal agencies; neighboring jurisdictions (i.e., Cumberland County); community leaders; educators; healthcare facilities; and other relevant private and nonprofit groups. Invitations to participate in meetings were sent to those stakeholders. Appendix E includes a copy of the Planning Team meeting invitation list and sample copies of invitation letters sent. Meeting invitations were also sent to all municipalities including elected officials and Emergency Management Coordinators. Additionally, direct outreach by phone or one-on-one meetings was conducted with municipality representatives unable to attend other meetings or who had questions about worksheets, participation requirements, the planning process, or mitigation project selection. Of the 38 municipalities, 17 of these partners had representatives attend at least one meeting; four more of the participating municipalities provided information through individual contact.

Through public announcements, email communications, and direct outreach via phone, the groups listed in Section 3.2 and the general public were invited to visit the project website, review the draft county HMP update, and send comments to the Dauphin County Department of Public Safety. Appendix E includes copies of the public notices and other forms of public and stakeholder outreach. Throughout the course of the entire planning process, the following stakeholder organizations participated in the planning process. Table 3-4 in Section 3.5 provides overall municipal participation in more detail.

• American Red Cross	• Halifax (T)	• Middle Paxton (T)	• Steelton (B)
• Capital Region Water	• Harrisburg (C)	• Middletown (B)	• Susquehanna (T)
• Central Dauphin S.D.	• Harrisburg Redevelopment Auth.	• Millersburg Area S. D.	• Swatara (T)
• Conewago (T)	• Hershey Medical Center	• Northern Dauphin Co. 4 Regional EMA	• Tri-County RPC
• Cumberland County	• Highspire (B)	• PA American Water	• Upper Paxton (T)
• Dauphin (B)	• Hummelstown (B)	• Paxtang (B)	• Washington (T)
• Dauphin Co. Community Org. Active in Disaster	• Jackson (T)	• Penbrook (B)	• Wayne (T)
• Dauphin Co. DPS	• Jefferson (T)	• Pillow (B)	• West Hanover (T)
• Dauphin Co. Communications	• Londonderry (T)	• Rabbit Transit	• Williams (T)
• Derry (T)	• Londonderry Schools	• Reed (T)	
• Derry (T) S.D.	• Lower Dauphin S.D.	• Royalton (B)	
• East Hanover (T)	• Lower Paxton (T)	• Rush (T)	
• Elizabethville (B)	• Lower Swatara (T)	• South Central PA Task Force	
• Halifax (B)	• Lykens (B)	• South Hanover (T)	

Notes: (B)=Borough; (C)=City; (T)=Township; S.D.=School District

3.5 MULTI-JURISDICTIONAL PLANNING

Dauphin County took a multi-jurisdictional approach to preparing the HMP to ensure that it would apply to the county and all participating municipalities. The county was able to provide resources (e.g., data, geographic information system [GIS], etc.) to which the municipalities may not have had access. However, Dauphin County depended on municipal buy-in because the municipalities have the legal authority to enforce compliance with land use planning and development directives.

Dauphin County undertook an intensive effort to involve all 40 municipalities in the update process. Municipal officials and representatives were invited to attend Planning Team and public meetings and were provided with worksheets to update the hazards of concern capabilities as well as local mitigation strategies. Municipalities were also asked to review and prioritize the mitigation actions which are described further in Section 6 of this Plan. Municipal participation culminated in the formal adoption of the HMP; copies of municipal adoption resolutions are in Appendix F. Table 3-4 indicates the ways each municipality participated in the planning process. In some cases, a municipality was unable to attend a Planning Team meeting; therefore, an individual follow-up meeting with each municipality was held by Dauphin County Steering Committee representatives to cover the meeting material and provide municipal support on the topics presented.

Table 3-4. Participation Matrix

Jurisdiction	*Meetings*				Indiv. Contact	*Worksheets*						2025 Plan Adoption Date
	Planning Team Kick-Off Meeting	Risk Assess. Meeting	Mit. Strategy Work.	HMP Draft Review Meeting		Hazard ID and Risk Eval	Mun. Risk Factor Form	Cap. Assess. Wksht.	NFIP Survey Wksht.	Mit. Action Review Wksht.	Mit. Strategy Review Wksht.	
Dauphin County	●	●	●	●	●	●	●	●	N/A	●	●	TBD
Berrysburg (B)	●	●	●	●	●	●	●	●	●	●	●	TBD
Conewago (T)	●		●	●	●	●	●	●	●		●	TBD
Dauphin (B)	●	●	●	●	●	●	●	●	●	●	●	TBD
Derry (T)	●	●	●	●	●	●	●	●	●	●	●	TBD
East Hanover (T)	●	●	●	●	●	●	●	●	●	●	●	TBD
Elizabethville (B)	●	●	●	●	●	●	●	●	●	●	●	TBD
Gratz (B)	●	●	●	●	●	●	●	●	●	●	●	TBD
Halifax (B)	●	●	●	●	●	●	●	●	●	●	●	TBD
Halifax (T)	●	●	●	●	●	●	●	●	●	●	●	TBD
Harrisburg (C)	●	●	●	●	●	●	●	●	●	●	●	TBD
Highspire (B)	●	●	●	●	●	●	●	●	●	●	●	TBD
Hummelstown (B)	●	●	●	●	●	●	●	●	●	●	●	TBD
Jackson (T)	●	●	●	●	●	●	●	●	●	●	●	TBD
Jefferson (T)	●	●	●	●	●	●	●	●	●	●	●	TBD
Londonderry (T)	●	●	●	●	●	●	●	●	●	●	●	TBD
Lower Paxton (T)	●	●	●	●	●	●	●	●	●	●	●	TBD
Lower Swatara (T)	●	●	●	●	●	●	●	●	●	●		TBD
Lykens (B)	●	●	●	●	●	●	●	●	●	●	●	TBD
Lykens (T)	●	●	●	●	●	●	●	●	●	●	●	TBD
Middle Paxton (T)	●	●	●	●	●	●	●	●	●	●	●	TBD
Middletown (B)	●	●	●	●	●	●	●	●	●	●	●	TBD
Mifflin (T)	●	●	●	●	●	●	●	●	●	●		TBD
Millersburg (B)	●	●	●	●	●	●	●	●	●	●	●	TBD
Paxtang (B)	●	●	●	●	●	●	●	●	●	●	●	TBD

Jurisdiction	Meetings				Indiv. Contact	Worksheets						2025 Plan Adoption Date
	Planning Team Kick-Off Meeting	Risk Assess. Meeting	Mit. Strategy Work.	HMP Draft Review Meeting		Hazard ID and Risk Eval	Mun. Risk Factor Form	Cap. Assess. Wksht.	NFIP Survey Wksht.	Mit. Action Review Wksht.	Mit. Strategy Review Wksht.	
Penbrook (B)	🔴	🟢	🟢	🔴	🔴	🔴	🟢	🔴	🔴	🔴	🔴	TBD
Pillow (B)	🔴	🔴	🟢	🔴	🔴	🟢	🔴	🟢	🟢	🟢	🟢	TBD
Reed (T)	🔴	🔴	🔴	🔴	🔴	🟢	🟢	🟢	🟢	🔴	🔴	TBD
Royalton (B)	🟢	🟢	🟢	🔴	🔴	🟢	🟢	🟢	🟢	🟢	🟢	TBD
Rush (T)	🔴	🔴	🟢	🔴	🔴	🔴	🟢	🔴	N/A 🔴	🔴	🔴	TBD
South Hanover (T)	🟢	🟢	🟢	🟢	🔴	🟢	🟢	🟢	🔴	🟢	🟢	TBD
Steelton (B)	🟢	🟢	🟢	🟢	🟢	🟢	🔴	🟢	🔴	🔴	🟢	TBD
Susquehanna (T)	🟢	🟢	🔴	🔴	🔴	🟢	🟢	🟢	🟢	🔴	🟢	TBD
Swatara (T)	🟢	🟢	🟢	🟢	🔴	🟢	🟢	🟢	🟢	🔴	🟢	TBD
Upper Paxton (T)	🟢	🟢	🔴	🔴	🟢	🟢	🔴	🟢	🟢	🟢	🟢	TBD
Washington (T)	🔴	🔴	🔴	🔴	🔴	🟢	🟢	🟢	🟢	🔴	🟢	TBD
Wayne (T)	🔴	🔴	🔴	🔴	🔴	🟢	🔴	🟢	🟢	🔴	🔴	TBD
West Hanover (T)	🟢	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	TBD
Wiconisco (T)	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	TBD
Williams (T)	🔴	🔴	🔴	🟢	🔴	🔴	🔴	🟢	🟢	🔴	🟢	TBD
Williamstown (B)	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	TBD

Notes: (B)=Borough; (C)=City; (T)=Township; green = participation; red = no participation; Cap. = Capability; Indiv. – Individual; Mit. = Mitigation; N/A = Not applicable

** = Though the worksheet was not received, the related information was collected during an interview with officials.*

SECTION 4 RISK ASSESSMENT

4.1 UPDATE PROCESS AND PARTICIPATION SUMMARY

In accordance with the Federal Emergency Management Agency (FEMA) Local Mitigation Planning Handbook, risk is defined as the potential for damage, loss, or other impacts created by the interaction of natural hazards with community assets. Dauphin County's risk assessment is organized into the following sections:

- Section 4.2 outlines the hazard identification process for both natural and human-caused hazards of concern for further profiling and evaluation.
- Section 4.3 profiles the hazards of concern (location and extent, range of magnitude, past occurrence, and future occurrence) and assesses vulnerability.
- Section 4.4 summarizes the risk assessment methodology, ranking results, potential losses, and future development and vulnerability.

The Steering Committee and Planning Team evaluated the 2021 Dauphin County Hazard Mitigation Plan (HMP) hazards of concern by examining the historic events that have taken place in the county since the last plan update and reviewing the Commonwealth's 2023 Hazard Mitigation Plan. In addition, the Steering Committee and Planning Team completed the Risk Assessment Worksheet (Hazard Identification and Risk Evaluation Worksheet). The worksheet listed hazards profiled in the 2021 HMP and requested that participants identify whether the frequency of occurrence, magnitude of impact, and/or geographic extent of each hazard has increased, decreased, or not changed since the 2021 HMP was issued. The worksheet also provided participants with the opportunity to assess hazards not profiled in the 2021 HMP to determine if those hazards should be included as part of the update. The Steering Committee reviewed responses from the worksheets to identify a list of hazards to profile in the 2025 HMP. Each hazard profile also includes an additional subsection that discusses the effect of climate change on vulnerability. Appendix H includes copies of the completed worksheets.

4.2 HAZARD IDENTIFICATION

4.2.1 Disaster Declarations

In reviewing and updating Dauphin County's hazards of concern, the Steering Committee and Planning Team reviewed additional information and historical records from a wide range of sources. The following section discusses the Presidential Disaster and Emergency Declarations, Gubernatorial Disaster Declarations or Proclamations, and Small Business Administration Disaster Declarations that have affected Dauphin County.

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. Since 1955, declarations have been issued for various hazard events, including hurricanes or tropical storms, severe winter storms, and flooding. Presidential Emergency Declaration 3235, issued in September 2005, was unique. Through this declaration, President George W. Bush declared that a state of emergency existed for the Commonwealth of Pennsylvania and ordered federal aid to supplement Commonwealth and local response efforts to help people evacuate from their homes because of Hurricane Katrina.

Table 4.2-1 lists Presidential Disaster and Emergency Declarations issued from 1972 through 2024 that have affected Dauphin County. Additional declarations can be found on the Federal Emergency Management Agency (FEMA) website at: https://www.fema.gov/disasters.

Table 4.2-1. Presidential Disaster and Emergency Declarations Affecting Dauphin County

Declaration Number	Date	Event
DR-4618	September 2021	Remnants of Hurricane Ida
DR-4506	March 2020	Covid-19 Pandemic
EM-3441	March 2020	Covid-19
DR-4267	March 2016	Severe Winter Storm and Snowstorm
DR-4099	January 2013	Hurricane Sandy
EM-3356	October 2012	Hurricane Sandy
DR-4030	September 2011	Tropical Storm Lee
EM-3340	September 2011	Remnants of Tropical Storm Lee
DR-1898	April 2010	Severe Winter Storms and Snowstorms
DR-1649	June 2006	Severe Storms, Flooding, and Mudslides
EM-3235	September 2005	Hurricane Katrina Evacuation
DR-1557	September 2004	Tropical Depression Ivan
EM-3180	March 2003	Snowstorm
DR-1298	September 1999	Tropical Depression Dennis and Flash Flooding
DR-1093	January 1996	Flooding
DR-1085	January 1996	Blizzard
DR-1015	March 1994	Winter Storm, Severe Storm
EM-3105	March 1993	Blizzard
DR-523	October 1976	Severe Storms, Flooding
DR-485	September 1975	Severe Storms, Heavy Rains, Flooding
DR-340	June 1972	Flood (Agnes)

Source: FEMA 2024

In addition to the Presidential Disaster and Emergency Declarations listed above, 67 events warranted Gubernatorial Disaster Declarations or Proclamations. Table 4.2-2 lists Gubernatorial Disaster Declarations or Proclamations issued for Dauphin County between 1958 and 2022, according to PEMA (PEMA 2023).

Table 4.2-2. Gubernatorial Disaster Declarations or Proclamations Affecting Dauphin County

Date	Event
August 2021	Proclamation of Disaster of Emergency – Hurricane Ida
April 2021	Proclamation of Disaster of Emergency – Civil Disturbance
February 2021	Proclamation of Disaster of Emergency - Pandemic
February 2021	Proclamation of Disaster Emergency – Opioid Crisis
February 2021	Proclamation of Disaster Emergency – Winter Weather
December 2020	Proclamation of Disaster Emergency – Winter Weather
November 2020	Amendment to Proclamation of Disaster Emergency – Coronavirus (COVID-19)
November 2020	Amendment to Proclamation of Disaster Emergency – Opioid Crisis
August 2020	Amendment to Proclamation of Disaster Emergency – Coronavirus (COVID-19)
August 2020	Amendment to Proclamation of Disaster Emergency – Opioid Crisis
June 2020	Amendment to Proclamation of Disaster Emergency – Coronavirus (COVID-19)
May 2020	Proclamation of Disaster Emergency
May 2020	Amendment to Proclamation of Disaster Emergency – Opioid Crisis
March 2020	Proclamation of Disaster Emergency – Coronavirus (COVID-19)
February 2020	Amendment to Proclamation of Disaster Emergency – Opioid Crisis
December 2019	Amendment to Opioid Crisis Emergency Proclamation
September 2019	Amendment to Opioid Crisis Emergency Proclamation
June 2019	Amendment to Opioid Crisis Emergency Proclamation
March 2019	Amendment to Opioid Crisis Emergency Proclamation
January 2019	Proclamation of Disaster Emergency for Severe Winter Event
December 2018	Amendment to Opioid Crisis Emergency Proclamation
September 2018	Amendment to the Opioid Crisis Emergency Proclamation
August 2018	Proclamation of Disaster Emergency for Severe Weather Event
June 2018	Amendment to Opioid Crisis Emergency Proclamation
April 2018	Amendment to Opioid Crisis Emergency Proclamation
January 2018	Opioid Crisis Emergency Proclamation
March 2017	Proclamation of Emergency – Severe Winter Storm
March 2017	Proclamation of Emergency – Severe Winter Storm
January 2016	Proclamation of Emergency – Severe Winter Storm
August 2015	Proclamation of Emergency – Severe Storms
January 2015	Proclamation of Disaster Emergency – Severe Winter Storms
February 2014	Proclamation of Disaster – Severe Winter Storms
January 2014	Proclamation of Disaster Emergency – Extreme Weather, Utility Interruption

Date	Event
June 2013	Proclamation of Emergency – High Winds, Thunderstorms, Heavy Rain, Tornado, Flooding
May 2013	Proclamation of Emergency – Dauphin Bridge Fire
October 2012	Proclamation of Emergency – Hurricane Sandy
April 2012	Proclamation of Emergency – Spring Winter Storms
August 2011	Proclamation of Emergency - Severe Storms and Flooding (Lee/Irene)
January 2011	Proclamation of Emergency - Severe Winter Storm
February 2010	Proclamation of Emergency - Severe Winter Storm
April 2007	Severe Storm
February 2007	Proclamation of Emergency - Severe Winter Storm
February 2007	Proclamation of Emergency - Regulations
April 2007	Proclamation of Emergency – Severe Winter Storm
September 2006	Proclamation of Emergency - Tropical Depression Ernesto
September 2005	Proclamation of Emergency - Hurricane Katrina
February 2002	Drought and Water Shortage
July 1999	Drought
February 1978	Blizzard
January 1978	Heavy Snow
February 1974	Truckers' Strike
February 1972	Heavy Snow
January 1966	Heavy Snow
February 1958	Heavy Snow

Source: PEMA 2023

Dauphin County has also received Small Business Administration (SBA) Disaster Assistance for a number of disaster events. A Small Business Administration Disaster Declaration qualifies communities for access to affordable, timely, and accessible financial assistance. Table 4.2-3 lists Small Business Administration Disaster Declarations issued for Dauphin County between 1989 and 2018 (SBA 2021, PEMA 2023).

Table 4.2-3. Small Business Administration Disaster Declarations Affecting Dauphin County

Date	Event
December 2018	Flooding
October 2018	Flooding
August 2018	Flooding
July 2018	Flooding
July 2016	Flash Flooding
July 2009	Fire
May 2004	Heavy Rain, High Winds and Flooding
February 1999	West Shore Farmer's Market Fire
July 1991	Drought
January 1990	Fire

Source: SBA 2021, PEMA 2021

Table 4.2-4 provides an overview of the municipal declarations issued in Dauphin County, between 2021 and 2024. These declarations encompass a range of topics, including winter weather events such as snow, severe weather incidents, tornadoes, remnants of tropical storms, and gas leaks, reflecting the county's efforts to address various challenges and emergencies during this period.

Table 4.2-4. Dauphin County Municipal Declarations, 2021 to 2024

Declaration Date	Municipality	Description
January 31-February 1, 2021	Highspire Borough, Hummelstown Borough, Londonderry Township, Lower Swatara Township, Lykens Borough, Middle Paxton Township, Middletown Borough, Steelton Borough, Swatara Township, West Hanover Township, Wiconisco Township, Williamstown Borough	Severe winter weather resulting in heavy snow.
February 17-18, 2021	Elizabethville Borough, Highspire Borough, Lower Swatara Township, Middletown Borough, Steelton Borough	Winter storm with heavy snowfall.
September 1, 2021	Conewago Township, Elizabeth Borough, Highspire Borough, Lower Swatara Township, Middle Paxton, Middletown Borough, Royalton Borough, South Hanover Township, Steelton Borough, Susquehanna Township, Swatara Township, Washington Township	Severe weather as a result of the remnants of Hurricane Ida.
January 14, 2022	Hummelstown Borough, Londonderry Township, Middletown Borough, Middle Paxton Township	Winter storm producing heavy snowfall.
December 13, 2022	Susquehanna Township	Gas Leak with Explosion
June 3, 2023	Dauphin County, Harrisburg City	Severe Thunderstorm
July 2, 2023	Gratz Borough, Lykens Township, Upper Paxton Township	EF-0 Tornado occurred causing downed trees and powerlines.
July 25, 2023	Dauphin County	Damage caused by a severe storm.
September 9, 2023	Millersburg Borough	Damage caused by straight-line winds.
January 6, 2024	Highspire Borough, Lower Swatara Township, Middletown Borough	Heavy snowfall and accumulation.
February 12-13, 2024	Hummelstown Borough, Middletown Borough, Millersburg Borough	Heavy snowfall and accumulation.
June 26, 2024	Dauphin County	Severe Thunderstorm
November, 2024	Dauphin County	Severe Weather

Source: Dauphin County 2024

4.2.2 Summary of Hazards

As part of the plan update process, the Steering Committee and Planning Team reviewed the hazards of concern detailed in the 2021 version of the plan as well as those identified in the State HMP. They also considered the history of hazard events occurring in Dauphin County as well as events occurring after the completion of the 2021 version of the plan. This review of historical events included an evaluation of all emergency and disaster declarations in the Commonwealth, with a focus on those in which Dauphin County was designated for federal assistance.

Further, all jurisdictions participating in the plan update process were provided a *Hazard Identification/ Evaluation of Risk* worksheet to help identify the hazards—natural and non-natural—that each community believed posed a significant risk to Dauphin County, including any that may not have been considered in either the 2021 version of the plan or the State HMP. Completed worksheets submitted by the municipalities are included in Appendix D. Following review of the 2021 hazards list and completion of the *Hazard Identification/Evaluation of Risk* worksheet, additional hazards were considered in need of a risk assessment. The Steering Committee and Planning Team decided to keep all 2021 hazards of concern and add the following hazards:

1. Environmental Hazards: Gas and Liquid Pipeline

Based on all available information and input from the municipalities, the Steering Committee and Planning Team selected the following natural and non-natural hazards for consideration in this plan:

Natural Hazards

- Drought
- Flood, Flash Flood, Ice Jam
- Hurricane, Tropical Storm, Nor'easter
- Invasive Species
- Landslide
- Pandemic and Infectious Disease
- Radon Exposure
- Subsidence and Sinkholes
- Tornado and Windstorm
- Wildfire
- Winter Storm

Non-Natural Hazards

- Building or Structure Collapse
- Cyber Terrorism
- Dam Failure
- Environmental Hazards: Hazardous Materials Releases
- Opioid Addiction Response
- Transportation Accidents
- Utility Interruption

These hazards have been profiled individually in Section 4.3 of this plan.

4.3.1 Building and Structure Collapse

This section provides a profile and vulnerability assessment for the building and structure collapse hazard for Dauphin County. According to the Pennsylvania Emergency Management Agency (PEMA), "Buildings and other engineered structures, including bridges, may collapse if their structural integrity is compromised, especially due to effects from other natural or human-made hazards. Older buildings or structures, structures that are not built to standard codes, or structures that have been weakened are more susceptible to be affected by these hazards" (PEMA 2023).

The cause(s) of the collapse, the force of the structural collapse, the type of structure that collapsed, and the pattern of collapse all affect the overall collapse disaster event. The four main types of forces include tension, compression, bending, and shear. When a force is applied to an individual structural support, it produces a stress factor, and when it is great enough, it can collapse a structure. Four main types of structural collapse include lean-to, pancake, V, and cantilever. (Daley 2018). Any type of collapse can cause damage to nearby structures and impact the safety, health, and welfare of the local population.

4.3.1.1 Location and Extent

Adherence to modern building codes can lower a building's risk of collapse. Building codes – developed by the International Code Council in partnership with FEMA and other federal, state, local, and private authorities – specify the minimum legal design and construction requirements for structural integrity, construction materials, and fire protection. (FEMA 2023).

Most buildings constructed after 1961 in Dauphin County were built according to modern building codes with the most comprehensive building code in Pennsylvania being adopted in the Pennsylvania Uniform Construction Code in 2015. The vast majority of historic resources (which are typically considered eligible for listing in the National Register of Historic Places once they have exceeded 50 years in age) were constructed before 1960. Historic resources are addressed in association with other hazards, but the hazard of building collapse poses a distinct, heightened risk. According to the Pennsylvania State Hazard Mitigation Plan, there are nearly 130,000 historical buildings in Pennsylvania. (PEMA 2023). Table 4.3.1-1 shows the distribution of historic buildings in Dauphin County.

Table 4.3.1-1. Structures Built Before 1969

Jurisdiction	Total Structures	Structures Built Before 1969	Percent of Total Structures Built Before 1969
Berrysburg (B)	384	316	82.3%
Conewago (T)	2,726	1,181	43.3%
Dauphin (B)	499	342	68.5%
Derry (T)	12,189	4,994	41.0%
East Hanover (T)	5,424	2,274	41.9%
Elizabethville (B)	1,022	903	88.4%
Gratz (B)	804	592	73.6%
Halifax (B)	529	478	90.4%
Halifax (T)	3,714	2,055	55.3%
Harrisburg (C)	19,455	18,218	93.6%
Highspire (B)	1,481	1,249	84.3%

Jurisdiction	Total Structures	Structures Built Before 1969	Percent of Total Structures Built Before 1969
Hummelstown (B)	2,488	1,958	78.7%
Jackson (T)	2,533	1,299	51.3%
Jefferson (T)	695	453	65.2%
Londonderry (T)	5,464	3,642	66.7%
Lower Paxton (T)	22,715	9,034	39.8%
Lower Swatara (T)	5,204	2,297	44.1%
Lykens (B)	1,438	1,344	93.5%
Lykens (T)	2,311	1,783	77.2%
Middle Paxton (T)	4,472	2,216	49.6%
Middletown (B)	3,849	3,388	88.0%
Mifflin (T)	1,318	799	60.6%
Millersburg (B)	1,518	1,294	85.2%
Paxtang (B)	900	872	96.9%
Penbrook (B)	1,581	1,486	94.0%
Pillow (B)	317	273	86.1%
Reed (T)	327	158	48.3%
Royalton (B)	724	503	69.5%
Rush (T)	379	238	62.8%
South Hanover (T)	4,275	1,240	29.0%
Steelton (B)	2,867	2,478	86.4%
Susquehanna (T)	12,511	6,147	49.1%
Swatara (T)	12,223	6,465	52.9%
Upper Paxton (T)	3,823	2,189	57.3%
Washington (T)	2,464	982	39.9%
Wayne (T)	1,460	348	23.8%
West Hanover (T)	7,194	2,472	34.4%
Wiconisco (T)	1,112	883	79.4%
Williams (T)	1,093	750	68.6%
Williamstown (B)	966	923	95.5%
Dauphin Co. (Total)	**156,448**	**90,516**	**57.9%**

Source: Dauphin County 2024
Note: (B) = Borough, (C) = City, (T) = Township

4.3.1.2 Range of Magnitude

Structural collapse severity can range from the failure of a single load-bearing element within or on a structure, (weakening the structure) to the failure of all load-bearing elements within a structure (bringing about the complete collapse of the structure).

The Occupational Safety and Health Administration (OSHA) states that "When internal load-bearing structural elements fail, a building will collapse into itself, and exterior walls are pulled into the falling structure. This

scenario may be caused by construction activity, an earthquake, or fire, and may result in a dense debris field with a small footprint. Alternatively, if the structural failure is caused by an explosion or natural forces such as weather, the building may collapse in an outward direction, resulting in a less dense and more scattered debris field" (OSHA 2024).

All infrastructure, commercial and industrial businesses, and residential structures within Dauphin County are vulnerable to loss because of structural collapse, whether the collapse is from a cascading event or a catastrophic structural failure. This vulnerability is compounded because of the ground composition, which is prone to subsidence throughout the region. Vacant and abandoned buildings (both residential and commercial) pose a particular threat of structural collapse. According to the U.S. Fire Administration (USFA), vacant and abandoned buildings have two separate definitions, as described below (USFA 2023, IAAI 2006):

- Vacant Buildings: Unoccupied buildings with an owner who is interested in the property and easily contacted are considered vacant.
- Abandoned Buildings: A property is considered abandoned if there is no owner or the landlord is absent. In addition, the building taxes are not paid, and the building is not legally occupied.

IAAI and USFA indicate that it is best to identify these buildings early enough before they go into disrepair. Once buildings and structures have been abandoned, it usually becomes a community issue to maintain and secure the structure. Many communities across the nation face inadequate laws to prevent or reduce vacancies and many do not have the funds for demolition to remove these structurally at-risk buildings.

Vacant and abandoned buildings have enormous negative impacts on neighborhoods and communities. The aesthetics of a community deteriorate, crime increases, and public safety decreases as a result of social stressors (crime, economic decline, decrease in structural market value) and physical structural disrepair. As further identified by IAAI and USFA, "abandonment is a contagious phenomenon". This problem can be seen in almost every community across the nation, including Dauphin County.

Bridges are also at risk for structural collapse and disrepair can critically affect the integrity of bridge structures. The level of disrepair depends on how much of the structure is damaged and how critical that portion of the structure is to the safety of drivers. Some structures only need deck replacement or a new superstructure, while others have substructure problems and should be entirely replaced. Dauphin County contains a total of 562 bridges, of which 48 are in poor condition (PennDOT 2024). Table 4.3.1-2 identifies these bridges in poor condition. In addition, three bridges participated in the PA Rapid Bridge Replacement program and replacements are complete. These bridges include the NW Gratz bridge on Valley Drive Road in Lykens Township, W. Enders bridge on West Enders Road in Jackson Township, and the Near Mountain Road bridge on SR 225 in Mifflin Township (PennDOT 2024).

Table 4.3.1-2. Dauphin County Bridges in Poor Condition

Locally (L) or State (S) Owned	Condition	Jurisdiction	Year Built	Posting Status	Superstructure Condition (Deck Support)	Substructure Condition (Bridge Support)
S	Poor	Reed (T)	1986	Open, no restriction	Good	Poor
S	Poor	Reed (T)	1986	Open, no restriction	Good	Poor
S	Poor	Harrisburg (C)	1963	Open, no restriction	N/A	N/A
S	Poor	Harrisburg (C), Lemoyne (B)	1960	Open, no restriction	Poor	Good
S	Poor	Reed (T)	1860	Open, no restriction	Serious	Poor
S	Poor	Millersburg (B)	1920	Open, no restriction	N/A	N/A

Locally (L) or State (S) Owned	Condition	Jurisdiction	Year Built	Posting Status	Superstructure Condition (Deck Support)	Substructure Condition (Bridge Support)
S	Poor	Washington (T)	1938	Open, no restriction	N/A	N/A
S	Poor	Wiconisco (T)	1974	Open, no restriction	Poor	Fair
S	Poor	Jackson (T)	1931	Open, no restriction	N/A	N/A
S	Poor	Harrisburg (C)	1950	Open, no restriction	Poor	Fair
S	Poor	Londonderry (T)	1982	Open, no restriction	Fair	Poor
S	Poor	Conewago (T)	1928	Open, no restriction	N/A	N/A
S	Poor	Conewago (T)	1941	Open, no restriction	N/A	N/A
S	Poor	Washington (T)	1973	Posted for load	Poor	Satisfactory
S	Poor	Lykens (T)	1933	Open, no restriction	N/A	N/A
S	Poor	Lykens (T)	1910	Bridge closed to all traffic	Poor	Poor
S	Poor	Londonderry (T)	1920	Open, no restriction	N/A	N/A
S	Poor	Londonderry (T)	1934	Open, no restriction	Fair	Fair
S	Poor	Conewago (T)	1974	Open, no restriction	Poor	Fair
S	Poor	Derry (T)	1920	Open, no restriction	Fair	Fair
S	Poor	Derry (T)	1917	Bridge closed to all traffic	Fair	Poor
S	Poor	Lower Paxton (T), South Hanover (T)	1984	Open, no restriction	Serious	Fair
S	Poor	Harrisburg (C)	1965	Open, no restriction	Satisfactory	Poor
S	Poor	Harrisburg (C)	1929	Open, no restriction	5 - Fair	Satisfactory
S	Poor	Middle Paxton (T), Susquehanna (T)	1910	Open, no restriction	4 - Poor	4 - Poor
S	Poor	Harrisburg (C), Wormleysburg Borough	1928	Open, no restriction	Poor	Fair
S	Poor	Not listed	1938	Open, no restriction	Poor	Satisfactory
S	Poor	Harrisburg (C)	1940	Open, no restriction	Poor	Poor
S	Poor	Lower Paxton (T)	1959	Open, no restriction	Serious	Fair
S	Poor	Jackson (T)	1974	Open, no restriction	Serious	Satisfactory
S	Poor	Lykens (T)	1991	Open, no restriction	Good	Critical
S	Poor	Lykens (T)	1860	Open, no restriction	Fair	Poor
S	Poor	Jackson (T)	1920	Bridge closed to all traffic	Serious	Poor
S	Poor	Jackson (T)	1974	Open, no restriction	Poor	Satisfactory
S	Poor	Lykens (B)	1973	Open, no restriction	Poor	Fair
L	Poor	Susquehanna (T)	1987	Posted for load	Serious	Satisfactory
L	Poor	East Hanover (T)	1980	Open, no restriction	Poor	Satisfactory
L	Poor	East Hanover (T)	1930	Posted for load	Poor	Fair
L	Poor	Jefferson (T)	1976	Posted for load	Fair	Poor
L	Poor	Lower Paxton (T)	1950	Open, no restriction	Poor	Fair
L	Poor	Mifflin (T)	1900	Bridge closed to all traffic	Imminent Failure	Fair
L	Poor	Upper Paxton (T)	1973	Open, no restriction	Good	Fair

Locally (L) or State (S) Owned	Condition	Jurisdiction	Year Built	Posting Status	Superstructure Condition (Deck Support)	Substructure Condition (Bridge Support)
L	Poor	Harrisburg (C)	1900	Open, no restriction	Poor	Fair
L	Poor	Harrisburg (C)	1940	Open, no restriction	Poor	Satisfactory
L	Poor	Harrisburg (C)	1960	Open, no restriction	Poor	Satisfactory
L	Poor	Harrisburg (C)	1940	The bridge closed to all traffic	Poor	Poor
L	Poor	Harrisburg (C)	1914	Open, no restriction	Fair	Poor
L	Poor	Harrisburg (C)	1965	Open, no restriction	Good	Poor

Source: PennDOT 2024
Notes: (B)=Borough; (C)=City; (T)=Township; N/A=Not Applicable

4.3.1.3 Past Occurrence

Currently, Dauphin County does not have a comprehensive record of building or structure collapses; however, several recent instances have made the local news. Table 4.3.1-3 lists structural or building collapses that have taken place within the last ten years:

Table 4.3.1-3. Building and Structure Collapse Reports between 2015 and 2024

Date(s) of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts
May 5, 2016 and June 25, 2016	Structural Retention Wall Collapse	NA	NA	MacFarland Wall Collapse: Located in Harrisburg, the MacFarland property, an 8-unit building complex, had a 107-year-old retaining wall collapse unto Henry's Tire Shop. The wall had collapsed twice within a 2-month time span because of age, lack of infrastructure maintenance, and saturated soils. Upon the second collapse, the City of Harrisburg's Bureau of Codes conducted a structural inspection of the property, which revealed various violations according to the 2000 International Property Maintenance Code. The City's Bureau of Codes further identified that the building structure and retaining wall were structurally deteriorated due to lack of maintenance. The building structure was identified as a fire hazard as well as an overall public health and safety hazard. On the same day as inspections, the City of Harrisburg issued a Condemnation Order, "which condemned the McFarland property as dangerous, unsafe, and unfit for human habitation." McFarland filed a Request for Hearing to disclaim any ownership of the collapsed wall, but it was eventually determined that McFarland did indeed own the wall. Since this determination, a civil lawsuit between McFarland and Henry is still ongoing as to who is responsible for cleaning up the debris and who should rebuild a new retaining wall, estimated to cost $500,000.
April 3, 2016	Building Fire, Roof Collapse	NA	NA	Holly Hall: Located in Middletown, the Holly Hall building of an apartment complex located in the Village of Pineford is primarily filled with college students or the elderly. In April 2016, the complex caught on fire with an eventual roof collapse. During this incident, firefighters had a difficult time keeping the flames under control due to strong winds.

Date(s) of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts
July 12, 2017	Building Collapse	N/A	N/A	A construction worker was taken to Hershey Medical Center after a vacant house the crew was working on collapsed in Susquehanna (T). Reports from the Fire Chief noted that they "heard cracking" as it began to fall, but the 25-year-old worker was not quick enough to escape before getting pinned.
January 16, 2020	New Construction Building Collapse	NA	NA	Graceful Acres Therapeutic Riding (2020): Located in Halifax, Graceful Acres is a teaching facility for people with special needs in addition to using therapy horses to help special needs children. The building was under construction in 2020 and strong wind gusts knocked down most of the framework.
August 2, 2022	Partial Building Collapse	NA	NA	A house fire broke out on the 100 block of Kathryn Avenue, leading to a partial building collapse. No injuries were reported in this incident.
March 26, 2023	Partial Structure Collapse	N/A	N/A	12 were injured after a floor collapsed at an off-campus apartment near Indiana University of Pennsylvania. Injuries ranged from minor to serious, and the exact cause of the collapse is unknown.
August 22, 2023	Building Collapse	N/A	N/A	Dauphin County fire burns multiple homes and partially collapsed a building.
2020-2024	Building Collapse	N/A	N/A	Since 2020 County officials noted that in the City of Harrisburg, there have been six derelict buildings that have collapsed
March 24, 2024	Partial Bridge Collapse	N/A	N/A	A bridge partially collapsed County officials noted that there had been one bridge collapse in Jackson (T). Halifax FD closed the one-lane bridge (which is state-owned) where it crosses over Armstrong Creek.
May 8, 2024	Partial Building Collapse	N/A	N/A	Lightning struck the new Triple Crown Corporation building on Commerce Drive in Susquehanna (T), sparking a fire and causing part of the new building to collapse.
August 9, 2024	Building Collapse	DR-4815-PA	No	Winds from Tropical Storm Debby ripped the exterior back wall of a warehouse in Swatara (T).
November 19, 2024	Building Collapse	N/A	N/A	A three-story building collapsed on South 14th Street. The building was condemned, and not occupied. No injuries were reported.

Sources: Maisel, 2021; Sheehan, 2020; Volturo, 2022, RA Meeting (09/23/2024); (Fox43 2017); (PennLive 2023); (ABC27 WHTM 2024); (ABC27 WHTM 2024); (PA Homepage 2024); (ABC27 2024)

Similarly, there have been no major disaster declarations nor state emergency proclamations that resulted from building/structure collapse. From 2021 to 2024, Dauphin County has not issued any municipal-level emergency declarations related to this hazard event.

4.3.1.4 Future Occurrence

Issues with building integrity can grow without proper maintenance and code enforcement, increasing the risk of building collapse in a community. The age of a structure also needs to be taken into consideration. As identified in the Pennsylvania State Hazard Mitigation Plan, Dauphin County has 2,105 structures registered as historic buildings according to Pennsylvania Historic Museum Commission 2022 data (PEMA 2023). Although many older homes may have been built to code compliance at the time of construction, these homes may not be structurally stable and may not conform to current enhanced International Building Codes. Other hazard events, such as winter storms, tropical storms, and fires, could contribute to the conditions leading to a building collapse.

According to the 2023 PA HMP, it is estimated that over 45,100 people and 17,700 buildings are vulnerable to structure collapse with nearly $8 billion of building value at risk (PEMA 2023). This includes 13 percent of the building stock value in Dauphin County. Between January 1, 2015, to October 31, 2024, Dauphin County saw 16 instances when a building, structure, or bridge collapsed, giving this hazard an average annual frequency of 1.1 events per year. After a review of these factors, the likelihood of a building or structure collapse in Dauphin County is considered to be *highly likely*.

Table 4.3.1-4. Probability of Future Building/Structure Collapse in Dauphin County

Hazard Type	Number of Occurrences between 2015-2024	Percent Chance of Occurrence in Any Given Year
Building/Structure Collapse	16	100%

4.3.1.5 Vulnerability Assessment

To understand risk, a community must evaluate all exposed and vulnerable assets located in the identified planning area. The following sections discuss the potential impact of the building and structure collapse hazard on Dauphin County, including:

- Overview of vulnerability
- Impact on (1) life, health, and safety; (2) general building stock and critical facilities; (3) the economy; and (4) the environment
- Future growth and development
- Effect of climate change on vulnerability

Overview of Vulnerability

Many factors influence vulnerability to a structure and building collapse. Age of structure, building materials, density of the area of the building location, maintenance, and enforceable measures. Older structures may not have been built with the same level of structural stability required by modern building codes and therefore may be more susceptible to collapse than a modern structure. More densely populated areas of Dauphin County face a higher vulnerability because of the proximity of residences to each other, commercial structures, and urban blight. Overall, Dauphin County's vulnerability has not changed since the 2023 PA HMP as the entire county continues to face vulnerability to the building and structure collapse hazard.

Impact on Life, Health, and Safety

As discussed in previous sections, with any type of collapse, additional effects must be anticipated. Structures can house transmission lines for gases; liquids; and other products, such as sheetrock dust, asbestos, etc., which can be released into the environment during an incident. In addition, the public, residents, or individuals trapped by the collapse may cause widespread panic and anxiety, creating the potential for outbreaks of civil unrest.

Following the initial events of a structural collapse, residents and/or businesses may be displaced. Depending on the type of structural collapse, disruptions could impact the local economy, housing, and healthcare access.

Impact on General Building Stock and Critical Facilities

All infrastructure, commercial and industrial businesses, and residential structures within Dauphin County are vulnerable to loss due to structural collapse, whether from a cascading event or a catastrophic structural failure. This vulnerability is compounded because of the ground composition, which is prone to subsidence throughout the region.

Impact on the Economy

Structural and building collapse may cause impacts on the economy depending on the scale and severity of the collapse. Economic impacts of structural and building collapse may result in lost wages from temporarily or permanently closed businesses, destruction and damage involving business and personal assets, loss of tax base, recovery costs, and lost investments in destroyed property.

Impact on the Environment

Environmental impacts from a structural fire could occur if hazardous materials are released during a structure collapse. Debris from these fires may also contain chemicals or substances, that carry the potential to yield impacts to the local environment.

Future Growth and Development

Areas targeted for potential future growth and development in the next five to 10 years have been identified across Dauphin County (further discussed in Section 2.3 of this HMP). Any areas of growth could be potentially impacted by the structural collapse hazard because Dauphin County is exposed and vulnerable to flooding, subsidence, and karst (limestone) features. Working with the Tri-County Regional Planning Commission (TCRPC), which provides planning services for Dauphin, Cumberland, and Perry counties, is key as TCRPC adopted a Regional Growth Management Plan (RGMP) in 2017.

Effect of Climate Change on Vulnerability

One trigger for structural collapse is sinkholes. Climatologists expect an increase in annual precipitation in the planning area and across the State of Pennsylvania, which may pose an increased risk of sinkholes in vulnerable areas. As these areas become increasingly developed, the strain on underground aquifers will increase, especially during periods of drought. Precipitation is expected to increase over the next several decades. Since the early 20th century, global precipitation has increased at an average rate of 0.04 inches per decade, while precipitation in the contiguous 48 states has increased at a rate of 0.20 inches per decade (EPA 2023). Increased levels of precipitation will prove to pose an even greater threat for sinkholes in developed areas, resulting in a greater risk of structural collapse. For more information about subsidence and sinkholes, see Section 4.3.14 of this plan.

4.3.2 Cyber Attack

This section provides a profile and vulnerability assessment of the cyber-attack hazard for the Dauphin County Hazard Mitigation Plan (HMP) update.

A cyber-attack is the unlawful use of information technology, such as computer systems or telecommunications, to impact an individual or organization. This can include instances of cybercrime, such as using cyber-attacks to steal or extort money from individuals or organizations or to cause property damage, as well as cyber terrorism. The term "cyber-attack" often refers to an attack on information technology itself in a way that would radically disrupt networked services. For example, cyber attackers could disable networked emergency systems or hack into networks that house critical financial information. Cyber-attacks can range from taking control of a host website to using networked resources to cause destruction and harm directly. A cyber-attack is generally considered an act of cyber *terrorism* when the following conditions are present (PEMA 2023):

- Effects-based: when computer attacks result in effects that are disruptive enough to generate fear comparable to a traditional act of terrorism.
- Intent-based: when unlawful or politically motivated computer attacks are done to intimidate a government or people to further a political objective, or to cause grave harm or severe economic damage.

The Commonwealth's Governor's Office of Homeland Security defines the following types and methods of cyber-attacks, as listed in the table below:

Table 4.3.2-1. Governor's Office of Homeland Security Cyber Attack Definitions

Threat	Description
Botnet	A collection of computers subject to control by an outside party without the knowledge of the owners, using secretly installed software robots. The robots are spread by trojan horses and viruses. The botnets can be used to launch denial-of-service attacks and to transmit spam.
Card Skimming	The act of using a skimmer to illegally collect data from the magnetic stripe of a credit, debit, or ATM card. This information, copied onto another blank card's magnetic stripe, is then used by an identity thief to make purchases or withdraw cash in the name of the account holder. Skimming can take place at an ATM, restaurant, axis, or other places where a user surrenders their card to an employee.
Denial-of-Service-Attack	Flooding the networks or servers of individuals or organizations with false data requests so they are unable to respond to requests from legitimate users.
Malicious Code	A code that can be used to attack a computer by spreading viruses, crashing networks, gathering intelligence, corrupting data, disturbing misinformation, and interfering with normal operations.
Pharming	The act of sending an email to a user falsely claiming to be an established legitimate enterprise to scam the user into surrendering private information that will be used for identity theft. The email directs the user to visit a website where they are asked to update personal information. The website is only used to steal the user's information.
Phishing	Using a fake email to trick individuals into revealing personal information, such as social security numbers, debit and credit card account numbers, and passwords for nefarious uses.
Spam	Unsolicited bulk email that may contain malicious software. Spam is now said to account for around 81 percent of all email traffic.
Spear Phishing	Focuses on a single user or department within an organization, addressed from someone within the company on a position of trust and requesting information such as login IDs and passwords. Once hackers get this information, they can enter secured networks.
Spoofing	Make a message or transaction appear to come from a source other than the originator.
Spyware	Software that collects information without a user's knowledge and transfers it to a third party.
Swatting	The action or practice of making a prank call to emergency services in an attempt to bring about the dispatch of a large number of armed police officers to a particular address.
Trojan Horse	A destructive program that acts as a benign application. Unlike viruses, Trojan horses do not replicate themselves, but they can be just as destructive. One of the most common types is a program that claims to rid your computer of viruses but instead introduces viruses onto your computer.

Threat	Description
Virus	A program designed to degrade service, cause inexplicable symptoms, or damage networks.
Worm	Program or algorithm that replicates itself over a computer network and usually performs malicious actions, such as using the computer's resources and possibly shutting the system down. A worm, unlike a virus, has the capability to travel without human action and does not need to be attached to another file or program.

Source: GOHS n.d.

Cyber attackers can be difficult to identify because the internet provides a meeting place for individuals from various parts of the world, allowing individuals or groups planning a cyber-attack to effectively communicate over long distances without delay (PEMA 2023). There is wide disagreement regarding the existing threat of cyber-attacks both within the United States and around the world.

Cyber-attacks can cause severe disruptions to transportation, public safety, and utility services, all of which (as critical infrastructure) are highly dependent on information technology. Cyber-attacks can take many forms (as shown above), are unpredictable, and can occur without warning.

4.3.2.1 Location and Extent

Nationally, cyber security incidents or attacks have impacted residents, businesses & industry, and public utilities to varying degrees, and those threats will continue and likely expand in the future. Cyber-attacks can occur anywhere within Dauphin County, and the location and extent of these potential attacks vary depending on an individual's or organization's agenda. Any processes that are networked and controlled by a computer are vulnerable to a cyber-attack. Dauphin County government, its municipalities, and stakeholders such as academia, healthcare, National Guard, conservancies, residents, travelers, and business & industry (i.e., the whole community), are potential targets for cyber-attacks. Cyber attackers can overtake websites, steal information, and alter the content that is presented to the public. 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. Even with required cyber security protection, damage to or disruption of government and business operations can still occur and profoundly impact Dauphin County and its communities.

4.3.2.2 Range of Magnitude

The magnitude of cyber-attacks has become more significant in recent years. Cyber-attacks can greatly impact the whole community to varying degrees. The magnitude varies based on which specific system is affected by an attack, the ability to predict an attack, and an attack's effect on operations. As shown in Table 4.3.2-1, there are many forms of cyber-attack, so the overall range of the magnitude of a cyber-attack can vary from a skimmer collecting financial information from people who use a particular gas pump to a large-scale cyberterrorist attack that aims to disrupt government functions. Additionally, vulnerability to cyber-attacks is greater where there are higher concentrations of people, businesses, and critical infrastructure. Also, as the City of Harrisburg serves as both the county seat and state capital, cyber-attacks targeting people and systems in the City of Harrisburg could have cascading impacts affecting all areas of the county and/or Commonwealth.

In response to the growing cybersecurity threat, the National Institute of Standards and Technology (NIST) developed the "Framework for Improving Critical Infrastructure Cybersecurity" in 2018. This document is described in Section 5 (Capability Assessment).

One worst-case scenario for a cyber-attack event in Dauphin County would be a hacker illicitly accessing government systems, disrupting normal operations, intercepting calls, and emails, and gaining access to personal financial and other sensitive information. Another worst-case scenario would be a virus affecting a large portion of the computer population of the county, stealing credit card information, and causing millions of dollars in damage.

4.3.2.3 Past Occurrence

Residents, government, and other stakeholders are regularly impacted by cybersecurity incidents involving the release of Personal Identifiable Information (PII) and other data, due to cybersecurity data breaches, such as Peekaboo, MGM Resorts, Walgreens, the Small Business Administration, and Marriott International, in 2020 alone. The majority of these incidents go unreported through standard emergency management channels and mechanisms.

The 2023 Pennsylvania HMP identified eight cyber-attacks that affected Dauphin County (PEMA 2023). Five of these attacks yielded statewide impacts, and the remaining three events specifically targeted Dauphin County. According to the 2023 Dauphin County Annual Report, ransomware was one of the techniques used in a cybersecurity breach at Dauphin County Tech School in April 2023. Additional details for these events are not provided here due to security concerns.

4.3.2.4 Future Occurrence

Due to the frequent nature of cyber-attacks and their sensitive nature across the Commonwealth of Pennsylvania and within Dauphin County specifically, cyber-attack occurrences are not typically publicized. Cyber-attacks happen in one form or another on an almost daily basis, so the future occurrence of cyber-attacks in Dauphin County can be considered ***highly likely***, as defined by the Risk Factor Methodology probability criteria (discussed in Section 4.4).

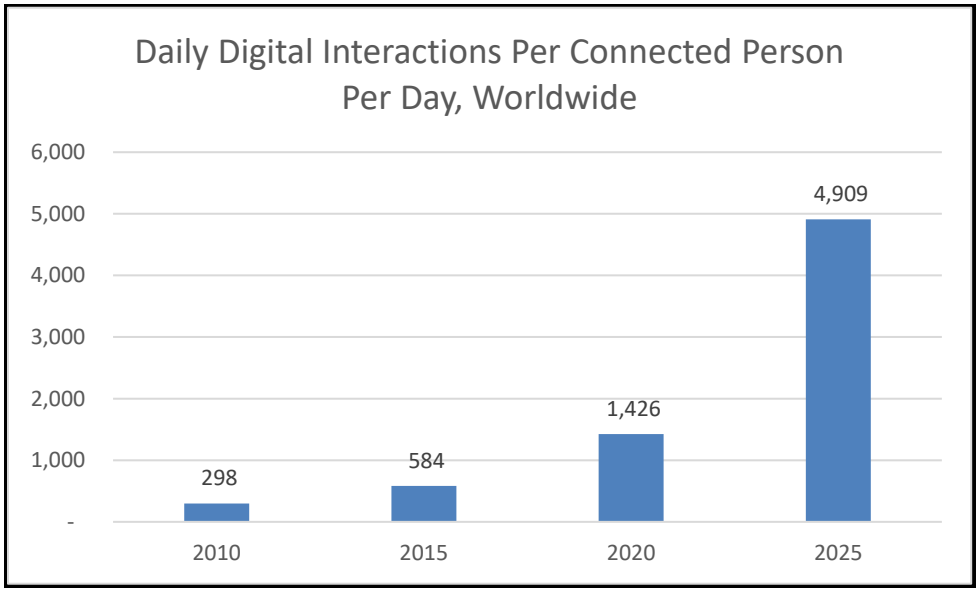
4.3.2.5 Vulnerability Assessment

To understand risk, all assets must be evaluated for exposure and vulnerability within the identified planning area. The following sections discuss the potential impact of the cyber-attack hazard in Dauphin County, including:

- Impact on (1) life, health, and safety; (2) general building stock; (3) critical facilities; (4) the economy; and (5) the environment.
- Future growth and development.
- Effect of climate change on vulnerability.
- Additional data and next steps.

As information technology evolves, so will the risk of cyber-attacks. Cyber-attacks today are largely based on existing operating systems and network vulnerabilities. As the technology develops, cyber attackers will find new ways to exploit vulnerabilities. Vulnerabilities in the Internet of Things (a network of physical devices, vehicles, appliances, and other physical objects that are embedded with sensors, software, and network connectivity, allowing them to collect and share data.), including wearable devices (e.g. smart watches), smart homes and assistants (e.g., Alexa, Google Home, etc.), networked doorbells (e.g., Ring), etc. will increase the vulnerability to cyber-attacks and provide new targets for malicious actors (IBM 2024). The average person produces approximately 1.7 MB of data every second (FinancesOnline 2024), and the average number of daily digital interactions per connected person worldwide is estimated to grow between 1,426 interactions in 2020 to 4,909 interactions in 2025 (Statista 2023), as shown in Figure 4.3.2-1. These statistics reflect the potential vulnerability to cyber-attacks across the United States, including within Dauphin County.

Figure 4.3.2-1. Daily Digital Interactions Per Connected Person Per Day, Worldwide



Source: Statista, 2023

Impact on Life, Health, and Safety

All 286,401 residents in Dauphin County are exposed to this hazard (U.S. Census Bureau 2024). Cyber-attacks can impact the healthcare system (e.g., networked medical equipment may be vulnerable to hacking). Likewise, as autonomous vehicle technology progresses and autonomous vehicles become more common on Dauphin County's roadways, they are vulnerable to cyber-attacks that could cause transportation accidents resulting in injuries and/or fatalities.

If a cyber-attack targeted Pennsylvania's power or utility grid, vulnerable populations could face the greatest impacts. For example, individuals with medical needs are vulnerable because many of the life-saving systems they rely on require power. Also, if an attack occurred during months of extreme hot or cold weather, the county's elderly population (those 65 years of age and older) would be vulnerable to the effects of the lack of climate control. These individuals would require shelter or admission to a hospital.

Furthermore, households located near vulnerable facilities could experience greater impacts of a cyber-attack. If a cyber-attack targeted a facility storing or manufacturing hazardous materials, individuals living adjacent to these facilities could be vulnerable to the secondary effects if the attack successfully caused a critical failure at that facility.

Impact on General Building Stock

Along with every home and business that is connected to the Internet, there are over 1,692 critical facilities in Dauphin County at risk of experiencing impacts from a cyber-attack. A cyber-attack can impact a building, ranging from minor system disruption to complete shutdown caused by infiltration of supervisory control and data acquisition (SCADA) systems. Secondary effects could disturb public welfare and property by causing denials of critical services. If services are disrupted by attacks, cyber incidents can cause damage to physical assets. If a cyber-attack targets a fire suppression system, these structures may face increased vulnerability to structural fires.

Impact on Critical Facilities

Critical facilities and lifelines are vulnerable to cyber-attacks based on the significance of the facilities and the potential to interrupt critical systems in the county. As previously mentioned, many critical facilities are reliant upon computer networks to monitor and control critical functions. This can include utilities, public safety facilities, medical facilities, or government buildings. A cyber-attack could result in catastrophic failure of any one of these facilities. The power grid is reliant upon computer systems to distribute power to the Commonwealth and an attack could disrupt power to thousands of Dauphin County residents. This is just one example of how critical facilities are vulnerable to cyber-attacks. Given the importance of critical facilities to daily living activities, critical facilities are highly vulnerable to cyber-attacks.

Impact on the Economy

Cyber-attacks can have a damaging effect on public trust in systems that are traditionally considered stable and secure, especially when these threats lead to widespread economic impacts. Companies and government services can lose large sums of unrecoverable revenue from site downtime and possible compromise of sensitive confidential data. Further, the cost of malicious cyber activity involves more than the loss of financial assets or intellectual property. Cybercrimes can cause damage to a company's brand and reputation, loss of competitive advantage, reduction in credit rating, and increases in cyber insurance premiums (Huang, et al. 2023).

Individuals' personal information is also at risk. Commonly stolen personal information includes name, social security number, and driver's license information. Because it is difficult to predict the particular target of a cyber-attack, assessing vulnerability to the hazard is also difficult. Generally, all members of the population who directly use a computer or those receiving services from automated systems are vulnerable to cyber-attacks. Although all individuals in Dauphin County are vulnerable to an attack, certain types of attacks may impact specific segments of the population.

Given the proliferation of electronic commerce and the reliance on electronics, virtually all elements of Dauphin County's economy are vulnerable to cyber-attacks. For example, an attack that caused the loss of power to hundreds of thousands of businesses during peak holiday shopping months could potentially cost millions of dollars in revenue if these businesses were to be closed. Additionally, a disruption in Dauphin County's manufacturing, agricultural, or tourism sectors would have devastating impacts on the economy. While it is difficult to quantitatively measure the economic impact of a cyber-attack, it is safe to say that cyber-attacks carry the potential to yield devastating effects on the local economy.

According to the Federal Bureau of Investigation (FBI)'s 2024 Internet Crime Report, over 880,418 cyber-attack complaints were received by the Internet Crime Complaint Center (IC3) with potential losses exceeding $12.5 billion (FBI 2024). This estimate marks a nearly 10% increase in complaints and a 22% increase in losses compared to the 2023 Report. Investment scams saw the greatest increase from the previous year, rising 38% to an estimated $4.57 billion in losses due to this form of cyber-attack.

The financial sector is uniquely exposed to the threat of cyber-attacks. Financial firms, given the large amounts of sensitive data and transactions they handle, are often targeted by criminals seeking to steal money or disrupt economic activity. Incidents in the financial sector could threaten financial and economic stability if they erode confidence in the financial system, disrupt critical services, or cause spillovers to other institutions (Natalucci, Qureshi and Sunthiem 2024).

Impact on the Environment

The impacts of a cyber-attack are usually limited to infrastructure and people, as highlighted in earlier sections. In the same way that people living near facilities that store or manufacture hazardous materials could be impacted by a cyber-attack affecting those facilities, those attacks could also release hazardous materials into the

environment. Outside of these secondary impacts of a cyber-attack on various facilities, cyber-attacks are not known to directly impact the environment.

Future Growth and Development

Areas targeted for potential future growth and development in the next 5 to 10 years have been identified across Dauphin County (further discussed in Section 2.4 of this HMP). Due to the unpredictable nature of cyber-attacks and their seemingly incalculable potential to disrupt various elements of society, any areas of growth within Dauphin face the same widespread risk of cyber-attacks.

Effects of Climate Change on Vulnerability

Because cyber-attacks are a human-caused hazard, climate change is not anticipated to affect the vulnerability associated with cyber-attacks.

Additional Data and Next Steps

Any additional information regarding localized concerns and past impacts will be collected and analyzed for the HMP update. These data will be developed to support future revisions to the plan.

4.3.3 Dam Failure

This section provides a profile and vulnerability assessment of the dam failure hazard in Dauphin County. A dam is an artificial barrier allowing storage of water, wastewater, or liquid-borne materials for many reasons (flood control, human water supply, irrigation, livestock water supply, energy generation, containment of mine tailings, recreation, or pollution control). Many dams fulfill a combination of these stated functions (Association of State Dam Safety Officials n.d.). Dams are an important resource in the United States.

Man-made dams can be classified according to type of construction material used; methods applied in construction, slope, or cross-section of the dam; how a dam resists forces of water pressure behind it; means used to control seepage; and purpose of the dam. Materials used for dam construction include earth, rock, tailings from mining or milling, concrete, masonry, steel, timber, miscellaneous materials (plastic or rubber), and any combination of these materials (Association of State Dam Safety Officials n.d.).

According to the Association of State Dam Safety Officials, "by 2025, seven out of 10 dams in the United States will be over 50 years old" (Association of State Dam Safety Officials n.d.). Approximately 16,000 dams pose a significant hazard to life and property if failure occurs. About 2,000 unsafe dams are dispersed throughout the United States in almost every state.

Dams typically fail when spillway capacity is inadequate and excess flow overtops the dam or when internal erosion (piping) through the dam or foundation occurs. Complete failure occurs if internal erosion or overtopping results in a complete structural breach, releasing a high-velocity wall of debris-filled water that rushes downstream, damaging or destroying anything in its path (FEMA 2018).

Dam failures can result from one or a combination of the following:

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

Regulatory Oversight of Dams

The potential for catastrophic flooding due to dam failures led to the enactment of the National Dam Safety Act (Public Law 92-367), which for 30 years has protected Americans from dam failures. The National Dam Safety Program (NDSP) is a partnership among states, federal agencies, and other stakeholders that encourages individual and community responsibility for dam safety. Under the Federal Emergency Management Agency's (FEMA's) leadership, state assistance funds have allowed all participating states to improve their programs through increased inspections, emergency action planning, and purchases of needed equipment. FEMA has also expanded existing and initiated new training programs to address dam failure. Grant assistance from FEMA provides support for the improvement of dam safety programs that regulate most dams in the United States (FEMA 2023).

Pennsylvania Department of Environmental Protection

The Pennsylvania Department of Environmental Protection (PADEP) holds responsibility for dam safety throughout the Commonwealth. Hazard Potential Category 1 dams are those "where its failure could result in significant loss of life, excessive economic losses, and significant public inconvenience" (Pennsylvania Code 2024). Hazard Potential Category 2 dams are those "where its failure could result in the loss of a few lives, appreciable property damage, and short-duration public inconvenience" (Pennsylvania Code 2024). Owners of

dams classified as Hazard Categories 1 or 2 ("high-hazard" dams) are required to create an Emergency Action Plan (EAP) that describes the dam, the inundation area if the dam were to catastrophically fail, and procedures for responding to the dam failure (such as notification to the vulnerable population) (Pennsylvania Code 2024). Dauphin County receives copies of EAPs and inundation maps for high-hazard dams whose failure could impact residents.

U.S. Army Corps of Engineers Dam Safety Program

The U.S. Army Corps of Engineers (USACE) is responsible for safety inspections of some federal and non-federal dams in the United States that meet the size and storage limitations specified in the National Dam Safety Act. USACE has inventoried dams and has surveyed each state's and federal agency's capabilities, practices, and regulations regarding the design, construction, operation, and maintenance of dams. USACE has also developed guidelines for inspection and evaluation of dam safety (USACE 2014). The USACE National Inventory of Dams (NID) provides the most recent dates of inspection of the following Dauphin County dams:

- Center Campus Pond No. 1: 3/23/2021
- DeHart Dam: 12/16/2020
- Hidden Valley: 12/28/2020
- Jacobs Creek: 3/23/2021
- Manada Golf Club Pond: 7/30/2018
- Round top: 7/11/2016
- Swatara: 6/2/2016
- Wildwood Lake: 7/11/2016
- Yingst: 7/30/2018

Federal Energy Regulatory Commission Dam Safety Program

The Federal Energy Regulatory Commission (FERC) has the largest dam safety program in the United States. FERC cooperates with a large number of federal and state agencies to ensure and promote dam safety and, more recently, homeland security. FERC staff inspect hydroelectric projects on an unscheduled basis to investigate the following:

- Potential dam safety problems
- Complaints about constructing and operating a project
- Safety concerns related to natural disasters
- Issues concerning compliance with terms and conditions of a license (FERC 2017)

Every 5 years, an independent consulting engineer, approved by FERC, must inspect and evaluate projects with dams higher than 32.8 feet (10 meters) or with total storage capacity of more than 2,000 acre-feet (FERC 2017).

FERC monitors and evaluates seismic research in geographic areas where seismic activity is a concern. This information is applied to investigate and analyze structures of hydroelectric projects within these areas. FERC staff also evaluates the effects of potential and actual large floods on dam safety. FERC staff visit dams and licensed projects during and after floods, assess the extent of damage, and direct any studies or remedial measures the licensee must undertake. FERC's *Engineering Guidelines for the Evaluation of Hydropower Projects* guides FERC engineering staff and licensees in evaluations of dam safety. The publication is frequently revised to reflect current information and methodologies (FERC 2017).

FERC requires licensees to prepare EAPs and conducts training sessions on developing and testing these plans. The plans outline an early warning system in the event of an actual or potential sudden release of water from a dam failure. The plans include operational procedures that may be implemented during regulatory measures, such as reducing reservoir levels and downstream flows as well as procedures for notifying affected residents and agencies responsible for emergency management. These plans are frequently updated and tested to ensure that all applicable parties are informed of the proper procedures in emergencies (FERC 2017).

4.3.3.1 Location and Extent

Forty-two dams are present throughout Dauphin County, as shown in Figure 4.3.3-1. The vast majority of these dams pose little risk; however, there are six high-hazard potential dams (HHPD) in the County and one outside

the County (Raystown Lake Dam) which threatens the planning area. Emergency Action Plans (EAPs) are current for all except three. One is currently being updated as of late 2024 while the other two (Hidden Valley Dam and Jacob's Creek) need updates.. Table 4.3.3-1 lists dam classification definitions. Table 4.3.3-2 is a complete list of dams in Dauphin County with high-hazard dams listed first.

One of the 6 HHPDs identified in Dauphin County is owned by a municipality, one is owned by a university, one is owned by a homeowners association, and the other three are privately owned. Dauphin County has conducted outreach with the dam owners which included gathering data from provided Emergency Action Plans and inundation maps for each high-hazard dam. This data was incorporated in compiling referenced maps. EAPs and associated inundation maps are kept on file by each identified owner and Dauphin County to protect the confidential and sensitive information contained within the documents. The EAPs can be requested due to the confidential and sensitive information contained in each plan and map.

Figure 4.3.3-1. Dam Locations in Dauphin County, PA

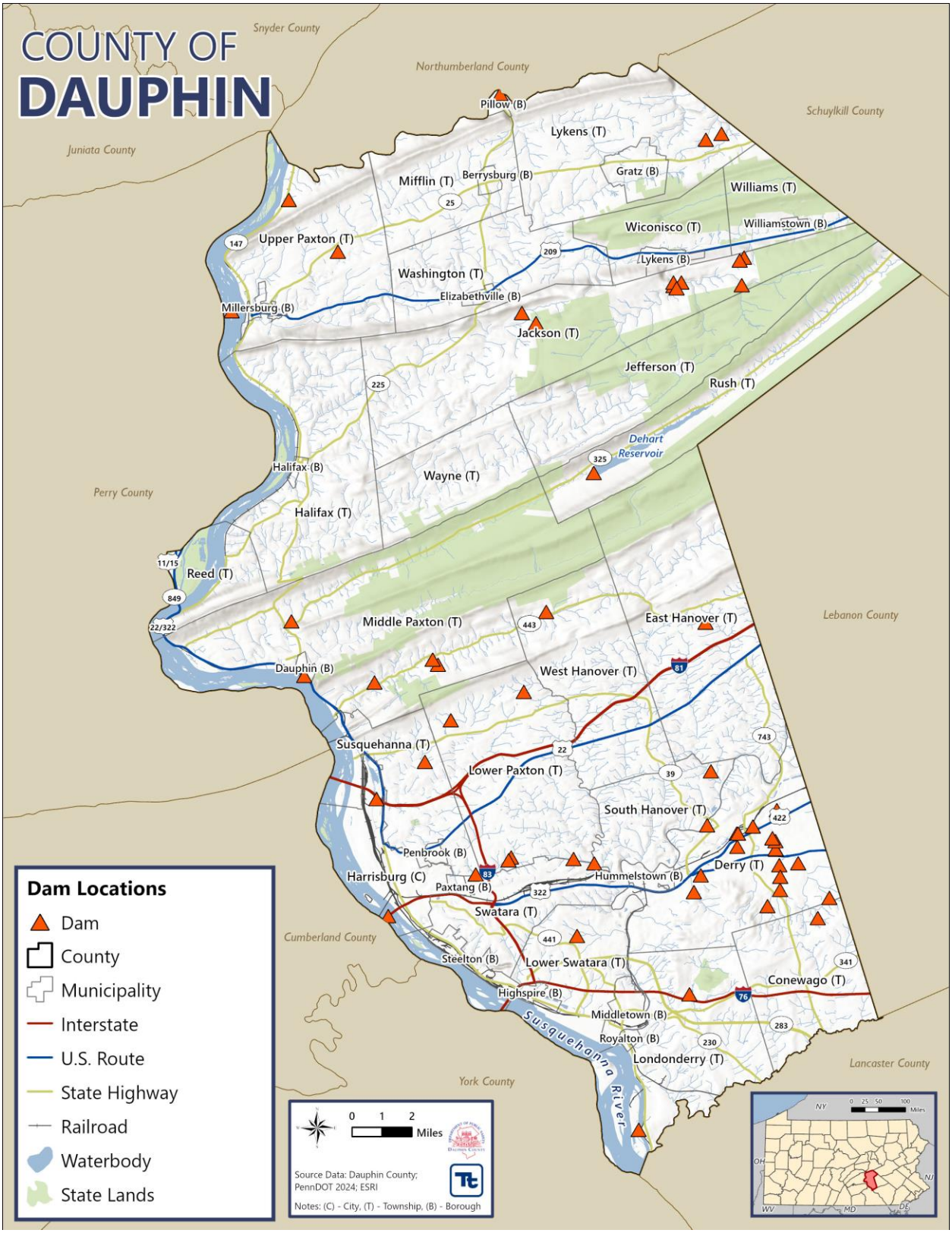


Table 4.3.3-1. Dam Classification Definitions

Size Category		
Category	**Impoundment Storage (Acre-feet)**	**Dam Height (Feet)**
A	Equal to or greater than 50,000	Equal to or greater than 100
B	Less than 50,000 but greater than 1,000	Less than 100 but greater than 40
C	Equal to or less than 1,000	Equal to or less than 40
Hazard Potential Category		
Category	**Population at Risk**	**Economic Loss**
1	Substantial (Numerous homes or small businesses or a large business or school)	Excessive, such as extensive residential, commercial, or agricultural damage, or substantial public inconvenience
2	Few (A small number of homes or small businesses)	Appreciable, such as limited residential, commercial, or agricultural damage, or moderate public inconvenience
3	None expected (no permanent structures for human habitation or employment)	Significant damage to private or public property and short-duration public inconvenience such as damage to storage facilities or loss of critical stream crossings
4	None expected (no permanent structures for human habitation or employment)	Minimal damage to private or public property and no significant public inconvenience

Source: Commonwealth of Pennsylvania 2011.

Table 4.3.3-2. Dams in Dauphin County

Dam Name	Municipality	Stream	Class	Permittee
High-Hazard Dams				
Center Campus Pond No. 1	Derry Township	Tr Swatara Creek	C-1	Pennsylvania State University
DeHart	Rush Township	Clarks Creek	A-1	The City of Harrisburg, Bureau of Water
Hidden Valley	Middle Paxton Township	Tr Fishing Creek	C-1	Lawrence M. Cooney
Jacobs Creek Dam	Derry Township	Tr Spring Creek	C-3	Jacobs Creek Homeowners Association
Yingst	West Hanover Township	Tr Fishing Creek	C-3	West Hanover Township
Manada Golf Club Pond	East Hanover Township	Bow Creek	C-3	Richard & Cathy Yingst
Other Dams				
Ayers Dam	Jackson Township	Armstrong Creek	C-4	Jan Ayers
Big Lick	Jefferson Township	Updegroves Run	C-4	Williamstown Borough Authority
Blue Meadow Farm Det Basin	Lower Paxton Township	Tr Beaver Creek	C-4	Triple Crown Corporation
Brook Drive	Derry Township	Spring Creek	C-4	Milton Hershey School
Bullfrog Valley Pond	Derry Township	Tr Swatara Creek	C-4	Derry Township
Dauphin	Dauphin Borough	Stony Creek	C-4	United Water of Pa
Dock Street	Harrisburg City	Susquehanna River	C-4	Harrisburg City
East Rattling Creek Res	Jackson Township	Rattling Run	C-4	Borough of Lykens
Felicita - Pond No. 4	Middle Paxton Township	Fishing Creek	C-4	King Drive Corporation
Felicita - Pond No. 6	Middle Paxton Township	Fishing Creek	C-4	King Drive Corporation

Dam Name	Municipality	Stream	Class	Permittee
Feltys	Derry Township	Tr Spring Creek	C-4	Larry Moyer
Ferry Wall	Millersburg Borough	Susquehanna River	C-4	Millersburg Ferry Boat Association
Glen Park	Lykens Borough	Rattling Creek	C-4	Borough of Lykens
Hershey	Derry Township	Spring Creek	C-4	Unknown
Keiser	Lower Paxton Township	Tr Paxton Creek	C-4	James F. & Albert L. Keiser
Lykens Reservoir	Jackson Township	Rattling Run	C-4	Borough of Lykens
Lykens Valley Golf Course	Upper Paxton Township	Unt Little Wiconisco Creek	C-4	Lykens Valley Golf Course
Lykens Water Supply	Jackson Township	Rattling Creek	C-4	Borough of Lykens
Nine O'clock	Jackson Township	East Branch Rattling Run	C-4	Williamstown Borough Authority
Old Reliance Farm Detention Pond	Lower Swatara Township	Tr Swatara Creek	C-4	Daniel Brawley
Old Reliance Farm Detention Pond	Lower Swatara Township	Tr Swatara Creek	C-4	Mr. & Mrs. Daniel Brawley
Pines Association	Conewago Township	Tr Spring Creek	C-4	Mr. & Mrs. Steve Stanislawczyk
Round Top	Londonderry Township	Iron Run	C-4	Middletown Borough
Sandbeach Diversion	South Hanover Township	Manada Creek	C-4	Pa American Water Company
Schlegel	Upper Paxton Township	Tr Susquehanna River	C-4	Willard Schlegel
Spring Creek	Derry Township	Spring Creek	C-4	Hershey Park
Stehr	Lykens Township	Tr Pine Creek	C-4	Craig Stehr
Swatara	Derry Township	Swatara Creek	C-4	PA American Water Company
Toyer	Susquehanna Township	Tr Spring Creek	C-4	Ed Toyer
Twin Lakes Park Lower	Lower Paxton Township	Tr Spring Creek	C-4	Twin Lakes Park Community Association
Twin Lakes Park Upper	Lower Paxton Township	Tr Spring Creek	C-4	Twin Lakes Park Community Association
Unnamed	Lower Paxton Township	Beaver Creek	C-4	United Water of Pa
Upper Reservoir	Jackson Township	Tr Wiconisco Creek	C-4	Williamstown Borough Authority
White Oak Road	Jackson Township	Tr Armstrong Creek	C-4	DCNR
Widener University	Susquehanna Township	Tr Black Run	C-4	Widener University
Wildwood Lake	Harrisburg City	Paxton Creek	C-4	County of Dauphin

Source: PADEP 2020

4.3.3.2 Range of Magnitude

The extent or magnitude of a dam failure event can be measured in terms of the classification of the dam. FEMA has three classification levels of dam hazard potential: low, significant, and high. The classification levels build on each other. The hazard potential classification system should be used with the understanding that failure of any dam or water-retaining structure could represent a danger to downstream life and property (FEMA 2004).

Each FEMA classification level of dam hazard potential is described as follows:

- Low-hazard potential dams are those where failure or misoperation would result in no probable loss of human life and low economic or environmental losses. Losses are principally limited to the owner's property.
- Significant-hazard potential dams are those where failure or misoperation would result in no probable loss of human life but could cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns. Significant-hazard potential dams are often located in predominantly rural or agricultural areas.
- High-hazard potential dams are those where failure or misoperation will probably cause loss of human life.

Table 4.3.3-3 breaks down the scale developed by USACE to assign hazard classifications and dam failure potential to federally monitored dams. This scale was based only on the potential consequences of a dam failure which is highly regulated by a variety of factors such as downstream population and the threat to property and lives. . Categorical groups are assigned to overall projects, not individual structures at a project. Also, loss-of-life potential is based on inundation mapping in the area downstream

Table 4.3.3-3. U.S. Army Corps of Engineers Hazard Potential Classification

Hazard Category[1]	Direct Loss of Life[2]	Lifeline Losses[3]	Property Losses[4]	Environmental Losses[5]
Low	None (rural location, no permanent structures for human habitation)	No disruption of services (cosmetic or rapidly repairable damage)	Private agricultural lands, equipment, and isolated buildings	Minimal incremental damage
Significant	Rural locations, only transient or day-use facilities	Disruption of essential facilities and access	Major public and private facilities	Major mitigation required
High	Certain (one or more) extensive residential, commercial, or industrial development	Disruption of essential facilities and access	Extensive public and private facilities	Extensive mitigation cost or impossible to mitigate

Source: USACE 2016

1 Categories are assigned to overall projects, not individual structures at a project.

2 Loss-of-life potential is based on inundation mapping of the area downstream of the project. Analysis of loss-of-life potential should consider the population at risk, time of flood wave travel, and warning time.

3 Lifeline losses include indirect threats to life caused by the interruption of lifeline services from project failure or operational disruption; for example, loss of critical medical facilities or access to them.

4 Property losses include damage to project facilities and downstream property and indirect impact from loss of project services, such as impact from loss of a dam and navigation pool, or impact from loss of water or power supply.

5 Environmental impact downstream caused by the incremental flood wave produced by the project failure, beyond what would normally be expected for the magnitude flood event under which the failure occurs.

The EAPs associated with the Dauphin County high-hazard dams provide information concerning the estimated number of homes and residents vulnerable to a dam failure. The county considers the DeHart Dam, located in Rush Township, to be the most significant due to the potential impact of a failure from this dam. Failure of this dam would inundate an area bordered on the north by State Route 325 and on the south by Third and Middle Mountains from the DeHart Dam to the Susquehanna River. The number of vulnerable structures includes 112 homes, one daycare center, and 11 highway bridges. The number of vulnerable residents is approximately 1,000. (Capital Region Water 2018).

In addition to dams located within the county, Dauphin County considers the "high-hazard" Raystown Lake Dam, located in Huntingdon County, to be significant for potential impact. Raystown Lake Dam is located 68

miles northwest of Dauphin County on the Juniata River. According to the USACE Raystown Lake Master Plan, the lake covers 513,000 acre-feet of water and reaches roughly 30 river miles long. During flood stages, the lake can hold 761,000 acre-feet of water and reach roughly 34 river miles long (USACE 2021). If a spillway failure were to occur at Raystown Dam, flood water would overflow the Susquehanna River banks for Dauphin County municipalities located south of the Juniata River confluence. According to the USACE, it would take 13.6 hours to begin experiencing increased flows and 24 hours to see peak flows after the dam failure. This is comparable to the Harrisburg 1996 Ice Jam flood event that occurred on the Susquehanna River (USACE 2012). USACE is in the process of repairing the Raystown spillway with $20,655,000 in Infrastructure, Investments, and Jobs Act (IIJA) funding (Center for American Progress 2023).

Dam failure events are frequently associated with other natural hazard events such as earthquakes, landslides, or severe weather, which limits their predictability and compounds the hazard. The shaking associated with earthquakes may weaken the structure of a dam, particularly earthen dams, causing them to fail. Landslides can directly impact a dam, causing damage or failure. Likewise, landslides of the ground around a dam may weaken the ground on which the dam exists, causing the potential for the dam structure to fail. Landslides into the water being impounded by the dam can cause a wave to travel the length of the dam's impoundment area, ultimately crashing on the dam itself. Severe weather can result in large quantities of rain upstream of the dam that will ultimately be impounded by the dam, which could raise water levels behind the dam, resulting in overtopping of the dam and/or flooding of properties upstream of the dam itself. Populations without adequate warning of the event are highly vulnerable to this hazard.

4.3.3.3 Past Occurrence

To date, there have not been any impactful dam failures in Dauphin County's recent history as minor issues are often not reported on smaller dams.

4.3.3.4 Future Occurrence

The likelihood of a dam failure in Dauphin County is difficult to predict. Dam failure events are infrequent and usually coincide with events, such as earthquakes, landslides, and excessive rainfall and/or snowmelt. However, the risk of dam failure may increase as dams age or due to lack of proper maintenance.

"Residual risk" to dams is the risk that remains after the implementation of safeguards. Residual risk to dams is associated with events beyond those that the facility was designed to withstand. However, the probability of any type of dam failure is low in today's dam safety regulatory and oversight environment.

Based on Risk Factor Methodology Probability Criteria (further defined in Section 4.4), and assuming regular maintenance and inspections of the dams in Dauphin County, dam failures are considered *unlikely* in the county.

4.3.3.5 Vulnerability Assessment

To assess Dauphin County's risk of dam failure, a quantitative review was implemented referencing the probable maximum flood inundation areas for the Raystown Dam, Sunny Day and PMF, DeHart Dam, Jacobs Creek Dam, Hershey Dam, Yingst Dam, and the Manada Golf Club Pond Dam (Figure 4.3.3-2 through Figure 4.3.3-8).

Figure 4.3.3-2. Dam Inundation Areas across Dauphin County, PA

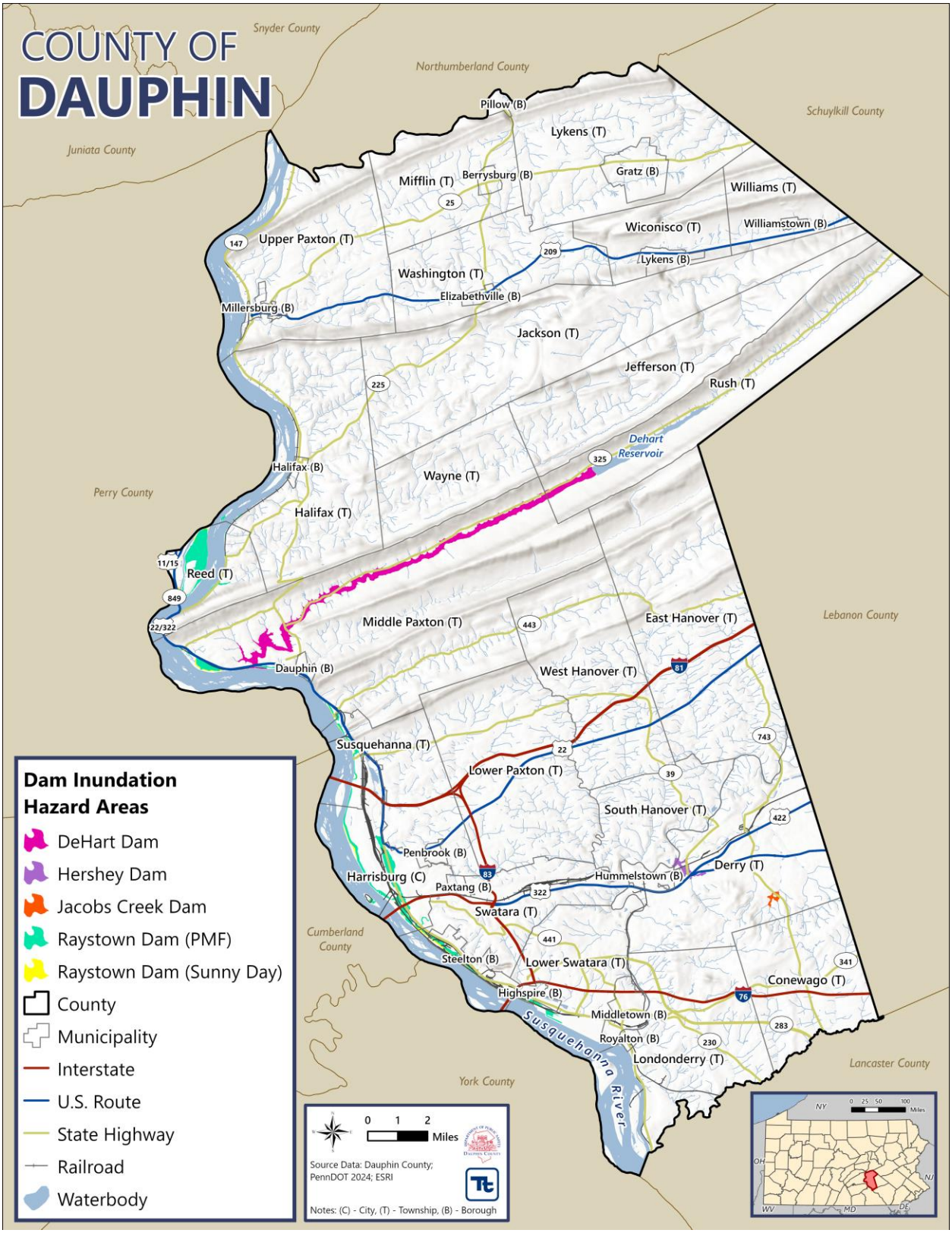


Figure 4.3.3-3 Raystown Dam Sunny Day and PMF Inundation Areas

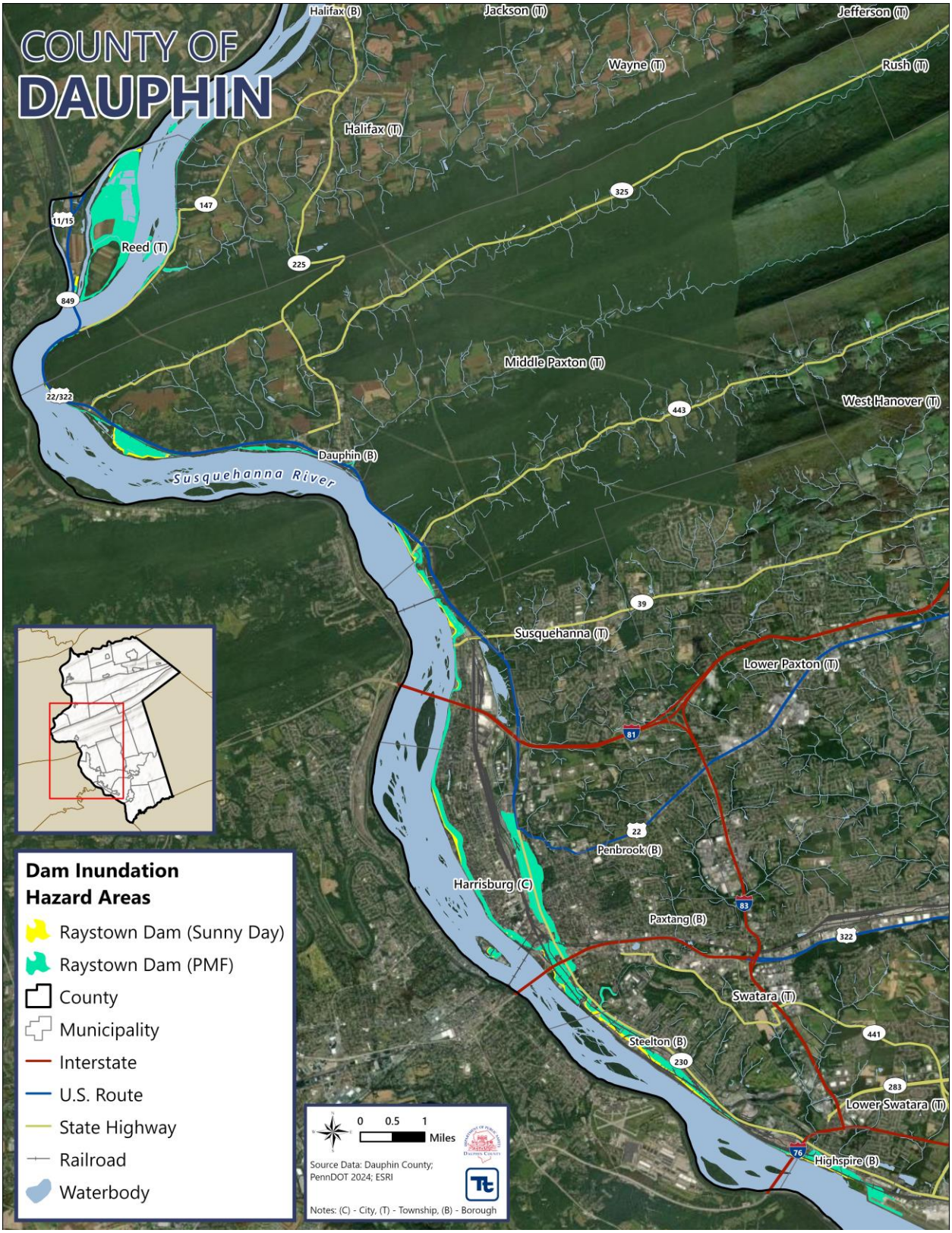


Figure 4.3.3-4 DeHart Dam Inundation Area

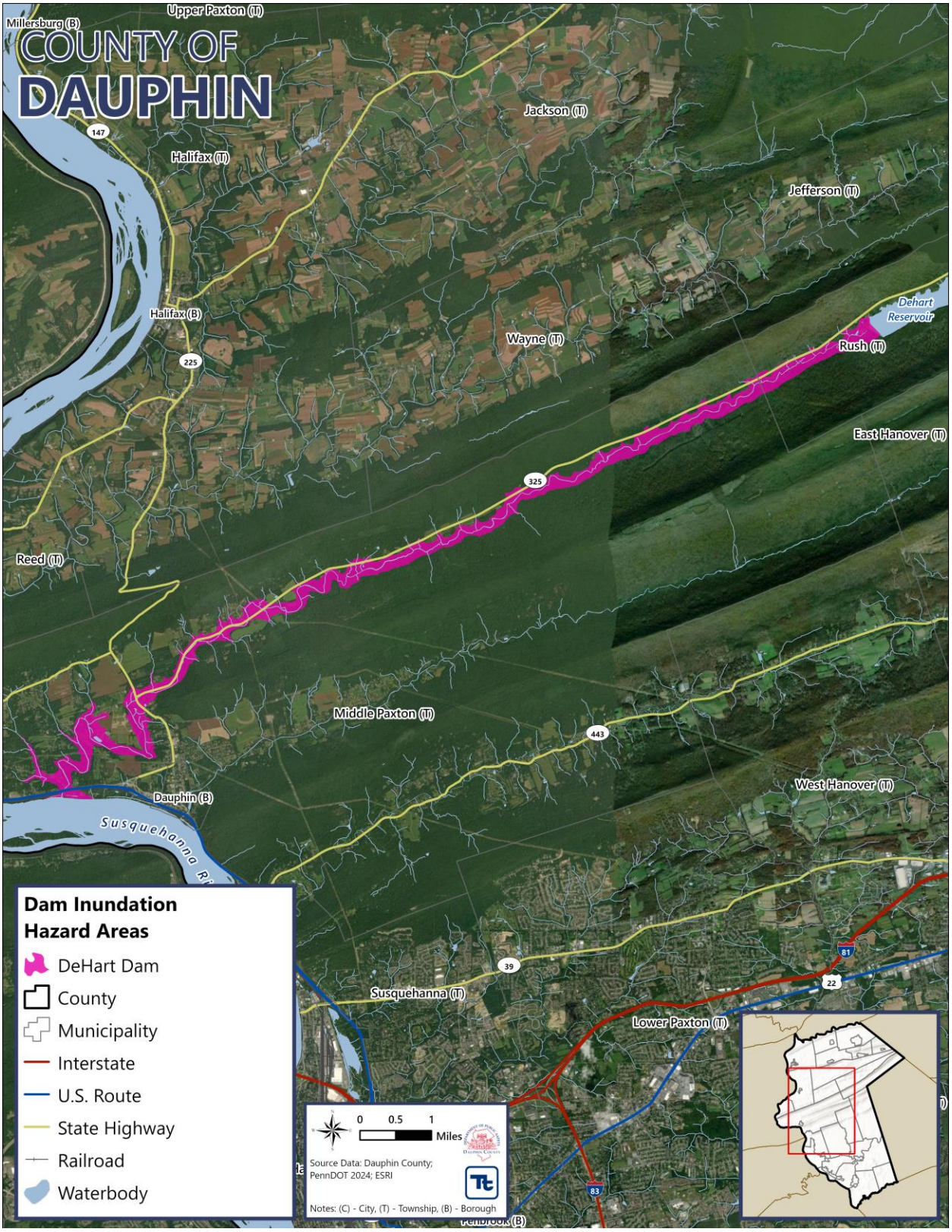
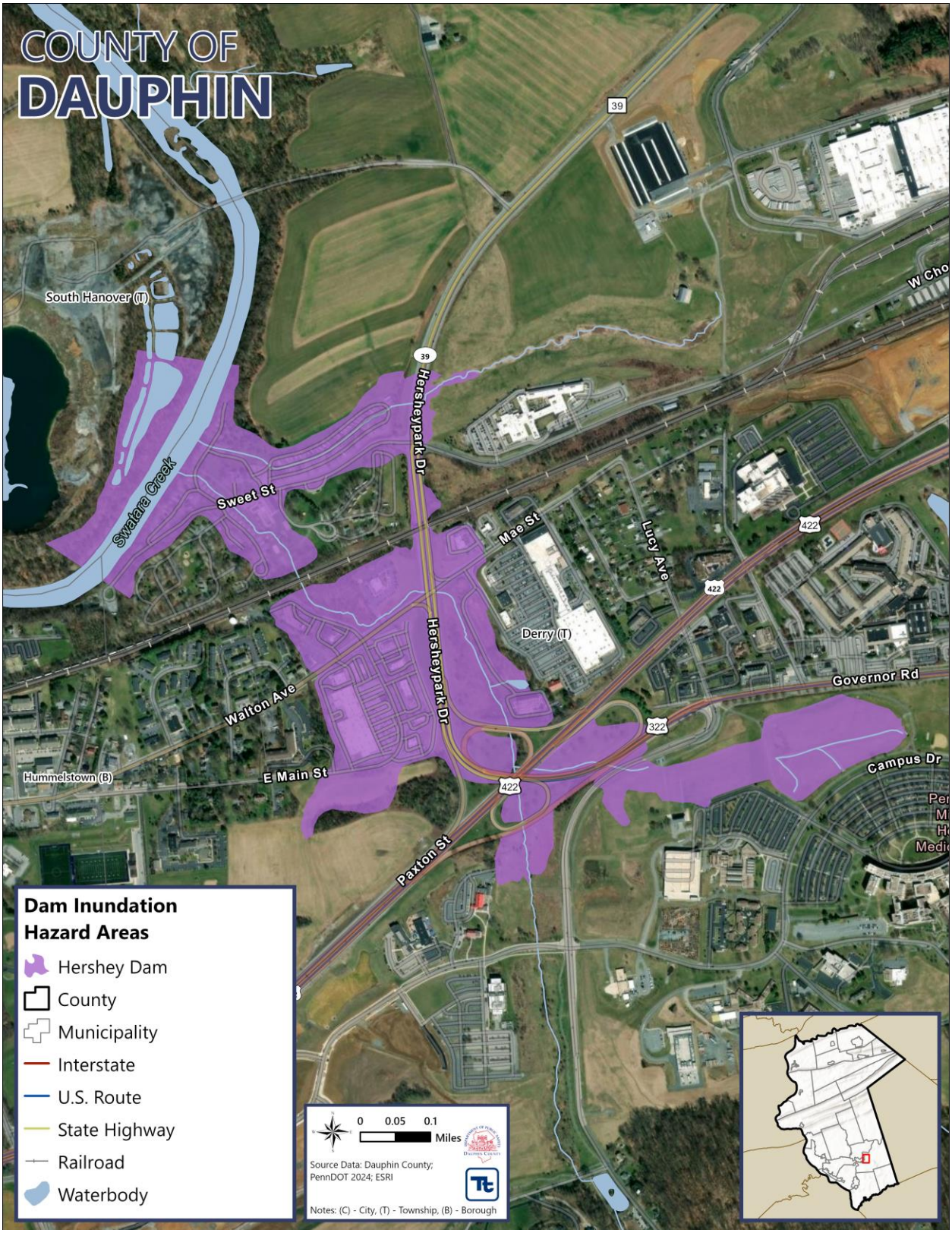
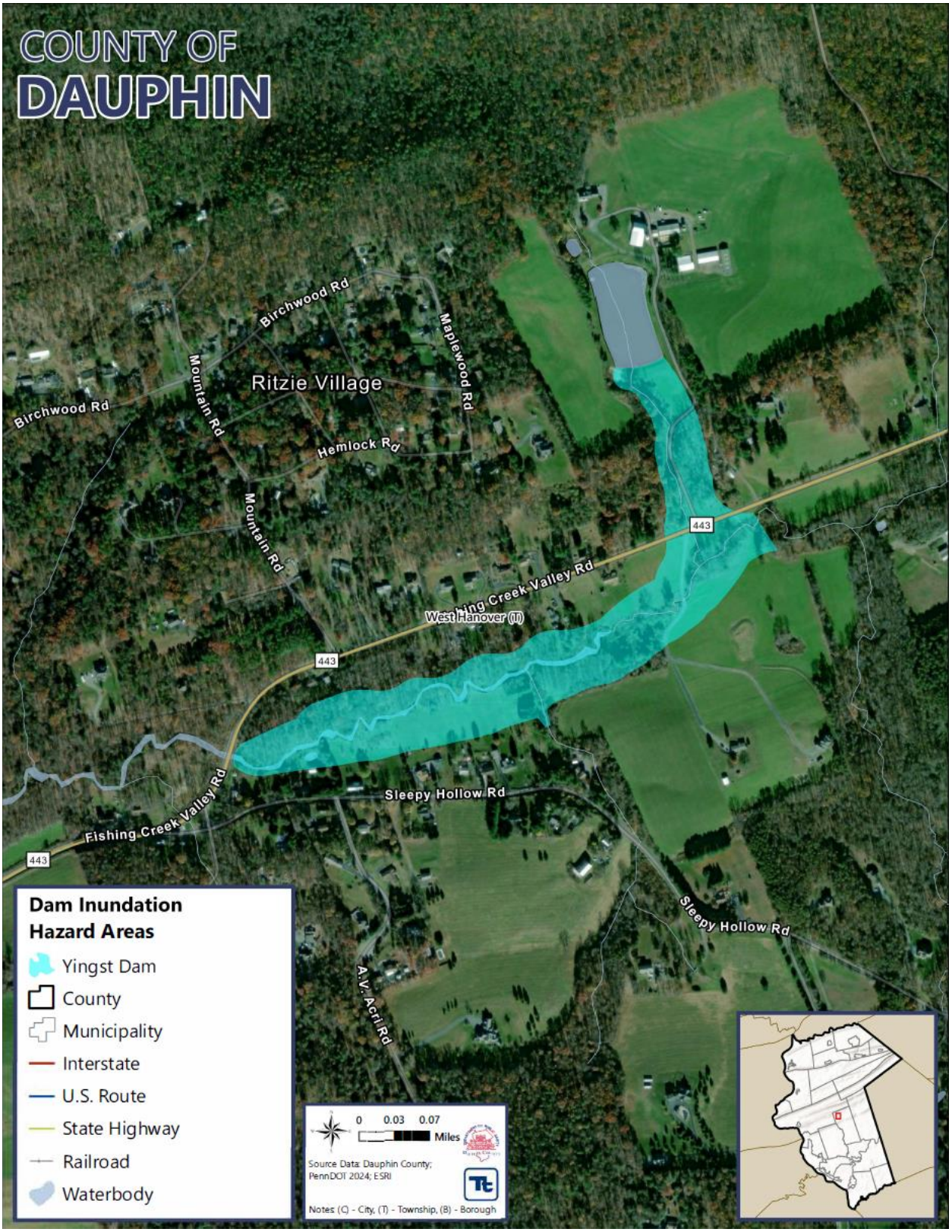


Figure 4.3.3-5 Jacobs Creek Dam Inundation Area

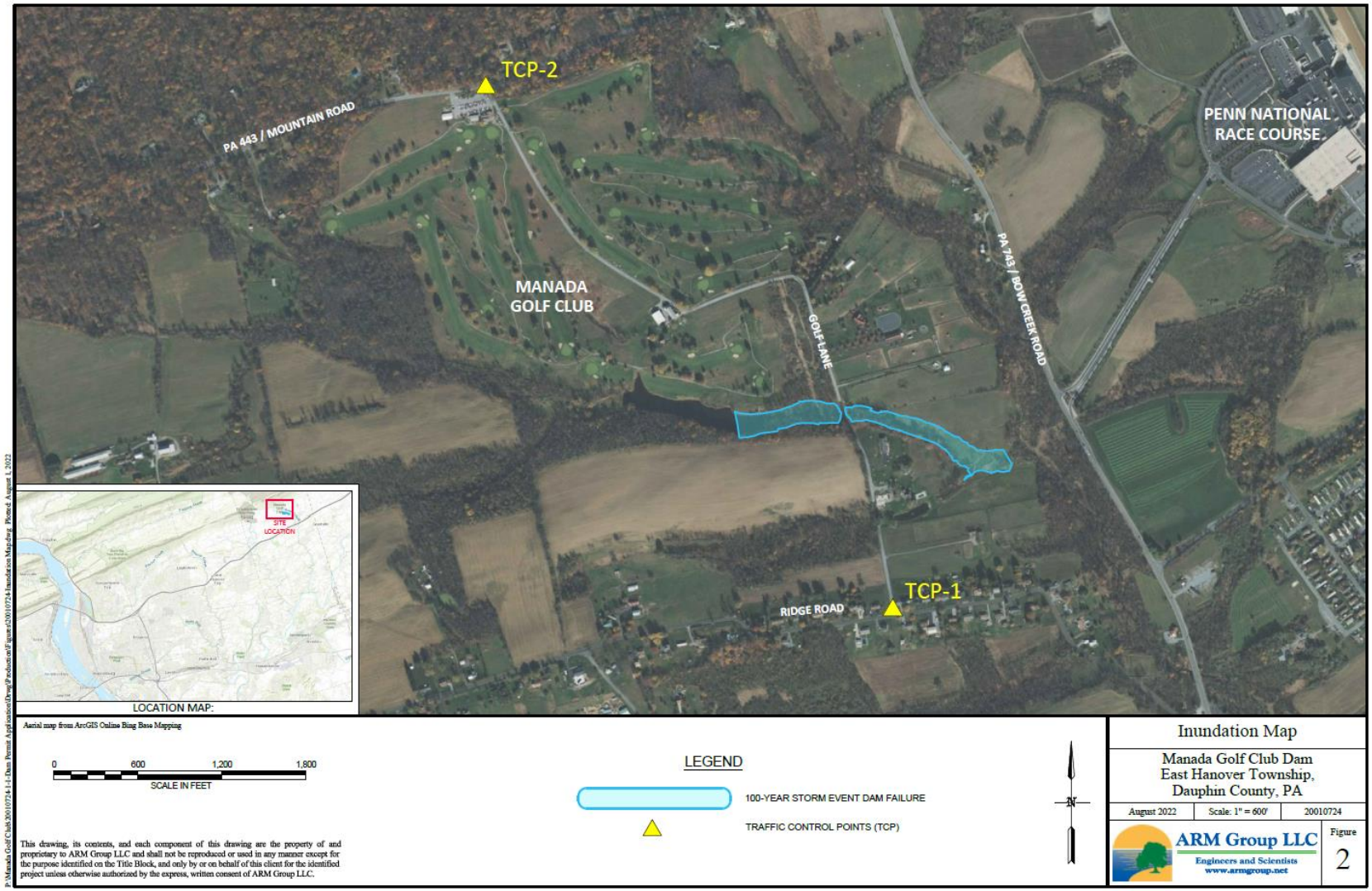
Figure 4.3.3-6. Hershey Dam Inundation Area



4.3.3-7 Yingst Dam Inundation Area



4.3.3-8 Manada Golf Club Pond Dam Inundation Area



Impact on Life, Health, and Safety

The entire population residing within a dam failure inundation zone is considered exposed and vulnerable. Other than the population in the dam failure inundation zone, the safety of the first responders on-scene is also at risk. First responders would be responsible for traffic control and responding to transportation accidents. There would be a higher-than-normal call volume and demand for first responders during a dam failure. Continuity of operations, including continued delivery of services, may be impeded, and additional personnel would potentially be needed due to the lack of fire and police personnel in the county.

An exposure analysis assessed five probable maximum flood inundation areas within the county. Of the 40 participating jurisdictions in the county, eight have persons living in the probable maximum flood inundation areas. The greatest number of persons exposed to the probable maximum flood inundation area are in the Raystown Dam PMF inundation area (3,250 persons total within the inundation area). The remaining dam inundation areas have the following total number of persons exposed:

- Raystown Dam Sunny Day = 225 persons
- Jacobs Creek Dam = 15 persons
- Hershey Dam = 8 persons
- DeHart Dam = 303 persons

According to the U.S. Army Corps of Engineers' "Emergency Action Plan for Raystown Lake", the most vulnerable areas to hazard events are within public access areas around the lake and communities within downstream flooding locations (USACE, 2012). Potential causes of downstream flooding include extreme storms, spillway erosion, and slope failure. The results of an extreme storm could cause large inflows causes the lake level to rise and discharge over the surface. In the event of slope failure, the embankment of the dam could be compromised causing a breach. During a spillway erosion, vegetation, soil, and rock will be displaced and potentially cause a scour hole as well as restrict access to dam operations. The report indicates over 50 municipalities could be affected by a major breach. Evacuation plans are pertinent to protect the population of those communities. Additionally, maintenance and enhancement of infrastructure are important to reduce the risk of downstream flooding and impact on structures within the affected communities.

Socially Vulnerable Populations

Of the population exposed, the economically disadvantaged and the population over the age of 65 are the most vulnerable. Economically disadvantaged populations are more vulnerable because they may be unable to evacuate their homes due to a lack of transportation, lack of a safe place to which to evacuate, or lack of financial resources (e.g., cannot afford temporary lodging). The population over the age of 65 is also highly vulnerable because they are more likely to seek or need medical attention that may not be available because of isolation during a flood event, and they may have more difficulty evacuating.

Impact on General Building Stock

All buildings and infrastructure located in the dam failure inundation zone are considered exposed and vulnerable. Property located closest to the dam inundation area has the greatest potential to experience the largest, most destructive surge of water. All transportation infrastructure in the dam failure inundation zone is vulnerable to damage and potentially cutting off evacuation routes, limiting emergency access, and creating isolation issues. Utilities such as overhead power lines, cable lines, and phone lines could also be vulnerable. Loss of these utilities could create additional isolation issues for the inundation areas.

Dam failure can cause severe downstream flooding and may transport large volumes of sediment and debris, depending on the magnitude of the event. Widespread damage to buildings and infrastructure affected by an event would result in large costs to repair these locations. In addition to physical damage costs, businesses can be closed while floodwaters retreat, and utilities are returned to a functioning state. Table 4.3.3-4 list the building

stock exposure in the dam inundation area by jurisdiction. Table 4.3.3-5 provides a summary of buildings in the dam inundation area by occupancy class.

Table 4.3.3-4. Buildings Located in Dam Inundation Area with Replacement Cost Values

Jurisdiction *(B) = Borough (C) = City (T) = Township*	Jurisdiction Total Buildings		Buildings in the Dam Inundation Area			
			Number of Buildings		Replacement Cost Value	
	Count	Replacement Cost Value	Count	% of Jurisdictional Total	Value	% of Jurisdictional Total
Berrysburg (B)	384	$155,707,892	0	0.0%	$0	0.0%
Conewago (T)	2,726	$1,408,072,267	0	0.0%	$0	0.0%
Dauphin (B)	499	$178,594,344	9	1.8%	$3,674,494	2.1%
Derry (T)	12,189	$16,562,878,409	40	0.3%	$102,723,776	0.6%
East Hanover (T)	5,424	$3,271,020,667	0	0.0%	$0	0.0%
Elizabethville (B)	1,022	$466,950,677	0	0.0%	$0	0.0%
Gratz (B)	804	$536,197,947	0	0.0%	$0	0.0%
Halifax (B)	529	$218,291,193	0	0.0%	$0	0.0%
Halifax (T)	3,714	$1,874,093,634	0	0.0%	$0	0.0%
Harrisburg (C)	19,455	$18,628,047,035	1,549	8.0%	$3,123,521,739	16.8%
Highspire (B)	1,481	$664,880,756	54	3.6%	$93,269,982	14.0%
Hummelstown (B)	2,488	$1,268,535,294	0	0.0%	$0	0.0%
Jackson (T)	2,533	$963,807,247	0	0.0%	$0	0.0%
Jefferson (T)	695	$279,826,276	0	0.0%	$0	0.0%
Londonderry (T)	5,464	$3,122,384,091	0	0.0%	$0	0.0%
Lower Paxton (T)	22,715	$16,760,123,401	0	0.0%	$0	0.0%
Lower Swatara (T)	5,204	$7,181,289,637	5	0.1%	$40,682,636	0.6%
Lykens (B)	1,438	$620,374,667	0	0.0%	$0	0.0%
Lykens (T)	2,311	$1,144,139,161	0	0.0%	$0	0.0%
Middle Paxton (T)	4,472	$1,679,813,405	367	8.2%	$156,339,553	9.3%
Middletown (B)	3,849	$2,433,657,717	0	0.0%	$0	0.0%
Mifflin (T)	1,318	$762,373,861	0	0.0%	$0	0.0%
Millersburg (B)	1,518	$913,497,912	0	0.0%	$0	0.0%
Paxtang (B)	900	$476,331,717	0	0.0%	$0	0.0%
Penbrook (B)	1,581	$698,112,706	0	0.0%	$0	0.0%
Pillow (B)	317	$115,637,971	0	0.0%	$0	0.0%
Reed (T)	327	$147,861,272	26	8.0%	$18,480,501	12.5%
Royalton (B)	724	$253,576,998	0	0.0%	$0	0.0%
Rush (T)	379	$88,377,859	5	1.3%	$4,408,077	5.0%
South Hanover (T)	4,275	$2,386,303,219	0	0.0%	$0	0.0%
Steelton (B)	2,867	$2,584,768,828	97	3.4%	$986,893,983	38.2%
Susquehanna (T)	12,511	$10,167,577,726	132	1.1%	$118,394,258	1.2%
Swatara (T)	12,223	$10,172,987,131	32	0.3%	$48,594,690	0.5%
Upper Paxton (T)	3,823	$1,780,080,745	0	0.0%	$0	0.0%
Washington (T)	2,464	$1,345,985,248	0	0.0%	$0	0.0%
Wayne (T)	1,460	$480,646,769	0	0.0%	$0	0.0%
West Hanover (T)	7,194	$3,876,826,721	0	0.0%	$0	0.0%
Wiconisco (T)	1,112	$351,954,145	0	0.0%	$0	0.0%
Williams (T)	1,093	$493,719,539	0	0.0%	$0	0.0%
Williamstown (B)	966	$399,114,521	0	0.0%	$0	0.0%
Dauphin Co. (Total)	**156,448**	**$116,914,420,604**	**2,316**	**1.5%**	**$4,696,983,688**	**4.0%**

Source: Dauphin County 2024; RS Means 2024; Pennsylvania Department of Environmental Protection (PA DEP) 2020; Federal Emergency Management Agency (FEMA) 2020; U.S. Army Corps of Engineers (USACE) 2020

Table 4.3.3-5. Buildings in Dam Inundation Area by General Occupancy

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Total Number of Buildings	Buildings in the Dam Inundation Area				
		Count	*Residential*	*Commercial*	*Industrial*	*Government, Religion, Agricultural, and Education*
Berrysburg (B)	384	0	0	0	0	0
Conewago (T)	2,726	0	0	0	0	0
Dauphin (B)	499	9	8	1	0	0
Derry (T)	12,189	40	8	30	2	0
East Hanover (T)	5,424	0	0	0	0	0
Elizabethville (B)	1,022	0	0	0	0	0
Gratz (B)	804	0	0	0	0	0
Halifax (B)	529	0	0	0	0	0
Halifax (T)	3,714	0	0	0	0	0
Harrisburg (C)	19,455	1,549	1,036	438	22	53
Highspire (B)	1,481	54	14	25	10	5
Hummelstown (B)	2,488	0	0	0	0	0
Jackson (T)	2,533	0	0	0	0	0
Jefferson (T)	695	0	0	0	0	0
Londonderry (T)	5,464	0	0	0	0	0
Lower Paxton (T)	22,715	0	0	0	0	0
Lower Swatara (T)	5,204	5	0	5	0	0
Lykens (B)	1,438	0	0	0	0	0
Lykens (T)	2,311	0	0	0	0	0
Middle Paxton (T)	4,472	367	276	53	0	38
Middletown (B)	3,849	0	0	0	0	0
Mifflin (T)	1,318	0	0	0	0	0
Millersburg (B)	1,518	0	0	0	0	0
Paxtang (B)	900	0	0	0	0	0
Penbrook (B)	1,581	0	0	0	0	0
Pillow (B)	317	0	0	0	0	0
Reed (T)	327	26	10	13	0	3
Royalton (B)	724	0	0	0	0	0
Rush (T)	379	5	0	5	0	0
South Hanover (T)	4,275	0	0	0	0	0
Steelton (B)	2,867	97	2	91	4	0
Susquehanna (T)	12,511	132	66	62	1	3
Swatara (T)	12,223	32	1	15	16	0
Upper Paxton (T)	3,823	0	0	0	0	0

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Total Number of Buildings	Buildings in the Dam Inundation Area				
		Count	*Residential*	*Commercial*	*Industrial*	*Government, Religion, Agricultural, and Education*
Washington (T)	2,464	0	0	0	0	0
Wayne (T)	1,460	0	0	0	0	0
West Hanover (T)	7,194	0	0	0	0	0
Wiconisco (T)	1,112	0	0	0	0	0
Williams (T)	1,093	0	0	0	0	0
Williamstown (B)	966	0	0	0	0	0
Dauphin County	**156,448**	**2,316**	**1,421**	**738**	**55**	**102**

Source: Dauphin County 2024; RS Means 2024; Pennsylvania Department of Environmental Protection (PA DEP) 2020; Federal Emergency Management Agency (FEMA) 2020; U.S. Army Corps of Engineers (USACE) 2020

Impact on Critical Facilities

Dam failures may also impact critical facilities and infrastructure located in the downstream inundation zone. Consequentially, dam failure can cut evacuation routes, limit emergency access, and/or create isolation issues. Dam failure can cause severe downstream flooding and may transport large volumes of sediment and debris, depending on the magnitude of the event. Widespread damage to buildings and infrastructure affected by an event would result in large costs to repair these locations. In addition to physical damage costs, businesses can be closed while floodwaters retreat and utilities are returned to a functioning state. Further, utilities such as overhead power lines, cable lines, and phone lines could also be vulnerable. Loss of these utilities could create additional isolation issues for the inundation areas.

Out of the 1,692 critical facilities in Dauphin County, 115 facilities are shown to be located within the aggregated dam inundation areas, with the City of Harrisburg having the most. Table 4.3.3-6 summarizes the jurisdictional breakdown of these facilities and provides a comparison amongst all the participating jurisdictions in the County.

Table 4.3.3-6. Number of Critical Facilities Located in the Aggregated Dam Inundation Area

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Number of Critical Facilities in Each Jurisdiction	Number of Critical Facilities in the Aggregated Dam Inundation Area	Percent of Jurisdiction Total in Hazard Area
Berrysburg (B)	5	0	0.0%
Conewago (T)	13	0	0.0%
Dauphin (B)	26	1	3.8%
Derry (T)	131	2	1.5%
East Hanover (T)	36	0	0.0%
Elizabethville (B)	12	0	0.0%
Gratz (B)	9	0	0.0%
Halifax (B)	9	0	0.0%
Halifax (T)	30	0	0.0%
Harrisburg (C)	392	91	23.2%
Highspire (B)	12	0	0.0%
Hummelstown (B)	35	0	0.0%

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Number of Critical Facilities in Each Jurisdiction	Number of Critical Facilities in the Aggregated Dam Inundation Area	Percent of Jurisdiction Total in Hazard Area
Jackson (T)	22	0	0.0%
Jefferson (T)	7	0	0.0%
Londonderry (T)	45	0	0.0%
Lower Paxton (T)	150	0	0.0%
Lower Swatara (T)	87	0	0.0%
Lykens (B)	18	0	0.0%
Lykens (T)	15	0	0.0%
Middle Paxton (T)	33	7	21.2%
Middletown (B)	47	0	0.0%
Mifflin (T)	8	0	0.0%
Millersburg (B)	26	0	0.0%
Paxtang (B)	11	0	0.0%
Penbrook (B)	17	0	0.0%
Pillow (B)	6	0	0.0%
Reed (T)	6	2	33.3%
Royalton (B)	11	0	0.0%
Rush (T)	5	1	20.0%
South Hanover (T)	24	0	0.0%
Steelton (B)	31	1	3.2%
Susquehanna (T)	118	9	7.6%
Swatara (T)	144	1	0.7%
Upper Paxton (T)	35	0	0.0%
Washington (T)	31	0	0.0%
Wayne (T)	8	0	0.0%
West Hanover (T)	43	0	0.0%
Wiconisco (T)	13	0	0.0%
Williams (T)	14	0	0.0%
Williamstown (B)	7	0	0.0%
Dauphin County (Total)	**1,692**	**115**	**6.8%**

Sources: Dauphin County 2024; HIFLD 2020, 2023; Department of Human Services 2024; Pennsylvania Department of Environmental Protection (PA DEP) 2020; Federal Emergency Management Agency (FEMA) 2020; U.S. Army Corps of Engineers (USACE) 2020

Most of the critical facilities sit in the Raystown Dam PMF inundation area (95 critical facilities). Of those exposed, 86 are considered lifelines for the county. A majority of the exposed critical facilities are historic sites, hazardous material sites, and bridges.

The remaining dam inundation areas have the following total number of critical facilities and lifelines exposed:

- Raystown Dam Sunny Day = 6 critical facilities, 4 lifelines
- Jacobs Creek Dam = no critical facilities/lifelines

- Hershey Dam = 3 critical facilities, 2 lifelines
- DeHart Dam = 9 critical facilities, 4 lifelines

Impact on the Economy

Severe flooding that follows an event like a dam failure can cause extensive structural damage and disrupt essential services. The cost to recover from flood damage after a surge will vary depending on the hazard risk of each dam. Severe flooding that follows an event like a dam failure can cause extensive damage to public utilities and disruptions to the delivery of services. Loss of power and communications may occur, and drinking water and wastewater treatment facilities can become temporarily out of operation. Debris from surrounding buildings can accumulate should the dam mimic major flood events, such as the 1 percent annual chance flood event that is discussed in Section 4.3.7 (Flood, Flash Flood, Ice Jam).

Impact on the Environment

The environmental impacts of a dam failure can include significant water quality and debris-disposal issues or severe erosion that can impact local ecosystems. Flood waters can back up sanitary sewer systems and inundate wastewater treatment plants, causing raw sewage to contaminate residential and commercial buildings and the flooded waterway. The contents of unsecured containers of oil, fertilizers, pesticides, and other chemicals may get added to flood waters. Hazardous materials may be released and distributed widely across the floodplain. Water supply and wastewater treatment facilities could be offline for weeks. After the flood waters subside, contaminated and flood-damaged building materials and contents must be properly disposed of. Contaminated sediment must be removed from buildings, yards, and properties.

Future Changes That May Impact Vulnerability

Understanding future changes that affect vulnerability can assist in planning for future development and ensure the establishment of appropriate mitigation, planning, and preparedness measures. Several factors are examined in this section to assess hazard vulnerability.

Projected Development

As discussed and illustrated in Section 4.4 (Hazard Vulnerability Summary), areas targeted for future growth and development have been identified across the county. Any areas of growth could be potentially impacted by a dam or levee failure event if the structures are located within the flood protection area and mitigation measures are not considered. Therefore, it is the intention of the county and all participating municipalities to discourage development in vulnerable areas or to encourage higher regulatory standards at the local level.

Projected Changes in Population

Estimated population projections provided by The Center of Rural Pennsylvania indicate that Dauphin County's population will continue to increase into 2040, increasing the total population to approximately 296,766 persons (The Center of Rural Pennsylvania 2021). As more persons move into flood zones, an increased amount of the population will be vulnerable to dam inundation hazards. Higher density can not only create issues for residents during evacuation of a dam failure event but can also affect commuters who travel into and out of the county for work. Refer to Section 2 (County Profile) for more information about population trends in the County.

Effect of Climate Change on Vulnerability

The 2021 Pennsylvania Climate Impact Assessment indicated that Pennsylvania is very likely to undergo increased temperatures and precipitation in the 21st century (PADEP 2021). Increased precipitation will occur in the form of heavy rainfalls, which have the potential to increase the risk of dam failures. Existing dams may not be able to retain and manage increases in water flow from more frequent, heavy rainfall events. These events may result in more frequent overtopping of dams and flooding of the county's assets in adjacent inundation

areas. However, the probable maximum flood used to design each dam may be able to accommodate climate changes.

4.3.3.6 Change of Vulnerability Since 2020 Hazard Mitigation Plan (HMP)

Since the 2020 analysis, population statistics have been updated using the 5-Year 2018–2022 American Community Survey Population Estimates. The general building stock was also established using RS Means 2020 building valuations that estimated replacement cost value for each building in the inventory. Additionally, a critical facility dataset was provided from the county. Additionally, the probable maximum flood inundation areas for the Raystown Dam Sunny Day, Raystown Dam PMF, DeHart Dam, Jacobs Creek Dam, and Hershey Dam were provided for this analysis.

For future HMP updates, additional dam failure inundation areas can be delineated and used to spatially assess the asset exposure. A customized general building stock list could be generated in the Hazus model to assess future impacts at the structural level versus the census-block level. Depth grids could be generated for the inundation areas and used in Hazus to estimate potential losses similar to those listed in the flood profile (Section 4.3.6).

4.3.4 Drought

This section provides a profile and vulnerability assessment of the drought hazard in Dauphin County. Drought is a period characterized by long durations of below-normal precipitation. Drought conditions occur in virtually all climatic zones, yet characteristics of drought vary significantly from one region to another, relative to normal precipitation within respective regions. Drought can affect agriculture, water supply, aquatic ecology, wildlife, and plant life. Drought is a temporary irregularity in typical weather patterns and differs from aridity, which reflects low rainfall within a specific region and is a permanent feature of the climate of that area.

Drought can be defined or grouped into four categories:

- Meteorological drought is a measure of the departure of precipitation from normal, defined solely by reference to the relative degree of dryness. Because of climatic differences, dryness considered a drought at one location of the country may not be considered a drought at another location.
- Agricultural drought links various characteristics of meteorological (or hydrological) drought to agricultural impacts, focusing on precipitation shortages, differences between actual and potential evapotranspiration, soil water deficits, reduced groundwater or reservoir levels, and other parameters. Agricultural drought occurs when not enough water is available for a particular crop to grow at a particular time. Agricultural drought is defined in terms of soil moisture deficiencies relative to water demands of plant life, primarily crops.
- Hydrological drought is associated with below-normal surface or subsurface water supply resulting from periods of precipitation shortfalls (including snowfall). Hydrological drought is related to the effects of precipitation shortfalls on stream flows and water levels in reservoirs, lakes, and groundwater.
- Socioeconomic drought is associated with the supply and demand of an economic good, with elements of meteorological, hydrological, and agricultural drought categories. This differs from the aforementioned types of drought because its occurrence depends on supply and demand to identify or classify droughts. Supplies of many economic goods such as water, silage, food grains, fish, and hydroelectric power depend on weather. Socioeconomic drought occurs when demand for an economic good exceeds supply as a result of a weather-related shortfall in water supply.
- Ecological drought is characterized by a prolonged and widespread deficit in naturally available water supplies — including changes in natural and managed hydrology — that create multiple stresses across ecosystems (NDMC 2023)

Drought can affect many sectors of an economy and can reach beyond an area undergoing physical drought. Because water is essential for producing goods and providing services, drought can reduce crop yield, increase fire hazard, lower water levels, and damage wildlife and fish habitats. Further consequences include reductions in crop yields, rangeland, and forest productivity that may lower incomes of farmers and agribusinesses; increase in prices of food and timber; increase in unemployment; reduction of tax revenues as expenditures decline; increase in crime, foreclosures, and migration; and depletion of disaster relief funds. The many impacts of drought can be categorized as economic, environmental, or social.

4.3.4.1 Location

Droughts are regional in scope and may affect the entirety of Dauphin County rather than only individual municipalities within the county. Droughts may also concurrently affect counties near Dauphin County or even the entire Commonwealth. Generally, areas along waterways will reveal drought conditions later than areas away from waterways.

Climate divisions are regions within a state that are climatically homogenous. The National Oceanic and Atmospheric Administration (NOAA) has divided the United States into 344 climate divisions. NOAA has a map of these climate divisions nationally across the country. It was originally developed for climate division, statewide, regional, national, and population-weighted monitoring of drought, temperature, precipitation, and heating/cooling degree day values (NCEI 2023).

According to NOAA, Pennsylvania includes 10 climate divisions: Pocono Mountains, East Central Mountains, Southeastern Piedmont, Lower Susquehanna, Middle Susquehanna, Upper Susquehanna, Central Mountains, South Central Mountains, Southwest Plateau, and Northwest Plateau Climate Division (PSL 2023). Dauphin County is within the Southeastern Piedmont and Middle Susquehanna climate divisions, as shown in Figure 4.3.4-1.

Figure 4.3.4-1. Climate Divisions for Pennsylvania

Source: PA State Climatologist n.d.
Note: Dauphin County is circled in blue.
The climate divisions for Pennsylvania are: 1 = Pocono Mountains; 2 = East Central Mountains; 3 = Southeastern Piedmont; 4 = Lower Susquehanna; 5 = Middle Susquehanna; 6 = Upper Susquehanna; 7 = Central Mountains; 8 = South Central Mountains; 9 = Southwest Plateau; 10 = Northwest Plateau

Particularly at locations where citizens rely on wells for drinking water, water supplies are vulnerable to the effects of drought and thus can impact the severity of a drought. Residents depending on well water can more easily handle short-term droughts without major inconveniences than can populations that rely on surface water. However, longer-term droughts inhibit groundwater aquifers from recharging and can thus extend the problems of well owners for an indeterminate amount of time. Dauphin County residents who depend on private domestic wells have this greater "hidden vulnerability" to droughts. According to the United States Geological Survey (USGS) National Water Information System, the average daily domestic self-supplied groundwater withdrawals of fresh water in Pennsylvania was 42 million gallons per day (Mgal/d) to 1 billion gallons per day in 2015 (USGS 2019).

Table 4.3.4-1 lists the number of reported domestic wells within each municipality of Dauphin County. The well data were obtained from the Pennsylvania Groundwater Information System (PaGWIS). PaGWIS is maintained by PA DCNR and 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. It is, however, the most complete data set of domestic wells available.

Table 4.3.4-1. Domestic Wells in Dauphin County

Municipality	Number of Reported Domestic Wells	Municipality	Number of Reported Domestic Wells	Municipality	Number of Reported Domestic Wells
Berrysburg Borough	13	Londonderry Township	558	Royalton Borough	0
Conewago Township	409	Lower Paxton Township	1,138	Rush Township	22
Dauphin Borough	13	Lower Swatara Township	163	South Hanover Township	583
Derry Township	513	Lykens Borough	45	Steelton Borough	20
East Hanover Township	767	Lykens Township	N/A	Susquehanna Township	342
Elizabethville Borough	18	Middle Paxton Township	605	Swatara Township	119
Gratz Borough	16	Middletown Borough	4	Upper Paxton Township	134
Halifax Township	201	Mifflin Township	51	Washington Township	124
Harrisburg City	8	Millersburg Borough	13	Wayne Township	88
Highspire Borough	15	Paxtang Borough	0	West Hanover Township	692
Hummelstown Borough	6	Penbrook Borough	1	Wiconisco Township	38
Jackson Township	133	Pillow Borough	3	Williams Township	25
Jefferson Township	44	Reed Township	41	Williamstown Borough	1
Dauphin County Total – 6,966					

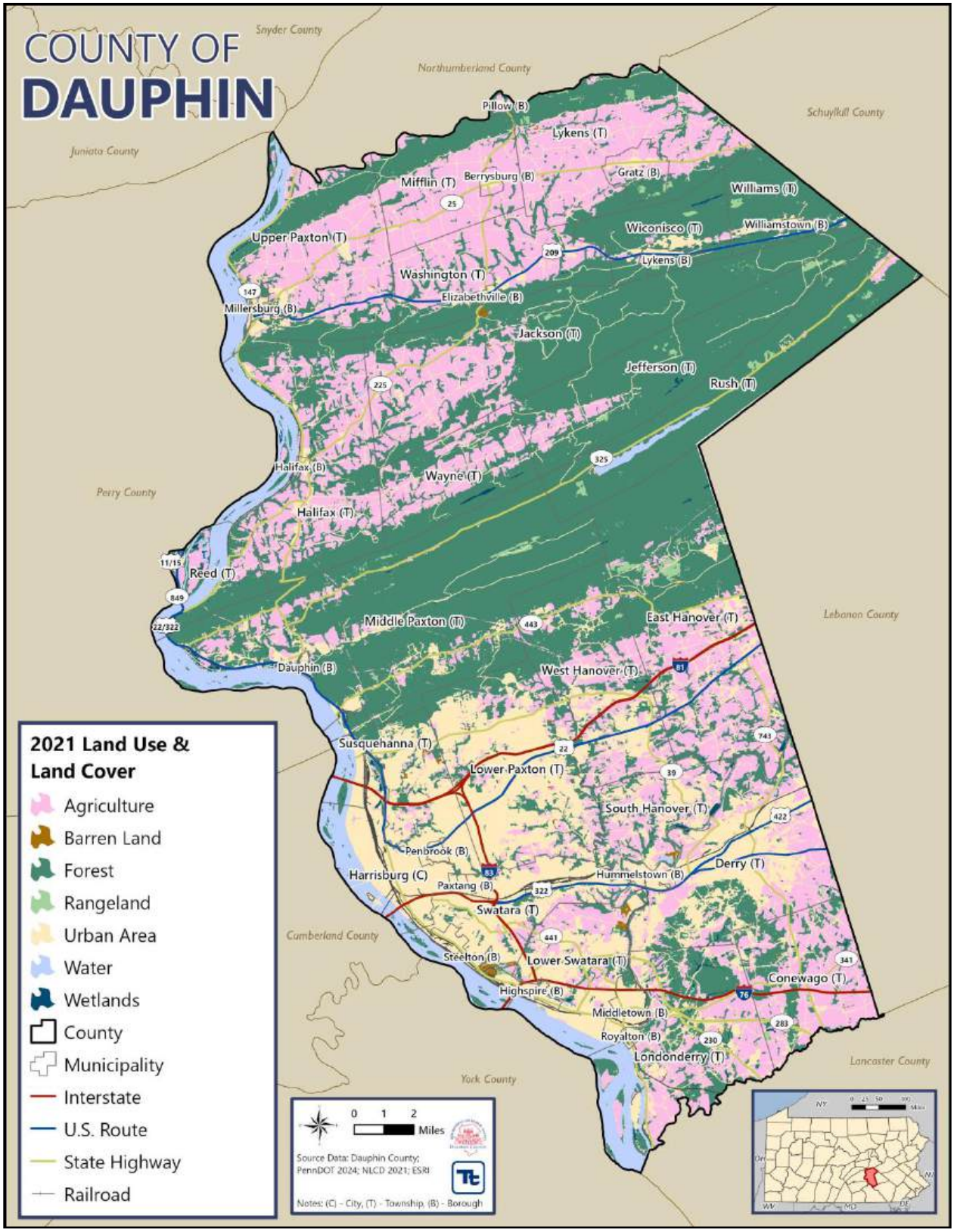
Source: (DCNR 2024)

In addition to domestic wells in the county, residents may also receive their water from municipal water providers. In addition to domestic wells in the county, residents may also receive their water from municipal water providers. The primary water source is the DeHart Reservoir and the secondary source is the mainstream of the Susquehanna River. The systems serve a population of approximately 67,000 people (Capital Region Water 2015). The municipal water provider for the City of Harrisburg, Paxtang, Penbrook, and Steelton Boroughs, and Lower Paxton, Susquehanna, and Swatara Townships is Capital Region Water. Pennsylvania American Water serves portions of Derry, Londonderry, South Hanover, and West Hanover Townships. Loyalton Water Association serves Washington Township, Harrisburg International Airport Water Co serves Lower Swatara Township, and Lykens Borough Authority covers Lykens Borough and Wiconisco Township. Middletown Borough Authority serves Middletown Borough, a portion of Lower Swatara Township, and Royalton Borough. Millersburg Borough Authority serves Millersburg Borough and Upper Paxton Township, Pillow Borough Authority serves Pillow Borough, Steelton Borough Authority serves Steelton Borough, and Williamstown Borough Authority serves a portion of Williams Township and Williamstown Borough.

Jurisdictions that are designated for agricultural use are particularly vulnerable to drought. As of 2022, 87,399 acres of farmland were recorded in Dauphin County with 481 total acres of land in the county that need to be irrigated (Census of Agriculture 2022). In Dauphin County, agricultural land is particularly prevalent in the

northern portion of the county, but also in portions of the more urbanized southern region (TCRPC 2020). Figure 4.3.4-2 illustrates the agricultural land use coverage in Dauphin County, shaded in pink.

Figure 4.3.4-2. Land Use and Land Cover, Dauphin County



4.3.4.2 Magnitude

Effects of droughts vary depending on their severity, timing, duration, and location. Some droughts may exert their greatest impact on agriculture, while others may have stronger effects on water supply or recreational activities. Droughts can adversely affect the following significantly:

- 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
- Water for forests and for fighting forest fires
- Water for navigation and recreation

Susquehanna River Basin Commission

The Susquehanna River Basin Commission (SRBC) plays a crucial role in managing drought emergencies within the Susquehanna River Basin. The Susquehanna River Basin Compact requires the Commission to plan for the immediate and long-range development and use of the water resources of the Basin. The Comprehensive Plan provides an overarching framework for the Commission to manage the Basin's water resources and serves as a guide for all Commission programs and activities. This updated Comprehensive Plan outlines the vision, needs, and strategy for effectively managing the water resources of the Basin during the period from 2021 to 2041 (SRBC 2021).

SRBC monitors various indicators such as precipitation deficits, stream flows, groundwater levels, soil moisture, and reservoir storage to assess drought conditions. The Commission can declare drought emergencies and delineate areas of water supply shortage, coordinating responses and implementing necessary measures (Susquehanna River Basin Commission 1972). During drought emergencies, SRBC directs adjustments to water allocations, diversions, and releases to mitigate drought impacts, working with public water suppliers and industries to implement drought contingency plans. Additionally, SRBC coordinates with federal and state agencies to ensure a uniform and effective response across jurisdictional boundaries and disseminates information and reports concerning water problems in the basin, keeping the public informed about drought conditions and management efforts.

Pennsylvania Emergency Management Agency and Department of Environmental Protection

PA DEP and Pennsylvania Emergency Management Agency (PEMA) manage water supply droughts according to the following three phases, as defined in the Commonwealth of Pennsylvania 2023 Standard Hazard Mitigation Plan (PA HMP) (PEMA 2023):

- Drought Watch: This is a period to alert government agencies, public water suppliers, water users, and the public regarding the potential for future drought-related problems. Drought watches are invoked when three or more drought indicators are present for a county or group of counties. The focus is on increased monitoring, awareness, and preparation for response if conditions worsen. A request for voluntary water conservation is issued. The objective of voluntary water conservation measures during a drought watch is to reduce water use by 5 percent within the affected areas. Because of varying conditions, individual water suppliers or municipalities may propose more stringent conservation actions.
- Drought Warning: This is a drought stage involving 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 use by 10 to 15 percent within the affected

areas. Because of varying conditions, individual water suppliers or municipalities may propose more stringent conservation actions.

- Drought Emergency: During this drought stage, water management entities assemble all available resources to respond to actual emergency conditions, avoid depletion of water sources, ensure at least minimum water supplies to protect public health and safety, support essential and high-priority water uses, and avoid unnecessary economic upsets. If deemed necessary and if ordered by the Governor during this stage, imposition of mandatory restrictions on nonessential water usage could occur, as provided for in 4 *Pa. Code*, Chapter 119. Objectives of water use restrictions (mandatory or voluntary) and other conservation measures during a drought emergency are to reduce consumptive water use within the affected areas by 15 percent and to reduce total use to the extent necessary to preserve public water system supplies, avoid or mitigate local or area shortages, and ensure equitable sharing of limited supplies.

Although not a drought phase, a public water supplier or local municipality may, with the approval of the PEMA Council, implement local water rationing to share a rapidly dwindling or severely depleted water supply within designated water supply service areas. These individual water rationing plans, authorized through provisions of 4 *Pa. Code* Chapter 120, 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 practices, procedures are specified for granting variances in consideration of individual hardships and economic dislocations (PEMA 2023).

Pennsylvania uses five parameters to assess drought conditions: precipitation deficits, stream flows, groundwater level, soil moisture, and reservoir storage levels. These parameters are detailed below:

- Precipitation Deficits: Because rainfall provides the basis for ground surface water resources, measuring the difference in precipitation from the normal (30-year average) tends to be the earliest indicator that a drought is possible in an area. The PA DEP will compare the cumulative precipitation for varying time periods (minimum of 3 months, maximum of 12 months) each month against the normal, 30-year average value for each same time period. Any duration that has less than the normal is considered to have had a deficit, represented by a percentage less than the normal precipitation. Table 4.3.4-2 shows what the deficit values need to be for each time period to qualify for each drought stage (PEMA 2023).

Table 4.3.4-2. Precipitation Deficit Drought Indicators for Pennsylvania

Duration of Deficit Accumulation (Months)	Drought Watch (deficit as Percent of normal precipitation)	Drought Warning (deficit as Percent of normal precipitation)	Drought Emergency (deficit as Percent of normal precipitation)
3	25%	35%	45%
4	20%	30%	40%
5	20%	30%	40%
6	20%	30%	40%
7	18.5%	28.5%	38.5%
8	17.5%	27.5%	37.5%
9	16.5%	26.5%	36.5%
10	15%	25%	35%
11	15%	25%	35%

Duration of Deficit Accumulation (Months)	Drought Watch (deficit as Percent of normal precipitation)	Drought Warning (deficit as Percent of normal precipitation)	Drought Emergency (deficit as Percent of normal precipitation)
12	15%	25%	35%

Source: PEMA 2023

- Stream Flows: The next earliest indicator that a drought is developing is stream flow measurements. There are 210 USGS stream gages that the DEP currently uses to monitor droughts across the state. The DEP calculates and maintains 30-day average values for stream flow based on the entire period of recording for each gage. Compared to precipitation, stream flow measurements lag by about a month or two when signaling a drought. Drought status is determined from stream flows based on percentiles, or exceedances, rather than percentages. Exceedances are similar to percentiles; a 75 percent exceedance flow value means that the current 30-day average flow is exceeded in the stream 75 percent of the time; in other words, the 30-day average flow in the stream is less than that value only 25 percent of the time. Similarly, with a 90 percent exceedance flow value, the 30-day average flows in the stream would be less than that value only 10 percent of the time, and only 5 percent of the time for a 95 percent exceedance. For stream flows, the 75, 90, and 95 percent exceedance 30-day average flows are used as indicators for drought watch, warning, and emergency, respectively.
- Groundwater Levels: There are about 80 trillion gallons of groundwater stored in the soil beneath Pennsylvania. Groundwater levels for each day are used to calculate the average level of the preceding 30 days. This 30-day value is compared to the values derived from historical records yielding a percentile indicating how much time the groundwater levels have been below the historical average levels. The USGS also maintains a network of groundwater monitoring wells, just recently upgraded to at least one well in each county. Groundwater is used to indicate drought status in a manner similar to stream flows. Groundwater level exceedances of 75, 90, and 95 percent are used to indicate watch, warning, and emergency status. In this case, it is the 30-day average depth to groundwater that is measured and monitored, again about long-term 30-day averages based on the period of record for each county well.
- Soil Moisture: Soil moisture is measured using an algorithm calibrated for relatively homogeneous regions which measures dryness based on temperature and precipitation in the area, information which is provided by NOAA. This generates a value called the Palmer Drought Severity Index (PDSI), which is compiled by the Climate Prediction Center of the National Weather Service every week. Table 4.3.4-3 lists PDSI classifications. The PDSI uses 0 to reflect normal status, and negative numbers indicate droughts. For example, 0 is no drought, -2 is moderate drought, and -4 is extreme drought. Positive numbers signify excess precipitation (UCAR 2023).

Table 4.3.4-3. PDSI Classifications

Severity Category	PDSI Value	Drought Status
Extremely wet	4.0 or more	None
Very wet	3.0 to 3.99	None
Moderately wet	2.0 to 2.99	None
Slightly wet	1.0 to 1.99	None
Incipient wet spell	0.5 to 0.99	None
Near Normal	0.49 to -0.49	None
Incipient dry spell	-0.5 to -0.99	None
Mild drought	-1.0 to -1.99	None
Moderate drought	-2.0 to -2.99	Watch

Severity Category	PDSI Value	Drought Status
Severe drought	-3.0 to -3.99	Warning
Extreme drought	-4.0 or less	Emergency

Source: (NDMC 2024)

- Reservoir Storage Levels: Water level storage in several large public water supply reservoirs (especially three New York City reservoirs in the Upper Delaware River Basin) is the fifth indicator that the PA DEP uses for drought monitoring. Depending on the total quantity of storage and the length of the refill period for the various reservoirs, PA DEP uses varying percentages of storage draw-down to indicate the three drought stages for each of the reservoirs (PEMA 2023).

The availability and management of water supply are discussed in the 2021 Pennsylvania State Water Plan, (PADEP 2023) a joint effort by the Statewide Water Resources Committee and PADEP. In 2023, the PADEP Secretary approved an updated State Water Plan to guide the management of Pennsylvania's water resources over a 15-year planning horizon. As a functional planning tool for all Pennsylvania municipalities, counties, and regional planning partnerships, the State Water Plan profiles drought and resource constraints and encourages the implementation of new technology and use policies to facilitate reduced water uses and resource demands at critical peak times. The State Water Plan provides inventories of water availability and an assessment of current and future water use demands and trends. It also offers strategies for improving management of water resources and waterway corridors that aim to reduce damage from extreme drought and flooding conditions (PADEP 2023).

4.3.4.3 Past Occurrence

Historical information has been drawn from many sources regarding previous occurrences and losses associated with drought events throughout Pennsylvania and Dauphin County. Because so many sources were reviewed for the purpose of developing this plan, loss, and impact information about many events could vary depending on the source. Therefore, the accuracy of cited monetary values is based only on the available information identified during research for this plan.

According to NOAA's NCEI storm events database, Dauphin County underwent four drought events between January 1, 1950, and October 19, 2017: October 1997, December 1998, July 1999, and August 1999. No Commonwealth-wide crop or property losses were reported because of the droughts; statewide losses would have included damages in other counties.

Since 1930, the Commonwealth of Pennsylvania has undergone 10 significant droughts. Since 1955, the Commonwealth has undergone 12 drought events that resulted in a Governor's proclamation or a Federal Emergency Management Agency (FEMA)-declared disaster or emergency. Dauphin County was included in one of these events, and full details are available in PEMA's Pennsylvania Disaster History list. In addition to these events, between 1980 and 2021, PA DEP indicated that Dauphin County has undergone 28 drought watch declarations, 11 drought warning declarations, and 12 drought emergency declarations (PEMA 2023).

According to FEMA, between 1954 and 2023, Pennsylvania underwent one drought-related disaster (DR) or emergency (EM) classified as one or a combination of the following disaster types: drought or water shortage. Because these disaster types generally cover a wide region of the Commonwealth, this single disaster may have impacted many counties. However, not all counties were included in the disaster declaration. FEMA, PEMA, and other sources indicate that Dauphin County has not been declared a disaster area as a result of a drought-related event (FEMA 2023).

Based on all sources researched, drought events between 1980 and 2023 that have affected Dauphin County are identified in Table 4.3.4-4, not all sources have been identified or researched, and therefore Table 4.3.4-4 may not include all events that have occurred throughout the county.

Table 4.3.4-4. Past Occurrences of Drought Events from 1980 to 2023

Dates of Event	Event Type	FEMA Declaration Number	USDA Disaster Designation Number	County Designated?	Losses / Impacts / PDSI Value
Nov 18, 1980 - Apr 20, 1982	Drought	N/A	N/A	N/A	Drought Emergency
Apr 26, 1985 - Oct 22, 1985	Drought	N/A	N/A	N/A	Drought Watch
Jul 29, 1985 – Oct 22, 1985	Drought	N/A	N/A	N/A	Drought Watch
Oct 29, 1985 - Dec 19, 1985	Drought	N/A	N/A	N/A	Drought Watch
Jul 7, 1988 - Aug 24, 1988	Drought	N/A	N/A	N/A	Drought Watch
Aug 24, 1988 – Dec 12, 1988	Drought	N/A	N/A	N/A	Drought Warning
Mar 3, 1989 – May 15, 1989	Drought	N/A	N/A	N/A	Drought Watch
June 28, 1991 – July 24, 1991	Drought	N/A	N/A	N/A	Drought Warning
July 24, 1991 – Apr 20, 1992	Drought	N/A	N/A	N/A	Drought Emergency
Apr 20, 1992 – June 23, 1992	Drought	N/A	N/A	N/A	Drought Warning
June 23, 1992 – Sept 11, 1992	Drought	N/A	N/A	N/A	Drought Watch
Sept 1, 1995 – Sept 20, 1995	Drought	N/A	N/A	N/A	Drought Watch
Sept 20, 1995 – Nov 8, 1995	Drought	N/A	N/A	N/A	Drought Watch
Nov 8, 1995 – Dec 18, 1995	Drought	N/A	N/A	N/A	Drought Watch
Sept 1, 1995 - Dec 18, 1995	Drought	N/A	N/A	N/A	Drought Watch
Jul 17, 1997 – Nov 13, 1997	Drought	N/A	N/A	N/A	Drought Watch
Dec 3, 1998 - Dec 8, 1998	Drought	N/A	N/A	N/A	Drought Watch
Dec 8, 1998 - Dec 14, 1998	Drought	N/A	N/A	N/A	Drought Watch
Dec 14, 1998 – Dec 16, 1998	Drought	N/A	N/A	N/A	Drought Warning
Dec 16, 1998 - Mar 15, 1999	Drought	N/A	N/A	N/A	Drought Emergency
Dec 3, 1998 – Dec 14, 1998	Drought	N/A	N/A	N/A	Drought Watch
Dec 14, 1998 – Mar 15, 1999	Drought	N/A	N/A	N/A	Drought Warning
Mar 15, 1999 – June 10, 1999	Drought	N/A	N/A	N/A	Drought Watch
June 10, 1999 – July 20, 1999	Drought	N/A	N/A	N/A	Drought Warning
July 20, 1999 – Sept 30, 1999	Drought	N/A	N/A	N/A	Drought Emergency
Sept 30, 1999 – May 5, 2000	Drought	N/A	N/A	N/A	Drought Watch
Aug 24, 2001 – Dec 5, 2001	Drought	N/A	N/A	N/A	Drought Watch

Dates of Event	Event Type	FEMA Declaration Number	USDA Disaster Designation Number	County Designated?	Losses / Impacts / PDSI Value
Dec 5, 2001 – Feb 12, 2002	Drought	N/A	N/A	N/A	Drought Warning
Feb 12, 2002 – Nov 7, 2002	Drought	N/A	N/A	N/A	Drought Emergency
Apr 11, 2006 – June 30, 2006	Drought	N/A	N/A	N/A	Drought Watch
Aug 6, 2007 – Oct 5, 2007	Drought	N/A	N/A	N/A	Drought Watch
Oct 5, 2007 – Jan 11, 2008	Drought	N/A	N/A	N/A	Drought Watch
Sept 16, 2010 – Nov 10, 2010	Drought	N/A	N/A	N/A	Drought Warning
Sept 16, 2010 – Nov 10, 2010	Drought	N/A	N/A	N/A	Drought Watch
Aug 5, 2011 – Sept 2, 2011	Drought	N/A	N/A	N/A	Drought Watch
Jun 17, 2015 – Jul 10, 2015	Drought	N/A	N/A	N/A	Drought Watch
Jul 16, 2015 – Sept 29, 2015	Drought	N/A	N/A	N/A	N/A
Jul 16, 2015 – Sept 29, 2015	Excessive Heat and Drought	NA	S3932	Yes	N/A
Apr 1, 2016 – Sept 19, 2016	Drought	N/A	N/A	N/A	N/A
Apr 1, 2016 – Sept 19, 2016	Combined effects of freeze, excessive heat, and drought	NA	S4071	Yes	N/A
Aug 2, 2016 – Feb 14, 2017	Drought	N/A	N/A	N/A	Drought Watch
Nov 2016 – April 2017	Drought	NA	N/A	N/A	(-3.62 PDSI)
Jun 24, 2018 – Jul 21, 2018	Excessive Heat and Drought Conditions	N/A	S4425	N/A	USDA Drought
Aug 15, 2019 – Oct 16, 2019	Drought	N/A	S4602	Yes	USDA Drought
February 24, 2021	Drought	N/A	S4911	Yes	USDA Drought
June 10 to October 4, 2022	Drought	N/A	S5341, S5344, S5361	N/A	USDA Drought
September 6 - December 6, 2022	Drought	N/A	N/A	N/A	Drought Watch
Jun 15, 2023 – Oct 2023	Drought	N/A	N/A	N/A	Drought Watch

Sources: NRCC 2019, PEMA 2023, NCEI 2024, PADEP 2023; USDA 2024
Notes: FEMA-Federal Emergency Management Agency; N/A- Not applicable; PDSI- Palmer Drought Severity Index; USDA – US Department of Agriculture

4.3.4.4 Probability of Future Occurrences

Information on previous drought occurrences in the County was used to calculate the probability of future occurrence of such events, as summarized in Table 4.3.4-5. The probability of occurrence, or likelihood of the event, is one parameter used for hazard rankings. Based on the Risk Factor Methodology probability criteria (described in Section 4.4), future occurrences of drought events are considered *highly likely*.

Table 4.3.4-5. Probability of Future Drought Events in Dauphin County

Hazard Type	Number of Occurrences Between 1996 and 2024	Percent Chance of Occurring in Any Given Year
Drought	47	100%

Sources: NOAA NCEI 2024
Notes: Due to limitations in data, not all drought events occurring between 1954 and 1996 are accounted for in the tally of occurrences. As a result, the number of hazard occurrences is calculated using the number of occurrences between 1996 and 2024; % = Percent

4.3.4.5 Vulnerability Assessment

To understand risk, a community must evaluate assets exposed and vulnerable within the identified hazard area. For the drought hazard, all of Dauphin County has been identified as the hazard area. Therefore, all assets (population, structures, critical facilities, and lifelines) described in the County Profile (Section 2) are potentially vulnerable to a drought. The following text evaluates and estimates the potential impact of the drought and water supply deficiency hazard on the county, including:

- Impact on (1) life, health, and safety; (2) general building stock; (3) critical facilities; (4) economy; (5) environment; and (6) future growth and development.
- Effects of climate change on vulnerability.
- Further data collection that will assist in understanding this hazard over time.

Impact on Life, Health, and Safety

Drought conditions can cause a shortage of water available for human consumption and can reduce local firefighting capabilities. Social impacts of drought include mental and physical stress, public safety threats (increased threat from forest/grass fires), health threats, conflicts among water users, reduced quality of life, and inequities in the distribution of impacts and disaster relief. The infirm, young, and elderly are particularly susceptible to drought and extreme temperatures, sometimes associated with drought conditions, because of their age; health conditions; and limited ability to mobilize to shelters, cooling centers, and medical sources. Impacts on the economy and environment may have social implications as well (NDMC 2023). For the purposes of this plan, the entire population of the County is considered vulnerable to drought events.

Impact on General Building Stock and Critical Facilities

A drought is not expected to directly affect any structures, and all are expected to be operational during a drought event. However, droughts contribute to conditions conducive to wildfires. Risk to life and property is greatest in regions where forested areas adjoin urbanized areas (high-density residential, commercial, and industrial), also known as the WUI. Therefore, all assets in and adjacent to the WUI zone, including population, structures, critical facilities, lifelines, and businesses, are considered vulnerable to wildfire.

Impact on the Economy

A prolonged drought can have a serious economic impact on a community. When drought conditions persist with little to no relief, water restrictions may be put into place by local or state governments. These restrictions may include placing limitations on when or how frequently lawns can be watered, car washing services, or any other recreational/commercial outdoor use of water supplies. In exceptional drought conditions, watering of lawns and crops may not be an option. If crops are not able to receive water, farmland will dry out and crops will die. This can lead to crop shortages, which, in turn, increases the price of food (North Carolina State University 2013).

Increased demand for water and electricity can also result in shortages and higher costs for these resources. Industries that rely on water for business could be impacted the most (e.g., landscaping businesses). Although most businesses will still be operational, they may be impacted aesthetically. These aesthetic impacts are most significant within the recreation and tourism industry. Moreover, droughts within another area could impact the food supply and price of food for residents within the County.

Loss estimates are based on lost agricultural revenues throughout Dauphin County. Table 4.3.4-6 below enumerates the County's farmland acreage exposure to the drought hazard as well as the annual market value of all agricultural products sold, as documented in the 2022 USDA Census of Agriculture. If the County loses its agricultural yield because of drought, total losses could amount to nearly $142 million. Livestock, poultry, and associated products have a potential loss value of nearly $101,000 (Census of Agriculture 2022).

Table 4.3.4-6. Estimated County Losses Relating to Agricultural Production

Impacted Farmland Acreage	Market Value of All Agricultural Products
87,399	$142,652,000

Source: Census of Agriculture 2022

Impact on the Environment

Droughts can impact the environment because these events can trigger wildfires, increase insect infestations, and exacerbate the spread of disease (Intergovernmental Panel on Climate Change 2016). Droughts will also impact water resources that are relied upon by aquatic and terrestrial species. Ecologically sensitive areas, such as wetlands, can be particularly vulnerable to drought periods because they are dependent on steady water levels and soil moisture availability to sustain growth. As a result, these types of habitats can be negatively impacted after long periods of dryness (New Jersey Department of Environmental Protection 2017).

Droughts also have the potential to lead to water pollution due to the lack of rainwater to dilute any chemicals in water sources. Contaminated water supplies may be harmful to plants and animals. If water is not getting into the soil, the ground will dry up and become unstable. Unstable soils increase the risk of erosion and loss of topsoil (North Carolina State University 2013).

Future Growth and Development

Areas targeted for potential future growth and development within the next 5 to 10 years have been identified across the County. It is anticipated that any new development and new residents will be exposed to the drought hazard. Future growth could increase water usage, and place more strain on water systems during periods of drought.

Effect of Climate Change on Vulnerability

Climate is defined not simply as average temperature and precipitation but also by type, frequency, and intensity of weather events. Both globally and at the local level, climate change can alter the prevalence and severity of weather extremes, such as droughts. Climate change is projected to intensify short-term drought risk across most of the United States (EPA 2024).

According to the Pennsylvania Climate Impacts Assessment 2021 Update, the likelihood of drought is expected to occur more frequently due to extreme and unpredictable precipitation patterns seen throughout the United States (PA DEP 2021). However, the extent of drought conditions remains uncertain as heightened temperatures are also projected to increase causing evaporative demand which may reduce water availability (PA DEP 2021).

Additional Data and Next Steps

The assessment above identifies vulnerable populations and potential structural and economic losses associated with this hazard of concern. The collection of additional information and actual loss data specific to the plan participants will further enhance Dauphin County's vulnerability assessment.

4.3.5 Environmental Hazards – Gas and Liquid Pipelines

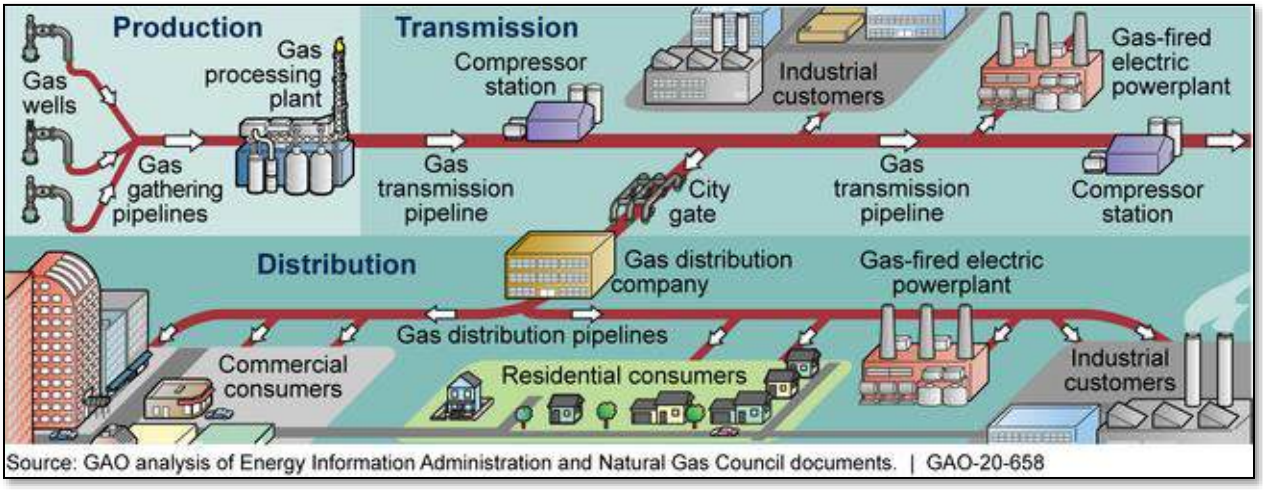
This section provides a profile and vulnerability assessment of the environmental hazards – gas and liquid pipelines profile for the Dauphin County Hazard Mitigation Plan (HMP).

According to the Pennsylvania State Hazard Mitigation Plan, there are 109 miles of natural gas transmission pipelines and 113 miles of liquid petroleum lines within Dauphin County (PEMA 2023). Pipeline failures are low-probability, potentially high-consequence events. Although gas and liquid pipeline failures are infrequent, the hazardous and inflammable materials released by these events can pose a significant threat to public safety and the built and natural environment. Explosions associated with pipeline failures, for example, can cause severe injury to nearby residents and destroy homes and other property (PEMA 2023).

Pipeline systems are defined by federal regulations as all parts of a pipeline facility through which a hazardous liquid or gas moves, including piping, valves, pumps or compressors, metering and delivery stations, and storage and breakout tanks (PEMA 2023). Although pipelines are typically located underground, they may also be located aboveground when dictated by operational considerations (such as connections to pump and compressor stations) or environmental conditions (such as geological characteristics).

Natural gas pipelines are the most common type of pipeline in the United States and serve to transport natural gas from the point of production to the point of use. Three major types of pipelines move natural gas: gathering lines, transmission lines, and distribution lines (PEMA 2023). Figure 4.3.5-1 shows the entire supply chain from gathering to distribution. Gas transmission lines are large pipelines (6 to 48 inches in diameter) and are designed to transport natural gas long distances at high pressures (often 200 – 1,500 psi), while gas distribution lines are smaller (1/2 to 2 inches in diameter) and transport natural gas shorter distances at relatively low pressures (Pipeline Safety Trust 2015).

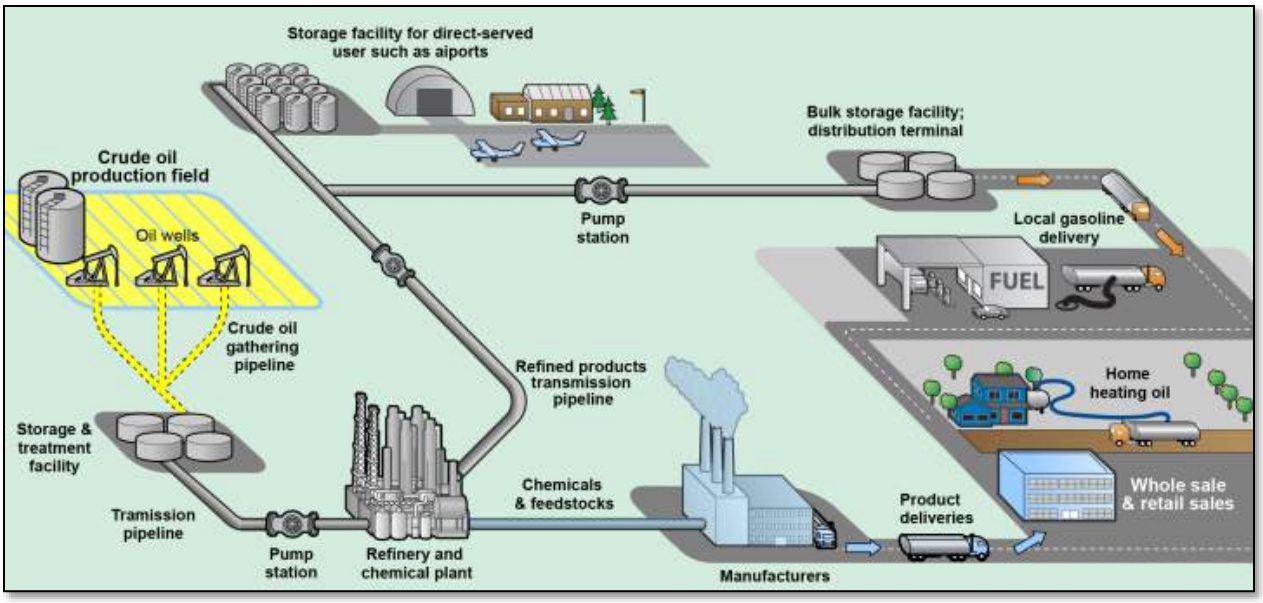
Figure 4.3.5-1. Diagram of Natural Gas Pipeline System



Liquid petroleum pipelines are the second most common type of pipeline in the United States and serve to transport crude oil, refined products, and highly volatile liquids (HVLs) to local distribution networks (PEMA 2023). The system for doing so has the same three categories of pipelines, as shown in Figure 4.3.5-2. Gathering lines are typically 2 to 8 inches in diameter, transmission lines are larger, cross-country pipelines (are 8 to 48 inches in diameter), and refined product lines are similar but typically smaller than transmission ones at 8 to 42

inches in diameter (PEMA 2023). Tanker trucks take the refined petroleum products the last few miles from the storage terminals to gas stations and homes.

Figure 4.3.5-2. Diagram of Liquid Petroleum Pipeline System



Source: GAO, Association of Oil Pipe Lines and Pipeline and Hazardous Materials Safety Administration 2021

Product release into the local environment can derive from a fixed facility or occur at any location along a pipeline route and may be the result of carelessness, technical failure, external incidents, or an intentional act against the facility or container. Release of certain products considered hazardous materials (hazmat) can immediately and adversely impact the general population, causing effects ranging from inconvenient evacuations to personal injury and even death. Moreover, any release can compromise the local environment through contamination of soil, groundwater, or local flora and fauna.

4.3.5.1 Location and Extent

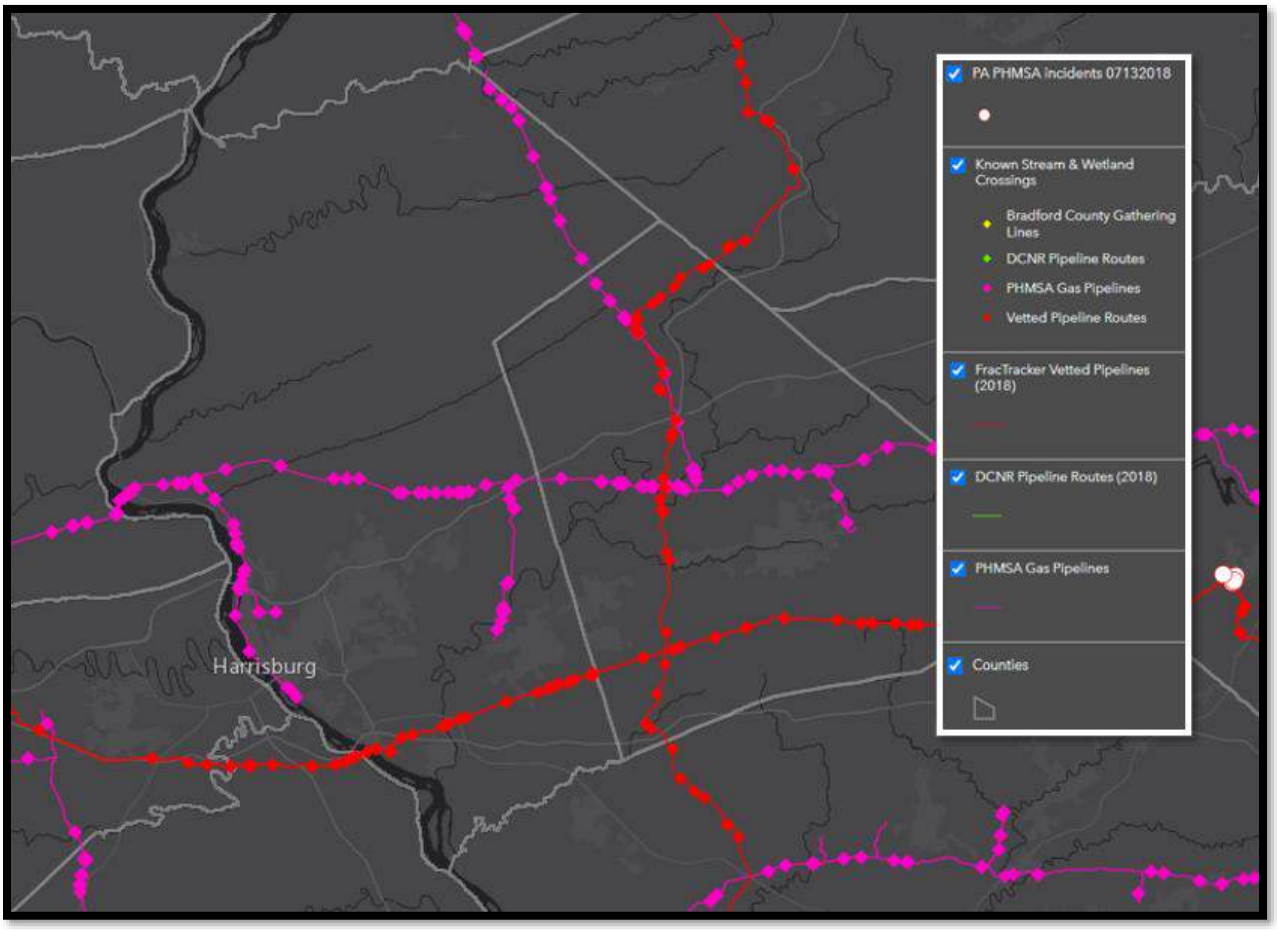
Pipelines within the Commonwealth of Pennsylvania are regulated by several different agencies. Although Dauphin County has no regulatory authority over pipeline operators, the county can be engaged in the environmental review of proposals and coordinating emergency services response. Some of the county-level departments involved include the Planning Commission, Water Resources Authority, Conservation District, Facility and Parks, and Department of Emergency Services. Federal and state agencies involved in pipeline safety and regulations include the following:

- Federal Energy Regulatory Commission (FERC) is an independent agency of the United States government that regulates the interstate transmission of electricity, natural gas, and oil and reviews proposals to build Liquefied Natural Gas (LNG) terminals and interstate natural gas pipelines.
- The U.S. Department of Transportation (USDOT) oversees the safety of pipelines and transportation infrastructure.
- Pipeline and Hazardous Materials Safety Administration (PHMSA) develops and enforces regulations for a safe, reliable, and environmentally sound pipeline transportation system.
- The Public Utility Commission (PUC) enforces safety standards for pipeline facilities.

- The Pennsylvania Department of Environmental Protection (PADEP) has regulatory authority over any pipeline crossing of a wetland or waterway.

Dauphin County has a total of 109 miles of natural gas transmission pipelines and 113 miles of liquid petroleum pipelines, and a detailed map of these pipeline locations is illustrated in Figure 4.3.5-3. On a broader scale, locations of major pipelines across Pennsylvania are compiled by the U.S. Energy Information Administration (EIA) and shown in Figure 4.3.5-4. One particular change has been the expansion of Sunoco Gas Pipeline in Conewago Township since the 2021 HMP.

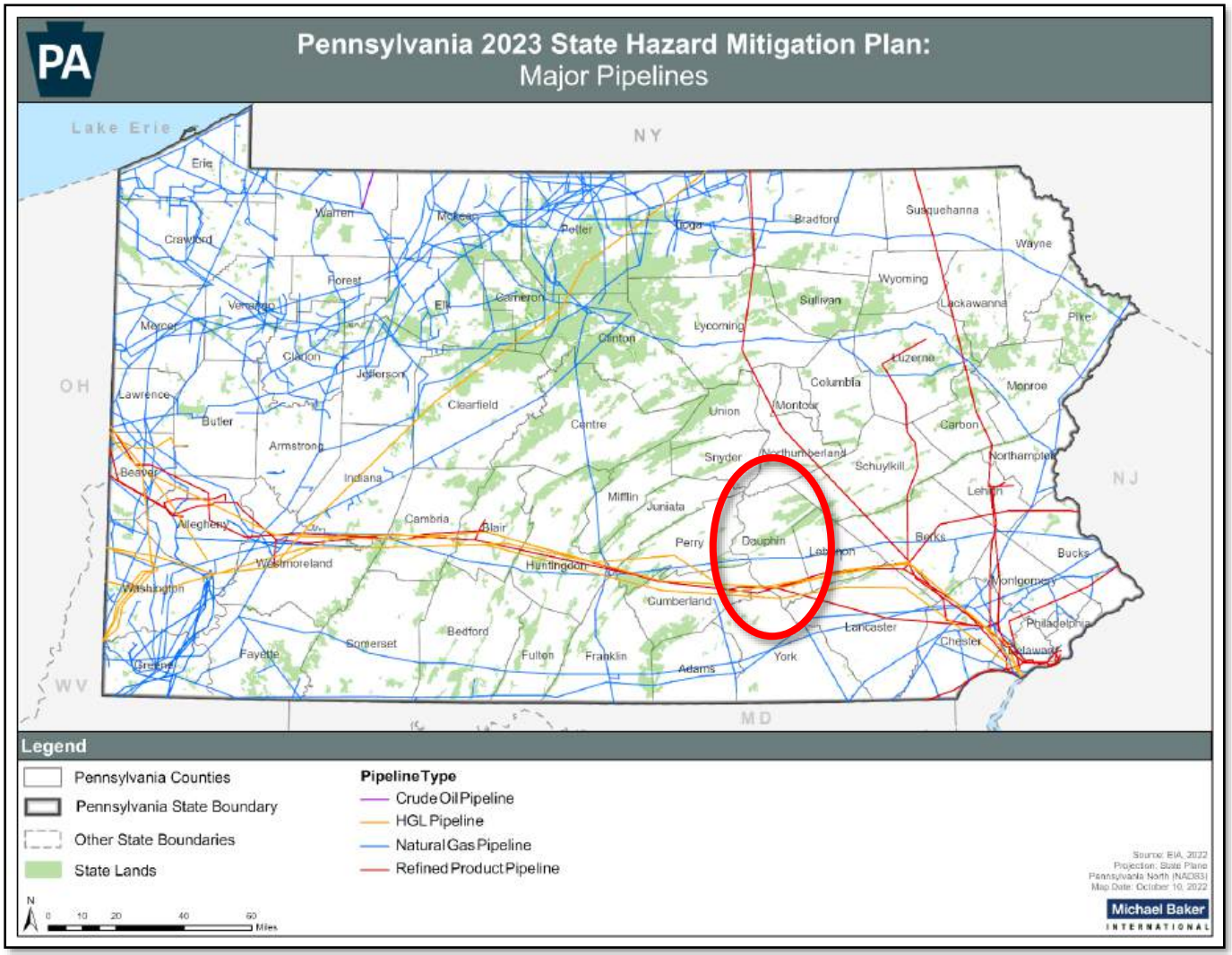
Figure 4.3.5-3. Pipelines in Dauphin County, PA



Source: (PA DCNR 2025)

The EIA defines major pipelines as interstate trunk lines and selected intrastate lines (as well as gathering lines for natural gas) and assembles pipeline data from the Federal Energy Regulatory Commission, industry sources, and other publicly available sources. The network of natural gas pipelines is particularly dense in the northwestern part of the state (PEMA 2023).

Figure 4.3.5-4. Major Pipelines of Pennsylvania



Source: PEMA 2023
Note: Dauphin County indicated by the red oval

4.3.5.2 Range of Magnitude

Many factors determine the magnitude of the hazard posed by pipeline failures, including the chemicals released, the failure mode of the pipeline, the operating conditions of the pipeline at the time of the incident, and the characteristics of the surrounding area. Impacts on life and property can result from inhalation or ingestion of toxins, exposure to a fire or explosion, or exposure to contaminated soils or drinking water (FEMA, 2015). These impacts may include:

- Serious injuries or fatalities
- Damage to buildings and infrastructure
- Disruptions and closures to critical infrastructure and services, including transportation routes and emergency medical services
- Residential, commercial, and industrial energy supply losses
- Disruption of local businesses and regional economies
- Displacement of residential communities or businesses

4.3.5.3 Past Occurrence

The Commonwealth of Pennsylvania has experienced 289 incidents between 2004-2023 (PHSMA 2024). While the PHSMA does not report any incidents in Dauphin County for the specified years, the Dauphin County Annual Reports for 2022 and 2023 document several pipeline incidents. These incidents have varied in severity, from minor leaks to significant ruptures, impacting both the environment and public safety. Table 4.3.5.3-1 presents those incidents noted in the annual reports.

Table 4.3.5.3-1. Gas and Liquid Pipeline Events in Dauphin County, 2022 and 2023

Dates of Events	Location	Description
January 19, 2022	Steelton (B)	Gas line struck during construction
February 4, 2022	South Hanover (T)	Gas line struck during excavation with resulting evacuations
February 17, 2022	Harrisburg (C)	Natural gas odor resulted in a school being evacuated
February 23, 2022	Harrisburg (C)	Gas leak (major release); PA-230 shut down, commerce closed and evacuated
April 12, 2022	Lower Paxton (T)	Gas line struck during excavation
April 12, 2022	Swatara (T)	Gas line struck by truck resulting in leak
April 14, 2022	Steelton (B)	Gas leak reported by multiple residents
April 15, 2022	Lower Paxton (T)	Odor of gas in building (Sheetz); resultant evacuation
April 24, 2022	Lower Paxton (T)	Gas line struck during construction

Dates of Events	Location	Description
April 25, 2022	Derry (T)	Gas line struck during excavation; resultant evacuation including the Cocoa Motel
April 30, 2022	Susquehanna (T)	Gas line struck by homeowner while gardening
May 4, 2022	Lower Paxton (T)	Gas line struck during excavation
June 7, 2022	Derry (T)	Odor in Sheetz facility
July 5, 2022	Derry (T)	Gas leak; resultant evacuation from nursing home
December 13, 2022	Susquehanna (T)	Gas leak: excavation work damaged a natural gas line, causing a home to explode in the area. One residence was destroyed, and several adjacent homes were damaged. Two individuals were sent to the hospital for treatment.
January 2023	Harrisburg (C)	Gas leak
January 2023	Harrisburg (C)	Gas leak causing a residential explosion & evacuation – 42,000 cubic feet of natural gas
January 2023	Derry (T)	Gas leak
January 2023	Susquehanna (T)	Gas leak, construction severed a gas line
April 2023	Swatara (T)	A two-inch gas main was struck, resulting in evacuations
May 2023	Lower Paxton (T)	Gas leak
June 2023	Derry (T)	Gas leak inside of a nursing home, resultant evacuation
July 2023	Swatara (T)	Gas leak with approximately 100 people being evacuated

Source: Dauphin County OEM 2022, 2023

4.3.5.4 Future Occurrence

Because of the wide scope of the definition of environmental hazards, ranging from a small spill to a large release of a highly volatile or toxic hazardous material, incidents can and will happen at any time. Although these facilities follow applicable safety and health regulations and best practices, the proximity of facilities to population centers is a concern for the county.

The best available data on gas and liquid pipeline events was used to calculate the probability of future events in the County. Information from the PHMSA, and the 2023 Commonwealth of Pennsylvania HMP were used to identify the number of events between 2004 and 2023, Table 4.3.5.4-1 shows these statistics, as well as the estimated percent chance of an incident occurring in a given year.

Based on these previous occurrences, the probability of future gas and liquid pipeline events on an annual basis is ***highly likely***, as defined by the Risk Factor Methodology probability criteria (see Table 4.4.1-1).

Table 4.3.5.4-1. Probability of Future Gas and Liquid Pipeline Events

Hazard Type	Number of Occurrences Between 2022 and 2023	% Chance of Occurrence in Any Year
Gas and Liquid Pipeline Events	23	100%

Source: PHSMA 2024; Dauphin County OEM 2022, 2023; PEMA 2023
Note: While data from the years 2004 to 2023 was reviewed, the only available data included in this table is derived from the Dauphin County Annual Reports for the years 2022 and 2023.

4.3.5.5 Vulnerability Assessment

To understand risk, a community must evaluate the assets exposed and vulnerable in the identified hazard area. The following text evaluates and estimates the potential impact of the hazardous materials release hazard on the county, including:

- Impact on (1) life, health, and safety; (2) general building stock; (3) critical facilities; (4) economy; (5) environment; and (6) future growth and development.
- Effects of climate change on vulnerability.
- Further data collection that will assist in understanding this hazard over time.

Impact on Life, Health, and Safety

Gas and liquid pipelines are critical components of the energy infrastructure, providing essential services to communities. However, their presence and operation can have significant impacts on both the overall population and socially vulnerable populations in Dauphin County.

Overall Population

Pipelines, while essential for transporting energy resources, pose several risks to the general population. These include potential leaks, explosions, and environmental contamination. Such incidents can lead to property damage, health hazards, and disruptions in daily life. The presence of pipelines also necessitates stringent safety measures and emergency response plans to mitigate these risks.

Much of the population in Dauphin County is exposed to the consequences of a pipeline failure. Exposure statistics are compiled in Table 4.3.5.5-1 by jurisdiction. The Township of Lower Paxton has the highest number of persons (9,307) within a half-mile radius of pipelines.

Table 4.3.5.5-1. Population within a Half-Mile Radius of Pipelines

Jurisdiction *(C) = City* *(B) = Borough* *(T) = Township*	Total Population (2020 Decennial)	Population within a Half-Mile Radius of Pipelines	
		Number of Persons	% of Jurisdiction Total
Berrysburg (B)	326	0	0.0%
Conewago (T)	2,952	1,630	55.2%

Jurisdiction *(C) = City* *(B) = Borough* *(T) = Township*	Total Population (2020 Decennial)	Population within a Half-Mile Radius of Pipelines	
		Number of Persons	% of Jurisdiction Total
Dauphin (B)	795	0	0.0%
Derry (T)	24,715	3,895	15.8%
East Hanover (T)	6,019	1,361	22.6%
Elizabethville (B)	1,357	0	0.0%
Gratz (B)	743	0	0.0%
Halifax (B)	796	0	0.0%
Halifax (T)	3,349	0	0.0%
Harrisburg City	50,099	0	0.0%
Highspire (B)	2,741	2,050	74.8%
Hummelstown (B)	4,544	0	0.0%
Jackson (T)	1,827	0	0.0%
Jefferson (T)	360	0	0.0%
Londonderry (T)	4,899	3,011	61.5%
Lower Paxton (T)	53,501	9,307	17.4%
Lower Swatara (T)	9,531	7,433	78.0%
Lykens (B)	1,873	0	0.0%
Lykens (T)	1,559	0	0.0%
Middle Paxton (T)	5,048	34	0.7%
Middletown (B)	9,533	7,055	74.0%
Mifflin (T)	816	0	0.0%
Millersburg (B)	2,545	0	0.0%
Paxtang (B)	1,648	0	0.0%
Penbrook (B)	3,274	0	0.0%
Pillow (B)	292	0	0.0%
Reed (T)	230	0	0.0%
Royalton (B)	1,138	0	0.0%
Rush (T)	228	0	0.0%
South Hanover (T)	7,209	0	0.0%
Steelton (B)	6,263	1,276	20.4%
Susquehanna (T)	26,736	3,840	14.4%
Swatara (T)	27,824	581	2.1%

Jurisdiction *(C) = City* *(B) = Borough* *(T) = Township*	Total Population (2020 Decennial)	Population within a Half-Mile Radius of Pipelines	
		Number of Persons	% of Jurisdiction Total
Upper Paxton (T)	4,010	0	0.0%
Washington (T)	2,129	0	0.0%
Wayne (T)	1,266	0	0.0%
West Hanover (T)	10,697	2,816	26.3%
Wiconisco (T)	1,159	0	0.0%
Williams (T)	1,067	0	0.0%
Williamstown (B)	1,303	0	0.0%
Dauphin County	**286,401**	**44,289**	**15.5%**

Sources: U.S. Census Bureau 2020; U.S. Energy Information Administration (EIA) 2020
Notes: Population results have been rounded down

Socially Vulnerable Population

Socially vulnerable populations, including low-income households, elderly individuals, and those with disabilities, are disproportionately affected by the presence of pipelines. Studies have shown that counties with higher social vulnerability scores tend to have a higher density of pipeline infrastructure (NCSU 2021). This correlation suggests that these communities are at greater risk of facing adverse effects such as water and air pollution, public health issues, and safety concerns.

In Dauphin County, socially vulnerable populations may lack the resources to effectively respond to and recover from pipeline-related incidents. Limited access to healthcare, financial constraints, and inadequate housing can exacerbate the impacts of such events. Additionally, these populations may have less influence in decision-making processes related to pipeline siting and safety regulations, further increasing their vulnerability.

Table 4.3.5.5-2 presents the estimated number of vulnerable individuals by jurisdictions within a half-mile radius of a pipeline. The Township of Lower Paxton has the highest number of individuals aged 65 and over (1,744), children under the age of 5 (527), and non-English speaking individuals (300) within this radius. Additionally, the Borough of Middletown has the greatest number of individuals with a disability (1,135) and individuals living in poverty (1,103) within the same radius.

Table 4.3.5.5-2. Estimated Number of Vulnerable Persons Located within a Half-Mile Radius of Pipelines

Jurisdiction *(B) = Borough (C) = City (T) = Township*	Estimated Number of Vulnerable Persons Located within a Half-Mile Radius of Pipelines									
	Persons Over 65	Percent of Total	Persons Under 5	Percent of Total	Non-English Speaking Persons	Percent of Total	Persons with/ a Disability	Percent of Total	Persons in Poverty	Percent of Total
Berrysburg (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Conewago (T)	251	55.0%	143	55.2%	6	50.6%	149	55.0%	108	54.8%
Dauphin (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Derry (T)	719	15.7%	153	15.7%	31	15.4%	365	15.7%	330	15.7%
East Hanover (T)	260	22.5%	41	22.3%	0	0.0%	149	22.5%	53	22.4%
Elizabethville (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Gratz (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Halifax (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Halifax (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Harrisburg (C)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Highspire (B)	299	74.8%	53	73.6%	35	73.8%	251	74.7%	216	74.5%
Hummelstown (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Jackson (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Jefferson (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Londonderry (T)	653	61.4%	286	61.4%	0	0.0%	280	61.3%	154	61.4%
Lower Paxton (T)	1,744	17.4%	527	17.4%	300	17.4%	931	17.4%	580	17.4%
Lower Swatara (T)	1,662	78.0%	386	77.8%	216	77.9%	867	78.0%	637	78.0%
Lykens (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Lykens (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Middle Paxton (T)	10	0.7%	1	0.4%	0	0.0%	6	0.6%	1	0.5%

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Estimated Number of Vulnerable Persons Located within a Half-Mile Radius of Pipelines									
	Persons Over 65	Percent of Total	Persons Under 5	Percent of Total	Non-English Speaking Persons	Percent of Total	Persons with/ a Disability	Percent of Total	Persons in Poverty	Percent of Total
Middletown (B)	1,095	74.0%	526	73.9%	165	74.1%	1,135	74.0%	1,103	74.0%
Mifflin (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Millersburg (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Paxtang (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Penbrook (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Pillow (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Reed (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Royalton (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Rush (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
South Hanover (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Steelton (B)	147	20.3%	78	20.2%	37	20.3%	302	20.4%	261	20.4%
Susquehanna (T)	804	14.4%	217	14.3%	117	14.3%	475	14.3%	325	14.3%
Swatara (T)	92	2.1%	25	2.0%	20	2.1%	64	2.1%	43	2.0%
Upper Paxton (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Washington (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Wayne (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
West Hanover (T)	719	26.3%	113	26.2%	0	0.0%	251	26.3%	77	26.3%
Wiconisco (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Williams (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Williamstown (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Estimated Number of Vulnerable Persons Located within a Half-Mile Radius of Pipelines									
	Persons Over 65	Percent of Total	Persons Under 5	Percent of Total	Non-English Speaking Persons	Percent of Total	Persons with/ a Disability	Percent of Total	Persons in Poverty	Percent of Total
Dauphin County (Total)	**8,455**	**16.9%**	**2,549**	**14.8%**	**927**	**10.1%**	**5,225**	**14.4%**	**3,888**	**11.3%**

Source: US Census Bureau, American Community Survey 2018-2022; US Energy Information Administration (EIA) 2020
Note: Population results have been rounded down

Impacts on General Building Stock

Potential losses to the general building stock caused by a hazmat incident are difficult to quantify. The degree of damage to the general building stock depends on the scale of the incident. Potential losses may include inaccessibility, loss of service, contamination, and/or potential structural and content losses if an explosion occurs. The closure of waterways, railroads, airports, and highways as a result of a hazmat incident has the potential to impact the ability to deliver goods and services efficiently. Potential impacts may have local, regional, or statewide effects depending on the magnitude of the event and level of service disruptions.

Table 4.3.5.5-3highlights the jurisdictions with the highest number of buildings and their replacement cost values within a half-mile radius of pipelines. Notably, the Township of Lower Paxton has the highest total number of buildings (22,715) with 3,982 of those buildings within the half-mile radius, valued at $2 billion (13.5 percent of the township's total value). The Township of Lower Swatara also stands out with 3,590 buildings within the half-mile radius, valued at $4.8 billion (66.9 percent of the township's total value).

Table 4.3.5.5-4 provides an overview of buildings within a half-mile radius of pipelines in Dauphin County, categorized by general occupancy class. The Township of Lower Paxton has the highest number of residential buildings (3,353), followed by the Township of Lower Swatara with 2,619 residential buildings. In terms of commercial buildings, the Township of Londonderry leads with 1,043 buildings, as well as government, religious, agricultural, and education buildings (309). Industrial buildings are relatively few across the jurisdictions, with the Township of Swatara having the highest count at 20.

Table 4.3.5.5-3. Buildings within a Half-Mile Radius of Pipelines

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Jurisdiction Total Buildings		Buildings within a Half-Mile Radius of Pipelines			
			Number of Buildings		Replacement Cost Value	
	Count	Replacement Cost Value	Count	% of Jurisdiction Total	Value	% of Jurisdiction Total
Berrysburg (B)	384	$155,707,892	0	0.0%	$0	0.0%
Conewago (T)	2,726	$1,408,072,267	1,299	47.7%	$691,729,842	49.1%
Dauphin (B)	499	$178,594,344	0	0.0%	$0	0.0%
Derry (T)	12,189	$16,562,878,409	1,757	14.4%	$884,071,488	5.3%
East Hanover (T)	5,424	$3,271,020,667	1,037	19.1%	$442,744,092	13.5%
Elizabethville (B)	1,022	$466,950,677	0	0.0%	$0	0.0%
Gratz (B)	804	$536,197,947	0	0.0%	$0	0.0%
Halifax (B)	529	$218,291,193	0	0.0%	$0	0.0%
Halifax (T)	3,714	$1,874,093,634	0	0.0%	$0	0.0%
Harrisburg (C)	19,455	$18,628,047,035	0	0.0%	$0	0.0%
Highspire (B)	1,481	$664,880,756	1,136	76.7%	$508,559,244	76.5%
Hummelstown (B)	2,488	$1,268,535,294	0	0.0%	$0	0.0%
Jackson (T)	2,533	$963,807,247	0	0.0%	$0	0.0%
Jefferson (T)	695	$279,826,276	0	0.0%	$0	0.0%
Londonderry (T)	5,464	$3,122,384,091	3,260	59.7%	$1,343,979,616	43.0%
Lower Paxton (T)	22,715	$16,760,123,401	3,982	17.5%	$2,261,834,940	13.5%
Lower Swatara (T)	5,204	$7,181,289,637	3,590	69.0%	$4,803,073,007	66.9%
Lykens (B)	1,438	$620,374,667	0	0.0%	$0	0.0%
Lykens (T)	2,311	$1,144,139,161	0	0.0%	$0	0.0%
Middle Paxton (T)	4,472	$1,679,813,405	57	1.3%	$24,451,821	1.5%
Middletown (B)	3,849	$2,433,657,717	2,777	72.1%	$1,660,061,935	68.2%
Mifflin (T)	1,318	$762,373,861	0	0.0%	$0	0.0%

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Jurisdiction Total Buildings		Buildings within a Half-Mile Radius of Pipelines			
			Number of Buildings		Replacement Cost Value	
	Count	Replacement Cost Value	Count	% of Jurisdiction Total	Value	% of Jurisdiction Total
Millersburg (B)	1,518	$913,497,912	0	0.0%	$0	0.0%
Paxtang (B)	900	$476,331,717	0	0.0%	$0	0.0%
Penbrook (B)	1,581	$698,112,706	0	0.0%	$0	0.0%
Pillow (B)	317	$115,637,971	0	0.0%	$0	0.0%
Reed (T)	327	$147,861,272	0	0.0%	$0	0.0%
Royalton (B)	724	$253,576,998	0	0.0%	$0	0.0%
Rush (T)	379	$88,377,859	0	0.0%	$0	0.0%
South Hanover (T)	4,275	$2,386,303,219	0	0.0%	$0	0.0%
Steelton (B)	2,867	$2,584,768,828	635	22.1%	$564,426,382	21.8%
Susquehanna (T)	12,511	$10,167,577,726	1637	13.1%	$787,206,001	7.7%
Swatara (T)	12,223	$10,172,987,131	274	2.2%	$267,570,607	2.6%
Upper Paxton (T)	3,823	$1,780,080,745	0	0.0%	$0	0.0%
Washington (T)	2,464	$1,345,985,248	0	0.0%	$0	0.0%
Wayne (T)	1,460	$480,646,769	0	0.0%	$0	0.0%
West Hanover (T)	7,194	$3,876,826,721	1774	24.7%	$949,901,951	24.5%
Wiconisco (T)	1,112	$351,954,145	0	0.0%	$0	0.0%
Williams (T)	1,093	$493,719,539	0	0.0%	$0	0.0%
Williamstown (B)	966	$399,114,521	0	0.0%	$0	0.0%
Dauphin County (Total)	**156,448**	**$116,914,420,604**	**23,215**	**14.8%**	**$15,189,610,927**	**13.0%**

Sources: Dauphin County 2024; RS Means 2024; U.S. Energy Information Administration (EIA) 2020
Notes: % = Percent

Table 4.3.5.5-4. Buildings within a Half-Mile Radius of Pipelines by General Occupancy Class

Jurisdiction *(B) = Borough (C) = City (T) = Township*	Buildings within a Half-Mile Radius of Pipelines by General Occupancy Class			
	Residential	Commercial	Industrial	Government, Religion, Agricultural, and Education
Berrysburg (B)	0	0	0	0
Conewago (T)	1,000	183	6	110
Dauphin (B)	0	0	0	0
Derry (T)	1,525	169	1	62
East Hanover (T)	757	117	1	162
Elizabethville (B)	0	0	0	0
Gratz (B)	0	0	0	0
Halifax (B)	0	0	0	0
Halifax (T)	0	0	0	0
Harrisburg (C)	0	0	0	0
Highspire (B)	914	194	10	18
Hummelstown (B)	0	0	0	0
Jackson (T)	0	0	0	0
Jefferson (T)	0	0	0	0
Londonderry (T)	1,900	1,043	8	309
Lower Paxton (T)	3,353	577	6	46
Lower Swatara (T)	2,619	788	8	175
Lykens (B)	0	0	0	0
Lykens (T)	0	0	0	0
Middle Paxton (T)	24	24	1	8
Middletown (B)	2,295	444	2	36
Mifflin (T)	0	0	0	0
Millersburg (B)	0	0	0	0
Paxtang (B)	0	0	0	$0
Penbrook (B)	0	0	0	0
Pillow (B)	0	0	0	0
Reed (T)	0	0	0	0
Royalton (B)	0	0	0	0
Rush (T)	0	0	0	0
South Hanover (T)	0	0	0	0
Steelton (B)	477	118	4	36
Susquehanna (T)	1546	76	5	10
Swatara (T)	212	42	20	0
Upper Paxton (T)	0	0	0	0
Washington (T)	0	0	0	0
Wayne (T)	0	0	0	0
West Hanover (T)	1486	217	10	61
Wiconisco (T)	0	0	0	0
Williams (T)	0	0	0	0
Williamstown (B)	0	0	0	0
Dauphin County (Total)	**18,108**	**3,992**	**82**	**1,033**

Source: Dauphin County 2024; US EIA 2020

Impacts on Critical Facilities

Potential losses of critical facilities caused by a pipeline incident are difficult to quantify. Potential losses may include inaccessibility, loss of service, contamination, and/or potential structural and content losses if a failure occurs. Within Dauphin County, there are a total of 125 critical lifelines within a half-mile radius of pipelines. The Safety and Security lifeline category has the highest number of lifelines, totaling 55. The Hazardous Materials category follows with 39 lifelines within this radius. For further details, refer to Table 4.3.5.5-5.

Table 4.3.5.5-5. Number of Facilities within a Half-Mile Radius of Pipelines, by Lifeline Category

Number of Critical Lifelines within a Half-Mile Radius of Pipelines	
FEMA Lifeline Category	*Total Number of Lifelines*
Communications	4
Energy	1
Food, Hydration, Shelter	0
Hazardous Materials	39
Health and Medical	13
Safety and Security	55
Transportation	8
Water Systems	5
Dauphin County (Total)	**125**

***Source**: Dauphin County 2024; HIFLD 2020, 2023; Department of Human Services 2024; U.S. Energy Information Administration (EIA) 2020*

Impact on the Economy

If a significant pipeline incident occurs, not only would life, safety, and building stock be at risk, but the economy of Dauphin County would also be affected. A significant incident within an urban area may force businesses to close for an extended period of time because of contamination or because of direct damage caused by an explosion. Exact impacts on the economy are difficult to predict, given the uncertainty of the size and scope of potential incidents.

Impact on the Environment

Should a pipeline failure occur during a natural disaster, access to the pipeline may be restricted, waterlines for fire suppression may be compromised, and response personnel and resources may be limited. In addition, the potential threat of a pipeline failure can be amplified by natural hazard events that are accompanied by winds, thunderstorms, or floods. These conditions can spread contamination more quickly and exacerbate the threat to local water supplies, air quality, soil, and agriculture (PEMA 2023).

Future Growth and Development

An increase in development and population can heighten the vulnerability of gas and liquid pipeline incidents by raising population density, which heightens the risk of casualties and property damage. Construction activities

associated with new developments can inadvertently damage pipelines, while increased demand for energy can strain existing infrastructure. Rapid development may also challenge regulatory oversight and emergency response capabilities. Additionally, changes in land use and environmental conditions can affect pipeline stability.

Effect of Climate Change on Vulnerability

As temperatures change, excessive heat on pipelines may alter the material properties. In addition, pipeline locations in the floodplain may experience an increase in flood events due to the project changes in increased precipitation events, magnitude, and frequency. Increased precipitation could accelerate the rate of corrosion of pipelines, resulting in leakage incidents.

Additional Data and Next Steps

The assessment above identifies vulnerable populations and potential structural and economic losses associated with this hazard of concern. The collection of additional information and actual loss data specific to the plan participants will further enhance Dauphin County's vulnerability assessment.

4.3.6 Environmental Hazards – Hazardous Materials Releases

This section provides a profile and vulnerability assessment of the environmental hazards – hazardous materials releases profile for the Dauphin County Hazard Mitigation Plan (HMP).

The U.S. Department of Transportation (DOT) categorizes hazardous materials (HazMat) into the following nine classes based on chemical characteristics producing the risk:

- Class 1: Explosives
- Class 2: Gases
- Class 3: Flammable liquids
- Class 4: Flammable solids
- Class 5: Oxidizers and organic pesticides
- Class 6: Poisons and etiologic materials
- Class 7: Radioactive materials
- Class 8: Corrosives
- Class 9: Miscellaneous

Facilities that use, manufacture, or store hazardous materials 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) (PEMA 2023). These statutes require that all owners or operators of facilities that manufacture produce, use, import, export, store, supply, or distribute any extremely hazardous substance report to the county or Commonwealth. The EPA also tracks key information about chemicals handled by industrial facilities through its Toxics Release Inventory (TRI) database. Facilities that employ ten or more full-time employees and which manufacture or process 25,000 pounds or more, or otherwise use 10,000 pounds or more, of any SARA Section 770-listed toxic chemicals in the course of a calendar year are required to report TRI information to the EPA and PEMA (PEMA 2023).

Product release into the local environment can derive from a fixed facility or occur at any location along a route of travel and may be the result of carelessness, technical failure, external incidents, or an intentional act against the facility or container. The volatility of products stored or transported, along with the potential impact on a local community, may increase the risk of intentional acts against a facility or transport vehicle. The release of certain products considered HazMat can immediately and adversely impact the general population, ranging from the inconvenience of evacuations to personal injury and even death. Moreover, any release can compromise the local environment through contamination of soil, groundwater, or local flora and fauna.

4.3.6.1 Location and Extent

Based on past occurrences, HazMat releases within Dauphin County have been accidental and have not been considered terrorist or criminal acts. While past occurrences have not been deemed intentional, an intentional release of any of these products in large quantity would pose a threat to the local population, economy, and environment resulting in lost revenue, injuries, and deaths. Table 4.3.6-1 summarizes the number of annual incidents when chemicals and other hazardous materials were released in Dauphin County. According to the Dauphin County LEPC, there are 142 total reporting facilities for SARA Title III in 2022.

Source: DAUPHIN COUNTY LEPC

Table 4.3.6-1 Chemical Releases in Dauphin County between 2010 – 2023*

Reporting Year	Number of Releases
2010	323
2011	364
2012	345
2013	386
2014	410
2015	377
2016	411
2017	407
2018	380
2019	360
2020	346
2021	350
2022	348
2023	343

Source: (EPA 2024)
*Note: *EPA data available only for years between1987-2023*

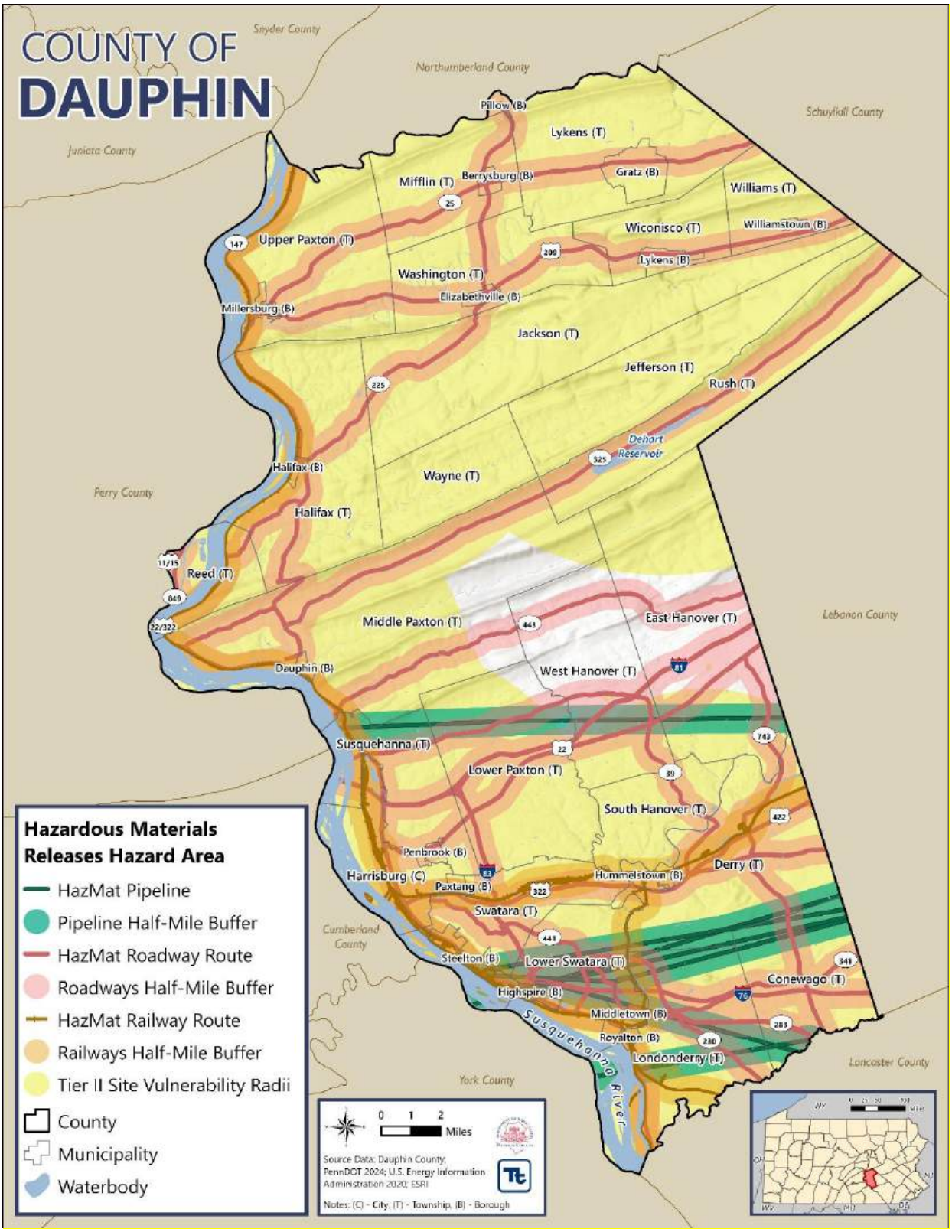
Dauphin County is also home to 1,988 miles of roadways, including 80.3 miles of Interstate, 201.1 miles of State Highway, 106.3 miles of U.S. Highways, and 2,304.4 miles of County and local roads (Dauphin County 2024). With a variety of roadways linking more-populated areas with rural communities, the gridwork of roadways facilitates the free movement of HazMat throughout the region. Table 4.3.6-2 breaks down the primary roadways in Dauphin County.

Table 4.3.6-2 Primary Roadways in Dauphin County, PA

Interstates	U.S. Routes	Pennsylvania Routes
Pennsylvania Turnpike (I-76)	U.S. Highway 11 (US-11)	State Highway 25 (PA-25)
Interstate 81 (I-81)	U.S. Highway 15 (US-15)	State Highway 25 (PA-39)
Interstate 83 (I-83)	U.S. Highway 22 (US-22)	State Highway 25 (PA-147)
Interstate 283 (I-283)	U.S. Highway 209 (US-209)	State Highway 225 (PA-225)
	U.S. Highway 322 (US-322)	State Highway 25 (PA-230)
	U.S. Highway 422 (US-422)	State Highway 283 (PA-283)
		State Highway 25 (PA-325)
		State Highway 341 (PA-341)
		State Highway 441 (PA-441)
		State Highway 443 (PA-443)
		State Highway 443 (PA-743)
		State Highway 849 (PA-849)

Rail lines that transport HazMat follow the Susquehanna River on the county's western border and run north and south along the river and traverse the middle of the county from east to west.

Figure 4.3.6-1. Major Transportation Routes and Railways with Buffer in Dauphin County, PA



4.3.6.2 Range of Magnitude

Environmental hazard incidents within Dauphin County could range from minor petroleum spills to large facility-based incidents that could lead to loss of life and damage to property, environment, and economy. Severity of an incident varies with the type of material released and distance and related response time for emergency response teams. Areas within closest proximity to the releases are generally at the greatest risk; however, depending on the material, a release can travel great distances or persist over a long time (e.g., nuclear radiation), resulting in far-reaching effects on people and the environment.

A HazMat release, whether accidental or intentional, can be exacerbated or mitigated by specific circumstances surrounding the event. Exacerbating conditions are characteristics that can enhance or magnify the effects of a hazard, and mitigating conditions are characteristics of the target and its physical environment that can reduce the effects of a hazard. These conditions are described below:

- Noncompliance with applicable codes (e.g., fire and building codes) and maintenance failures (e.g., fire protection and containment features) – can substantially increase damage to a facility and to surrounding buildings.
- Geographic location of HazMat site – if occurring within a Special Flood Hazard Area (SFHA), a materials release could cause large-scale water contamination during a flood incident, or a flood incident could compromise the production and storage of hazardous chemicals. Stormwaters and floodwaters can also move toxic chemicals swiftly across great distances.
- Weather conditions – affect how the hazard develops.
- Micro-meteorological effects of buildings and terrain – alter dispersion of materials.
- Shielding in the form of sheltering-in-place – protects people and property from harmful effects.

4.3.6.3 Past Occurrence

The county has undergone HazMat release accidents at facilities and along roadways. For most incidents, the County HazMat Team's representative is contacted by the on-scene fire department for technical advice about addressing the HazMat. The county receives notifications through the Dauphin County Emergency Communications (911) Center, and the Hazardous Materials Response Team responds to incidents if needed. **Table 4.3.6-3** below summarizes some of the more notable HazMat incidents in the County between 2019 and 2023.

Table 4.3.6-3. Hazardous Material Releases in Dauphin County, 2019 to 2023

Dates of Event	Location	Description
August 6, 2019	Harrisburg (C)	1 liquid gallon of a corrosive liquid, basic, inorganic, n.o.s. was spilled. During loading, freight was struck with equipment, causing damage. Damage caused by a release of a product. Dock personnel recovered the released product with absorbents and placed it into a container for proper disposal. Total damages were $10,000.
August 19, 2021	Harrisburg (C)	A container was found leaking material out the back door of the container to a rail car. When open 5 gal pails had shifted due to lack of blocking and bracing and lack of enough stretch wrap. Total damages were $5,000.
January 19, 2022	Steelton (B)	Gas line struck during construction
February 4, 2022	South Hanover (T)	Gas line struck during excavation with resulting evacuations
February 15, 2022	Lykens (T)	Diesel fuel spill
February 17, 2022	Harrisburg (C)	Natural gas odor resulted in a school being evacuated

Dates of Event	Location	Description
February 23, 2022	Harrisburg (C)	Gas leak (major release); PA-230 shut down, commerce closed and evacuated
February 25, 2022	Harrisburg (C)	Diesel fuel spill of 120 gallons from saddle tank
March 2, 2022	Lower Swatara (T) / Turnpike	A corrosive liquid leak from a tractor-trailer
March 3, 2022	Williamstown	Heating oil spill
March 29, 2022	Susquehanna (T)	Diesel fuel spill
April 8, 2022	Harrisburg (C)	75 pounds of an environmentally hazardous substance were spilled, resulting in $1,200 in damage. While unloading, two bags of the substance were found torn and leaking.
April 12, 2022	Lower Paxton (T)	Gas line struck during excavation
April 12, 2022	Swatara (T)	Gas line struck by truck resulting in leak
April 12, 2022	Washington (T)	Diesel fuel sheen on creek (NRCC notification)
April 14, 2022	Steelton (B)	Gas leak reported by multiple residents
April 15, 2022	Lower Paxton (T)	Odor of gas in building (Sheetz); resultant evacuation
April 22, 2022	Harrisburg (C)	Raw sewage spill (NRCC report)
April 24, 2022	Lower Paxton (T)	Gas line struck during construction
April 25, 2022	Derry (T)	Gas line struck during excavation; resultant evacuation including the Cocoa Motel
April 27, 2022	Highspire (B) / Turnpike	Diesel fuel spill of 50 gallons
April 30, 2022	East Hanover (T)	Propane leak at hotel, building evacuated
April 30, 2022	Susquehanna (T)	Gas line struck by homeowner while gardening
April 30, 2022	Susquehanna (T)	Anhydrous Ammonia leak
May 4, 2022	Lower Paxton (T)	Gas line struck during excavation
May 5, 2022	Lykens (T)	Diesel fuel spill
May 7, 2022	Conewago (T)	Transformer oil spill (NRCC Notification)
May 19, 2022	Harrisburg (C)	Sulfuric Acid leak at Frank's Nursery
May 21, 2022	Derry (T)	Food-grade oil spill
May 24, 2022	Susquehanna (T)	Propane tank at the residence leaking
May 26, 2022	East Hanover (T)	Diesel fuel spill
June 7, 2022	Derry (T)	Odor in Sheetz facility
June 12, 2022	East Hanover (T)	Diesel fuel spill
June 15, 2022	Steelton (B)	Heating oil spill
June 21, 2022	Harrisburg (C)	A Sodium Hydroxide spill at railyard (NRCC notification), resulted in $3,000 in damages.
July 5, 2022	Derry (T)	Gas leak; resultant evacuation from nursing home
July 12, 2022	Paxtang (B)	Pesticide incident; 3 transported to hospital
July 20, 2022	Swatara (T)	Fuel spill
July 26, 2022	East Hanover (T)	Biological hazard on the roadway (deceased livestock)
August 17, 2022	Penbrook (T) / Susquehanna (T)	Sewage release in Asylum Run
September 6, 2022	Lower Swatara (T)	Diesel fuel spill
September 14, 2022	Berrysburg (B)	Antifreeze spill

Dates of Event	Location	Description
September 15, 2022	Lower Paxton (T)	Pail spill on roadway
September 16, 2022	West Hanover (T)	Dumped oil
September 25, 2022	Lower Paxton (T)	Diesel fuel spill
October 13, 2022	Reed (T)	Diesel fuel spill
October 15, 2022	Millersburg (B)	Unknown oil spill (NRCC Notification)
November 2022	Middle Paxton (T)	Diesel fuel spill
November 2022	Swatara (T)	Diesel fuel spill, 50+ gallons
December 2022	West Hanover (T)	Diesel fuel spill, 70 gallons
December 2022	Susquehanna (T)	Gas leak
December 2022	East Hanover (T)	Diesel fuel spill, 50+ gallons
January 2023	Harrisburg (C)	Gas leak
January 2023	Harrisburg (C)	Chemical leak, over 100 gallons of paint and solvents
January 2023	Harrisburg (C)	Gas leak causing a residential explosion & evacuation – 42,000 cubic feet of natural gas
January 2023	Swatara (T)	Fuel spill within railyard, 50+ gallons
January 2023	Derry (T)	Gas leak
January 2023	Susquehanna (T)	Gas leak, construction severed a gas line
March 2023	Lower Paxton (T)	Diesel fuel spill, 100 gallons
April 2023	Swatara (T)	A two-inch gas main was struck, resulting in evacuations
May 2023	Lower Paxton (T)	Gas leak
May 2023	Harrisburg (C) Paxtang (B)	200 gallons of milk spilled into Paxton Creek
June 2023	Derry (T)	Gas leak inside of a nursing home, resultant evacuation
June 2023	Harrisburg (C)	Diesel leak of 1,500 gallons
June 2023	Lower Paxton (T)	The HazMat partial response team called for an ethylene glycol leak
June 2023	Wiconisco (T)	Junkyard fire
June 2023	Mifflin (T)	Fire at S&L Spindles with more than 1,000 gallons of fuel released
June 2023	West Hanover (T)	Diesel fuel leak of 100 gallons
July 2023	Swatara (T)	Gas leak with approximately 100 people being evacuated
September 2023	Middle Paxton (T)	47,940 pounds of milk spilled into the river (roughly 6,000 gallons)

Source: Dauphin County EM; (US DOT 2024)
Notes: (B) = Borough ; (C) = City ; (T) = Township

4.3.6.4 Future Occurrence

Because of the wide scope of the definition of environmental hazards, ranging from a small spill to a large release of a highly volatile or toxic hazardous material, incidents can and will happen at any time. The probability of future occurrence in Dauphin County is compounded by the fact that the county is home to SARA facilities as well as thousands of miles of roadways used for transportation.

Hazardous materials are also transported via rail and along roadways. Transportation of Hazardous Materials on highways involves tanker trucks or trailers; not surprisingly, trucks are responsible for the greatest number of

Hazardous Materials incidents. At several points, these transportation routes cross streams within the watersheds that are part of the county's domestic water supply.

While HazMat release incidents in Dauphin County have occurred in the past, they are generally considered difficult to predict. Smaller incidents, such as fuel spills, will affect the county many times each year, most likely along major highways or during refilling of home heating oil tanks, and may not be reported.

Although the county does not anticipate severe releases on any regular basis, the possibility of a significant release should not be discounted. Between January 1, 2019, and November 2024, Dauphin County experienced 70 hazardous materials incidents as shown in Table 4.3.6-3, and based on Risk Factor Methodology Probability Criteria, the likelihood of future occurrences within Dauphin County remains *highly likely*.

4.3.6.5 Vulnerability Assessment

To understand risk, a community must evaluate the assets exposed and vulnerable in the identified hazard area. The following text evaluates and estimates the potential impact of the hazardous materials release hazard on the county, including:

- Impact on (1) life, health, and safety; (2) general building stock; (3) critical facilities; (4) economy; (5) environment; and (6) future growth and development.
- Effects of climate change on vulnerability.
- Further data collection that will assist in understanding this hazard over time.

A spatial analysis was conducted using various lengths of buffer radii around hazardous material facilities and transportation networks. If a hazardous material incident occurred in or on the facility, pipeline, or transportation network, these buffers would represent the toxin or radiation release area. For the purposes of the assessment, an asset (population, structures, critical facilities, and lifelines) is considered exposed and potentially vulnerable to the HazMat hazard if it is located within these hazardous material buffer areas. The analysis looked at three different hazardous material buffer areas:

- 0.5-mile from a major highway
- 0.5-mile from a rail line
- Unique radius for each SARA Type II facility

Impact on Life, Health, and Safety

Much of the population in Dauphin County is exposed to some kind of environmental hazard (Table 4.3.6-4). Several incidents reported in the county are related to petroleum spills, which may have resulted from motor vehicle incidents. First responders' safety may also be at risk during on-scene operations, and they may have difficulty traveling to incidents due to limited access to roads. First responder resources may be exhausted during environmental hazard events due to a lack of personnel and a higher-than-normal call volume/demand.

Table 4.3.6-4. Estimated Dauphin County Population Vulnerable to Environmental Hazards

Jurisdiction *(C) = City (B) = Borough (T)=Township*	**Total Population** (2020 Decennial)	**Estimated Population Located in the Hazardous Materials Hazard Areas**					
		Population within ½ Mile of Major Roadways	Percent of Jurisdiction Total	Population within a ½ Mile of Railways	Percent of Jurisdiction Total	Population Exposed to HazMat Facility Incident Zones	Percent of Jurisdiction Total
Berrysburg (B)	326	325	99.7%	0	0.0%	325	99.7%
Conewago (T)	2,952	1,392	47.2%	0	0.0%	2,951	100.0%
Dauphin (B)	795	794	99.9%	644	81.0%	794	99.9%
Derry (T)	24,715	12,868	52.1%	10,168	41.1%	24,714	100.0%
East Hanover (T)	6,019	4,007	66.6%	0	0.0%	2,588	43.0%
Elizabethville (B)	1,357	1,357	100.0%	0	0.0%	1,357	100.0%
Gratz (B)	743	691	93.0%	0	0.0%	742	99.9%
Halifax (B)	796	796	100.0%	781	98.1%	796	100.0%
Halifax (T)	3,349	2,327	69.5%	825	24.6%	3,348	100.0%
Harrisburg City	50,099	23,942	47.8%	35,230	70.3%	50,098	100.0%
Highspire (B)	2,741	2,741	100.0%	2,615	95.4%	2,741	100.0%
Hummelstown (B)	4,544	3,333	73.3%	4,544	100.0%	4,544	100.0%
Jackson (T)	1,827	529	29.0%	0	0.0%	1,826	99.9%
Jefferson (T)	360	0	0.0%	0	0.0%	359	99.7%
Londonderry (T)	4,899	2,733	55.8%	928	18.9%	4,899	100.0%
Lower Paxton (T)	53,501	27,537	51.5%	22	<0.1%	52,657	98.4%
Lower Swatara (T)	9,531	9,057	95.0%	1,495	15.7%	9,530	100.0%
Lykens (B)	1,873	1,872	99.9%	0	0.0%	1,872	99.9%
Lykens (T)	1,559	601	38.6%	0	0.0%	1,559	100.0%
Middle Paxton (T)	5,048	3,737	74.0%	1,033	20.5%	4,616	91.4%
Middletown (B)	9,533	9,532	100.0%	7,897	82.8%	9,532	100.0%
Mifflin (T)	816	513	62.9%	0	0.0%	816	100.0%
Millersburg (B)	2,545	2,545	100.0%	1,828	71.8%	2,545	100.0%
Paxtang (B)	1,648	1,605	97.4%	1,622	98.4%	1,647	99.9%
Penbrook (B)	3,274	3,105	94.8%	0	0.0%	3,274	100.0%
Pillow (B)	292	292	100.0%	0	0.0%	292	100.0%
Reed (T)	230	198	86.1%	141	61.3%	229	99.6%
Royalton (B)	1,138	1,138	100.0%	1,138	100.0%	1,138	100.0%
Rush (T)	228	224	98.2%	0	0.0%	228	100.0%

Jurisdiction *(C) = City (B) = Borough (T)=Township*	**Total Population** (2020 Decennial)	**Estimated Population Located in the Hazardous Materials Hazard Areas**					
		Population within ½ Mile of Major Roadways	Percent of Jurisdiction Total	Population within a ½ Mile of Railways	Percent of Jurisdiction Total	Population Exposed to HazMat Facility Incident Zones	Percent of Jurisdiction Total
South Hanover (T)	7,209	2,722	37.8%	748	10.4%	7,208	100.0%
Steelton (B)	6,263	6,174	98.6%	6,038	96.4%	6,262	100.0%
Susquehanna (T)	26,736	19,274	72.1%	3,710	13.9%	26,735	100.0%
Swatara (T)	27,824	19,117	68.7%	14,929	53.7%	27,824	100.0%
Upper Paxton (T)	4,010	3,139	78.3%	1,009	25.2%	4,009	100.0%
Washington (T)	2,129	1,731	81.3%	0	0.0%	2,129	100.0%
Wayne (T)	1,266	0	0.0%	0	0.0%	1,265	99.9%
West Hanover (T)	10,697	7,910	73.9%	0	0.0%	6,259	58.5%
Wiconisco (T)	1,159	906	78.2%	0	0.0%	1,159	100.0%
Williams (T)	1,067	807	75.6%	0	0.0%	1,067	100.0%
Williamstown (B)	1,303	1,192	91.5%	0	0.0%	1,303	100.0%
Dauphin County	**286,401**	**182,763**	**63.8%**	**97,345**	**34.0%**	**277,237**	**96.8%**

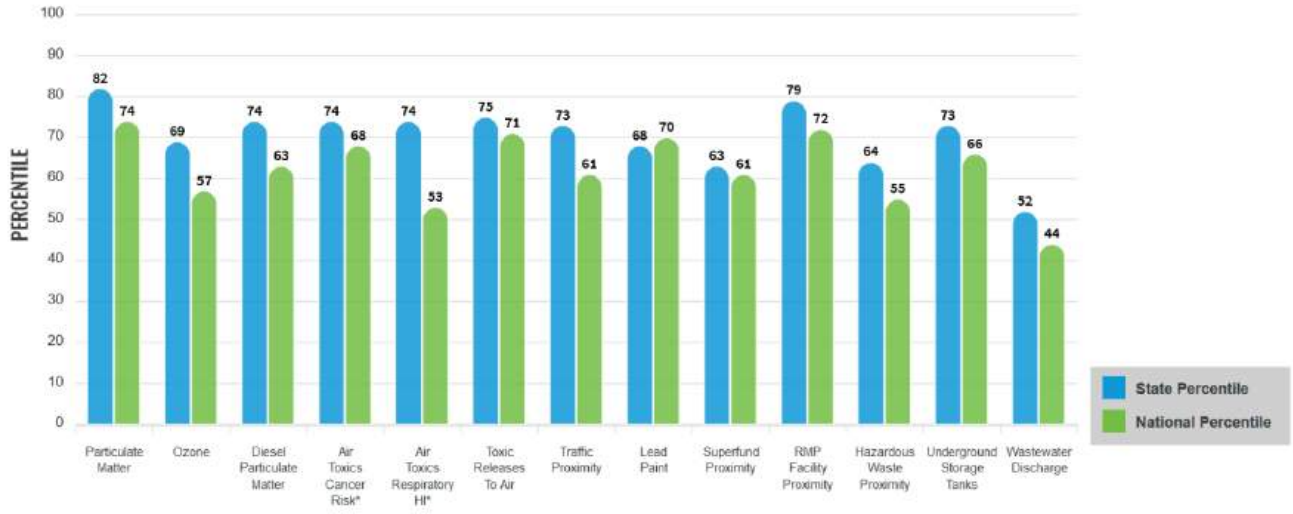
***Source**: U.S. Census Bureau 2020; Dauphin County 2024; Pennsylvania Department of Transportation 2024*
***Notes:** Population results have been rounded up*

Impacts on Socially Vulnerable Populations

Socially vulnerable and underserved communities, including low-income communities and communities of color, have historically been the most impacted by hazardous material releases and environmental pollution (EPA 2023). Dauphin County has several Black, Indigenous, and People of Color (BIPOC) residents (see Section 2 – Jurisdiction Profile), and around 12% of the residents are living below the poverty level (U.S. Census Bureau). There are communities in the County that may be at higher risk of hazardous materials releases or near hazardous material storage sites.

The EPA's EJScreen tool is an environmental justice mapping and screening tool that provides a nationally consistent dataset and approach for combining environmental and demographic socioeconomic indicators (EPA 2023). The tool combines data on low-income and people of color populations with a single environmental indicator to produce an EJ Index. The County's EJ Index shows it is in a high percentile for most indicators; however, the County is in the 79th percentile compared to the rest of the Commonwealth and in the 72nd percentile compared to the rest of the country in residential proximity to RMP facilities. The EJ index for the County is included as Figure 4.3.6-2.

Figure 4.3.6-2 EJ Index for Dauphin County, EPA EJScreen



Source: EPA 2023

Table 4.3.6-5 Number of Vulnerable Populations within a Half-Mile Radius of Major Roadways

Jurisdiction *(B) = Borough (C) = City (T) = Township*	Estimated Numbers of Vulnerable Populations Located within ½ Mile of Major Roadways									
	Persons Over 65	Percent of Total	Persons Under 5	Percent of Total	Non-English Speaking	Percent of Total	Persons with a Disability	Percent of Total	Persons in Poverty	Percent of Total
Berrysburg (B)	64	98.5%	33	100.0%	0	0.0%	53	100.0%	20	100.0%
Conewago (T)	215	47.1%	122	47.1%	5	42.2%	127	46.9%	92	46.7%
Dauphin (B)	187	99.5%	60	100.0%	0	0.0%	120	100.0%	119	100.0%
Derry (T)	2,377	52.1%	507	52.1%	104	51.6%	1,206	52.0%	1,092	52.0%
East Hanover (T)	767	66.5%	122	66.3%	0	0.0%	440	66.5%	157	66.2%
Elizabethville (B)	199	100.0%	70	100.0%	0	0.0%	176	99.4%	129	100.0%
Gratz (B)	106	93.0%	26	92.9%	0	0.0%	199	93.0%	156	92.9%
Halifax (B)	130	99.2%	31	96.9%	47	99.2%	161	99.4%	158	99.4%
Halifax (T)	592	69.5%	182	69.2%	0	0.0%	334	69.3%	216	69.2%
Harrisburg (C)	2,675	47.8%	1,993	47.8%	2,108	47.8%	4,042	47.8%	6,670	47.8%
Highspire (B)	399	99.8%	71	98.6%	46	97.0%	335	99.7%	290	100.0%
Hummelstown (B)	506	73.3%	205	73.2%	27	71.2%	374	73.2%	408	73.2%
Jackson (T)	117	28.8%	17	27.4%	0	0.0%	51	28.7%	72	28.9%
Jefferson (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Londonderry (T)	593	55.8%	260	55.8%	0	0.0%	255	55.8%	140	55.8%
Lower Paxton (T)	5,160	51.5%	1,561	51.5%	887	51.4%	2,756	51.5%	1,717	51.5%
Lower Swatara (T)	2,025	95.0%	471	95.0%	263	94.8%	1,056	95.0%	776	95.0%
Lykens (B)	270	99.6%	71	100.0%	8	84.4%	322	100.0%	336	100.0%
Lykens (T)	71	38.2%	68	38.4%	24	37.5%	48	38.1%	66	38.2%

Jurisdiction *(B) = Borough (C) = City (T) = Township*	Estimated Numbers of Vulnerable Populations Located within ½ Mile of Major Roadways									
	Persons Over 65	Percent of Total	Persons Under 5	Percent of Total	Non-English Speaking	Percent of Total	Persons with a Disability	Percent of Total	Persons in Poverty	Percent of Total
Middle Paxton (T)	1,100	74.0%	200	73.8%	33	73.3%	744	74.0%	154	73.7%
Middletown (B)	1,479	99.9%	711	99.9%	222	99.6%	1,534	100.0%	1,490	99.9%
Mifflin (T)	71	62.3%	47	62.7%	8	56.3%	44	62.0%	145	62.5%
Millersburg (B)	427	100.0%	210	99.5%	0	0.0%	369	100.0%	301	100.0%
Paxtang (B)	249	97.3%	101	97.1%	45	94.9%	144	97.3%	168	97.1%
Penbrook (B)	302	94.7%	326	94.8%	40	93.8%	600	94.8%	474	94.8%
Pillow (B)	63	100.0%	34	100.0%	9	94.9%	37	100.0%	12	100.0%
Reed (T)	58	85.3%	2	66.7%	0	0.0%	38	84.4%	17	85.0%
Royalton (B)	189	100.0%	44	97.8%	0	0.0%	176	99.4%	124	100.0%
Rush (T)	99	98.0%	2	66.7%	0	0.0%	54	98.2%	5	83.3%
South Hanover (T)	403	37.7%	224	37.6%	0	0.0%	171	37.7%	112	37.7%
Steelton (B)	714	98.5%	380	98.4%	179	98.1%	1,462	98.6%	1,263	98.5%
Susquehanna (T)	4,037	72.1%	1,092	72.0%	589	72.0%	2,389	72.1%	1,632	72.1%
Swatara (T)	3,054	68.7%	840	68.7%	669	68.7%	2,136	68.7%	1,442	68.7%
Upper Paxton (T)	834	78.2%	158	78.2%	0	0.0%	504	78.1%	507	78.2%
Washington (T)	374	81.1%	62	80.5%	0	0.0%	217	81.0%	209	81.0%
Wayne (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
West Hanover (T)	2,020	73.9%	318	73.8%	0	0.0%	706	73.8%	216	73.7%
Wiconisco (T)	166	77.9%	46	76.7%	7	73.8%	128	78.0%	107	77.5%
Williams (T)	145	75.5%	26	74.3%	0	0.0%	163	75.5%	130	75.1%
Williamstown (B)	187	91.2%	54	90.0%	1	42.2%	216	91.1%	266	91.4%

Jurisdiction (B) = Borough (C) = City (T) = Township	Estimated Numbers of Vulnerable Populations Located within ½ Mile of Major Roadways									
	Persons Over 65	Percent of Total	Persons Under 5	Percent of Total	Non-English Speaking	Percent of Total	Persons with a Disability	Percent of Total	Persons in Poverty	Percent of Total
Dauphin County (Total)	**32,424**	**64.9%**	**10,747**	**62.5%**	**5,321**	**57.8%**	**23,887**	**65.6%**	**21,388**	**62.4%**

Source: U.S. Census Bureau, American Community Survey 2018-2022; Dauphin County 2024
Notes: Population results based on the 2022 ACS Population estimates. Numbers have been rounded down

Table 4.3.6-6 Number of Vulnerable Populations within a Half-Mile Radius of Railways

Jurisdiction (B) = Borough (C) = City (T) = Township	Estimated Numbers of Vulnerable Populations Located within ½ Mile of Railways									
	Persons Over 65	Percent of Total	Persons Under 5	Percent of Total	Non-English Speaking	Percent of Total	Persons with a Disability	Percent of Total	Persons in Poverty	Percent of Total
Berrysburg (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Conewago (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Dauphin (B)	152	80.9%	48	80.0%	0	0.0%	97	80.8%	96	80.7%
Derry (T)	1,878	41.1%	400	41.1%	82	40.7%	953	41.1%	863	41.1%
East Hanover (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Elizabethville (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Gratz (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Halifax (B)	128	97.7%	31	96.9%	46	97.0%	158	97.5%	156	98.1%
Halifax (T)	209	24.5%	64	24.3%	0	0.0%	118	24.5%	76	24.4%
Harrisburg (C)	3,937	70.3%	2,933	70.3%	3,103	70.3%	5,947	70.3%	9,815	70.3%
Highspire (B)	381	95.3%	68	94.4%	44	92.8%	320	95.2%	276	95.2%
Hummelstown (B)	690	100.0%	279	99.6%	37	97.6%	510	99.8%	556	99.8%
Jackson (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Jurisdiction *(B) = Borough (C) = City (T) = Township*	Estimated Numbers of Vulnerable Populations Located within ½ Mile of Railways									
	Persons Over 65	Percent of Total	Persons Under 5	Percent of Total	Non-English Speaking	Percent of Total	Persons with a Disability	Percent of Total	Persons in Poverty	Percent of Total
Jefferson (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Londonderry (T)	201	18.9%	88	18.9%	0	0.0%	86	18.8%	47	18.7%
Lower Paxton (T)	4	<0.1%	1	<0.1%	0	0.0%	2	<0.1%	1	<0.1%
Lower Swatara (T)	334	15.7%	77	15.5%	43	15.5%	174	15.6%	128	15.7%
Lykens (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Lykens (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Middle Paxton (T)	304	20.4%	55	20.3%	9	20.0%	206	20.5%	42	20.1%
Middletown (B)	1,226	82.8%	589	82.7%	184	82.6%	1,270	82.8%	1,235	82.8%
Mifflin (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Millersburg (B)	306	71.7%	151	71.6%	0	0.0%	265	71.8%	216	71.8%
Paxtang (B)	252	98.4%	102	98.1%	46	97.0%	145	98.0%	170	98.3%
Penbrook (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Pillow (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Reed (T)	41	60.3%	1	33.3%	0	0.0%	27	60.0%	12	60.0%
Royalton (B)	189	100.0%	44	97.8%	0	0.0%	176	99.4%	124	100.0%
Rush (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
South Hanover (T)	110	10.3%	61	10.3%	0	0.0%	47	10.4%	30	10.1%
Steelton (B)	698	96.3%	372	96.4%	175	95.9%	1,429	96.4%	1,235	96.3%
Susquehanna (T)	777	13.9%	210	13.9%	113	13.8%	459	13.9%	314	13.9%
Swatara (T)	2,385	53.6%	656	53.6%	522	53.6%	1,668	53.6%	1,126	53.6%
Upper Paxton (T)	268	25.1%	50	24.8%	0	0.0%	162	25.1%	163	25.2%

Jurisdiction (B) = Borough (C) = City (T) = Township	Estimated Numbers of Vulnerable Populations Located within ½ Mile of Railways									
	Persons Over 65	Percent of Total	Persons Under 5	Percent of Total	Non-English Speaking	Percent of Total	Persons with a Disability	Percent of Total	Persons in Poverty	Percent of Total
Washington (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Wayne (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
West Hanover (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Wiconisco (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Williams (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Williamstown (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Dauphin County (Total)	**14,470**	**29.0%**	**6,280**	**36.5%**	**4,404**	**47.9%**	**14,219**	**39.1%**	**16,681**	**48.7%**

Source: U.S. Census Bureau, American Community Survey 2018-2022; Pennsylvania Department of Transportation 2024
Notes: Population results are based on the 2022 ACS population estimates. Numbers have been rounded down.

Table 4.3.6-7 Vulnerable Populations Exposed to HazMat Facility Incident Zones

Jurisdiction (B) = Borough (C) = City (T) = Township	Estimated Numbers of Vulnerable Populations Exposed to HazMat Facility Incident Zones									
	Persons Over 65	Percent of Total	Persons Under 5	Percent of Total	Non-English Speaking	Percent of Total	Persons with a Disability	Percent of Total	Persons in Poverty	Percent of Total
Berrysburg (B)	64	98.5%	33	100.0%	0	0.0%	53	100.0%	20	100.0%
Conewago (T)	455	99.8%	258	99.6%	12	100.0%	270	99.6%	197	100.0%
Dauphin (B)	187	99.5%	60	100.0%	0	0.0%	120	100.0%	119	100.0%
Derry (T)	4,565	100.0%	974	100.0%	200	99.3%	2,317	100.0%	2,099	100.0%
East Hanover (T)	495	42.9%	79	42.9%	0	0.0%	284	42.9%	101	42.6%
Elizabethville (B)	199	100.0%	70	100.0%	0	0.0%	176	99.4%	129	100.0%
Gratz (B)	113	99.1%	27	96.4%	0	0.0%	213	99.5%	168	100.0%

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Estimated Numbers of Vulnerable Populations Exposed to HazMat Facility Incident Zones									
	Persons Over 65	Percent of Total	Persons Under 5	Percent of Total	Non-English Speaking	Percent of Total	Persons with a Disability	Percent of Total	Persons in Poverty	Percent of Total
Halifax (B)	130	99.2%	31	96.9%	47	99.2%	161	99.4%	158	99.4%
Halifax (T)	851	99.9%	263	100.0%	0	0.0%	482	100.0%	312	100.0%
Harrisburg (C)	5,599	100.0%	4,171	100.0%	4,413	100.0%	8,457	100.0%	13,958	100.0%
Highspire (B)	399	99.8%	71	98.6%	46	97.0%	335	99.7%	290	100.0%
Hummelstown (B)	690	100.0%	279	99.6%	37	97.6%	510	99.8%	556	99.8%
Jackson (T)	405	99.8%	62	100.0%	0	0.0%	177	99.4%	249	100.0%
Jefferson (T)	80	98.8%	19	95.0%	0	0.0%	40	100.0%	4	80.0%
Londonderry (T)	1,063	100.0%	466	100.0%	0	0.0%	456	99.8%	251	100.0%
Lower Paxton (T)	9,868	98.4%	2,986	98.4%	1,697	98.4%	5,271	98.4%	3,283	98.4%
Lower Swatara (T)	2,130	100.0%	495	99.8%	277	99.9%	1,111	99.9%	817	100.0%
Lykens (B)	270	99.6%	71	100.0%	8	84.4%	322	100.0%	336	100.0%
Lykens (T)	185	99.5%	177	100.0%	63	98.5%	125	99.2%	173	100.0%
Middle Paxton (T)	1,359	91.4%	247	91.1%	41	91.1%	920	91.5%	191	91.4%
Middletown (B)	1,479	99.9%	711	99.9%	222	99.6%	1,534	100.0%	1,490	99.9%
Mifflin (T)	113	99.1%	75	100.0%	13	91.4%	71	100.0%	232	100.0%
Millersburg (B)	427	100.0%	210	99.5%	0	0.0%	369	100.0%	301	100.0%
Paxtang (B)	256	100.0%	103	99.0%	46	97.0%	148	100.0%	172	99.4%
Penbrook (B)	319	100.0%	343	99.7%	42	98.5%	633	100.0%	500	100.0%
Pillow (B)	63	100.0%	34	100.0%	9	94.9%	37	100.0%	12	100.0%
Reed (T)	67	98.5%	3	100.0%	0	0.0%	45	100.0%	20	100.0%
Royalton (B)	189	100.0%	44	97.8%	0	0.0%	176	99.4%	124	100.0%

Jurisdiction *(B) = Borough (C) = City (T) = Township*	Estimated Numbers of Vulnerable Populations Exposed to HazMat Facility Incident Zones									
	Persons Over 65	Percent of Total	Persons Under 5	Percent of Total	Non-English Speaking	Percent of Total	Persons with a Disability	Percent of Total	Persons in Poverty	Percent of Total
Rush (T)	101	100.0%	2	66.7%	0	0.0%	55	100.0%	6	100.0%
South Hanover (T)	1,068	100.0%	594	99.8%	0	0.0%	454	100.0%	297	100.0%
Steelton (B)	724	99.9%	385	99.7%	181	99.2%	1,483	100.0%	1,281	99.9%
Susquehanna (T)	5,599	100.0%	1,515	99.9%	817	99.9%	3,313	100.0%	2,264	100.0%
Swatara (T)	4,446	100.0%	1,222	99.9%	974	100.0%	3,110	100.0%	2,100	100.0%
Upper Paxton (T)	1,065	99.9%	202	100.0%	0	0.0%	644	99.8%	647	99.8%
Washington (T)	461	100.0%	77	100.0%	0	0.0%	267	99.6%	258	100.0%
Wayne (T)	145	99.3%	68	98.6%	0	0.0%	131	100.0%	30	96.8%
West Hanover (T)	1,598	58.5%	252	58.5%	0	0.0%	559	58.5%	171	58.4%
Wiconisco (T)	212	99.5%	59	98.3%	9	94.9%	163	99.4%	138	100.0%
Williams (T)	192	100.0%	35	100.0%	0	0.0%	215	99.5%	173	100.0%
Williamstown (B)	204	99.5%	60	100.0%	2	84.4%	236	99.6%	290	99.7%
Dauphin County (Total)	**47,835**	**95.8%**	**16,833**	**97.8%**	**9,156**	**99.5%**	**35,443**	**97.3%**	**33,917**	**99.0%**

Source: U.S. Census Bureau, American Community Survey 2018-2022; Dauphin County 2024
Notes: Population results are based on the 2022 ACS estimates. Numbers have been rounded down.

Impacts on General Building Stock

Potential losses to the general building stock caused by a HazMat incident are difficult to quantify. The degree of damage to the general building stock depends on the scale of the incident. Potential losses may include inaccessibility, loss of service, contamination, and/or potential structural and content losses if an explosion occurs. The closure of waterways, railroads, airports, and highways as a result of a HazMat incident has the potential to impact the ability to deliver goods and services efficiently. Potential impacts may have local, regional, or statewide effects depending on the magnitude of the event and level of service disruptions.

To estimate the buildings exposed to a hazardous material event, the HazMat buffer areas were overlaid upon the building level. The replacement cost value of the structures with their center in the buffer areas was totaled (Table 4.3.6-8). The areas with the largest exposure to replacement cost value are those buffer areas that extend out along highways. However, if a HazMat release were to occur, the incident would not be located along all highways in the county but instead only a section of the total HazMat exposure area. Similarly, a railway or SARA site hazardous material incident would not occur in all areas of the structure but instead only along one section or within one site. Therefore, the total exposure does not represent a complete vulnerability should a hazard event occur.

Table 4.3.6-8. Buildings Exposed to Hazardous Materials Incident Zones

Jurisdiction *(B) = Borough (C) = City (T)=Township*	**Total Number of Buildings** (2020 Census Tract)	**Buildings within ½ Mile Radius of Major Roadways**		**Buildings within ½ Mile Radius of Railways**		**Buildings Exposed to HazMat Facility Incident Zones**	
		Count	% of Jurisdiction Total	Count	% of Jurisdiction Total	Count	% of Jurisdiction Total
Berrysburg (B)	384	384	100.0%	0	0.0%	384	100.0%
Conewago (T)	2,726	1,491	54.7%	0	0.0%	2,726	100.0%
Dauphin (B)	499	499	100.0%	402	80.6%	499	100.0%
Derry (T)	12,189	6,938	56.9%	5,074	41.6%	12,189	100.0%
East Hanover (T)	5,424	3,823	70.5%	0	0.0%	1,975	36.4%
Elizabethville (B)	1,022	1,022	100.0%	0	0.0%	1,022	100.0%
Gratz (B)	804	746	92.8%	0	0.0%	804	100.0%
Halifax (B)	529	529	100.0%	521	98.5%	529	100.0%
Halifax (T)	3,714	2,454	66.1%	924	24.9%	3,714	100.0%
Harrisburg City	19,455	9,672	49.7%	13,971	71.8%	19,455	100.0%
Highspire (B)	1,481	1,481	100.0%	1,414	95.5%	1,481	100.0%
Hummelstown (B)	2,488	1,781	71.6%	2,485	99.9%	2,488	100.0%
Jackson (T)	2,533	739	29.2%	0	0.0%	2,533	100.0%
Jefferson (T)	695	1	0.1%	0	0.0%	695	100.0%
Londonderry (T)	5,464	3,082	56.4%	1,074	19.7%	5,464	100.0%
Lower Paxton (T)	22,715	12,021	52.9%	8	<0.1%	22,337	98.3%
Lower Swatara (T)	5,204	4,811	92.4%	1,079	20.7%	5,204	100.0%
Lykens (B)	1,438	1,438	100.0%	0	0.0%	1,438	100.0%
Lykens (T)	2,311	825	35.7%	0	0.0%	2,311	100.0%
Middle Paxton (T)	4,472	3,286	73.5%	858	19.2%	4,103	91.7%

Jurisdiction *(B) = Borough (C) = City (T)=Township*	**Total Number of Buildings** (2020 Census Tract)	**Buildings within ½ Mile Radius of Major Roadways**		**Buildings within ½ Mile Radius of Railways**		**Buildings Exposed to HazMat Facility Incident Zones**	
		Count	% of Jurisdiction Total	Count	% of Jurisdiction Total	Count	% of Jurisdiction Total
Middletown (B)	3,849	3,842	99.8%	3,215	83.5%	3,849	100.0%
Mifflin (T)	1,318	841	63.8%	0	0.0%	1,318	100.0%
Millersburg (B)	1,518	1,514	99.7%	1,116	73.5%	1,518	100.0%
Paxtang (B)	900	869	96.6%	880	97.8%	900	100.0%
Penbrook (B)	1,581	1,491	94.3%	0	0.0%	1,581	100.0%
Pillow (B)	317	317	100.0%	0	0.0%	317	100.0%
Reed (T)	327	280	85.6%	177	54.1%	327	100.0%
Royalton (B)	724	724	100.0%	724	100.0%	724	100.0%
Rush (T)	379	373	98.4%	0	0.0%	379	100.0%
South Hanover (T)	4,275	1,608	37.6%	417	9.8%	4,275	100.0%
Steelton (B)	2,867	2,832	98.8%	2,779	96.9%	2,867	100.0%
Susquehanna (T)	12,511	9,176	73.3%	1,858	14.9%	12,511	100.0%
Swatara (T)	12,223	8,653	70.8%	6,813	55.7%	12,223	100.0%
Upper Paxton (T)	3,823	2,888	75.5%	970	25.4%	3,823	100.0%
Washington (T)	2,464	1,894	76.9%	0	0.0%	2,464	100.0%
Wayne (T)	1,460	0	0.0%	0	0.0%	1,460	100.0%
West Hanover (T)	7,194	5,247	72.9%	0	0.0%	4,099	57.0%
Wiconisco (T)	1,112	861	77.4%	0	0.0%	1,112	100.0%
Williams (T)	1,093	842	77.0%	0	0.0%	1,093	100.0%
Williamstown (B)	966	887	91.8%	0	0.0%	966	100.0%
Dauphin County	**156,448**	**102,162**	**65.3%**	**46,759**	**29.9%**	**149,157**	**95.3%**

***Sources**: Dauphin County 2024; RS Means 2024; Pennsylvania Department of Transportation 2024*

Impacts on Critical Facilities

Potential losses of critical facilities caused by a HazMat incident are difficult to quantify. Potential losses may include inaccessibility, loss of service, contamination, and/or potential structural and content losses if an explosion occurs. The tables below summarize critical facilities and lifelines located within the HazMat buffer area. A total of 1,443 critical facilities are located in Dauphin County. Overall, 990 critical facilities are exposed to a roadway

hazardous material event, 811 critical facilities are exposed to a rail line hazardous material event, and 1,273 critical facilities are exposed to a SARA site hazardous material facility event, as shown in Table 4.3.6-9.

Table 4.3.6-9. Critical Facilities within Hazardous Materials Release Hazard Areas

Jurisdiction (B) = Borough (C) = City (T) = Township	Total Facilities in Hazard Area	Facilities within a Half-Mile of Major Roadways		Facilities within a Half-Mile of Railways		Facilities within the HazMat Facility Incident Zones	
		Count	Percent of Jurisdiction Total	Count	Percent of Jurisdiction Total	Count	Percent of Jurisdiction Total
Berrysburg (B)	5	5	100.0%	0	0.0%	5	100.0%
Conewago (T)	13	7	53.8%	0	0.0%	9	69.2%
Dauphin (B)	26	26	100.0%	26	100.0%	24	92.3%
Derry (T)	131	108	82.4%	59	45.0%	95	72.5%
East Hanover (T)	36	27	75.0%	0	0.0%	11	30.6%
Elizabethville (B)	12	12	100.0%	0	0.0%	10	83.3%
Gratz (B)	9	9	100.0%	0	0.0%	7	77.8%
Halifax (B)	9	9	100.0%	9	100.0%	8	88.9%
Halifax (T)	30	26	86.7%	12	40.0%	22	73.3%
Harrisburg City	392	236	60.2%	315	80.4%	280	71.4%
Highspire (B)	12	12	100.0%	12	100.0%	8	66.7%
Hummelstown (B)	35	27	77.1%	35	100.0%	26	74.3%
Jackson (T)	22	7	31.8%	0	0.0%	18	81.8%
Jefferson (T)	7	0	0.0%	0	0.0%	6	85.7%
Londonderry (T)	45	32	71.1%	22	48.9%	30	66.7%
Lower Paxton (T)	150	100	66.7%	1	0.7%	77	51.3%
Lower Swatara (T)	87	80	92.0%	43	49.4%	79	90.8%
Lykens (B)	18	18	100.0%	0	0.0%	16	88.9%
Lykens (T)	15	7	46.7%	0	0.0%	11	73.3%
Middle Paxton (T)	33	26	78.8%	8	24.2%	27	81.8%
Middletown (B)	47	46	97.9%	44	93.6%	28	59.6%
Mifflin (T)	8	6	75.0%	0	0.0%	6	75.0%
Millersburg (B)	26	26	100.0%	22	84.6%	17	65.4%

Jurisdiction (B) = Borough (C) = City (T) = Township	Total Facilities in Hazard Area	Facilities within a Half-Mile of Major Roadways		Facilities within a Half-Mile of Railways		Facilities within the HazMat Facility Incident Zones	
		Count	Percent of Jurisdiction Total	Count	Percent of Jurisdiction Total	Count	Percent of Jurisdiction Total
Paxtang (B)	11	11	100.0%	11	100.0%	9	81.8%
Penbrook (B)	17	17	100.0%	0	0.0%	5	29.4%
Pillow (B)	6	6	100.0%	0	0.0%	5	83.3%
Reed (T)	6	5	83.3%	2	33.3%	6	100.0%
Royalton (B)	11	11	100.0%	11	100.0%	9	81.8%
Rush (T)	5	5	100.0%	0	0.0%	5	100.0%
South Hanover (T)	24	14	58.3%	2	8.3%	20	83.3%
Steelton (B)	31	31	100.0%	31	100.0%	16	51.6%
Susquehanna (T)	118	87	73.7%	17	14.4%	73	61.9%
Swatara (T)	144	131	91.0%	96	66.7%	106	73.6%
Upper Paxton (T)	35	30	85.7%	6	17.1%	24	68.6%
Washington (T)	31	24	77.4%	0	0.0%	26	83.9%
Wayne (T)	8	0	0.0%	0	0.0%	8	100.0%
West Hanover (T)	43	38	88.4%	0	0.0%	18	41.9%
Wiconisco (T)	13	12	92.3%	0	0.0%	11	84.6%
Williams (T)	14	14	100.0%	0	0.0%	12	85.7%
Williamstown (B)	7	6	85.7%	0	0.0%	5	71.4%
Dauphin County	**1,692**	**1,294**	**76.5%**	**784**	**46.3%**	**1,178**	**69.6%**

Source: Dauphin County 2024; HIFLD 2020, 2023; Department of Human Services 2024; Pennsylvania Department of Transportation 2024

Of the 1,692 lifeline facilities in Dauphin County, 76.5% are located within a half-mile radius of major roadways, 46.3% are within a half-mile radius of railways, and 69.6% are located within the HazMat facility incident zones. The breakdown of exposure by lifeline categories is displayed in Table 4.3.6-10.

Table 4.3.6-10. Lifeline Facility Exposure to Hazardous Material Facility Buffer Areas

FEMA Lifeline Category	Total Number of Lifelines	Lifelines within a Half-Mile of Major Roadways	Lifelines within a Half-Mile of Railways	Lifelines within the HazMat Facility Incident Zones
Communications	44	33	23	43
Energy	6	6	4	6
Food, Hydration, Shelter	26	22	14	0
Hazardous Materials	240	217	140	25
Health and Medical	103	73	31	233
Safety and Security	620	463	309	103
Transportation	131	79	52	605
Water Systems	42	36	18	122
Other Critical Facilities	480	365	193	41
Dauphin County (Total)	**1,692**	**1,294**	**784**	**1,178**

Source: Dauphin County 2024; HIFLD 2020, 2023; Department of Human Services 2024; Pennsylvania Department of Transportation 2024

Impact on the Economy

If a significant HazMat incident occurs, not only would life, safety, and building stock be at risk, but the economy of Dauphin County would also be affected. A significant incident within an urban area may force businesses to close for an extended period of time because of contamination or because of direct damage caused by an explosion. Exact impacts on the economy are difficult to predict, given the uncertainty of the size and scope of potential incidents.

HazMat incidents can lead to closures of major transportation routes in Dauphin County. Closures of waterways, railroads, airports, and highways as a result of these incidents can hinder the delivery of goods and services. Potential impacts may be local, regional, or statewide depending on the magnitude of the event and the extent of disruptions to services. In 2019, the United States experienced nearly $1 billion in damages from HazMat transportation incidents (DOT 2019).

Impact on the Environment

Hazardous material sites near bodies of water are at high risk in the event of an extreme storm or if high water levels approach. Such events could release toxins, waste, and other pollutants into the water and greatly impact surrounding habitats. Many of these sites were intentionally constructed in locations believed to be removed from potential contamination or exposure-increasing factors, but floodplain boundary change increases the likelihood that water may reach hazardous material and waste sites.

Future Changes that May Impact Vulnerability

Understanding future changes that impact vulnerability in the County can assist in planning for future development and ensuring that appropriate mitigation, planning, and preparedness measures are in place. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development.
- Projected changes in population.
- Other identified conditions as relevant and appropriate, including the impacts of climate change.

Future Growth and Development

An increase in development and population can increase the likelihood of a HazMat incident. Future migration to larger jurisdictions may also increase the likelihood of an incident. The tables and hazard maps included in the jurisdictional annexes in this HMP contain additional information regarding the specific areas of development that would increase county vulnerability to the hazardous materials incident hazard.

Projected Changes in Population

Estimated population projections provided by The Center of Rural Pennsylvania indicate that Dauphin County's population will continue to increase into 2040, increasing the total population to approximately 296,766 persons (The Center of Rural Pennsylvania 2021). A higher density of residents could mean that more community members are impacted by HazMat incidents.

Effect of Climate Change on Vulnerability

As temperatures change, excessive heat on containers that contain HazMat may alter the material properties. In addition, hazardous substances stored at fixed locations in the floodplain may experience an increase in flood events due to the project changes in increased precipitation events, magnitude, and frequency.

Additional Data and Next Steps

The assessment above identifies vulnerable populations and potential structural and economic losses associated with this hazard of concern. The collection of additional information and actual loss data specific to the plan participants will further enhance Dauphin County's vulnerability assessment.

4.3.7 Flood, Flash Flood, Ice Jam

This section provides a profile and vulnerability assessment of the flood hazard in Dauphin County. Flooding is the temporary condition of partial or complete inundation of normally dry land, and it is the most frequent and costly of all natural hazards in Pennsylvania (PEMA 2020). For the purpose of this HMP update and as deemed appropriate by the Planning Team, riverine, flash, ice-jam, and stormwater/urban flooding are the main hazard types of concern for Dauphin County. These types of flooding are further discussed in the following sections.

4.3.7.1 Riverine Flooding

Riverine flooding occurs when a channel (i.e., rivers, creeks, streams, or ditches) receives too much water usually due to heavy rains, heavy thunderstorms, or snowmelt. The excess water flows over its banks and inundates low-lying areas. These floods usually can be slow or fast-rising and generally develop over a period of hours to days (FEMA 2005).

4.3.7.2 Flash Flooding

Flash flooding is usually a result of heavy localized precipitation falling in a short period (less than six hours over a given location, often along mountain streams and in urban areas where much of the ground is covered by impervious surfaces (PEMA 2020). It most often occurs during thunderstorm season in the summer. This type of flood can be deadly because it produces rapid rises in water levels and intense flow velocities, often leaving little time for warning and reaching peak flows within only a few minutes. The most severe conditions usually when compounded with seasonal or weather patterns, such as simultaneous snowmelt or saturated/frozen soil that cannot absorb additional precipitation (FEMA n.d.).

Ice-jam Flooding

Ice-jam flooding occurs when an accumulation of ice occurs on a river or waterway, becoming a natural dam to the water channel and restricting the flow of a body of water (USACE n.d.). It happens when warm temperatures and heavy rains cause rapid snow melt. The melting snow, combined with the heavy rain, causes frozen rivers to swell. The rising water breaks the ice layers into large chunks, which float downstream and often pile up near narrow passages (bridges and dams).

There are two different types of ice jams: freeze-up and breakup. Freeze-up jams occur in the early to mid-winter when floating ice may slow or stop due to a change in water slope as it reaches an obstruction to movement. Breakup jams occur during periods of thaw, generally in late winter and early spring. The ice cover breakup is usually associated with a rapid increase in runoff and corresponding river discharge caused by heavy rainfall, snowmelt, or warmer temperatures (FEMA 2018).

Stormwater/Urban Flooding

Stormwater/urban flooding occurs when heavy localized precipitation events produce flooding in areas other than delineated floodplains or along recognizable drainage channels (FEMA 2005). If local conditions cannot accommodate intense precipitation through a combination of infiltration and surface runoff, water may accumulate and cause flooding problems. During winter and spring, frozen ground and snow accumulations may contribute to inadequate drainage and localized ponding. Flooding issues of this nature generally occur in areas with flat gradients. Stormwater flooding generally increases with urbanization, which can speed up the accumulation of floodwaters due to increased impervious areas. Shallow street flooding can occur unless channels have been improved to account for increased flows (FEMA 1997).

Urban flooding is the flooding of streets, underpasses, low-lying areas, or storm drains (NOAA n.d.). A combination of urban development and inadequate drainage capacities can increase precipitation runoff, elevating the risk of flooding. Drainage systems bypass the natural filtration process by channeling surface water away from developed areas to surrounding streams as quickly as possible to avoid localized flooding. Urban flooding can be worsened by aging and inadequate infrastructure as well as the over-development of land. The growing number of extreme rainfall events that produce intense precipitation are resulting in increased urban flooding (UMD CDR 2018).

4.3.7.3 Location and Extent

Flooding in Pennsylvania is typically associated with abnormally high and intense rainfall amounts. It can also be caused by sudden snowmelt, landslides, or dam failures. In Pennsylvania, flooding usually occurs in the summer; however, it has occurred during the winter months as well.

Floodplains are found in lowland areas adjacent to rivers, streams, creeks, lakes, or other bodies of water that become inundated during a flood. The size of a floodplain depends on the recurrence interval of a given flood. A 1-percent annual chance floodplain (also referred to as the 100-year-floodplain) is smaller than the floodplain associated with a flood that has a 0.2-percent annual chance of occurring (PEMA 2023). Floodplain maps of each Dauphin County jurisdiction are available at the end of this profile. These maps show locations of both the 1-percent chance annual floodplain and the 0.2-percent chance annual floodplain.

Dauphin County's greatest flooding threat is along the Susquehanna River corridor. Other major waterways within the county include Clarks Creek, Mahantago Creek, Paxton Creek, Powells Creek, Rattling Creek, Spring Creek, Swatara Creek, and Wiconisco Creek.

Most municipalities in Dauphin County have flood-prone areas because they are located along streams, creeks, or lakes. In addition, community development of the floodplain has resulted in frequent flooding. For inland areas, excess water from snowmelt or rainfall accumulates and overflows onto stream banks and adjacent floodplains.

Table 4.3.7-1 lists total land areas within the 1-percent and 0.2-percent annual chance flood zones calculated via a spatial analysis referencing the 2012 Digital Flood Insurance Rate Map (DFIRM).

Table 4.3.7-1. Total Land Areas in the 1-percent and 0.2-percent Annual Chance Flood Zones (Acres)

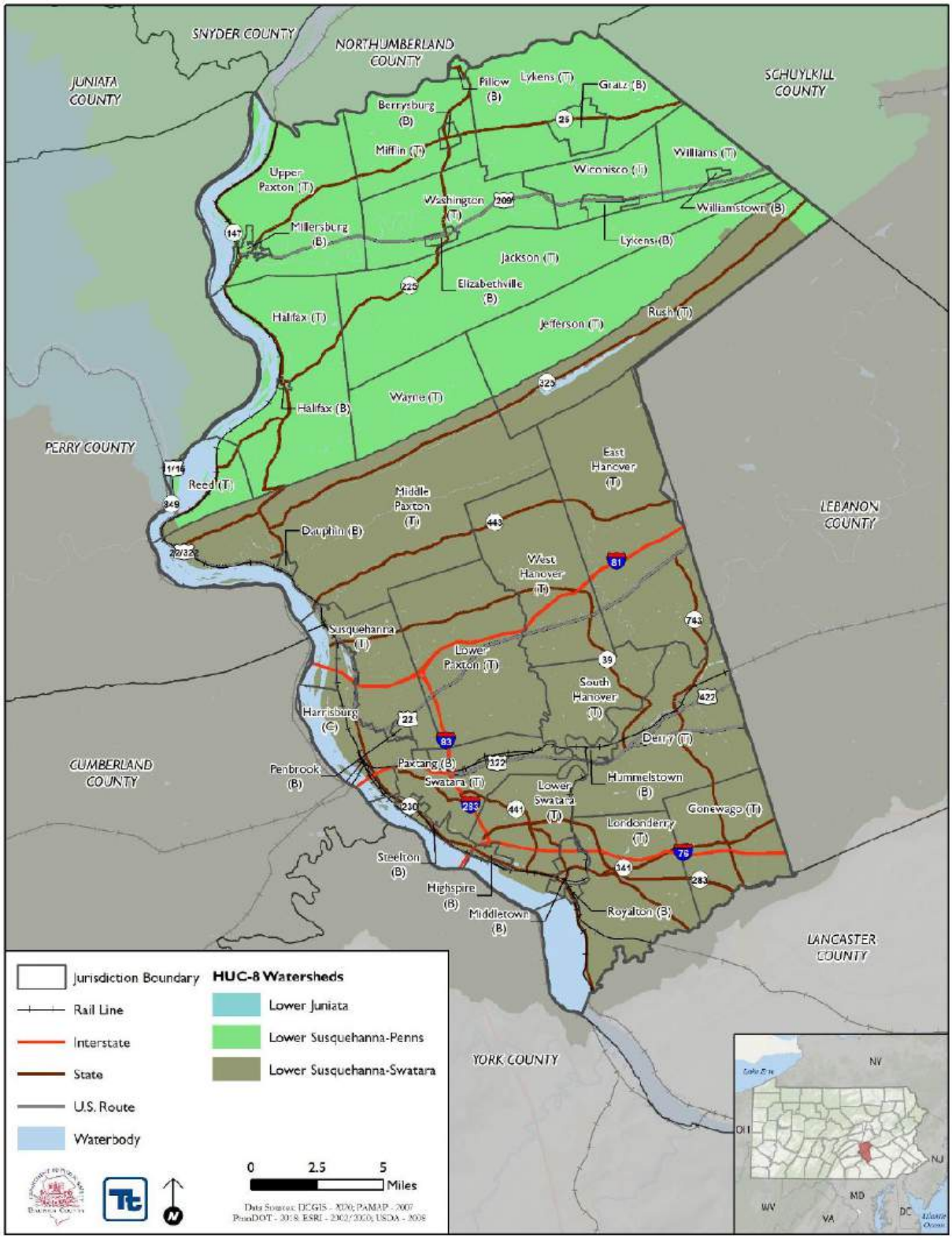
Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	NFIP-Participating Community	Total Area* (acres)	1% Flood Event Hazard Area		0.2% Flood Event Hazard Area	
			Area (acres)	% of Total	Area (acres)	% of Total
Berrysburg (B)	No	388	0	0.0%	0	0.0%
Conewago (T)	Yes	10,626	339	3.2%	339	3.2%
Dauphin (B)	Yes	267	15	5.8%	41	15.2%
Derry (T)	Yes	17,196	833	4.8%	971	5.6%
East Hanover (T)	Yes	25,331	833	3.3%	1,087	4.3%
Elizabethville (B)	Yes	349	3	0.8%	3	0.8%
Gratz (B)	Yes	1,924	103	5.3%	103	5.3%
Halifax (B)	Yes	112	6	5.4%	10	8.7%
Halifax (T)	Yes	17,653	1,032	5.8%	1,212	6.9%
Harrisburg (C)	Yes	5,113	1,215	23.8%	1,642	32.1%

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	NFIP-Participating Community	Total Area* (acres)	1% Flood Event Hazard Area		0.2% Flood Event Hazard Area	
			Area (acres)	% of Total	Area (acres)	% of Total
Highspire (B)	Yes	436	168	38.4%	307	70.3%
Hummelstown (B)	Yes	806	85	10.6%	98	12.1%
Jackson (T)	Yes	25,562	214	0.8%	221	0.9%
Jefferson (T)	Yes	15,587	451	2.9%	451	2.9%
Londonderry (T)	Yes	14,500	1,496	10.3%	1,931	13.3%
Lower Paxton (T)	Yes	17,921	943	5.3%	982	5.5%
Lower Swatara (T)	Yes	7,907	380	4.8%	1,127	14.3%
Lykens (B)	Yes	770	143	18.6%	238	30.9%
Lykens (T)	Yes	16,755	1,212	7.2%	1,212	7.2%
Middle Paxton (T)	Yes	34,659	1,528	4.4%	1,814	5.2%
Middletown (B)	Yes	1,291	233	18.0%	341	26.4%
Mifflin (T)	Yes	9,825	113	1.1%	132	1.3%
Millersburg (B)	Yes	477	63	13.3%	93	19.5%
Paxtang (B)	Yes	246	32	13.1%	37	15.0%
Penbrook (B)	Yes	273	0	0.0%	0	0.0%
Pillow (B)	Yes	331	70	21.2%	71	21.5%
Reed (T)	Yes	3,794	731	19.3%	951	25.1%
Royalton (B)	Yes	203	42	20.8%	77	38.2%
Rush (T)	Yes	14,766	519	3.5%	519	3.5%
South Hanover (T)	Yes	7,279	565	7.8%	654	9.0%
Steelton (B)	Yes	1,173	348	29.7%	484	41.2%
Susquehanna (T)	Yes	8,592	514	6.0%	688	8.0%
Swatara (T)	Yes	8,366	476	5.7%	570	6.8%
Upper Paxton (T)	Yes	16,380	1,403	8.6%	1,581	9.7%
Washington (T)	Yes	11,176	841	7.5%	841	7.5%
Wayne (T)	Yes	8,825	195	2.2%	195	2.2%
West Hanover (T)	Yes	14,697	290	2.0%	466	3.2%
Wiconisco (T)	Yes	6,205	394	6.4%	437	7.1%
Williams (T)	Yes	5,626	323	5.7%	323	5.7%
Williamstown (B)	Yes	164	12	7.4%	12	7.4%
Dauphin County		**333,552**	**18,163**	**5.4%**	**22,258**	**6.7%**

Source: Dauphin County 2023; FEMA 2012; (FEMA 2024)
Note: Excludes areas designated as water

In 2010, Dauphin County developed and implemented the "Dauphin County-Act 167-Stormwater Management Plan." The goals of this plan for the five regional planning areas are to maintain and/or restore six elements within Dauphin County, which are channel stability, groundwater recharge, base flows, flooding, water quality, and stream biology. Major watersheds within the County, as designated by PA DEP, are shown below.

Figure 4.3.7-1. Watersheds of Dauphin County (PA DEP)



Source: (Dauphin County 2021)

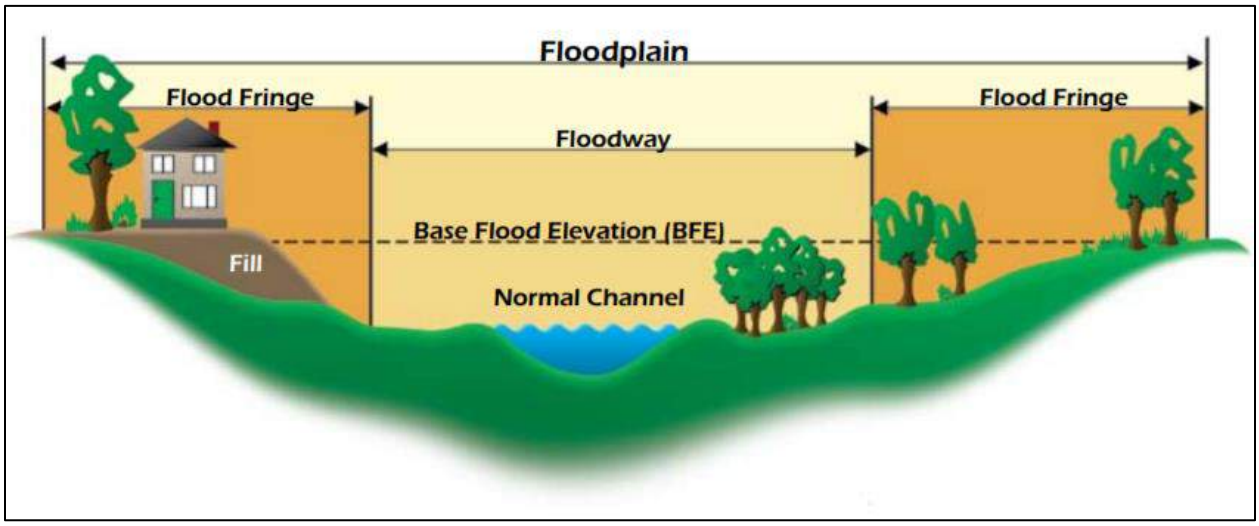
The 2012 FEMA Flood Insurance Study (FIS) for Dauphin County also documents the major flooding problems in the County. According to the report, flooding is a widespread problem across the county except for the Boroughs of Berrysburg and Penbrook. According to the FIS, these jurisdictions are not located within a Special Flood Hazard Area (FEMA 2012).

FEMA Regulatory Flood Zones

According to the Federal Emergency Management Agency (FEMA), flood hazard areas are defined as areas on a map shown to be inundated by a flood of a given magnitude. These areas are determined by using statistical analyses of records of river flow, storm tides, and rainfall; information obtained through consultation with the community; floodplain topographic surveys; and hydrologic and hydraulic analyses. Flood hazard areas are delineated on FEMA's Flood Insurance Rate Maps (FIRMs), which are official maps of a community on which the Federal Insurance and Mitigation Administration has delineated both Special Flood Hazard Areas (SFHA) and the risk premium zones applicable to the community. These maps identify SFHAs, the location of a specific property in relation to the SFHA, the Base Flood Elevation (BFE) (1-percent annual chance) at a specific site, the magnitude of a flood hazard within a specific area, undeveloped coastal barriers where flood insurance is not available, and regulatory floodways and floodplain boundaries (1-percent and 0.2-percent annual chance floodplain boundaries (FEMA 2005). Dauphin County's FIRMs can be accessed online via the FEMA Flood Map Service (FEMA n.d.).

The land area covered by floodwaters of the base flood is the SFHA on a FIRM. It is the area where the National Flood Insurance Program's (NFIP) floodplain management regulations must be enforced, and the area where mandatory purchase of flood insurance applies. This regulatory boundary is a convenient tool for assessing vulnerability and risk in flood-prone communities because many communities have maps showing the extent of the base flood and likely depths that will occur.

Figure 4.3.7-2 Schematic of Floodplain Characteristics



Source: FEMA 2009

The 1-percent annual chance flood is referred to as the base flood. As defined by NFIP, the BFE on a FIRM is the elevation of a base flood event or a flood that has a 1-percent chance of occurring in any given year. The BFE describes the exact elevation of the water that will result from a given discharge level, which is one of the most important factors used in estimating potential damage within a given area. A structure within a 1-percent annual chance floodplain has a 26-percent chance of undergoing flood damage during the term of a 30-year mortgage. The 1-percent annual chance floodplain is a regulatory standard used by federal agencies and most

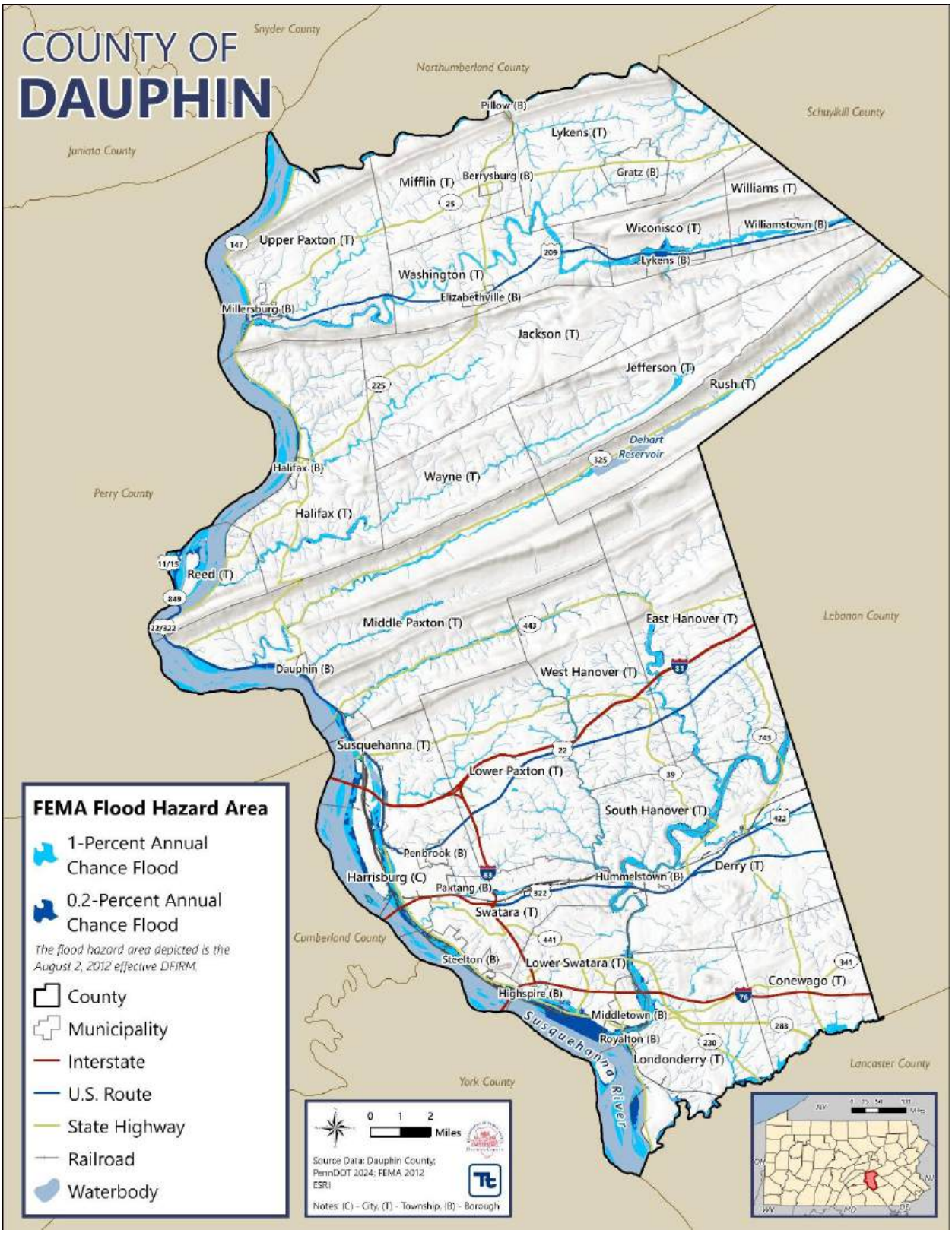
states to administer floodplain management programs. The 1-percent annual chance floodplain is used by NFIP as the basis for insurance requirements nationwide. FIRMs also depict 0.2-percent annual chance flood designations (FEMA 2005). Figure 4.3.7-2 depicts the SFHA, the BFE, the flood fringe, and the floodway areas of a floodplain for the 1-percent annual chance floodplain.

The SFHA serves as the primary regulatory boundary used by FEMA and Pennsylvania. Dauphin County's effective map date is August 2, 2012. Digitized FIRMs (DFIRMs), Flood Risk Products, FIRMs, and other flood hazard information can be used to identify the expected spatial extent of flooding from a 1-percent and 0.2-percent annual chance event. The FEMA Flood Risk Database was considered the best available data at the time the draft Plan was developed. Figure 4.3.7-3 illustrates the land area located within the 1-percent and 0.2-percent annual flood zones. It maps the Dauphin County floodplains as depicted on the Risk Map products in the Flood Risk Database used in the vulnerability assessment. Maps of each municipality's flood zones are included at the end of this profile. While the FIRMs provide a credible source to document the extent and location of the flood hazard, there are limitations to the accuracy of the data reflected on these maps. As such, it is noted that FIRMs are based on the existing hydrology conditions at the time of the map's preparation. FIRMs are not set up to account for the possible changes in hydrology that can occur over time.

At the time this plan was written, the 2012 DFIRMs were considered the best available and were used for the risk analysis.

Figure 4.3.7-3 illustrates NFIP flood zones in Dauphin County. Maps of each municipality's flood zones are shown at the end of this profile.

Figure 4.3.7-3. FEMA Flood Hazard Areas in Dauphin County, PA



While the FIRMs provide a credible source to document the extent and location of the flood hazard, the accuracy of data reflected on these maps has limitations. Notably, FIRMs are based on existing hydrological conditions at the time of map preparation. FIRMs are not set up to account for possible changes in hydrology over time.

Flood Insurance Study

In addition to FIRMs and DFIRMs, FEMA also provides FIS of entire counties and individual jurisdictions. These studies aid in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. They are narrative reports of countywide flood hazards, including descriptions of flood areas studied and engineered methods used, principal flood problems, flood protection measures, and graphic profiles of flood sources (FEMA 2016). The countywide FIS for Dauphin County was last completed in 2012, at the same time as the DFIRM revisions.

Township of Derry: The principal sources of flooding in Derry are Swatara Creek and Spring Creek. Considerable damage to the township was caused by the floods of 1935, 1965, and 1972.

Township of East Hanover: Bow Creek, Manada Creek, Swatara Creek, and their tributaries are the principal sources of flooding in the township, with Swatara Creek being the most serious source of flooding. The most severe flooding in the township is generally attributed to rainfall, but snowmelt and moving ice have compounded floods. Tropical storms have also been the cause of major floods in the late summer and fall.

Borough of Halifax: The principal source of flooding in the Borough is the Susquehanna River. Major flooding occurred in 1886, 1936, and 1972. The flood of 1972 was the worst with river flow downstream measuring 1,020,000 cubic feet per second (cfs).

Township of Halifax: Flooding of small tributaries from local thunderstorms typically affects Armstrong Creek, Gurdy Run, and Powells Creek. Larger, area-wide storms have resulted in flooding on the Susquehanna River. In the past 100 years, four major floods have occurred on the Susquehanna River in the reach between the Juniata River and Penns Creek, which includes Halifax.

City of Harrisburg: Principal sources of flooding are Paxton Creek and the Susquehanna River. The Susquehanna River will reach flood stage on average of about every 4 years in Harrisburg; serious flooding is much less frequent. In the southwest portion of the city, Spring Creek is also a source of flooding problems.

Borough of Highspire: The principal source of flooding is the Susquehanna River. Portions of the borough also experience flooding from Burd Run. The Susquehanna River will reach flood stage on average about every 4 years in Highspire; serious flooding is much less frequent.

Borough of Hummelstown: Swatara Creek is the principal source of flooding in the low-lying areas in the borough.

Township of Londonderry: The Susquehanna River and Swatara Creek are the principal sources of flooding to the township. Conewago Creek East and Iron Run have also caused flooding problems. The flood of 1972, which resulted from Tropical Storm Agnes, damaged roads, bridges, and culverts.

Township of Lower Paxton: Sources of flooding to the township have been noted from Beaver Creek, Nyes Run, the tributary leading to Paxton Creek, and the tributaries to Goose Valley Run and Spring Creek. Low-lying areas are the most susceptible, and notable floods occurred in 1936, 1972, and 1975. Common flood damage included damage to the sewage pumping station structure, roadway facilities, and structures at the southeastern end of Nyes Run.

Township of Lower Swatara: The principal sources of flooding in the township are the Susquehanna River and Swatara Creek. Burd Run has also caused flooding problems in the past. Severe flooding of the Susquehanna River occurred in March 1936 and June 1972.

Borough of Lykens: The principal sources of flooding in the borough are the Rattling and Wiconisco Creeks. The flood of 1972 destroyed six highway bridges and their foundations, eroded stream banks, and, coupled with heavy stream debris and extensive sedimentation, caused blockage of the stream channel at the Edwards and Market Street bridges. In the years 1905, 1927, 1936, 1946, 1955, and 1976 other serious flooding occurred, and stream channel blockage was reported during some of these storms.

Township of Middle Paxton: The principal source of flooding in the township is the Susquehanna River. In 1972, flood waters caused extensive damage to permanent and summer homes, severe runoff producing high flows on local streams and tributaries, and disruption of utility services and transportation facilities.

Borough of Middletown: The principal sources of flooding in the borough are the Susquehanna River and Swatara Creek. The Susquehanna Valley suffered damage and loss to agriculture, roads, and water and sewage treatment plants in the flood of September 1975.

Borough of Millersburg: The principal source of flooding in the borough is the Susquehanna River. Major flooding occurred in 1889, 1936, and 1972. In the flood of 1972, several roads were washed out, utility services were disrupted, and several residential homes were damaged on the west side of town.

Borough of Paxtang: Severe flooding is attributed to rainfall and has been compounded by snowmelt and moving ice. Flooding problems in the past have been increased by the Derry Street Bridge and the Conrail box culvert and embankment. The embankment acts as a storage dam retarding flow and causing severe upstream flooding.

Borough of Pillow: The floodplains of Mahantango Creek are commonly the location of severe flooding in the borough.

Township of Reed: The principal sources of flooding in the township are the Juniata River and the Susquehanna River. The flood of June 1972 resulted in heavy damage to residential and commercial land on Duncan Island. The flood made a segment of Route 147 between Clarks Ferry Bridge and Inglenook impassable and flooded the basements and first floors of homes in this area. Previous major floods also occurred in 1889 and 1936.

Township of South Hanover: The principal source of flooding for the township is Swatara Creek. Beaver, Kellock, and Manada Creeks are also sources of flooding because of backwater from Swatara Creek.

Borough of Steelton: The principal source of flooding for the borough is the Susquehanna River. Notable floods occurred in June 1889 and May 1894.

Township of Susquehanna: The principal source of flooding, primarily in the western portion of the Township, is the Susquehanna River. A minor flooding source is the tributary to Paxton Creek. Previous major floods in the township occurred in March 1902, March 1936, and June 1972.

Township of Swatara: The principal sources of flooding in the township are the Susquehanna River; and Swatara Creek. Beaver Creek, Spring Creek, and the West Branch Spring Creek. Their tributaries have also contributed to flooding. The history of flooding along the streams within the township indicates that floods may be experienced in any season of the year; however, the possibility of flooding is greatly reduced during the winter months. Although most severe floods have been attributed to rainfall alone, the spring floods have been

compounded by melting snow and moving ice. The major floods in late summer and fall have been associated with tropical storms moving up the Atlantic coastline.

Township of Upper Paxton: The principal source of flooding in the township is the Susquehanna River. Mahantango Creek and Wiconisco Creek also contribute to flooding problems. The flood of 1972 caused severe runoff conditions producing high flow on local streams and tributaries. A residential development near the Wiconisco Creek banks destroyed several homes as the homes were washed from their foundations and destroyed. Throughout the township, soil erosion and crop damage occurred, contributing to agricultural losses. In the Lenkerville section, serious damage to residential and commercial structures occurred when backwater from the Susquehanna River combined with Wiconisco Creek.

Township of Washington: The principal source of flooding for the township is Wiconisco Creek.

Township of West Hanover: The principal source of flooding in the township is high groundwater and not surface flooding. Beaver Creek has been the cause of major flooding in the vicinity of Devonshire Heights Road, with minor surface flooding on other streams. Previous major floods occurred in March 1936, June 1972, and September 1975. The flood in June 1972 caused the greatest damage with interruption of utilities, basement flooding, and inundation of farmland.

Township of Wiconisco: Notable floods affecting the township occurred in 1905, 1927, 1936, 1946, 1955, 1972, 1975, and 1976. The flood of 1972 created stream flow that destroyed highway bridges and foundations. Also, during past flooding events, stormwater runoff exceeded bank capacity on the two creeks in the township, creating flooding and backwater ponding along the light, sporadic developments near the creeks.

Ice Jam Hazard Areas

Ice jams are common in the northeastern United States, and the Commonwealth of Pennsylvania is not an exception. Ice jam floods occur on rivers that are totally or partially frozen. A rise in stream stage will break up a frozen river and create ice flows that can pile up on channel obstructions such as shallow riffles, log jams, or bridge piers. The jammed ice creates a dam across the channel over which the water/ice mixture continues to flow, allowing for more jamming to occur.

The ice jam database, maintained by the Ice Engineering Group at the USACE Cold Regions Research and Engineering Laboratory (CRREL), currently consists of over 26,000 records from across the United States. According to the USACE-CRREL, Dauphin County underwent or may have been impacted by 34 historical ice jam incidents between 1780 and 2020 (USACE 2021). Ice jams have formed along the Susquehanna River, Juniata River, East Mahantango Creek, and Stony Creek. Historical events are further mentioned in the "Previous Occurrences" section of this hazard profile.

4.3.7.4 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 diseases are spread by moving or stagnant floodwaters. Most property damage results from inundation by sediment-filled water. A large amount of rainfall over a short period of time can result in flash floods, and the American Meteorological Society classifies rainfall intensity into three different categories – light rain, moderate rain, and heavy rain (PEMA 2023).

Rainfall Intensity	Hourly Rainfall Rates
Light Rain	0.01 to 0.10 inches/hour
Moderate Rain	0.11 to 0.30 inches/hour
Heavy Rain	> 0.30 inches/hour

Several factors determine the severity of floods, including intensity and duration, topography, ground cover, and rate of snowmelt. Water runoff is greater in areas with steep slopes and little or no vegetative ground cover. Many areas in Pennsylvania have relatively steep slopes that enable quick surface water runoff. Most storms track from west to east; however, some originate in the Great Lakes or the Atlantic Ocean (PEMA 2020).

Another key factor in determining the magnitude of a flood is the affected land's ability to retain water. One element is the size of rivers and streams in an area, but an equally important factor is the land's absorbency. When it rains, the soil acts as a sponge. When the land is saturated or frozen, infiltration into the ground slows, and any more water that accumulates must flow as runoff (PEMA 2018).

In the case of riverine or flash flooding, once a river reaches flood stage, the flood extent or severity categories used by the National Weather Service (NWS) include minor flooding, moderate flooding, and major flooding. Each category has a definition based on property damage and public threats.

Table 4.3.7-2 NWS Categories for Riverine/Flash Flooding

Flooding Category	Definition
Action Stage	The stage, when reached by a rising stream, lake, or reservoir, represents the level where the NWS or a partner/user needs to take some type of mitigation action in preparation for possible significant hydrologic activity.
Minor Flooding	Flooding that incurs minimal or no property damage but possibly some public threat or inconvenience.
Moderate Flooding	Flooding results in some inundation of structures and roads near streams. Some evacuations of people and/or transfer of property to higher elevations are necessary.
Major Flooding	When there is extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations are necessary.
Record Flooding	Flooding that equals or exceeds the highest stage or discharge at a given site during the period of record-keeping.

Source: (NOAA n.d.)

In Dauphin 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 dense snowpacks throughout contributing watersheds, although the snowpack is generally moderate during most winters. Winter floods also have resulted from runoff of intense rainfall on frozen ground, and local flooding has been exacerbated by ice jams in streams and creeks.

Summer floods have occurred from intense rainfall on dry hard-packed or previously saturated soils. Summer thunderstorms deposit large quantities of rainfall over a short period of time and have also produced flash flooding. In addition, the county has been experiencing more intense rainfall from tropical storms and hurricanes in late summer and early fall.

4.3.7.5 Past Occurrence

Dauphin County has a long history of flooding events. While flooding is often localized to streets and small neighborhoods, the county has historically experienced periodic storm events that affect multiple communities over a large area. Past building practices often resulted in homes being constructed in the FEMA-designated floodplains, exacerbating flooding problems within certain communities.

Water Level Data

A hydrograph shows how a water level changes over time at a specific location to enable a review of historic water levels, which are useful in floodplain management planning. In Dauphin County, there are four stream gages. These forecast hydrographs are useful to reference when flooding is expected or to determine the observed water level for the past few days. A gage at Harrisburg (HARP1) monitors hydrologic conditions on the Susquehanna River. A gage at Dalmatia (DALP1) monitors conditions on East Mahantango Creek. A gauge at Glenwood (GLWP1) monitors conditions on Paxton Creek. Two gages at Hershey (HERP1) and Middletown (MTLP1) monitor conditions on Swatara Creek. Two gages at Falmouth (FALP1) and Bellarie (CCBP1) monitor conditions on Conewago Creek. The NWS uses flood categories as forecast points that describe the severity of flood impacts in the river/stream reach. Table 4.3.7-3 summarizes the flood categories in feet at recorded gages. Table 4.3.7-4 summarizes the top historic crests at recorded locations. They also display the flood of record (or the highest recorded water level) for the specific gauge. Below are the identified flood stages at the three gage sites while Table 4.3.7-4 summarizes some of the historic crests at each.

Table 4.3.7-3. Flood Categories at the Harrisburg (HARP1), Hershey (HERP1), and Middletown (MTLP1) Gauges

Flood Category	HARP1: Harrisburg (feet)	HERP1: Hershey (feet)	MTLP1: Middletown (feet)
Major Flood Stage	23	14	18
Moderate Flood Stage	20	10	15
Flood Stage	17	7	11
Action Stage	11	6	10

Source: (NOAA/OWP 2024)

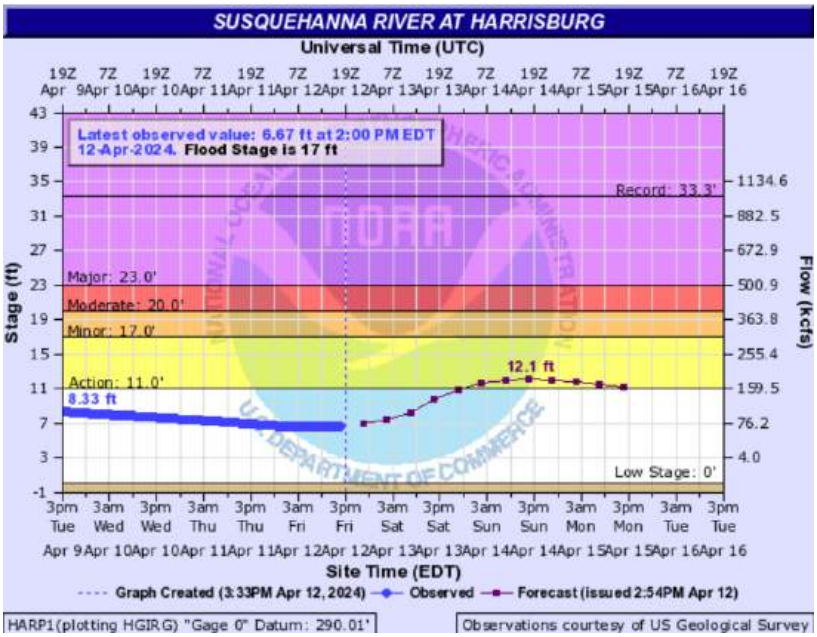
Table 4.3.7-4. Historic Crests at the Harrisburg (HARP1), Dalmatia (DALP1), Hershey (HERP1), and Middletown (MTLP1) Gauges

Susquehanna River at Harrisburg		East Mahantango Creek at Dalmatia		Swatara Creek at Hershey		Swatara Creek at Middletown	
Feet	*Date*	*Feet*	*Date*	*Feet*	*Date*	*Feet*	*Date*
33.27	June 24, /1972	**26.62**	June 22, 1972	**26.80**	September 8, 2011	**23.29**	09/09/2011
29.23	March 19, 1936	**17.47**	January 19, 1996	**17.08**	July 26, 2018	**16.36**	03/12/2011
26.80	June 2, 1889	–	–	**16.12**	June 29, /2006	**16.19**	07/26/2018
25.70	May 22, 1894	–	–	**15.36**	September 27, 1975	**13.68**	12/26/2020
25.17	September 9, 2011	–	–	**14.43**	January 25, 1979	**13.46**	September 3, /2021
25.08	January 20, 1996	–	–	**14.30**	January 20, 1996	**13.37**	February 5, 2022
24.66	January 21, 1996	–	–	**14.27**	September 19, 2004	**12.67**	March 8, 2011
24.40	September 19, 2004	–	–	**14.01**	September 3, 2021	**12.63**	April 18, 2011
23.81	September 27, 1975	–	–	**10.97**	March 12, 2011	**11.81**	January 14, 2014
21.80	May 29, 1946	–	–	**10.33**	November 29, 1993	**11.76**	September 12, 2018
21.51	March 12, 1964	–	–	**10.24**	January 21, 1996	**11.05**	December 19, 2023

Source: (NOAA/OWP 2024)

To illustrate the data available, an example of these gage readings is provided in Figure 4.3.7-4. The hydrograph reflects data collected at the *Susquehanna River at Harrisburg* gage, as captured on April 12, 2024, and it indicates the high-water level of record, Action Stage, Minor Stage, Moderate Stage, and Major Stage. In addition to these flood stages, these hydrographs also display the actual water height recorded in real time. This information is useful for local officials, emergency managers, and citizens to inform preparedness and response planning and activities to reduce potential impacts of flooding.

Figure 4.3.7-4 Flood Hydrograph for Susquehanna River at Harrisburg



Source: (NOAA/OWP 2024)

Between 1954 and September 2024, Dauphin County was included in eight major disaster declarations and one State Emergency Proclamation (EM), all of which are summarized in Table 4.3.7-5 below.

Table 4.3.7-5. Flood-Related FEMA Disaster Declarations for Dauphin County, 1954 to 2024*

Declaration Number	Event Beginning Date	Event End Date	Declaration Date	Incident Type	Details
DR-340-PA	June 23, 1972	June 23, 1972	June 23, 1972	Flood	Tropical Storm Agnes
DR-485-PA	September 26, 1975	September 26, 1975	September 26, 1975	Flood	Severe Storms, Heavy Rains & Flooding
DR-523-PA	October 20, 1976	October 20, 1976	October 20, 1976	Flood	Severe Storms & Flooding
DR-1093-PA	January 19, 1996	February 1, 1996	January 21, 1996	Flood	Severe Storms & Flooding
DR-1298-PA	September 6, 1999	September 7, 1999	September 22, 1999	Flood	Tropical Depression Dennis
DR-1555-PA	September 8, 2004	September 9, 2004	September 19, 2004	Severe Storm	Severe Storms & Flooding Associated With Tropical Depression Frances
DR-1649-PA	June 23, 2006	July 10, 2006	June 30, 2006	Severe Storm	Severe Storms, Flooding, & Mudslides
EM-3340-PA	September 3, 2011	October 15, 2011	September 8, 2011	Flood	Remnants Of Tropical Storm Lee
DR-4030-PA	September 3, 2011	October 15, 2011	September 12, 2011	Flood	Tropical Storm Lee

Source: (FEMA 2024)
*Note: * as of December 19, 2024*

According to the National Centers for Environmental Information (NCEI) Storm Events Database, Dauphin County experienced 79 flood and flash flood events between January 1, 1996, and September 30, 2024. Table 4.3.7-6 summarizes these previous occurrences which together, resulted in $150.7 million in property damage.

Table 4.3.7-6 NCEI Flood, Flash Flood-Related Reports between 1996 and 2024

Event Type	Total Number of Flood, Flash Flood Events Reported by NCEI				
	(1996-2024) [1]	*(2020-2024)* [2]	*Estimated Property Damage*	*Fatalities*	*Injuries*
Flood	35	0	$150,000,000	5	0
Flash Flood	44	9	$700,000	0	0

Source: (NOAA/NCEI 2024)
Note: storm event history is valid through September 30, 2024

Based on all sources researched, known flooding events resulting in property damage that affected Dauphin County and its municipalities since 1996 are listed in Table 4.3.7-7. With flood documentation for the Commonwealth of Pennsylvania so extensive, not all sources have been identified or researched. Therefore, Table 4.3.7-7 may not include all events that have occurred throughout the county. It does, however, include all flood-related storm reports logged between January 1, 2020, and November 20, 2024. This includes 64 reports of "Rain", two reports of "Heavy Rain", five "Flood" reports, and 17 "Flash Flood" storm reports (IEM 2024).

Table 4.3.7-7. Flooding Events between 1996 and 2024 in Dauphin County

Date of Event	Event Type	Location	FEMA Declaration Number	County Designated?	Losses/Impacts
January 19, 1996	Flood	Countywide	DR-1093	Yes	No data provided.
October 8, 1996	Flash Flood	Steelton (B)	N/A	N/A	Route 441 was flooded and closed in Swatara Township near Steelton south of Harrisburg.
December 13, 1996	Flash Flood	Countywide	N/A	N/A	No data provided.
January 8, 1998	Flash Flood	Countywide	N/A	N/A	No data provided.
May 5, 1998	Flash Flood	South Portion	N/A	N/A	Nearly 2 inches of rain fell in little more than an hour, flooding roads and small streams.
June 13, 1998	Flash Flood	Hershey	N/A	N/A	2.5 inches of rain fell in 45 minutes, flooding roads and small streams in the Hershey area.
June 23, 1998	Flash Flood	Harrisburg Area	N/A	N/A	Heavy rains flooded roadways and small streams in the Harrisburg area.
September 6, 1999	Flash Flood	West End	DR-1298-PA	Yes	$50,000 in property damage was reported. Heavy rain from Dennis fell across the area, closing roads and flooding basements. In Swatara Township, up to 8 feet of water was reported and one neighborhood was evacuated.
September 16, 1999	Flash Flood	Countywide	N/A	N/A	$30,000 in property damage was reported.
September 19, 2000	Flash Flood	Borough of Middletown	N/A	N/A	$10,000 in property damage was reported. Heavy rains caused small streams and poor drainage.
December 17, 2000	Flash Flood	Countywide	N/A	N/A	No data provided.
July 25, 2001	Flash Flood	City of Harrisburg	N/A	N/A	Widespread urban flooding was reported with many roads closed in Harrisburg. Over 3 inches of rain was reported over portions of the Harrisburg metropolitan area.
August 16, 2003	Flash Flood	City of Harrisburg	N/A	N/A	Heavy rains caused flash flooding in Dauphin County. Widespread reports of flooded roads and basements were received. One water rescue was performed, and a warehouse roof collapsed from the weight of water. Four vehicles were stranded in the intersection of 18th and Derry streets, where over 4 feet of water filled the roadway. Four homes were evacuated because of flooding.
September 23, 2003	Flood, Flash Flood	Harrisburg Area	N/A	N/A	Heavy rain caused flooding in Harrisburg, Halifax, and Elizabethville. Two water rescues were performed. A spotter at Dehart Dam in northern Dauphin County reported 4.80 inches of rain overnight.
September 23, 2003	Flood	Countywide	N/A	N/A	Heavy rainfall caused flash flooding across much of Dauphin County shortly after midnight on the night of the 23rd. Although flash flooding ended, high water and flooding continued into the early afternoon. High-water closed roads, along with the closure of the Dehart Dam Bridge, about 3 miles east of the Route 325/225 interchange. Clarks Creek also continued to overflow its banks into the early afternoon.
December 11, 2003	Flood	Hershey, Borough of Middletown	N/A	N/A	Heavy rainfall caused Swatara Creek to exceed the flood stage at Hershey and Middletown.
December 12, 2003	Flood	Countywide	N/A	N/A	Heavy rainfall caused Swatara Creek at Middletown to exceed the flood stage. The creek rose above its flood stage of 11.0 feet at 9:00 AM EST on the 12th, crested at 11.4 feet at 12:00 PM EST on the 12th, and then fell back below the flood stage at 3:00 PM EST on the 12th.

Date of Event	Event Type	Location	FEMA Declaration Number	County Designated?	Losses/Impacts
July 14, 2004	Flash Flood	Borough of Steelton	N/A	N/A	Heavy rain from thunderstorms caused flash flooding in Dauphin County, especially in Swatara Township. Flooding occurred behind a local shopping mall, and a road was washed out in Steelton.
July 22, 2004	Flash Flood	Colonial Park	N/A	N/A	Thunderstorms with heavy rain produced flash flooding in Linglestown and the Colonial Park area of Dauphin County. Multiple vehicles were stranded in flood waters in Lower Paxton Township, especially near Colonial Park. Several roads were also closed because of high water.
July 23, 2004	Flash Flood	Linglestown	N/A	N/A	Heavy rain produced flash flooding in Linglestown, Colonial Park, and Harrisburg. Flooding closed several roads there were many reports of flooded basements.
August 1, 2004	Flash Flood	Borough of Highspire	N/A	N/A	Heavy rain caused flash flooding in the Highspire and Middletown areas of southern Dauphin County, resulting in the closing of several roads. One house sustained flood damage in Lower Swatara Township.
September 18, 2004 – October 1, 2004	Tropical Depression, Flood	South Portion	DR-1557-PA	Yes	Tropical Depression Ivan impacted all of Pennsylvania. In Dauphin County, heavy rain caused the Susquehanna River and Swatara Creek to rise.
January 15, 2005	Flood	Hershey, Borough of Middletown	N/A	N/A	Heavy rain caused flooding along Swatara Creek at Hershey and Middletown.
March 28, 2005 – March 30, 2005	Flood	South Portion	N/A	N/A	Heavy rain caused the Susquehanna River at Harrisburg and Swatara Creek at Middletown and Hershey to flood. This event was an on-off-on event over a week.
April 2, 2005	Flood	Countywide	N/A	N/A	No data provided.
April 3, 2005	Flood	Countywide	N/A	N/A	Heavy rain caused Swatara Creek at Hershey to flood. The creek exceeded the flood stage of 7 feet at 03:00 EST on the 3rd, crested at 8.01 feet at 22:15 EST on the 3rd, and then fell back below the flood stage at 11:00 EST on the 4th.
June 25, 2006 – June 28, 2006	Severe Storms, Flash Flood, Flooding, Mudslides	Countywide	DR-1649-PA	Yes	Heavy rain caused flash flooding throughout Dauphin County over 3 days. Especially affected was Middle Paxton Township where Route 441 was closed at several interchanges because of flooding from Fishing Creek. Heavy rain caused Swatara Creek at Middletown to flood.
November 16, 2006	Flash Flood	Harrisburg Area	N/A	N/A	Heavy rain caused flash flooding in Dauphin County and flooding closed Route 230 for over 4 hours. A strong cold front crossing the region triggered widespread severe weather and flash flooding across Central Pennsylvania during the afternoon.

Date of Event	Event Type	Location	FEMA Declaration Number	County Designated?	Losses/Impacts
June 1, 2007	Flash Flood	Hershey	N/A	N/A	$500,000 in property damage was reported. Heavy rain produced by slow-moving thunderstorms caused flash flooding in Dauphin County in Derry Township, mainly south of Hershey. Seven residential structures were affected. Two homes sustained major damage, while another five sustained minor damage. Five additional reports of flooded basements were received. In addition, seven vehicle rescues were performed. A state of emergency was declared in Derry Township by local emergency management officials.
May 2, 2010	Flash Flood	City of Harrisburg	N/A	N/A	Heavy rain resulted in flash flooding over portions of the City of Harrisburg. Several roads were flooded and closed, including Cameron Street, Berryhill Road, Arsenal Boulevard, Locust Lane, and Elmerton Avenue. Four water rescues were performed when vehicles became stranded in flood waters.
August 12, 2010	Flash Flood	City of Harrisburg	N/A	N/A	$10,000 in property damage was reported. Heavy thunderstorms produced significant flash flooding throughout the City of Harrisburg. The flooding closed multiple roads, including a portion of the I-283/83 interchange. The urbanized areas of the Harrisburg metro area bore the brunt of the flooding, mainly because of the intensity of the rain and because the concrete and other impervious surfaces did not allow water to soak into the ground. There were numerous road closures because of high water and several people were rescued from stranded vehicles. High water also forced the evacuation of 40 residents on 19th and Rollerston Streets.
March 10, 2011	Flood	Countywide	N/A	N/A	Numerous road closures resulted from flooding of low-lying areas and small streams and creeks overflowing their banks. Multiple water rescues and isolated evacuations were reported along with one drowning fatality.
March 11, 2011	Flood	Hoernerstown, Olmsted AFB, Speeceville	N/A	N/A	Swatara Creek at Hershey crested at 10.97 feet on March 12th at 3 am. This is categorized as a moderate flood. At 10.0 feet a few homes adjacent to the creek upstream of the Route 39 bridge flood. Swatara Creek at Middleton crested at an estimated 15.1 feet on March 12th at approximately 8 am. This is categorized as a moderate flood. At 14.0 feet residences are affected by high water on both banks upstream of the Vine Street Bridge. The Susquehanna River at Harrisburg crested at 20.09 feet on March 12th at 915 am. This is characterized as a moderate flood. At 19.0 feet a number of homes in West Fairview, Dauphin, and Harrisburg flood. At 17.0 feet basements of residences and businesses on both banks flood. The parking lot on City Island begins to take on water.
April 16, 2011	Flash Flood	Pleasant Hills	N/A	N/A	Very heavy, short-duration rainfall resulted in small-stream flooding and several road closures near Linglestown. A dynamic area of low pressure and trailing frontal zone moved across southeastern Pennsylvania during the late afternoon and evening, producing intense lines of heavy showers and thunderstorms. Deep moisture and very strong wind fields ahead of the frontal system produced torrential rains, flash flooding, and localized wind damage across the Lower Susquehanna Valley.
April 28, 2011	Flash Flood	Piketown	N/A	N/A	Above-normal soil moisture from recent heavy rains combined with high stream-flows and intense short-duration rainfall contributed to flash flooding. Flooding was reported on Route 443.

Date of Event	Event Type	Location	FEMA Declaration Number	County Designated?	Losses/Impacts
August 6, 2011	Flash Flood	Estherton	N/A	N/A	Excessive rainfall rates between 1-2 inches per hour were observed and resulted in localized rainfall amounts of 3-7 inches in a few hours impacting south-central Dauphin County. The flash flooding closed numerous roads and caused extensive basement flooding. A small cluster of regenerating thunderstorms produced localized flash flooding in the vicinity of the Harrisburg Metro area east-southeast along and north of Interstate 76 toward Mt. Gretna in southern Lebanon County.
September 3, 2011 – October 15, 2011	Tropical Storm, Flood	Countywide	DR-4030-PA EM-3340-PA	Yes Yes	$150,000,000 in property damage and $700,000 in crop damage were reported. Heavy rainfall from the remnants of Tropical Storm Lee produced widespread flooding, flash flooding, and river flooding mainly near and to the east of the Susquehanna Valley from September 4-10. Several locations in the Susquehanna Basin came close to records set by Hurricane Agnes (June 1972) and Hershey set new floods of record. Flooding along Swatara Creek resulted in property damage and several deaths. The rainfall associated with the remnants of Lee produced the 4th largest flood of record in the Mid-Atlantic Region. The five-day storm rainfall totals for September 5 to 9 were generally in the 5-8 inch range over the mid-section of central Pennsylvania and the 8-12 inch range in the Susquehanna Valley region. There were local amounts reported more than 15 inches east of the Susquehanna River. The local climate sites in Harrisburg (KMDT) reported 13.44 inches. On September 7, 2011, both KMDT sites set an all-time daily (24-hour) rainfall for September at 7.71 inches.
June 22, 2012	Flash Flood	Borough of Middletown	N/A	N/A	Heavy thunderstorms produced localized flash flooding in the Middletown area. A police vehicle was trapped in flooded waters below an underpass. Minor flooding persisted into the late evening across southeastern Dauphin County near the Dauphin County line, where radar estimated rainfall was between 3-4 inches in four hours.
June 27, 2013	Flash Flood	Borough of Penbrook	N/A	N/A	Heavy rains caused urbanized flash flooding around Harrisburg and Penbrook. Further north, flash flooding closed a section of Route 209 in Upper Paxton Township.
October 10, 2013	Flood	Countywide	N/A	N/A	Excessive rainfall between 5-10 inches produced widespread significant flooding causing multiple road closures. Spring Creek came out of its banks and caused flooding and road closures in Swatara Township and Paxtang Borough. Portions of the Farm Show Complex parking lots were underwater. Flooding and stranded vehicles were reported along McClay Street. Flooding in Derry Township included the Hershey/Hershey Park area. Minor river flooding occurred on the Swatara Creek at Hershey with a crest of 7.54 feet.
April 30, 2014	Flood	Countywide	N/A	N/A	Heavy rains across southeastern Pennsylvania flooded and closed roads in Dauphin County. A few small creeks and streams overflowed their banks and inundated surrounding areas. A very moist southerly flow combined with a slow-moving low-pressure system produced heavy rainfall (3-5+ inches) across southeastern Pennsylvania over a two-day period. The heavy rain leads to considerable flooding of roadways and small streams across portions of the Lower Susquehanna Valley. Minor flood stages were exceeded on Swatara Creek at Hershey.

Date of Event	Event Type	Location	FEMA Declaration Number	County Designated?	Losses/Impacts
July 23, 2017	Flash Flood	Enhaut	N/A	N/A	Heavy rainfall brought flash flooding to Dauphin County with record rainfall event with 4.27 inches in 1 hour and 4.71 inches total. Many roads were flooded and impassible during the event. Several water rescues were performed, both in cars and residences. Residential apartments and a mobile home park were evacuated, and shelters were opened. A total of 28 residents were displaced from the retirement living community.
July 23, 2018	Flood, Flash Flood	Countywide	N/A	N/A	A persistent upper-level flow of moist southerly air brought over 4 inches of rain that produced flooding and flash flooding in the region. Significant flooding was reported across eastern portions of the area. Two deaths were also reported, one person was washed away attempting to cross a stream, while a motorist was swept away in flood waters.
July 24, 2018	Flood	Countywide	N/A	N/A	Flooding resulted in more than forty roads being closed county-wide. The flooding also led to water rescues at a trailer park near Sunset and Sunrise Drive. In Derry Township several residents were trapped as a result of floodwaters.
December 26, 2020	Flood	New Cumberland			NWS Storm Report received from the public described roads were flooded at Yellow Breeches Creek in New Cumberland.
July 11, 2021	Flash Flood	Harrisburg	N/A	N/A	NWS Storm Report received from the Fire Department described flash flooding that resulted in several cars being stranded on Cameron Street 2 miles SSE of Harrisburg.
July 17, 2021	Flash Flood	Millersburg	N/A	N/A	NWS Storm Report received from the public described flash flooding in Millersburg. Social media pictures received by the NWS show water over multiple roads.
August 11, 2021	Flash Flood	Harrisburg	N/A	N/A	NWS Storm Reports received from the 911 call center and the public described stranded cars 1 mile ESE of Harrisburg, including submerged cars on Market Street.
August 18, 2021	Flood	Middle Paxton (T)	N/A	N/A	NWS Storm report received from Emergency Management described significant washout and undermining of roadways at Route 225 near Clarks Valley Rd in Middle Paxton
September 1, 2021	Flash Flood	Countywide	N/A	N/A	NWS Storm Reports received from trained spotters and the public describe numerous water rescues reported across Dauphin County. Some areas that reported flash flooding include Hockensville Road and Hannover Street in South Hanover Township, areas near the Hershey Country Club at Derry Road, Richardson Road in Lower Swatara Township, Swatara Creek Park in South Hanover Township, McCorkle Road between Jacobs Creek and Church Road, Church Road between Laurie Avenue and Ney Road, Wood Road between Bullfrog Valley Road to Limeric, Eby Road from Meadow Lane to Royal Road, SR743 between Lingle Avenue and Bindnagle Road, and Bachmanville Road between Meadow Road and Felty Mill Road. A mobile home park near Highspire was also evacuated due to flooding.
May 7, 2022	Heavy Rain	Countywide			NWS Storm Report received from the public describes how heavy rainfall in Skyline View totaled 2.22”
November, 2022	Flash Flooding				HMC ED flooded
November 22, 2023	Rain	Countywide	N/A	N/A	Numerous NWS Storm Reports describe rainfall totals across the county that ranged from 1.30” to 2.49”.

Date of Event	Event Type	Location	FEMA Declaration Number	County Designated?	Losses/Impacts
December 11, 2023	Rain	Countywide	N/A	N/A	Numerous reports of rainfall were sent to the NWS for locations countywide. Rainfall totals ranged between 0.49" to 1.33".
January 9, 2024	Rain	Elizabethville	N/A	N/A	NWS Storm Reports received from trained storm spotters describe rainfall totals in Elizabethville being 2.15".
June 6, 2024	Rain	Harrisburg	N/A	N/A	NWS Storm Report received from Emergency Management describes 1.61" of rainfall falling in Harrisburg, where rainfall rates over 30 minutes ranged from 3 to 4.5 inches.
June 29, 2024	Rain	Elizabethville	N/A	N/A	NWS Storm Reports received from the public describe rainfall totals of 1.25", which fell in under one hour.
August 9, 2024	Flood, Flash Flood	Harrisburg, Halifax, Millersburg	N/A	N/A	Remnants of Tropical Storm Debby brought torrential rain to the Dauphin County region, creating widespread areas of flooding and flash flooding. In Harrisburg, a stranded vehicle was reported to the NWS with water over the roadway on McClay Street. Floodwaters had closed the street in both directions. In Halifax, trained storm spotters reported numerous roadways with water over them, while just northwest of Millersburg, flooding and debris were reported over the railroad tracks along State Route 147.
September 21, 2024	Flash Flood	Lower Paxton (T) Susquehanna (T)	N/A	N/A	Ten NWS Storm Reports received from the Fire Department describe flooding across portions of Route 22 and on Morton Drive. In addition to roadway flooding, there were multiple instances where residents at apartment complexes became stranded during the event and needed help from first responders to be extracted.

Sources: (NOAA/NCEI 2024); (FEMA 2024) (IEM 2024)
N/A Not applicable/not available

Based on a review of the CRREL database, Table 4.3.7-8 lists the ice jam events that have occurred in or near the county between 1904 and 2024. Information regarding losses associated with these reported ice jams was limited.

Table 4.3.7-8. Ice Jam Events in Dauphin County Between 1904 and 2024

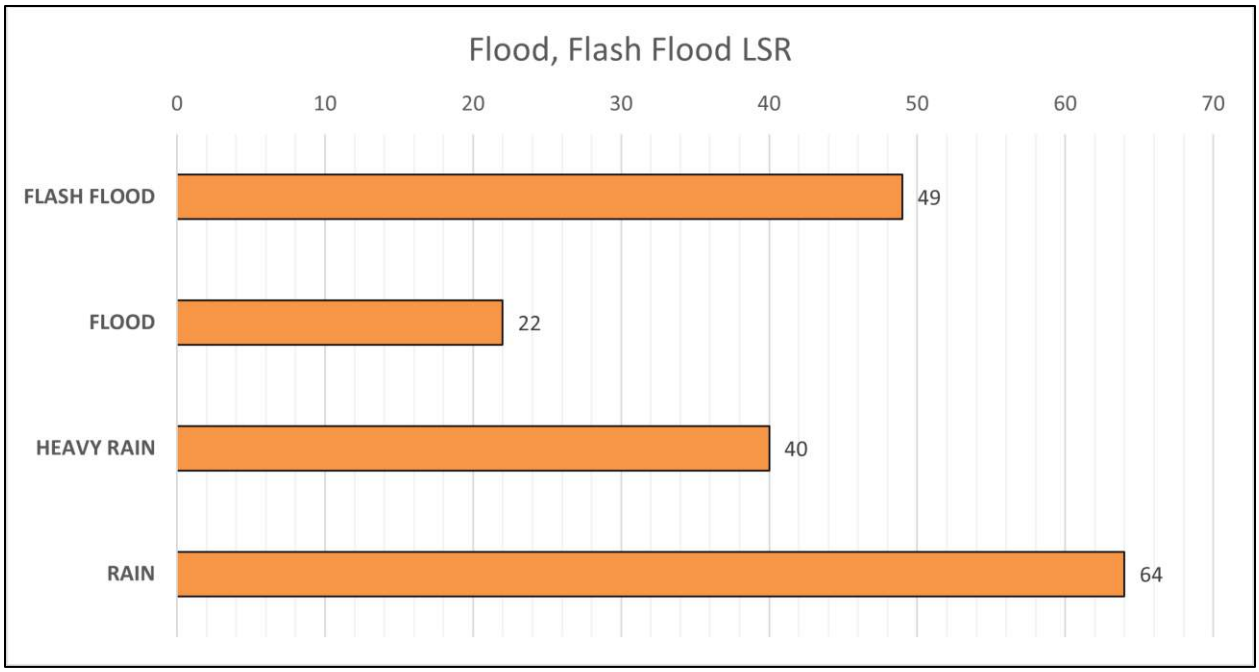
City (Additional Geographic Identifier)	River	Jam Date	Water Year	Gage Number	Impact
Harrisburg	Susquehanna River	February 5, 2022	2022	-	Minor Flooding Reported
Harrisburg	Susquehanna River	January 14, 2018	2018	6275000	No Data Available
Harrisburg	Susquehanna River	February 20, 2015	2015	1570500	No Data Available
Middletown	Susquehanna River	January 8, 2014	2014	-	No Data Available
Harrisburg	Susquehanna River	February 3, 2009	2009	-	No Data Available
Dauphin	Susquehanna River	March 2, 2007	2007	-	No Data Available
Dauphin	Susquehanna River	January 22, 2004	2004	-	No Data Available
Harrisburg	Susquehanna River	February 5, 2004	2004	-	No Data Available
Duncannon	Juniata River	January 4, 2001	2001	-	No Data Available
Dauphin	Susquehanna River	January 4, 2001	2001	-	No Data Available
Fort Hunter	Susquehanna River	January 4, 2001	2001	-	No Data Available
Harrisburg	Susquehanna River	January 4, 2001	2001	-	No Data Available
Harrisburg	Susquehanna River	January 27, 2000	2000	1570500	No Data Available
Harrisburg	Susquehanna River	January 20, 1996	1996	1570500	No Data Available
Dalmatia	East Mahantango Creek	February 1, 1982	1982	1555500	No Data Available
Harrisburg	Susquehanna River	February 5, 1982	1982	1570500	No Data Available
Dalmatia	East Mahantango Creek	February 2, 1981	1981	1555500	No Data Available
Dalmatia	East Mahantango Creek	February 24, 1979	1979	1555500	$100K USD
Dalmatia	East Mahantango Creek	February 13, 1971	1971	1555500	No Data Available
Dauphin	Stony Creek	February 13, 1971	1971	1569000	No Data Available
Highspire	Susquehanna River	February 16, 1971	1971	-	No Data Available
Steelton	Susquehanna River	February 10, 1971	1971	-	No Data Available
Dalmatia	East Mahantango Creek	February 2, 1970	1970	1555500	No Flooding
Harrisburg	Susquehanna River	February 2, 1969	1969	1570500	No Data Available
Dalmatia	East Mahantango Creek	January 31, 1968	1968	1555500	No Data Available
Dalmatia	East Mahantango Creek	February 13, 1966	1966	1555500	No Data Available
Dalmatia	East Mahantango Creek	February 8, 1965	1965	1555500	No Data Available
Harrisburg	Susquehanna River	February 9, 1965	1965	1570500	No Data Available

City (Additional Geographic Identifier)	River	Jam Date	Water Year	Gage Number	Impact
Dalmatia	East Mahantango Creek	February 19, 1961	1961	1555500	No Data Available
Dalmatia	East Mahantango Creek	January 21, 1959	1959	1555500	No Data Available
Harrisburg	Susquehanna River	February 2, 1939	1939	1570500	No Data Available
Dalmatia	East Mahantango Creek	March 4, 1934	1934	1555500	No Data Available
Harrisburg	Susquehanna River	November 29, 1930	1931	1570500	No Data Available
Duncannon	Juniata River	March 3, 1904	1904	-	No Data Available
Harrisburg	Susquehanna River	January 14, 2018	2018	6275000	No Data Available

Source: (USACE n.d.) *; Dauphin County*

Data from the National Weather Service was also utilized to determine previous occurrences since this data is more comprehensive and up-to-date. Local Storm Reports available from the NWS were queried for Flooding, Flash Flooding (or heavy rain) events between 2005 and September 2024, and the figure below summarizes the LSRs for Dauphin County during this time. Data prior to 2005 was not readily available online.

Figure 4.3.7-5 Flood, Flash Flood Related LSR for Dauphin County (2005-2024)



Source: (Iowa State University 2024)

4.3.7.6 Future Occurrence

Floods are described in terms of their extent (including the horizontal area affected and the vertical depth of flood waters) and the related probability of occurrence. The NFIP uses historical records to determine the probability of occurrence for different extents of flooding. The probability of occurrence is expressed in percentages as the chance of a flood of a specific extent occurring in any given year.

The NFIP recognizes the 1-percent annual chance of flood, also known as the *base flood*, as the standard for identifying properties subject to federal flood insurance purchase requirements. A 1-percent annual chance flood is a flood that has a 1-percent chance of occurring over a given year. The DFIRMs identify areas subject to the 1-percent and 0.2-percent annual chance of flooding. Areas subject to 2% and 10% annual chance events are not shown on maps; however, water surface elevations associated with these events are included in the flood source profiles contained in the Flood Insurance Study Report. Table 4.3.7-9 shows a range of flood recurrence intervals and associated probabilities of occurrence.

Table 4.3.7-9. Recurrence Interval and Probabilities of Future Flood Occurrence

Recurrence Interval	Percent Chance of Occurrence in Any Given Year	Flows
5-year	20	Extreme
10-year	10	Heavy to extreme
25-year	4	Moderate
50-year	2	Light to moderate
100-year	1	Light
500-year	0.2	Mild

Source: FEMA 2012

Based on the historic and more recent flood events in Dauphin County, it is clear the county has a high probability of flooding in the future. The fact that the elements required for flooding exist and that major flooding has occurred throughout the county in the past suggests that many people and properties are at risk from flood hazards in the future.

For the 2025 HMP update, the most up-to-date data was collected to calculate the probability of future occurrence of flooding events for Dauphin County. Information from the NOAA NCEI storm events database, FEMA, Pennsylvania State Climatologist, and the CRREL ice jam database were used to identify the number of flood events that occurred between 1972 (the earliest event available) and 2024. Using these sources ensures the most accurate probability estimates possible. The table below shows these statistics, as well as the annual average number of events and the estimated percent chance of an incident occurring in a given year.

Table 4.3.7-10. Probability of Future Flooding Events

Hazard Event Type	Number of Occurrences Between 1972 and 2024	Recurrence Interval (Years)	Percent Chance of Occurrence in Any Given Year
Flash Flood	39	1.9	71.7%
Flood	38	1.9	73.6%
Ice Jam	34	2.2	64.2%

Sources: NOAA NCEI 2024; FEMA 2024; USACE 2024

It is estimated Dauphin County will continue to experience direct and indirect impacts of annual flooding events that may induce secondary hazards, such as infrastructure deterioration or failure, utility failures, power outages, water quality and supply concerns, and transportation delays, accidents, and inconveniences. Therefore, the future occurrence of floods in Dauphin County has been adjusted and characterized as *likely*, when taking into consideration flash flooding, as defined by the Risk Factor Methodology probability criteria (see Table 4.4-4).

4.3.7.7 Vulnerability Assessment

The 1 and 0.2-percent annual chance flood events were examined to evaluate Dauphin County's flood risk. Polygons representing the 1 and 0.2-percent annual chance events from the FEMA Risk Map products dated August 2012 were used to estimate exposure.

Figure 4.3.7-3 presented earlier in this section illustrates the flood boundaries used for the vulnerability assessment. The 1-percent annual chance flood depth grid generated for the FEMA Risk Map program was imported into FEMA's Hazus model and a riverine analysis was processed to estimate potential losses. To understand risk, a community must evaluate what assets are exposed and vulnerable in the identified hazard area. The following text evaluates and estimates the potential impact of the flood hazard on the county, including:

- Impact on (1) life, health, and safety; (2) general building stock; (3) critical facilities; (4) economy; (5) environment; and (6) future growth and development.
- Effects of climate change on vulnerability.
- Further data collection that will assist in understanding this hazard over time.

Impact on Life, Health, and Safety

The impacts of flooding on life, health, and safety depend on several factors including the severity of the event and whether or not adequate warning time is provided to residents. It is assumed that the population living in or near floodplain areas that could be impacted by a flood would be exposed. However, exposure should not be limited only to those who reside within a defined hazard zone, but to everyone who may be affected by a hazard event (e.g., people are at risk while traveling in flooded areas, or their access to emergency services is compromised during an event, as well as the first responders' safety); the degree of that impact varies and is not strictly measurable.

Based on the spatial analysis, an estimated 9,672 people live in the SFHA (or 1-percent annual chance event floodplain) and an estimated 18,548 people are located in the 0.2-percent annual chance flood event floodplain (Table 4.3.7-11). In the event of a flood hazard, these residents could be displaced from their homes, requiring them to seek temporary shelter with friends, family, or emergency shelters. The City of Harrisburg has the greatest estimated number of individuals residing in the floodplain—approximately 3,351 people in the 1-percent and 7,261 people in the 0.2-percent chance flood boundaries, respectively. The Borough of Lykens has the highest percentage of the population within the 1-percent and 0.2-percent annual chance floodplains (41.6 percent and 82.6 percent, respectively, of its 1,873, total jurisdictional population). For this project, the potential population exposed is used as a guide for planning purposes.

Table 4.3.7-11 Estimated Population Exposed to the 1-percent and 0.2-percent Flood Hazard Area

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Total Population (2020 Decennial)	Population in the Flood Hazard Areas			
		Population in the 1-percent Annual Chance Flood Hazard Area	Percent of Jurisdiction Total	Population in the 0.2-percent Annual Chance Flood Hazard Area	Percent of Jurisdiction Total
Berrysburg (B)	326	0	0.0%	0	0.0%
Conewago (T)	2,952	6	0.2%	6	0.2%
Dauphin (B)	795	20	2.5%	48	6.0%
Derry (T)	24,715	199	0.8%	209	0.8%

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Total Population (2020 Decennial)	Population in the Flood Hazard Areas			
		Population in the 1-percent Annual Chance Flood Hazard Area	Percent of Jurisdiction Total	Population in the 0.2-percent Annual Chance Flood Hazard Area	Percent of Jurisdiction Total
East Hanover (T)	6,019	113	1.9%	185	3.1%
Elizabethville (B)	1,357	8	0.6%	8	0.6%
Gratz (B)	743	1	0.1%	1	0.1%
Halifax (B)	796	0	0.0%	44	5.5%
Halifax (T)	3,349	60	1.8%	112	3.3%
Harrisburg (C)	50,099	3,351	6.7%	7,261	14.5%
Highspire (B)	2,741	672	24.5%	1,727	63.0%
Hummelstown (B)	4,544	58	1.3%	90	2.0%
Jackson (T)	1,827	6	0.3%	6	0.3%
Jefferson (T)	360	11	3.1%	11	3.1%
Londonderry (T)	4,899	435	8.9%	537	11.0%
Lower Paxton (T)	53,501	535	1.0%	580	1.1%
Lower Swatara (T)	9,531	218	2.3%	357	3.7%
Lykens (B)	1,873	779	41.6%	1,547	82.6%
Lykens (T)	1,559	71	4.6%	71	4.6%
Middle Paxton (T)	5,048	409	8.1%	556	11.0%
Middletown (B)	9,533	510	5.3%	931	9.8%
Mifflin (T)	816	5	0.6%	8	1.0%
Millersburg (B)	2,545	74	2.9%	258	10.1%
Paxtang (B)	1,648	155	9.4%	196	11.9%
Penbrook (B)	3,274	0	0.0%	0	0.0%
Pillow (B)	292	2	0.7%	2	0.7%
Reed (T)	230	22	9.6%	35	15.2%
Royalton (B)	1,138	196	17.2%	331	29.1%
Rush (T)	228	9	3.9%	9	3.9%
South Hanover (T)	7,209	132	1.8%	252	3.5%
Steelton (B)	6,263	117	1.9%	409	6.5%
Susquehanna (T)	26,736	673	2.5%	1,480	5.5%
Swatara (T)	27,824	614	2.2%	956	3.4%
Upper Paxton (T)	4,010	91	2.3%	165	4.1%
Washington (T)	2,129	16	0.8%	16	0.8%
Wayne (T)	1,266	0	0.0%	0	0.0%
West Hanover (T)	10,697	79	0.7%	102	1.0%
Wiconisco (T)	1,159	5	0.4%	22	1.9%
Williams (T)	1,067	20	1.9%	20	1.9%
Williamstown (B)	1,303	0	0.0%	0	0.0%
Dauphin County	**286,401**	**9,672**	**3.4%**	**18,548**	**6.5%**

Source: U.S. Census Bureau 2020; Federal Emergency Management Agency (FEMA) 2012
Note: Population results have been rounded down.

Using 2020 U.S. Census data, Hazus estimates the potential sheltering needs as a result of a 1-percent annual chance flood event. For the 1-percent flood event, Hazus estimates 9,959 people will be displaced, and 1,463 people will seek short-term sheltering. The City of Harrisburg would have the greatest displaced population (3,552 people) and the greatest number of persons seeking short-term shelter (481 people). These statistics, by jurisdiction, are presented in Table 4.3.7-12. The estimated displaced population and number of persons seeking short-term sheltering differs from the number of persons exposed to the 1-percent annual chance flood because the displaced population numbers take into consideration that not all residents will be significantly impacted enough to be displaced or require short-term sheltering during a flood event.

Table 4.3.7-12 Population Displaced Located the 1-Percent Annual Chance Flood Event

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Total Population (Census Bureau 2020 Decennial)	1-Percent Annual Chance Flood Impacts on People	
		Displaced Population	Persons Seeking Short-Term Sheltering
Berrysburg (B)	326	0	0
Conewago (T)	2,952	4	0
Dauphin (B)	795	19	2
Derry (T)	24,715	241	69
East Hanover (T)	6,019	96	16
Elizabethville (B)	1,357	4	2
Gratz (B)	743	3	3
Halifax (B)	796	5	0
Halifax (T)	3,349	50	15
Harrisburg (C)	50,099	3,552	481
Highspire (B)	2,741	936	50
Hummelstown (B)	4,544	72	17
Jackson (T)	1,827	4	3
Jefferson (T)	360	12	2
Londonderry (T)	4,899	92	10
Lower Paxton (T)	53,501	638	231
Lower Swatara (T)	9,531	302	47
Lykens (B)	1,873	703	54
Lykens (T)	1,559	66	42
Middle Paxton (T)	5,048	393	34
Middletown (B)	9,533	449	91
Mifflin (T)	816	6	0
Millersburg (B)	2,545	79	10
Paxtang (B)	1,648	229	11
Penbrook (B)	3,274	0	0
Pillow (B)	292	3	0
Reed (T)	230	23	0
Royalton (B)	1,138	161	3
Rush (T)	228	7	3
South Hanover (T)	7,209	184	12
Steelton (B)	6,263	202	28
Susquehanna (T)	26,736	586	52
Swatara (T)	27,824	572	85

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Total Population (Census Bureau 2020 Decennial)	1-Percent Annual Chance Flood Impacts on People	
		Displaced Population	Persons Seeking Short-Term Sheltering
Upper Paxton (T)	4,010	110	43
Washington (T)	2,129	27	2
Wayne (T)	1,266	3	0
West Hanover (T)	10,697	67	34
Wiconisco (T)	1,159	24	4
Williams (T)	1,067	35	7
Williamstown (B)	1,303	0	0
Dauphin County	**286,401**	**9,959**	**1,463**

Source: Hazus v6.1, U.S. Census Bureau 2020; FEMA 2012

Total number of injuries and casualties resulting from typical riverine flooding is generally limited because of advanced weather forecasting, blockades, and warnings. Therefore, injuries and deaths generally are not anticipated if proper warning occurs and precautions are in place. Warning time for flash flooding is often limited. Flash flood events are frequently associated with other natural hazard events, such as earthquakes, landslides, or severe weather, which limits their predictability and compounds the hazard. Populations without adequate warning of the event are highly vulnerable to this hazard. Ongoing mitigation efforts should help to avoid the most likely cause of injury—persons trying to cross flooded roadways or channels. Mitigation action items addressing this issue are included in Section 6 (Mitigation Strategy) of this plan.

Cascading impacts may also include exposure to pathogens such as mold. After flood events, excess moisture and standing water contribute to the growth of mold in buildings. Mold may present a health risk to building occupants, especially those with already compromised immune systems such as infants, children, the elderly, and pregnant women. The degree of impact will vary and is not strictly measurable. Mold can grow in as short a period as 24-48 hours in wet and damaged areas of buildings that have not been properly cleaned. Very small mold spores can easily be inhaled, creating the potential for allergic reactions, asthma episodes, and other respiratory problems. Buildings should be properly cleaned and dried out to safely prevent mold growth. (CDC 2022).

Mold and mildew are not the only public health risks associated with flooding. Flood waters can be contaminated by pollutants such as sewage, human and animal feces, pesticides, fertilizers, oil, asbestos, and rusting building materials. Common public health risks associated with flood events also include:

- Unsafe food.
- Contaminated drinking and washing water and poor sanitation.
- Mosquitos and animals.
- Carbon monoxide poisoning.
- Secondary hazards associated with re-entering/cleaning flooded structures.
- Mental stress and fatigue.

Current loss estimation models, such as Hazus, are not equipped to measure public health impacts. The best mitigation measures for these impacts are to be aware that they can occur, educate the public on prevention, and be prepared to address these vulnerabilities in responding to flood events.

Socially Vulnerable Populations

Of the population exposed, the most vulnerable include the economically disadvantaged and the population over the age of 65. Economically disadvantaged populations are more vulnerable because they are likely to evaluate their risk and make decisions to evacuate based on the net economic impact on their families. The population

over the age of 65 is also more vulnerable because they are more likely to seek or need medical attention that may not be available because of isolation during a flood event, and they may have more difficulty evacuating. They also may need to seek or need medical attention that may not be available due to isolation during a flood event. Within Dauphin County, approximately 49,936 people are over the age of 65, and 34,256 people are below the poverty level. The Township of Lower Paxton has the most elderly people in the floodplain (10,027) while the City of Harrisburg has the greatest number of people below poverty inside the floodplain (13,958).

Impact on General Building Stock

After consideration of the population exposed and vulnerable to the flood hazard, the built environment was evaluated. Exposure to the flood hazard includes those buildings within the flood zone. Potential damage is the modeled loss that could occur to the exposed inventory, including structural and content value.

The potential damage caused by flood events is the modeled loss that could occur to the exposed building stock measured by the structural and content replacement cost value. Table 4.3.7-13 summarizes these results. Countywide, there are 6,768 structures, or 4.3 percent of the building stock, are within the 1-percent annual chance flood zone; and 11,762 structures, or 7.5 percent of the building stock, are within the 0.2-percent flood zone.

Table 4.3.7-13 Flooding Impacts on Buildings in Dauphin Co., PA

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Jurisdiction Total Buildings	Buildings in the Flood Hazard Area			
		Buildings in the 1-percent Annual Chance Flood Hazard Area	Percent of Jurisdiction Total	Buildings in the 0.2-percent Annual Chance Flood Hazard Area	Percent of Jurisdiction Total
Berrysburg (B)	384	0	0.0%	0	0.0%
Conewago (T)	2,726	8	0.3%	8	0.3%
Dauphin (B)	499	12	2.4%	31	6.2%
Derry (T)	12,189	197	1.6%	234	1.9%
East Hanover (T)	5,424	90	1.7%	186	3.4%
Elizabethville (B)	1,022	6	0.6%	6	0.6%
Gratz (B)	804	2	0.2%	2	0.2%
Halifax (B)	529	0	0.0%	25	4.7%
Halifax (T)	3,714	86	2.3%	144	3.9%
Harrisburg (C)	19,455	1,641	8.4%	3,145	16.2%
Highspire (B)	1,481	398	26.9%	972	65.6%
Hummelstown (B)	2,488	41	1.6%	58	2.3%
Jackson (T)	2,533	10	0.4%	10	0.4%
Jefferson (T)	695	22	3.2%	22	3.2%
Londonderry (T)	5,464	690	12.6%	892	16.3%
Lower Paxton (T)	22,715	246	1.1%	265	1.2%
Lower Swatara (T)	5,204	214	4.1%	542	10.4%
Lykens (B)	1,438	578	40.2%	1,186	82.5%
Lykens (T)	2,311	120	5.2%	120	5.2%
Middle Paxton (T)	4,472	339	7.6%	468	10.5%
Middletown (B)	3,849	367	9.5%	570	14.8%
Mifflin (T)	1,318	5	0.4%	8	0.6%
Millersburg (B)	1,518	57	3.8%	166	10.9%
Paxtang (B)	900	104	11.6%	130	14.4%

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Jurisdiction Total Buildings	Buildings in the Flood Hazard Area			
		Buildings in the 1-percent Annual Chance Flood Hazard Area	Percent of Jurisdiction Total	Buildings in the 0.2-percent Annual Chance Flood Hazard Area	Percent of Jurisdiction Total
Penbrook (B)	1,581	0	0.0%	0	0.0%
Pillow (B)	317	4	1.3%	5	1.6%
Reed (T)	327	68	20.8%	90	27.5%
Royalton (B)	724	125	17.3%	226	31.2%
Rush (T)	379	25	6.6%	25	6.6%
South Hanover (T)	4,275	90	2.1%	155	3.6%
Steelton (B)	2,867	229	8.0%	381	13.3%
Susquehanna (T)	12,511	390	3.1%	784	6.3%
Swatara (T)	12,223	304	2.5%	489	4.0%
Upper Paxton (T)	3,823	136	3.6%	216	5.7%
Washington (T)	2,464	34	1.4%	34	1.4%
Wayne (T)	1,460	0	0.0%	0	0.0%
West Hanover (T)	7,194	51	0.7%	68	0.9%
Wiconisco (T)	1,112	35	3.1%	55	4.9%
Williams (T)	1,093	40	3.7%	40	3.7%
Williamstown (B)	966	4	0.4%	4	0.4%
Dauphin County	**156,448**	**6,768**	**4.3%**	**11,762**	**7.5%**

Source: Dauphin County 2024; RS Means 2024; Federal Emergency Management Agency (FEMA) 2012

Furthermore, Hazus estimated potential damage to buildings in Dauphin County for the 1-percent annual chance flood event. Table 4.3.7-14 summarizes these results. In total, Hazus estimates $1,575,305,064 in potential building damage across the entire County. Hazus estimates $170,751,484 of which is residential building loss.

Table 4.3.7-14 1-Percent Annual Chance Flood Impacts on Buildings in Dauphin, Co.

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Estimated Loss for All Occupancies	Estimated Loss for Residential Properties	Estimated Loss for Commercial Properties	Estimated Loss for All Other Occupancies
Berrysburg (B)	$0	$0	$0	$0
Conewago (T)	$18,662	$18,662	$0	$0
Dauphin (B)	$409,676	$409,676	$0	$0
Derry (T)	$31,751,382	$2,082,796	$22,545,316	$7,123,270
East Hanover (T)	$1,438,185	$944,453	$176,016	$317,716
Elizabethville (B)	$0	$0	$0	$0
Gratz (B)	$203	$0	$0	$203
Halifax (B)	$0	$0	$0	$0
Halifax (T)	$29,545,111	$2,331,272	$21,713,555	$5,500,283
Harrisburg (C)	$768,747,211	$61,020,368	$560,203,645	$147,523,198
Highspire (B)	$20,267,704	$4,519,540	$11,344,636	$4,403,527
Hummelstown (B)	$4,138,958	$440,205	$2,501,785	$1,196,968
Jackson (T)	$275,526	$115,765	$0	$159,761
Jefferson (T)	$386,531	$173,607	$149,436	$63,488
Londonderry (T)	$289,815,677	$20,268,200	$255,048,818	$14,498,659
Lower Paxton (T)	$7,480,340	$6,051,062	$941,502	$487,777
Lower Swatara (T)	$10,006,100	$2,562,086	$5,212,079	$2,231,935

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Estimated Loss for All Occupancies	Estimated Loss for Residential Properties	Estimated Loss for Commercial Properties	Estimated Loss for All Other Occupancies
Lykens (B)	$22,552,714	$9,076,613	$7,972,938	$5,503,163
Lykens (T)	$5,132,315	$1,979,614	$14,567	$3,138,133
Middle Paxton (T)	$26,568,205	$19,523,874	$5,970,918	$1,073,413
Middletown (B)	$85,539,408	$5,618,714	$78,086,907	$1,833,787
Mifflin (T)	$774,733	$452,063	$0	$322,670
Millersburg (B)	$1,722,546	$462,413	$218,494	$1,041,639
Paxtang (B)	$21,451,631	$4,222,975	$14,777,513	$2,451,142
Penbrook (B)	$0	$0	$0	$0
Pillow (B)	$1,014,194	$1,014,194	$0	$0
Reed (T)	$10,400,749	$1,019,051	$6,994,134	$2,387,564
Royalton (B)	$1,656,382	$1,599,895	$56,487	$0
Rush (T)	$2,672,972	$117,323	$2,523,878	$31,771
South Hanover (T)	$9,170,265	$3,783,319	$4,977,954	$408,993
Steelton (B)	$159,648,841	$1,777,863	$77,697,172	$80,173,806
Susquehanna (T)	$34,627,800	$10,588,418	$20,470,015	$3,569,367
Swatara (T)	$7,204,652	$4,070,570	$2,714,975	$419,107
Upper Paxton (T)	$11,132,267	$3,431,436	$3,639,567	$4,061,264
Washington (T)	$2,462,544	$248,652	$983,375	$1,230,517
Wayne (T)	$0	$0	$0	$0
West Hanover (T)	$1,748,194	$320,894	$448,116	$979,184
Wiconisco (T)	$1,184,529	$118,343	$873,298	$192,888
Williams (T)	$4,358,858	$387,569	$354,378	$3,616,912
Williamstown (B)	$0	$0	$0	$0
Dauphin County	**$1,575,305,064**	**$170,751,484**	**$1,108,611,474**	**$295,942,106**

Sources: Hazus v6.1; Dauphin County 2024; RS Means 2024; FEMA 2012

NFIP Statistics

In addition to total building stock modeling, individual data on flood policies, claims, repetitive loss (RL), and severe repetitive loss (SRL) properties were analyzed.

According to data received from FEMA, there were 1,315 active NFIP policies listed in Dauphin County as of November 29, 2023. Together, these claims total represent $2,311,334 in coverage. Since January 1978, there have been 5,428 total claims for NFIP policies in the county for a total of $89,223,048 in losses paid (PEMA 2023).

According to Section 1361A of the National Flood Insurance Act (NFIA), as amended, 42 *United States Code* (U.S.C.) 4102a, the definition of an SRL property is a residential property covered by an NFIP flood insurance policy, and for which at least one of the following sets of claim payments have occurred:

- At least four NFIP claim payments (including building and contents) over $5,000 each, with the cumulative amount of payments for these claims exceeding $20,000.
- At least two separate payments for claims (building payments only), with the cumulative amount of the building portion of these payments exceeding the market value of the building.

Moreover, for both above, at least two of the referenced claims must have occurred within any 10-year period and must have been submitted separately on dates more than ten days apart. An RL property is defined by FEMA's Flood Mitigation Assistance (FMA) Program as an NFIP-insured structure that incurred flood-related

damage on two occasions and for which the cost of repair equaled or exceeded 25 percent of the market value of the structure at the time of each such flood. According to data from November 2023, Dauphin County has 792 RL and 49 SRL properties throughout the county. Table 4.3.7-15 summarizes RL properties and Table 4.3.7-16 summarizes SRL properties in Dauphin County.

Table 4.3.7-15 Total and Mitigated Repetitive Loss (RL) Properties in Dauphin Co., PA

Single-Family		2-4 Family		Assumed Condo		Other Residential		Non-Residential		Total	
Total	*Mit*	*Total*	*Mit*	*Total*	*Mit*	*Total*	*Mit*	*Total*	*Mit*	*Total*	*Mit*
625	80	43	8	64	4	9	0	29	0	770	92

Source: PEMA 2023
Note: Mit = Mitigated

Table 4.3.7-16 Total and Mitigated Severe Repetitive Loss (SRL) Properties in Dauphin Co., PA

Single-Family		2-4 Family		Assumed Condo		Other Residential		Non-Residential		Total	
Total	*Mit*	*Total*	*Mit*	*Total*	*Mit*	*Total*	*Mit*	*Total*	*Mit*	*Total*	*Mit*
30	1	2	0	10	1	4	0	3	0	49	

Source: PEMA 2023
Note: Mit = Mitigated

Impact on Critical Facilities

It is important to determine the critical facilities and infrastructure within the county that may be at risk of flooding (riverine, flash/stormwater flooding, ice jam), and that may be impacted should damage occur. Critical services during and after a flood event may not be available if facilities are directly damaged or transportation routes to access these critical facilities are impacted. Roads that are blocked or damaged can isolate residents and can prevent access throughout the planning area to many service providers needing to get to vulnerable populations or to make repairs. Utilities, such as overhead power, cable, and phone lines, could also be vulnerable because of damage to utility poles by standing water or the surge of water from a dam failure event. Loss of these utilities could create additional isolation issues for the inundation zones.

Critical facility exposure to the 1-percent and 0.2-percent annual chance flood hazard event boundary was examined, and these results are summarized for both in Table 4.3.7-17 below. Section 4.4 (Hazard Vulnerability Summary) provides more information about the critical facilities and lifelines in Dauphin County. Of the 248 critical facilities located in the 1-percent annual chance flood event boundary, 226 are considered lifelines for the county, and out of the 353 critical facilities located in the 0.2-percent annual chance flood event boundary, 315 are considered lifelines for the county.

Table 4.3.7-17 Critical Facilities in the 1-Percent and 0.2 Percent Annual Chance Flood Hazard Areas in Dauphin Co., PA

Jurisdiction (B) = Borough (C) = City (T) = Township	Total Facilities	Total Lifeline Facilities	Number of Facilities in the 1-Percent Annual Chance Flood Event Hazard Area				Number of Facilities in the 0.2-Percent Annual Chance Flood Event Hazard Area			
			Critical Facilities	*% of Total Critical Facilities*	*Lifelines*	*% of Total Lifelines*	*Critical Facilities*	*% of Total Critical Facilities*	*Lifelines*	*% of Total Lifelines*
Berrysburg (B)	5	5	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Conewago (T)	13	9	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Dauphin (B)	26	24	2	7.7%	2	7.7%	10	38.5%	10	38.5%
Derry (T)	131	95	10	7.6%	10	7.6%	11	8.4%	11	8.4%
East Hanover (T)	36	28	10	27.8%	10	27.8%	10	27.8%	10	27.8%
Elizabethville (B)	12	10	1	8.3%	1	8.3%	1	8.3%	1	8.3%
Gratz (B)	9	7	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Halifax (B)	9	8	0	0.0%	0	0.0%	1	11.1%	1	11.1%
Halifax (T)	30	22	8	26.7%	8	26.7%	8	26.7%	8	26.7%
Harrisburg (C)	392	280	90	23.0%	75	19.1%	120	30.6%	99	25.3%
Highspire (B)	12	8	5	41.7%	3	25.0%	12	100.0%	8	66.7%
Hummelstown (B)	35	26	3	8.6%	3	8.6%	3	8.6%	3	8.6%
Jackson (T)	22	18	2	9.1%	2	9.1%	2	9.1%	2	9.1%
Jefferson (T)	7	6	3	42.9%	3	42.9%	3	42.9%	3	42.9%
Londonderry (T)	45	30	8	17.8%	8	17.8%	10	22.2%	10	22.2%
Lower Paxton (T)	150	80	12	8.0%	12	8.0%	12	8.0%	12	8.0%
Lower Swatara (T)	87	79	2	2.3%	2	2.3%	23	26.4%	23	26.4%
Lykens (B)	18	16	6	33.3%	6	33.3%	17	94.4%	16	88.9%
Lykens (T)	15	11	5	33.3%	4	26.7%	5	33.3%	4	26.7%
Middle Paxton (T)	33	28	5	15.2%	5	15.2%	6	18.2%	6	18.2%
Middletown (B)	47	28	3	6.4%	3	6.4%	5	10.6%	3	6.4%
Mifflin (T)	8	6	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Millersburg (B)	26	17	0	0.0%	0	0.0%	2	7.7%	2	7.7%
Paxtang (B)	11	9	5	45.5%	5	45.5%	5	45.5%	5	45.5%
Penbrook (B)	17	5	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Jurisdiction (B) = Borough (C) = City (T) = Township	Total Facilities	Total Lifeline Facilities	Number of Facilities in the 1-Percent Annual Chance Flood Event Hazard Area				Number of Facilities in the 0.2-Percent Annual Chance Flood Event Hazard Area			
			Critical Facilities	*% of Total Critical Facilities*	*Lifelines*	*% of Total Lifelines*	*Critical Facilities*	*% of Total Critical Facilities*	*Lifelines*	*% of Total Lifelines*
Pillow (B)	6	5	1	16.7%	1	16.7%	1	16.7%	1	16.7%
Reed (T)	6	6	5	83.3%	5	83.3%	5	83.3%	5	83.3%
Royalton (B)	11	9	1	9.1%	1	9.1%	2	18.2%	2	18.2%
Rush (T)	5	5	1	20.0%	1	20.0%	1	20.0%	1	20.0%
South Hanover (T)	24	20	6	25.0%	6	25.0%	7	29.2%	7	29.2%
Steelton (B)	31	16	5	16.1%	4	12.9%	10	32.3%	5	16.1%
Susquehanna (T)	118	73	12	10.2%	9	7.6%	16	13.6%	12	10.2%
Swatara (T)	144	106	8	5.6%	8	5.6%	10	6.9%	10	6.9%
Upper Paxton (T)	35	24	8	22.9%	8	22.9%	8	22.9%	8	22.9%
Washington (T)	31	26	8	25.8%	8	25.8%	8	25.8%	8	25.8%
Wayne (T)	8	8	6	75.0%	6	75.0%	6	75.0%	6	75.0%
West Hanover (T)	43	31	2	4.7%	2	4.7%	4	9.3%	4	9.3%
Wiconisco (T)	13	11	4	30.8%	4	30.8%	7	53.8%	7	53.8%
Williams (T)	14	12	1	7.1%	1	7.1%	1	7.1%	1	7.1%
Williamstown (B)	7	5	0	0.0%	0	0.0%	1	14.3%	1	14.3%
Dauphin County	1692	1212	**248**	**14.7%**	**226**	**13.4%**	**353**	**20.9%**	**315**	**18.6%**

Source: Dauphin County 2024; HIFLD 2020, 2023; Department of Human Services 2024; Federal Emergency Management Agency 2012

Impact on the Economy

For impact on the economy, estimated losses from a flood event are considered. Losses include but are not limited to general building stock damage, agricultural losses, business interruption, and impacts on tourism and tax base within Dauphin County. Damage to general building stock can be quantified by the use of Hazus as discussed above. Other economic components such as loss of facility use, functional downtime, and social and economic factors are less susceptible to measurement with a high degree of certainty. In areas that are directly flooded, renovations of commercial and industrial buildings may be necessary, disrupting associated services.

Hazus estimates the amount of debris generated from a 1-percent annual chance flood event. The model breaks down debris into three categories because of the different types of equipment needed to handle debris: (1) finishes (drywall, insulation, etc.), (2) structural (wood, brick, etc.), and (3) foundations (concrete slab and block, rebar, etc.). Table 4.3.7-18 summarizes the debris Hazus estimates to result from a 1-percent annual chance flood event, which is more than 17,507 tons of debris across the County. Notably, this table lists estimated debris generated only by riverine flooding and does not include additional potential damage and debris possibly generated by the force of wind.

Table 4.3.7-18. Estimated Debris Created During the 1-percent Annual Chance Flood Event

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Estimated Debris Created During the 1-Percent Annual Chance Food Event			
	Total (tons)	Finish (tons)	Structure (tons)	Foundation (tons)
Berrysburg (B)	0	0	0	0
Conewago (T)	3	2	0	0
Dauphin (B)	110	41	40	29
Derry (T)	241	167	44	31
East Hanover (T)	39	23	9	7
Elizabethville (B)	1	1	0	0
Gratz (B)	6	4	1	1
Halifax (B)	4	3	1	1
Halifax (T)	447	148	183	115
Harrisburg (C)	5,599	4,269	804	525
Highspire (B)	341	282	28	32
Hummelstown (B)	296	91	119	86
Jackson (T)	20	5	9	6
Jefferson (T)	3	1	1	1
Londonderry (T)	602	169	233	200
Lower Paxton (T)	1,474	392	626	455
Lower Swatara (T)	141	75	31	35
Lykens (B)	1,101	596	246	260
Lykens (T)	370	131	136	103
Middle Paxton (T)	1,877	679	703	495
Middletown (B)	356	297	30	29
Mifflin (T)	146	34	62	49
Millersburg (B)	234	87	83	63
Paxtang (B)	660	535	76	49
Penbrook (B)	0	0	0	0
Pillow (B)	48	14	18	16
Reed (T)	78	23	32	22

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Estimated Debris Created During the 1-Percent Annual Chance Food Event			
	Total (tons)	Finish (tons)	Structure (tons)	Foundation (tons)
Royalton (B)	137	88	20	30
Rush (T)	10	7	2	1
South Hanover (T)	706	184	290	232
Steelton (B)	159	159	0	0
Susquehanna (T)	967	818	88	61
Swatara (T)	554	430	73	51
Upper Paxton (T)	522	215	164	143
Washington (T)	50	20	17	13
Wayne (T)	2	1	1	1
West Hanover (T)	31	28	2	1
Wiconisco (T)	44	14	18	13
Williams (T)	129	61	36	31
Williamstown (B)	0	0	0	0
Dauphin County	**17,507**	**10,094**	**4,225**	**3,188**

Source: Hazus v6.1; Dauphin County 2024; FEMA 2012

Impact on the Environment

As Dauphin County and its jurisdictions evolve with changes in population and density, flood events may increase in frequency and/or severity as land use changes, more structures are built, and impervious surfaces expand. Flood extents for the 1-percent and 0.2-percent annual chance flood event will continue to evolve alongside natural occurrences such as climate change and/or severe weather events. These flood events will inevitably impact Dauphin County's natural and local environment.

Furthermore, the environmental impacts of a dam failure event can include significant water quality and debris disposal issues. Flood waters can back up sanitary sewer systems and inundate wastewater treatment plants, causing raw sewage to contaminate residential and commercial buildings and the flooded waterway. The contents of unsecured containers of oil, fertilizers, pesticides, and other chemicals get added to flood waters. Hazardous materials may be released and distributed widely across the floodplain. Water supply and wastewater treatment facilities could be offline for weeks. After the flood waters subside, contaminated and flood-damaged building materials and contents must be properly disposed of. Contaminated sediment must be removed from buildings, yards, and properties. In addition, severe erosion is likely; such erosion can negatively impact local ecosystems. Severe flooding will affect these natural areas and can ultimately be disruptive to species that reside in these natural habitats.

Future Changes that May Impact Vulnerability

Understanding future changes that affect vulnerability can assist in planning for future development and ensure the establishment of appropriate mitigation, planning, and preparedness measures. Several factors are examined in this section to assess hazard vulnerability.

Projected Development

Any areas of growth could be impacted by the flood hazard if within identified hazard areas. The tables and hazard maps included in the jurisdictional annexes contain additional information regarding the specific areas of development that would increase county vulnerability to flood inundation areas.

Projected Changes in Population

Estimated population projections provided by The Center of Rural Pennsylvania indicate that Dauphin County's population will continue to increase into 2040, increasing the total population to approximately 296,766 persons (The Center of Rural Pennsylvania 2021). As more people move into flood zones, an increased amount of the population will be vulnerable to flood hazards.

Effect of Climate Change on Vulnerability

Climate is defined not simply as average temperature and precipitation but also by type, frequency, and intensity of weather events. Both globally and at the local scale, climate change can alter the prevalence and severity of extremes such as flood events. While predicting changes in flood events under a changing climate is difficult, understanding vulnerabilities to potential changes is a critical part of estimating future climate change impacts on human health, society, and the environment (EPA 2024).

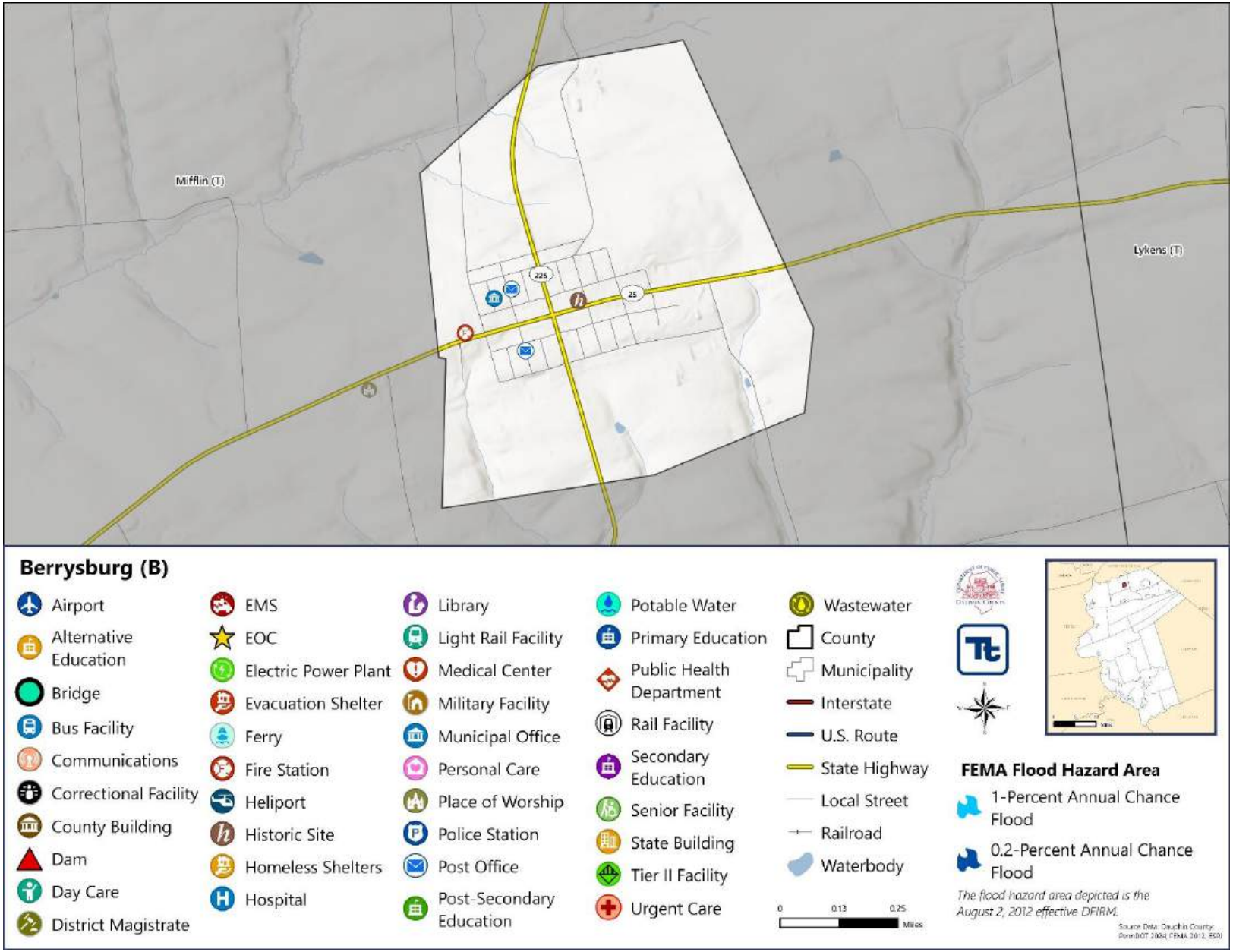
The 2021 Pennsylvania Climate Impact Assessment indicated that Pennsylvania is very likely to undergo increased temperatures and precipitation in the 21st century (PADEP 2021). An increase in variability of temperature and precipitation may lead to increased frequency and/or severity of storm events. Summer floods and general stream flow variability are projected to increase because of increased variability in precipitation. Even with the anticipated increase in winter precipitation as rain rather than snow, increased winter temperatures and a reduced snowpack may decrease rain-on-snow events and, thus, major flooding events in Pennsylvania. This conclusion, however, remains speculative until further studies can validate it. Future improvements in modeling smaller-scale climatic processes are expected and will lead to improved understanding of how the changing climate will alter temperature, precipitation, storms, and flood events in Pennsylvania (PADEP 2021).

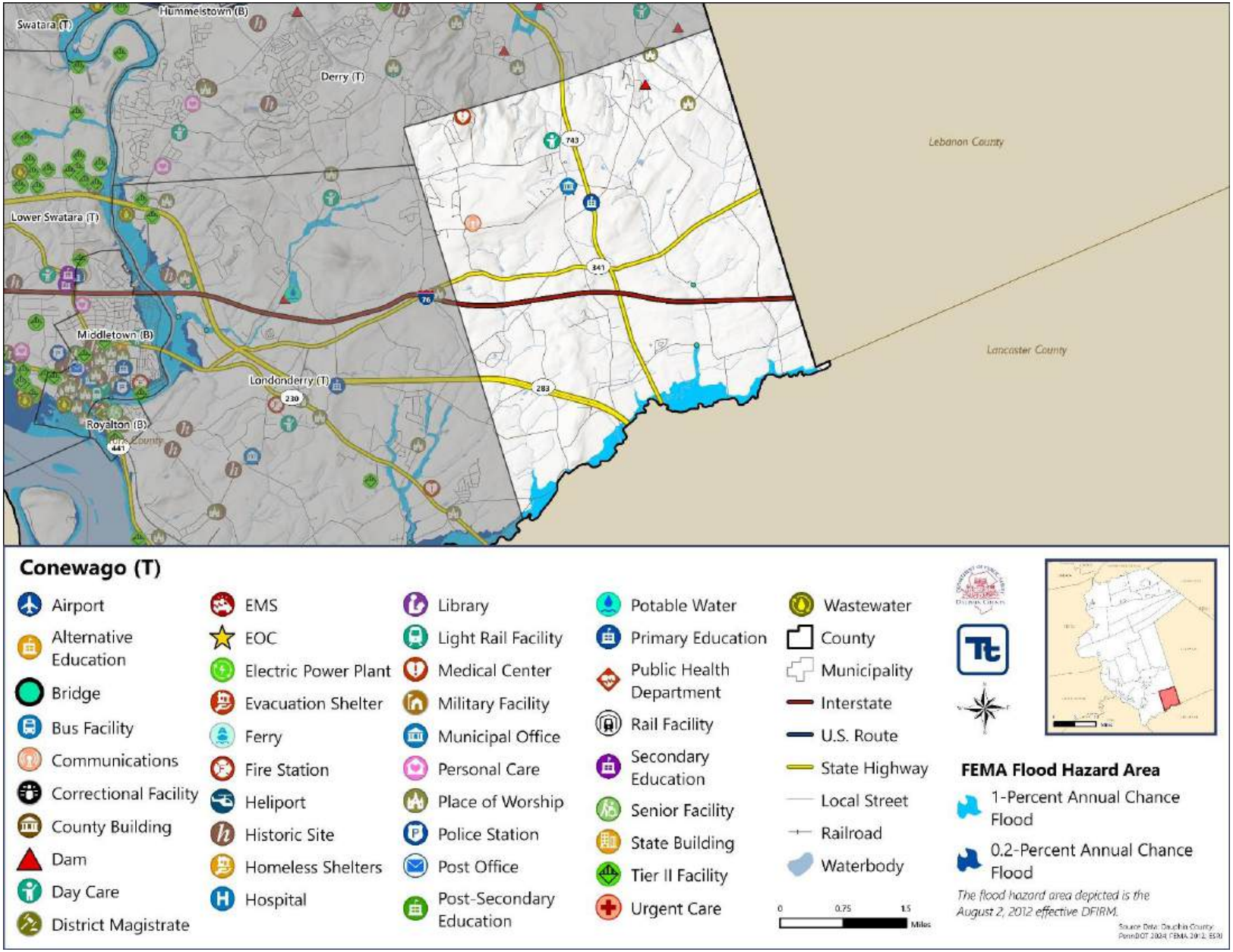
Next Steps

Dauphin County will work to update building and critical facility inventories to develop more precise modeling of flood impacts in future updates.

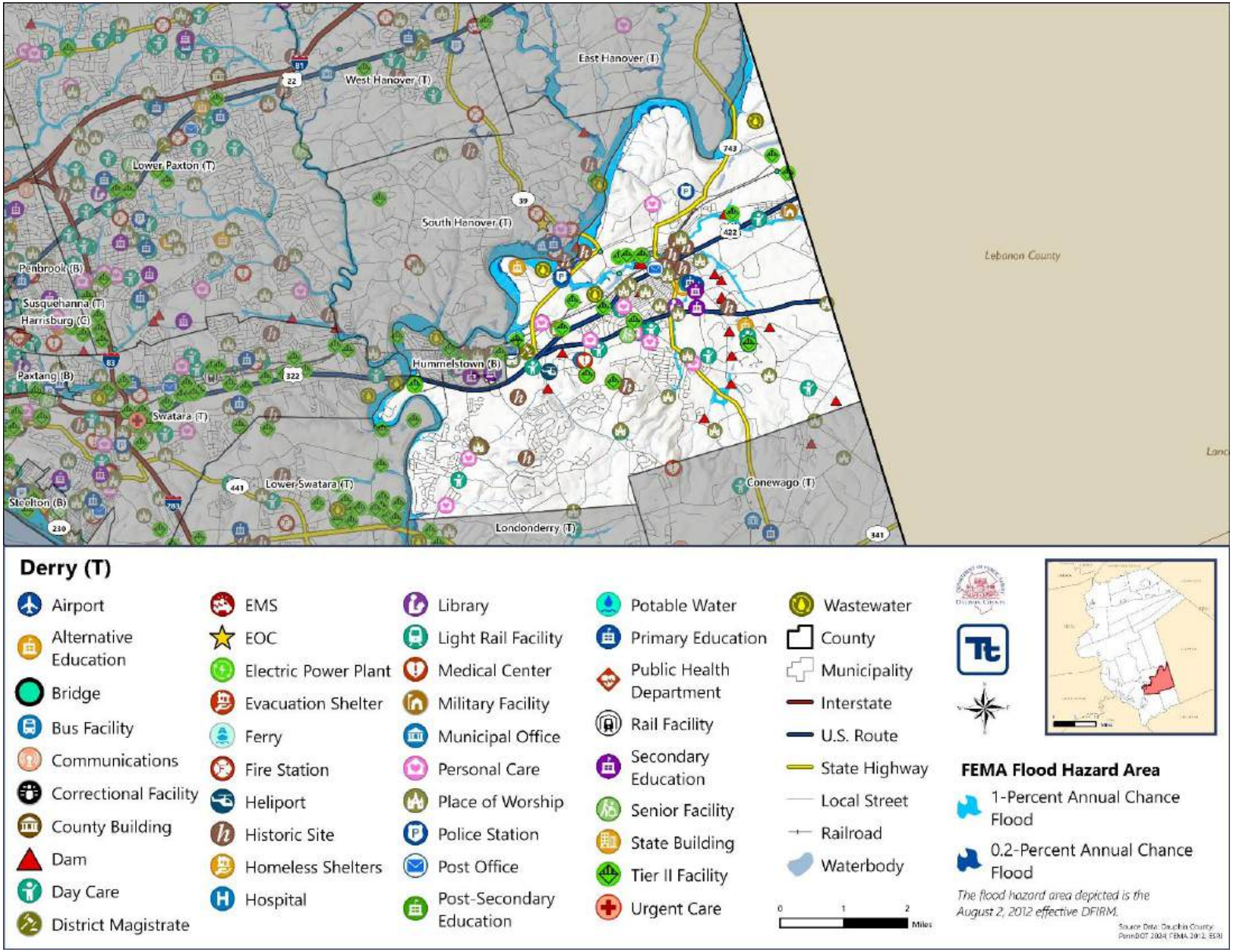
Additional Data – Flood Hazard Maps

As mentioned earlier, each of the 40 participating jurisdictions can view their flood hazard map at the end of this profile. With this higher level of detail, each map illustrates the location of the 1-percent and 0.2-percent annual chance flood hazard areas (if applicable) along with the identified critical/lifeline facilities located within each jurisdiction.


Mifflin (T)
Lykens (T)
225
25
Berrysburg (B)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0
0.13
0.25
Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.

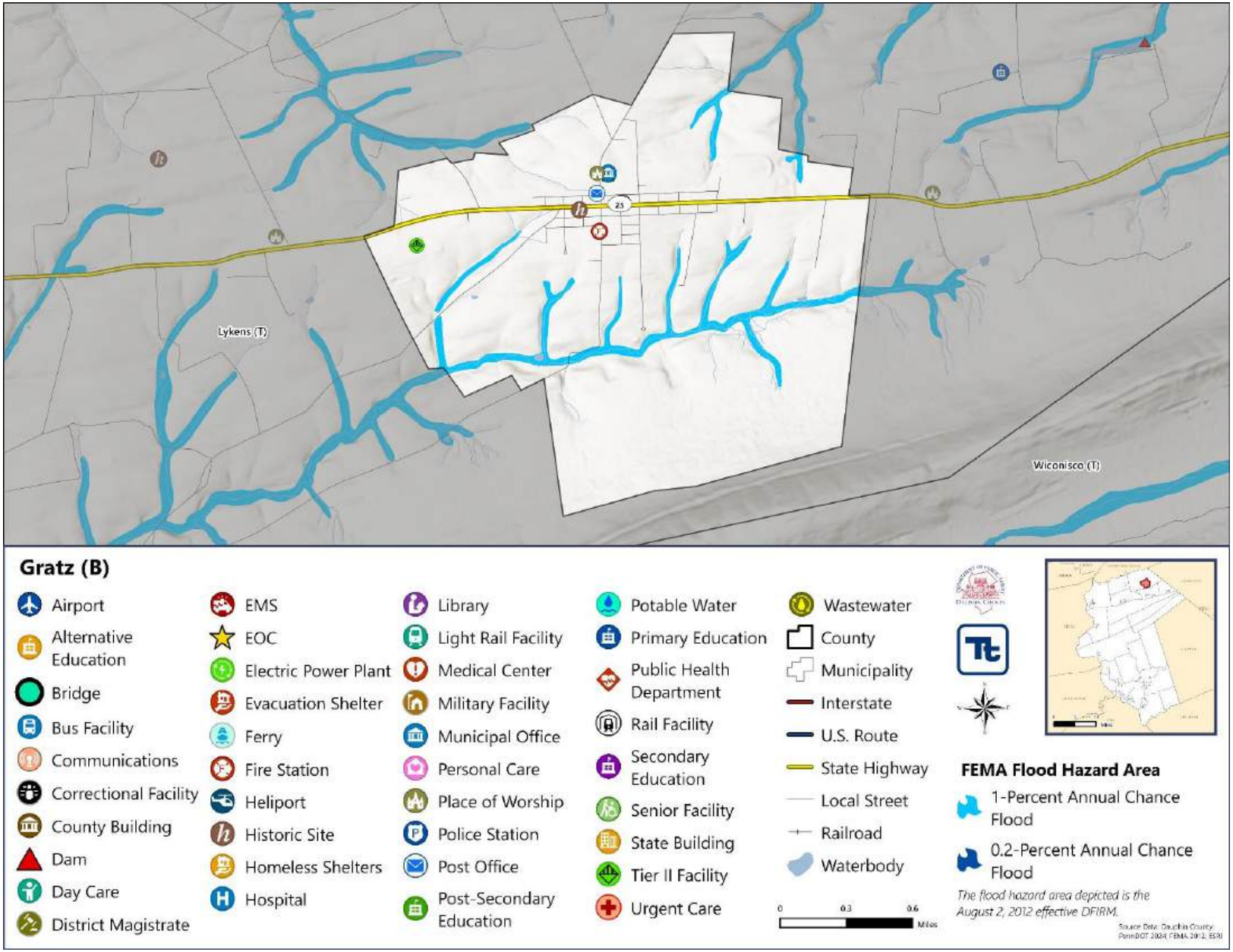

Swatara (T)
Hummelstown (B)
Derry (T)
Lebanon County
Lower Swatara (T)
Middletown (B)
Londonderry (T)
Royalton (B)
Lancaster County
743
341
76
283
230
441
Conewago (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0
0.75
1.5
Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Middle Paxton (T)
225
22/322
Dauphin (B)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0
0.13
0.25
Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


East Hanover (T)
West Hanover (T)
Lower Paxton (T)
South Hanover (T)
Lebanon County
Penbrook (B)
Susquehanna (T)
Harrisburg (C)
Hummelstown (B)
Paxtang (B)
Swatara (T)
Lower Swatara (T)
Conewago (T)
Steelton (B)
Londonderry (T)
Derry (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 1 2 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Jackson (T)
Jefferson (T)
Dehart Reservoir
Halifax (B)
Wayne (T)
Rush (T)
Halifax (T)
Reed (T)
Middle Paxton (T)
Lebanon County
Dauphin (B)
West Hanover (T)
Perry County
Susquehanna River
Susquehanna (T)
Lower Paxton (T)
Harrisburg (C)
South Hanover (T)
Derry (T)
East Hanover (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0
1.5
3
Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Washington (T)
Jackson (T)
209
225
Elizabethville (B)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 0.1 0.2 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Lykens (T)
Wiconisco (T)
Gratz (B)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 0.3 0.6 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.

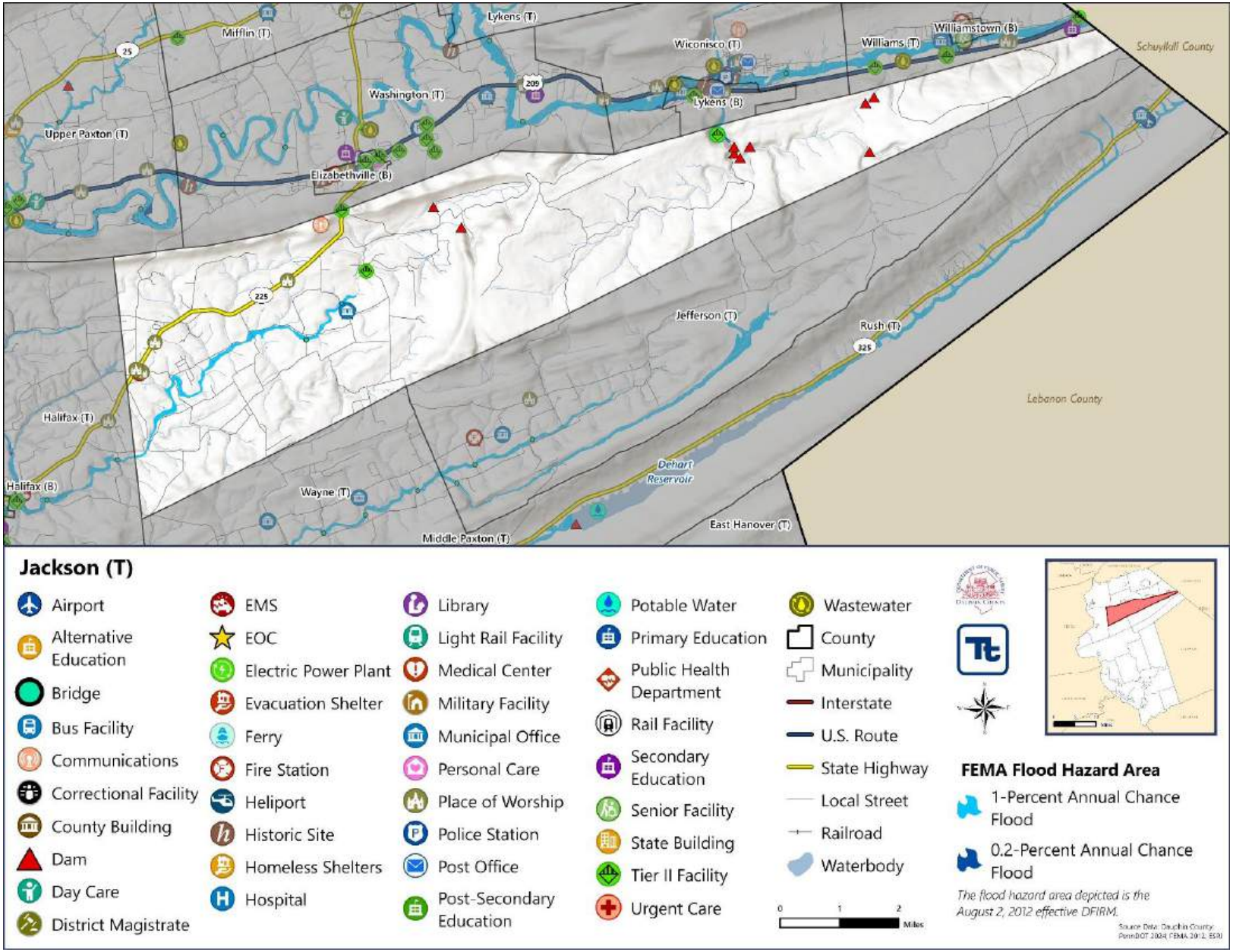

Perry County
147
225
Halifax (T)
Halifax (B)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0
0.15
0.3
Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Millersburg (B)
Upper Paxton (T)
Washington (T)
Jackson (T)
Jefferson (T)
Susquehanna River
Perry County
Halifax (B)
Wayne (T)
Dehart Reservoir
Rush (T)
East Hanover (T)
Middle Paxton (T)
Reed (T)
West Hanover (T)
147
225
325
11/15
22/322
849
443
Halifax (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 1 2 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Perry County
Cumberland County
Susquehanna River
West Hanover (T)
South Hanover (T)
Lower Paxton (T)
Susquehanna (T)
Penbrook (B)
Paxtang (B)
Swatara (T)
Derry (T)
Lower Swatara (T)
Steelton (B)
Harrisburg (C)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 0.75 1.5 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.

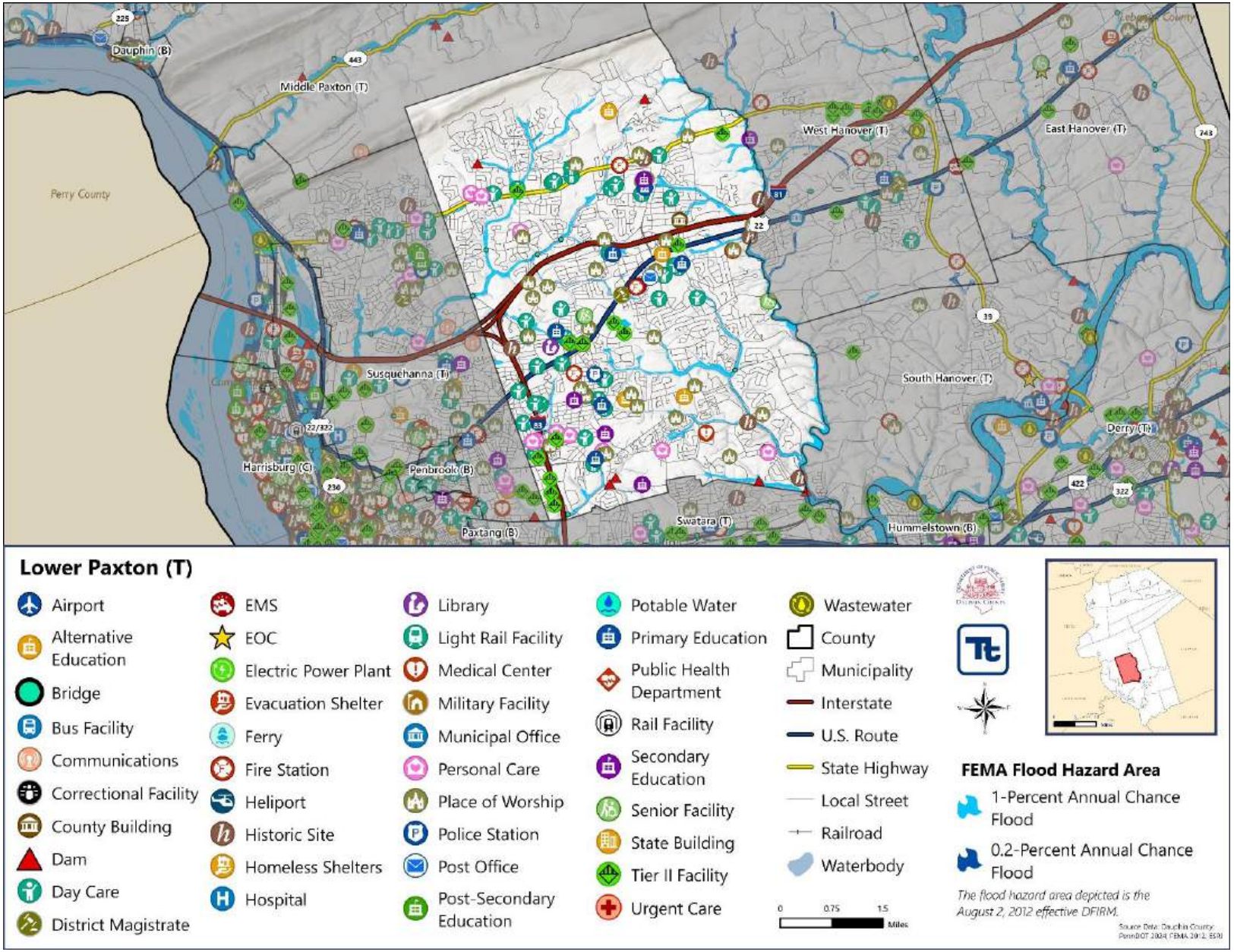

Steelton (B)
Lower Swatara (T)
Swatara (T)
York County
76
230
Highspire (B)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 0.13 0.25
Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.

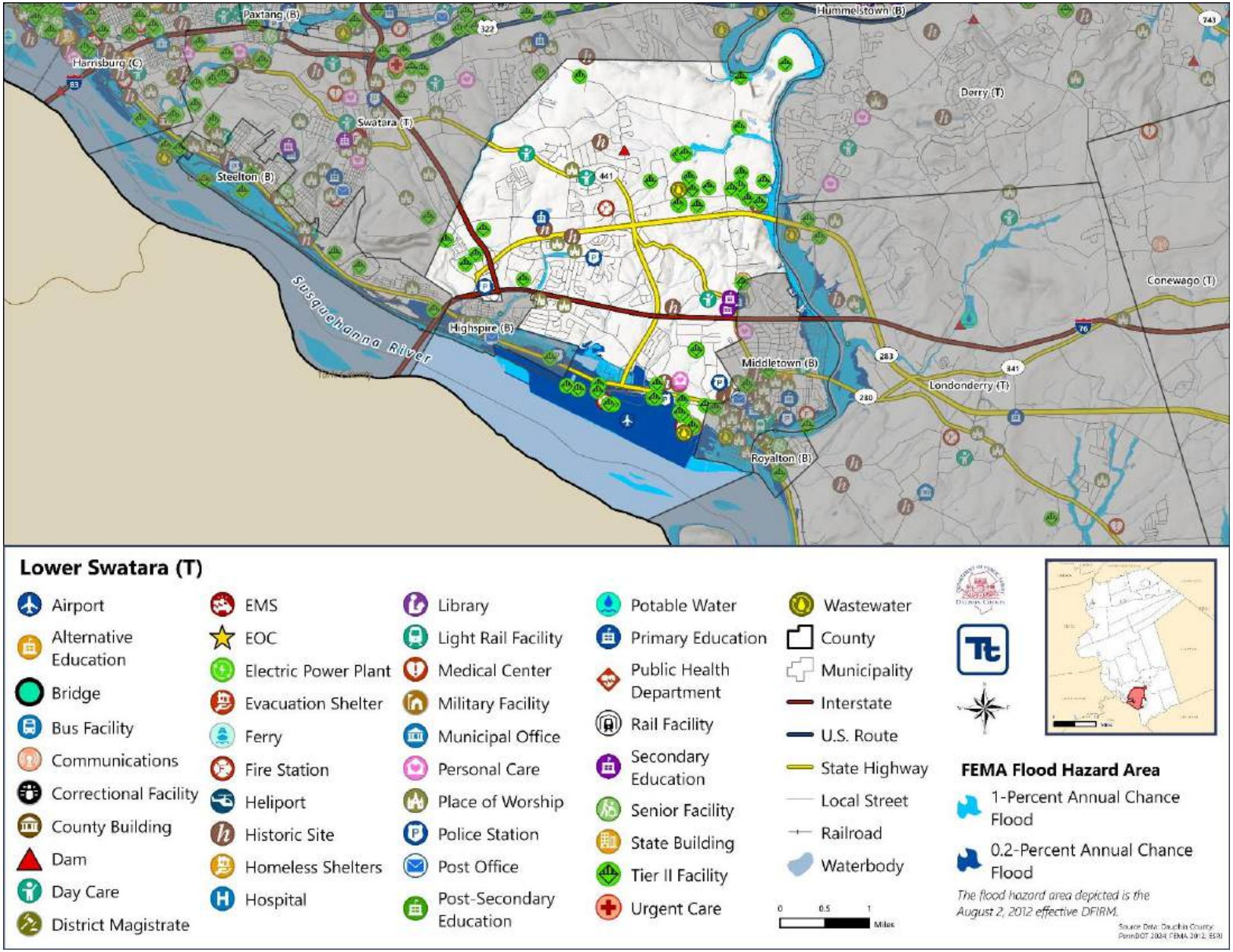

South Hanover (T)
Derry (T)
Swatara (T)
322
39
422
Hummelstown (B)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0
0.15
0.3
Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Lykens (T)
Mifflin (T)
Wiconisco (T)
Williams (T)
Williamstown (B)
Schuylkill County
Washington (T)
Lykens (B)
Upper Paxton (T)
Elizabethville (B)
Jefferson (T)
Rush (T)
Lebanon County
Halifax (T)
Halifax (B)
Wayne (T)
Dehart Reservoir
Middle Paxton (T)
East Hanover (T)
Jackson (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 1 2 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Mifflin (T)
Lykens (T)
Wiconisco (T)
Williamstown (B)
Williams (T)
Lykens (B)
Schuylkill County
Washington (T)
Upper Paxton (T)
Elizabethville (B)
Jackson (T)
Rush (T)
Lebanon County
Dehart Reservoir
Wayne (T)
East Hanover (T)
Middle Paxton (T)
Jefferson (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 1 2 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Harrisburg (C)
Steelton (B)
Derry (T)
Lebanon County
Lower Swatara (T)
Swatara (T)
Highspire (B)
Conewago (T)
Susquehanna River
Middletown (B)
Royalton (B)
York County
Lancaster County
Londonderry (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 1 2 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Dauphin (B)
Middle Paxton (T)
Perry County
West Hanover (T)
East Hanover (T)
Susquehanna (T)
South Hanover (T)
Derry (T)
Harrisburg (C)
Penbrook (B)
Paxtang (B)
Swatara (T)
Hummelstown (B)
Lower Paxton (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 0.75 1.5 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Paxtang (B)
Harrisburg (C)
Swatara (T)
Steelton (B)
Hummelstown (B)
Derry (T)
Conewago (T)
Susquehanna River
Highspire (B)
Middletown (B)
Londonderry (T)
Royalton (B)
322
83
441
743
76
283
341
230
Lower Swatara (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
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Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
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Light Rail Facility
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Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
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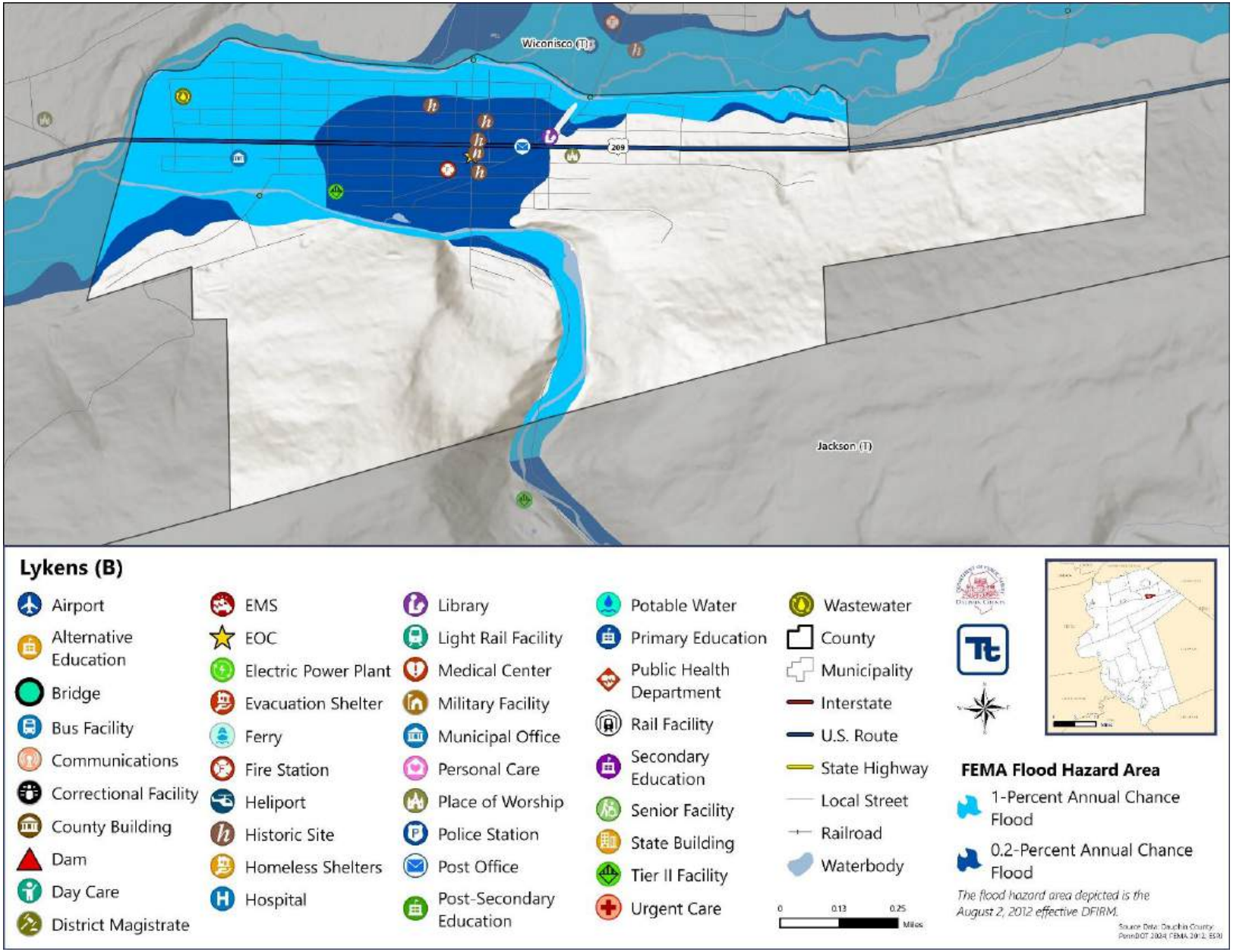
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 0.5 1 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Wiconisco (T)
Jackson (T)
209
Lykens (B)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
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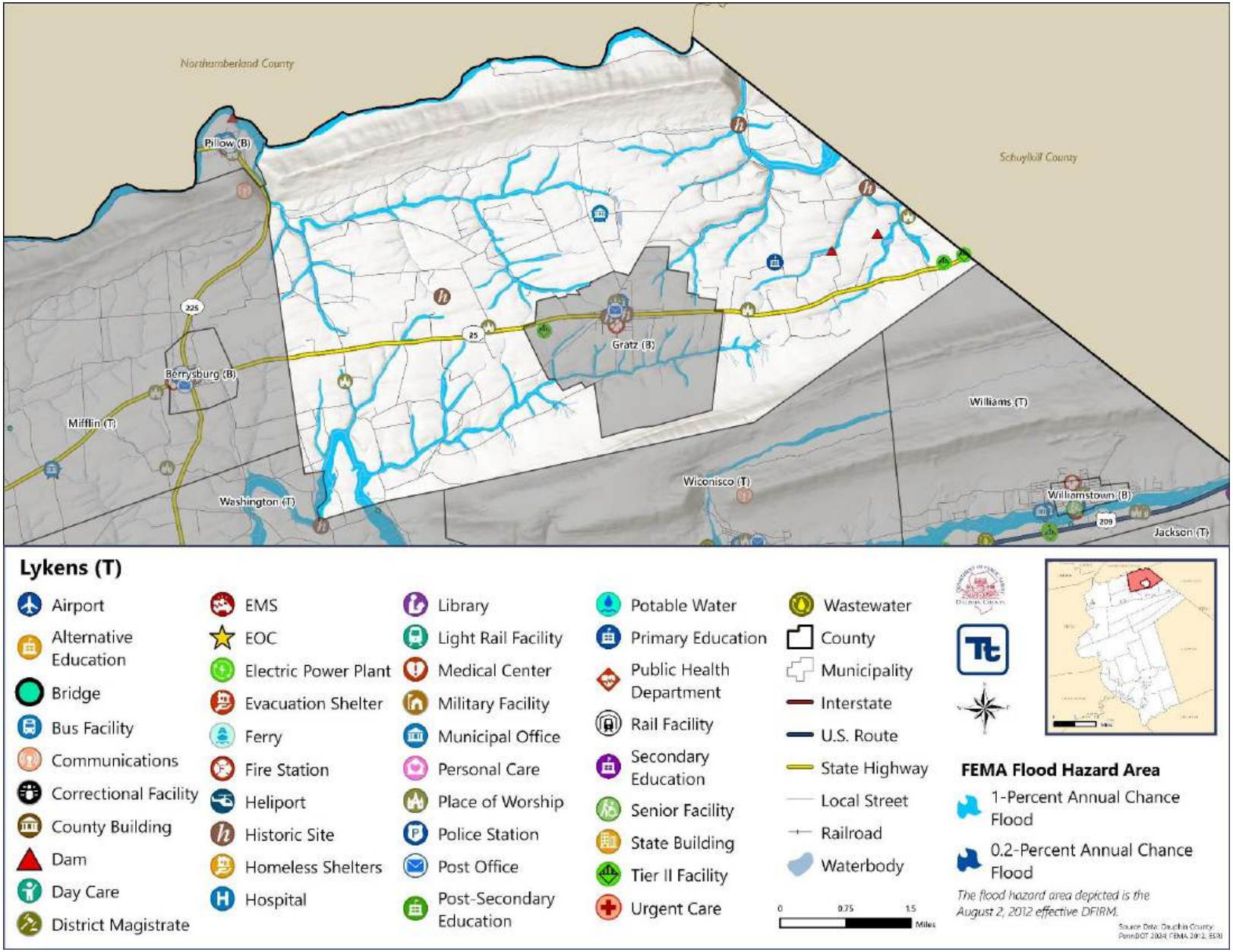
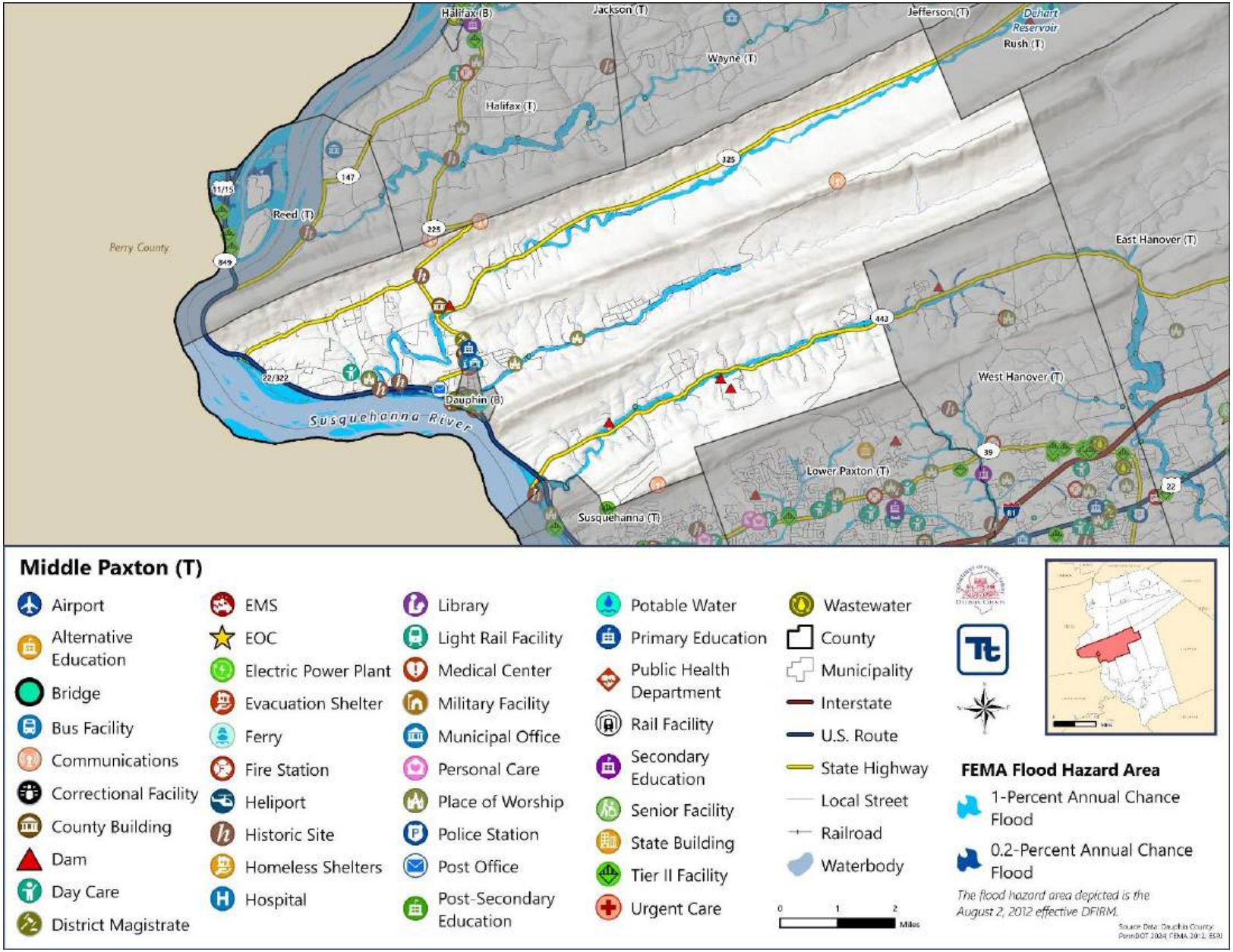
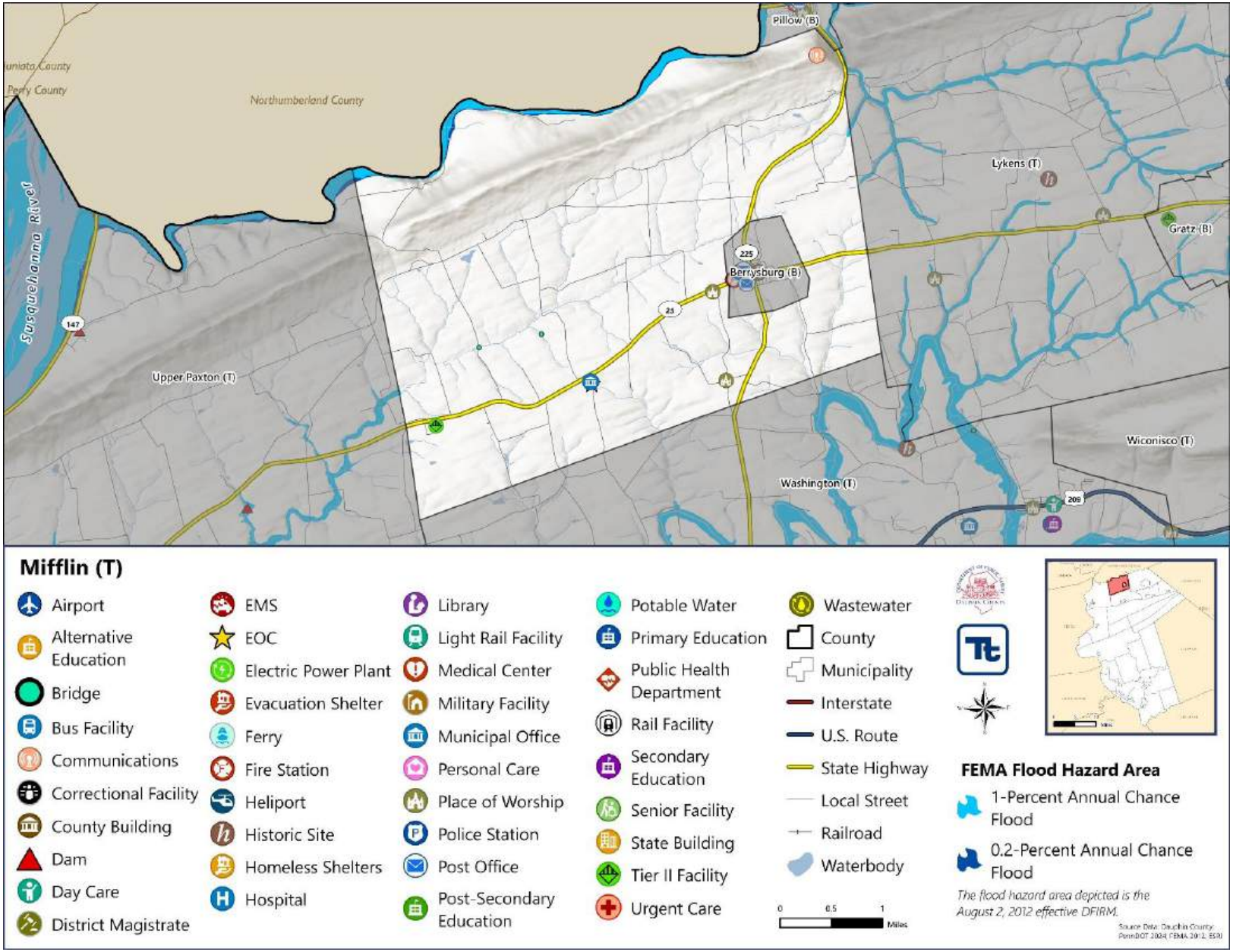
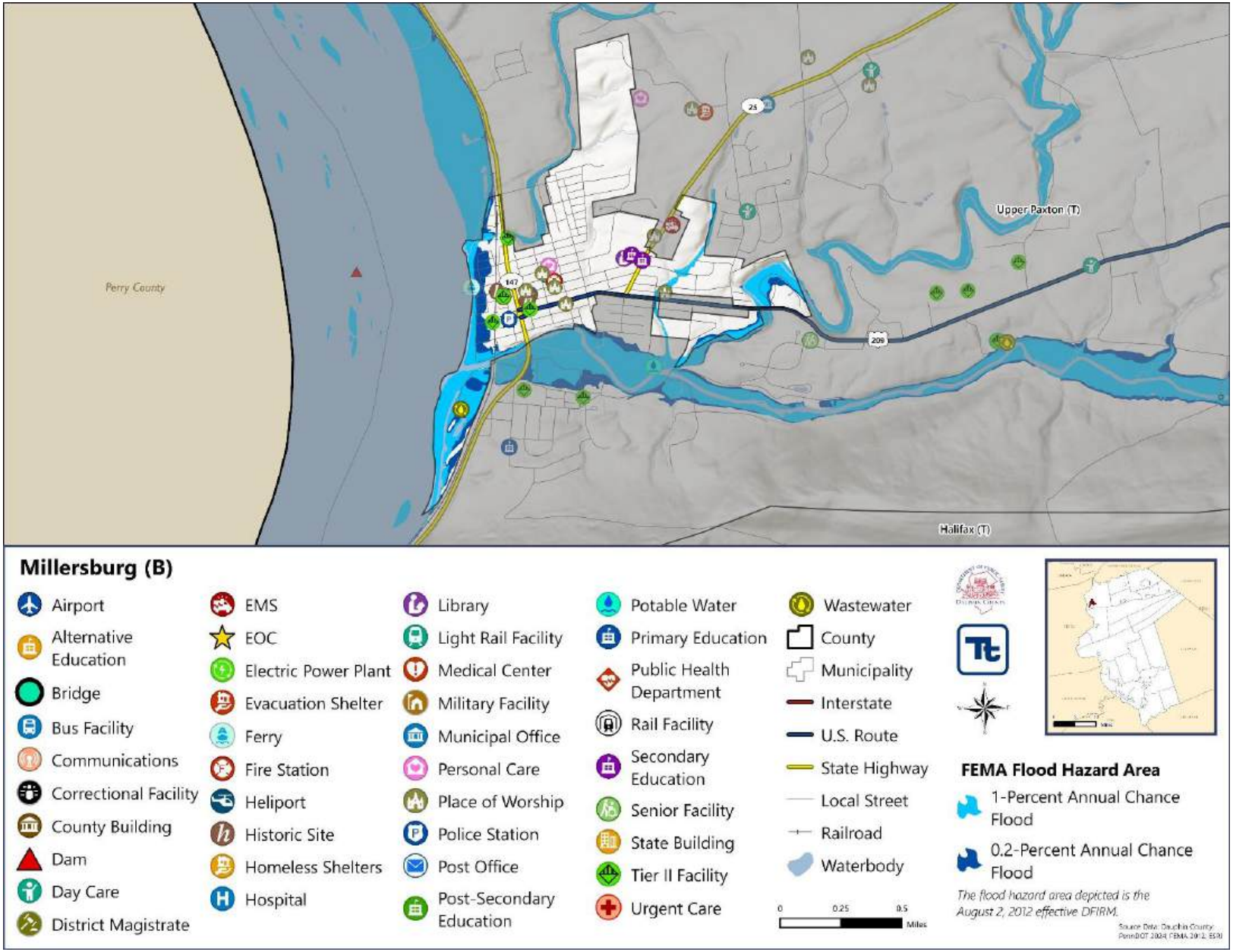
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 0.13 0.25
Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.

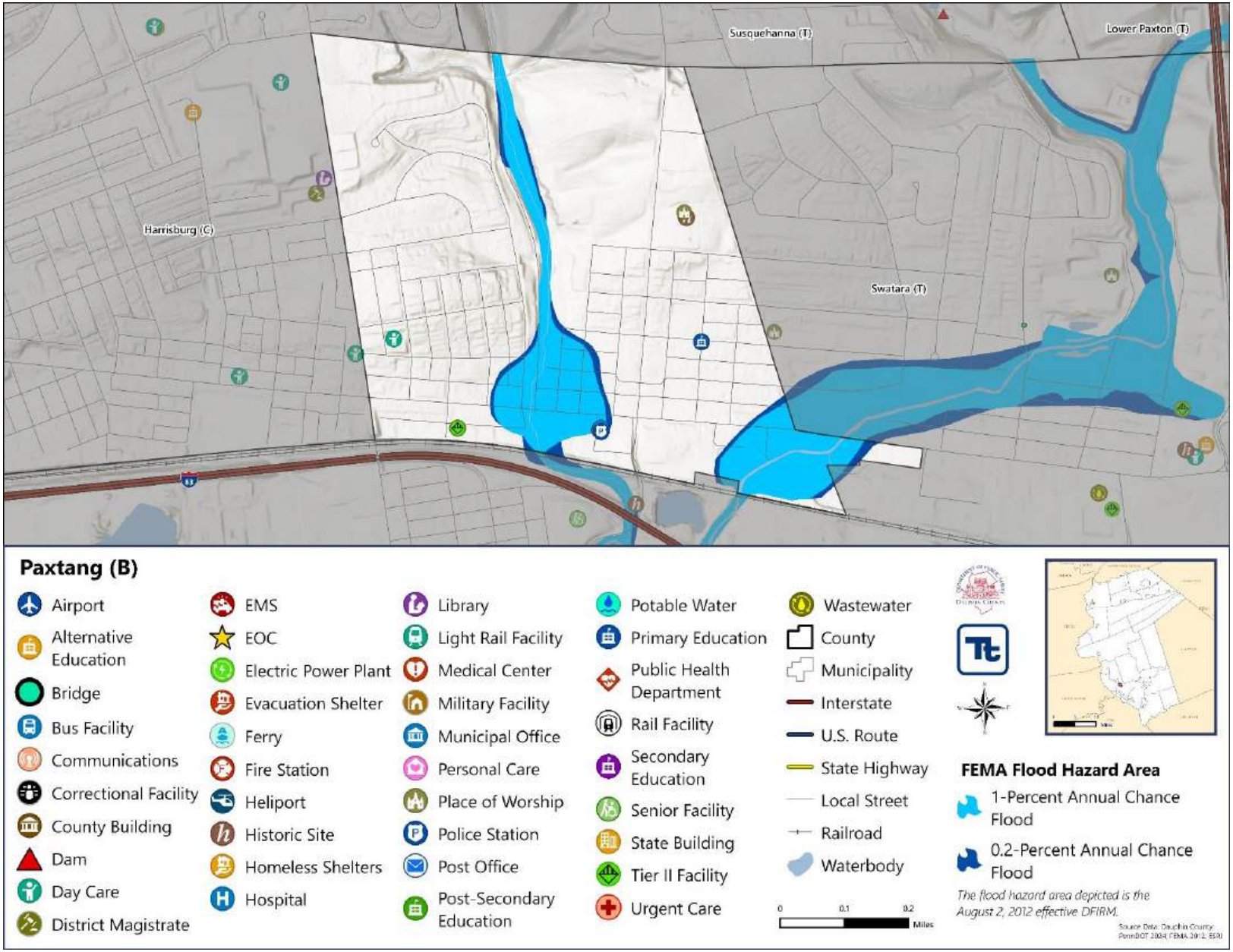

Northumberland County
Schuylkill County
Pillow (B)
Gratz (B)
Berrysburg (B)
Mifflin (T)
Washington (T)
Wiconisco (T)
Williams (T)
Williamstown (B)
Jackson (T)
225
25
209
Lykens (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0
0.75
1.5
Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Halifax (B)
Jackson (T)
Jefferson (T)
Dehart Reservoir
Rush (T)
Wayne (T)
Halifax (T)
Reed (T)
Perry County
East Hanover (T)
Dauphin (B)
Susquehanna River
West Hanover (T)
Lower Paxton (T)
Susquehanna (T)
Middle Paxton (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 1 2 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Highspire (B)
Lower Swatara (T)
Londonderry (T)
Royalton (B)
York County
76
441
230
283
341
Middletown (B)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 0.3 0.6 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Pillow (B)
Northumberland County
Perry County
Susquehanna River
Lykens (T)
Gratz (B)
225
Berrysburg (B)
23
147
Upper Paxton (T)
Wiconisco (T)
Washington (T)
209
Mifflin (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 0.5 1 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Perry County
Upper Paxton (T)
Halifax (T)
25
147
209
Millersburg (B)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0
0.25
0.5
Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.

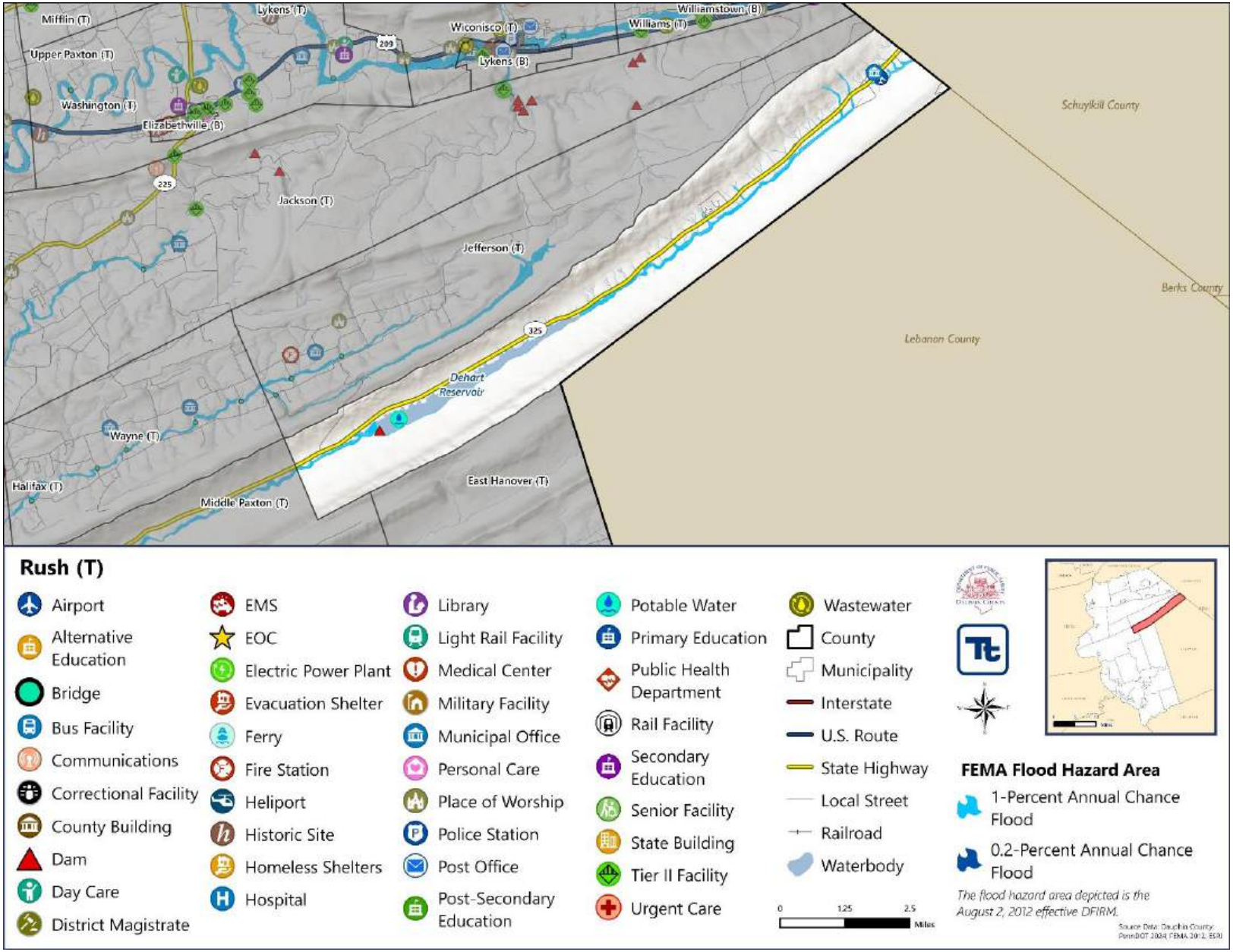

Susquehanna (T)
Lower Paxton (T)
Harrisburg (C)
Swatara (T)
Paxtang (B)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 0.1 0.2 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.

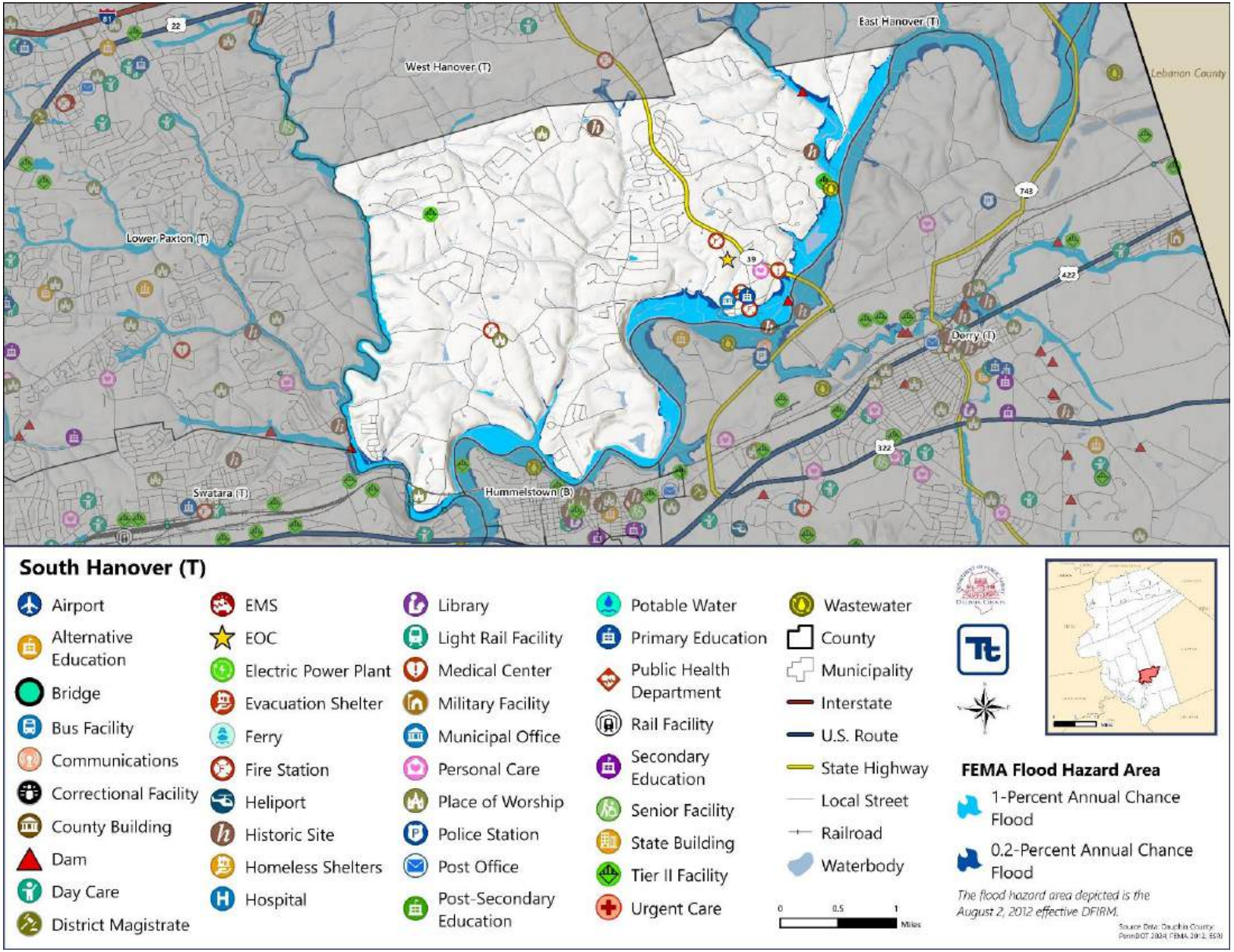

Lower Paxton (T)
Susquehanna (T)
Harrisburg (C)
22
Penbrook (B)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 0.1 0.2 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.

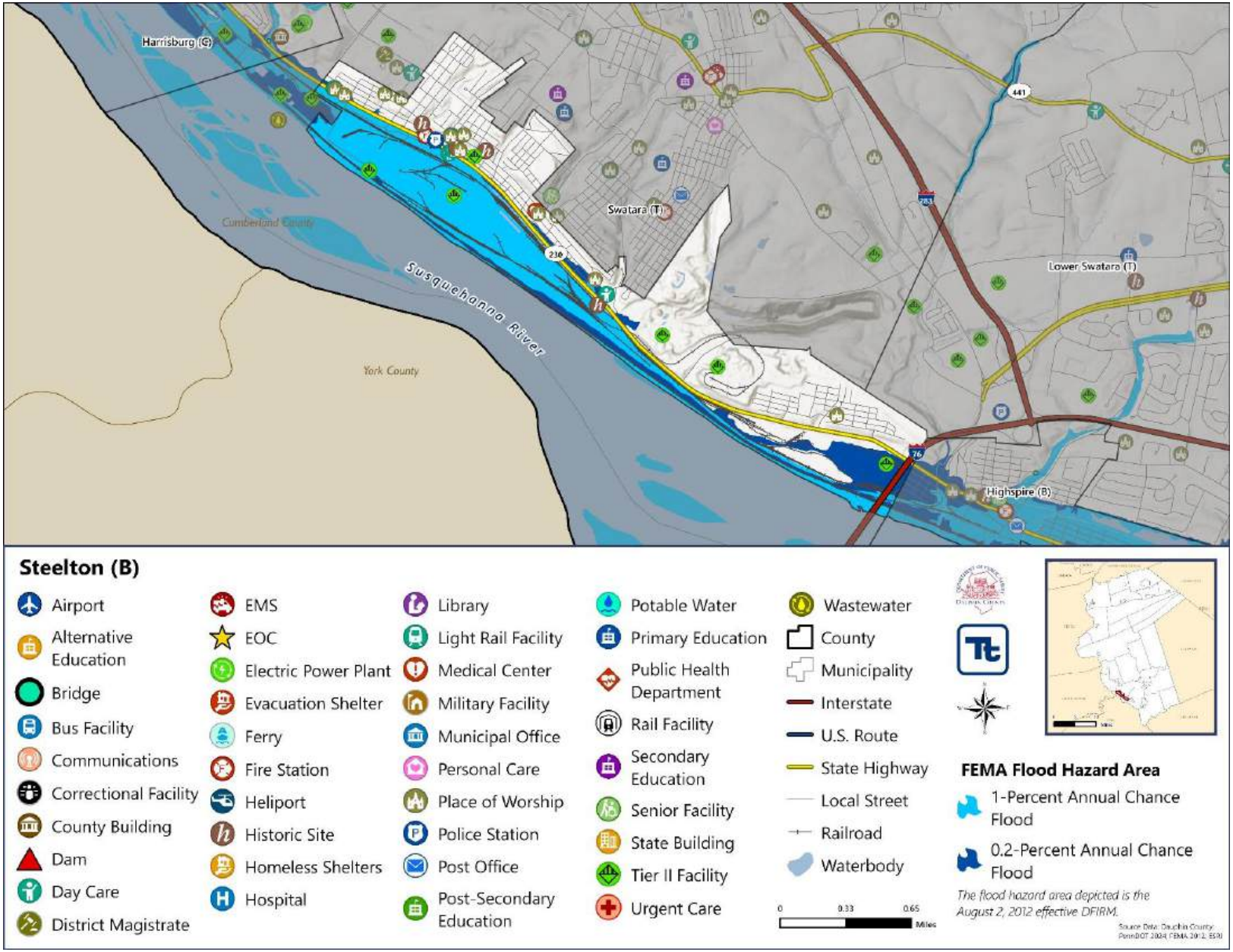

Northumberland County
Lykens (T)
Mifflin (T)
225
Pillow (B)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0
0.13
0.25
Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.

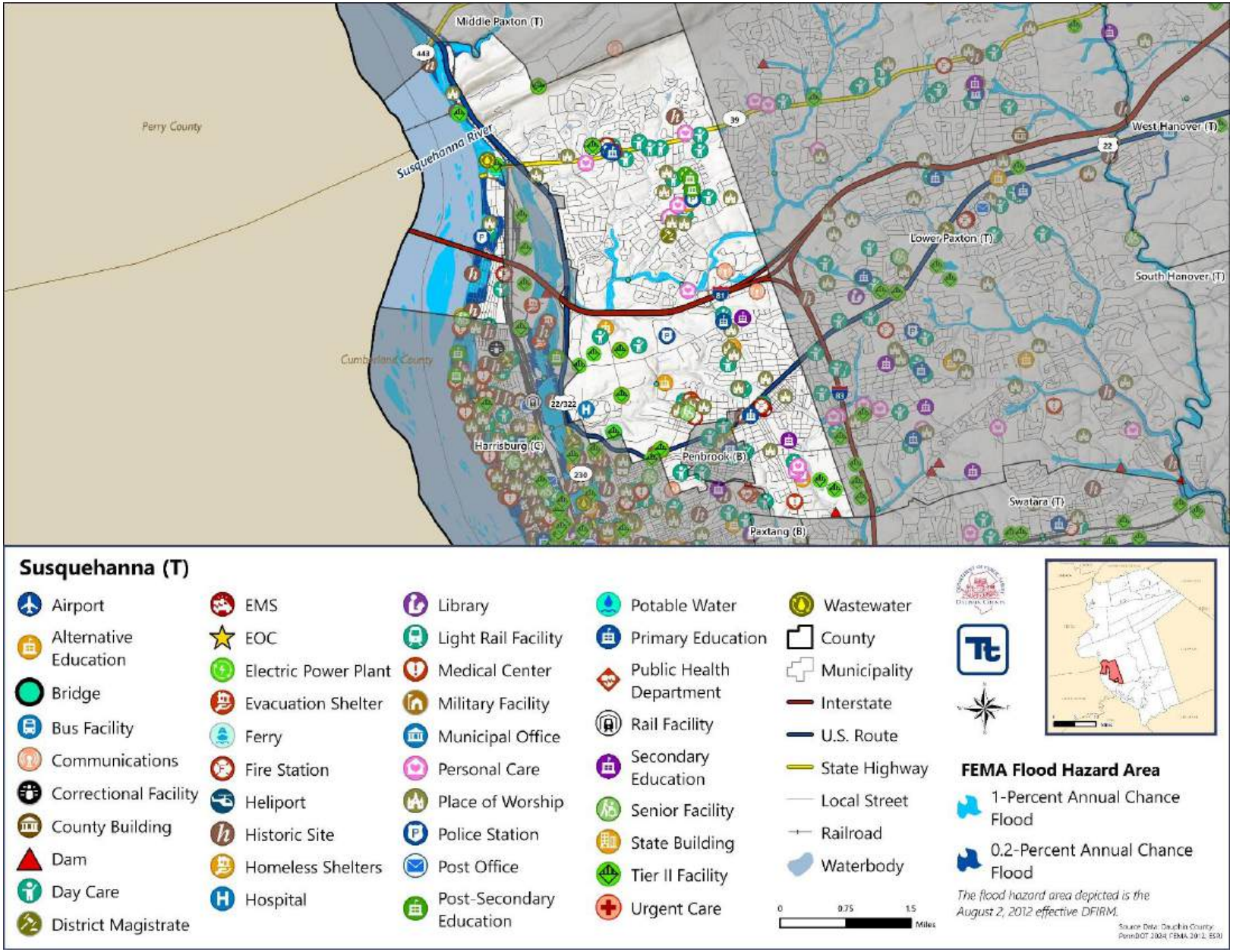

Perry County
Susquehanna River
Halifax (T)
Middle Paxton (T)
11/15
147
225
849
22/322
325
Reed (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0
0.5
1
Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Middletown (B)
Lower Swatara (T)
Londonderry (T)
441
Royalton (B)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0
0.1
0.2
Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Mifflin (T)
Lykens (T)
Wiconisco (T)
Williamstown (B)
Williams (T)
Upper Paxton (T)
209
Lykens (B)
Washington (T)
Elizabethville (B)
Schuylkill County
225
Jackson (T)
Jefferson (T)
Berks County
Lebanon County
325
Dehart Reservoir
Wayne (T)
Halifax (T)
East Hanover (T)
Middle Paxton (T)
Rush (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0
1.25
2.5
Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


West Hanover (T)
East Hanover (T)
Lebanon County
Lower Paxton (T)
Derry (T)
Swatara (T)
Hummelstown (B)
22
81
39
743
422
322
South Hanover (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 0.5 1 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.

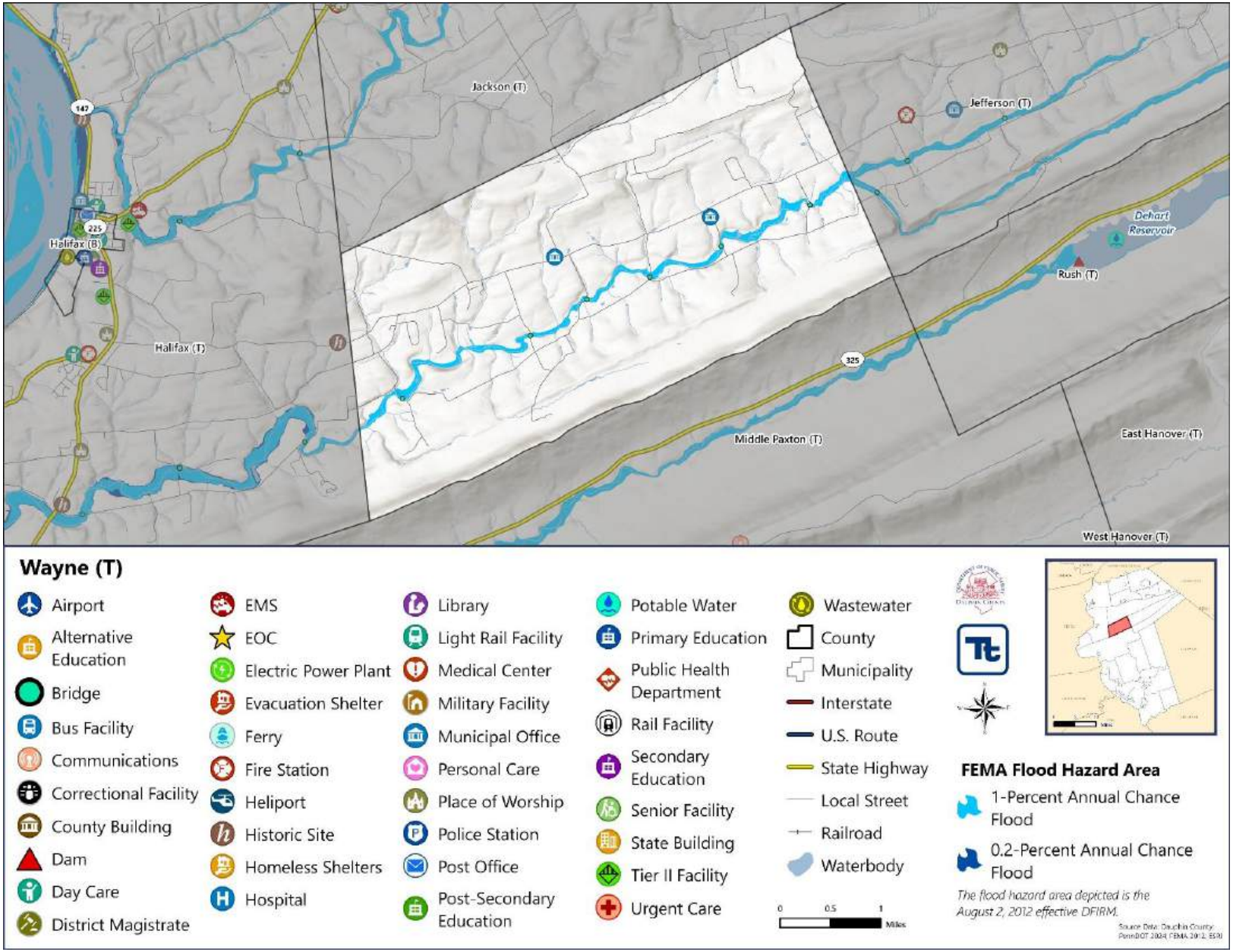

Harrisburg (C)
Swatara (T)
Lower Swatara (T)
Highspire (B)
Cumberland County
York County
Susquehanna River
441
283
230
76
Steelton (B)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0
0.33
0.65
Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.

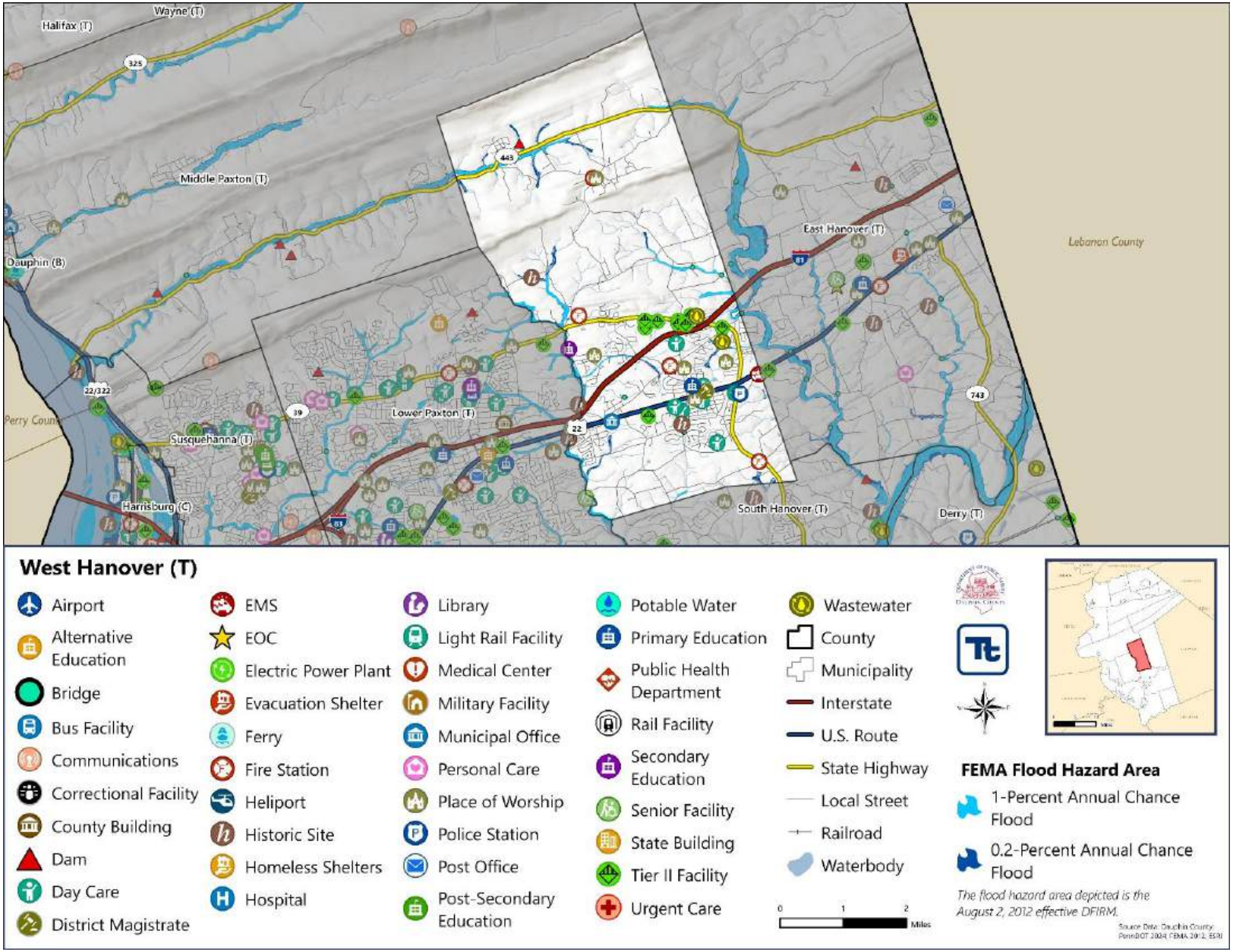

Middle Paxton (T)
Perry County
Susquehanna River
West Hanover (T)
Lower Paxton (T)
South Hanover (T)
Cumberland County
Harrisburg (C)
Penbrook (B)
Swatara (T)
Paxtang (B)
Susquehanna (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 0.75 1.5 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.

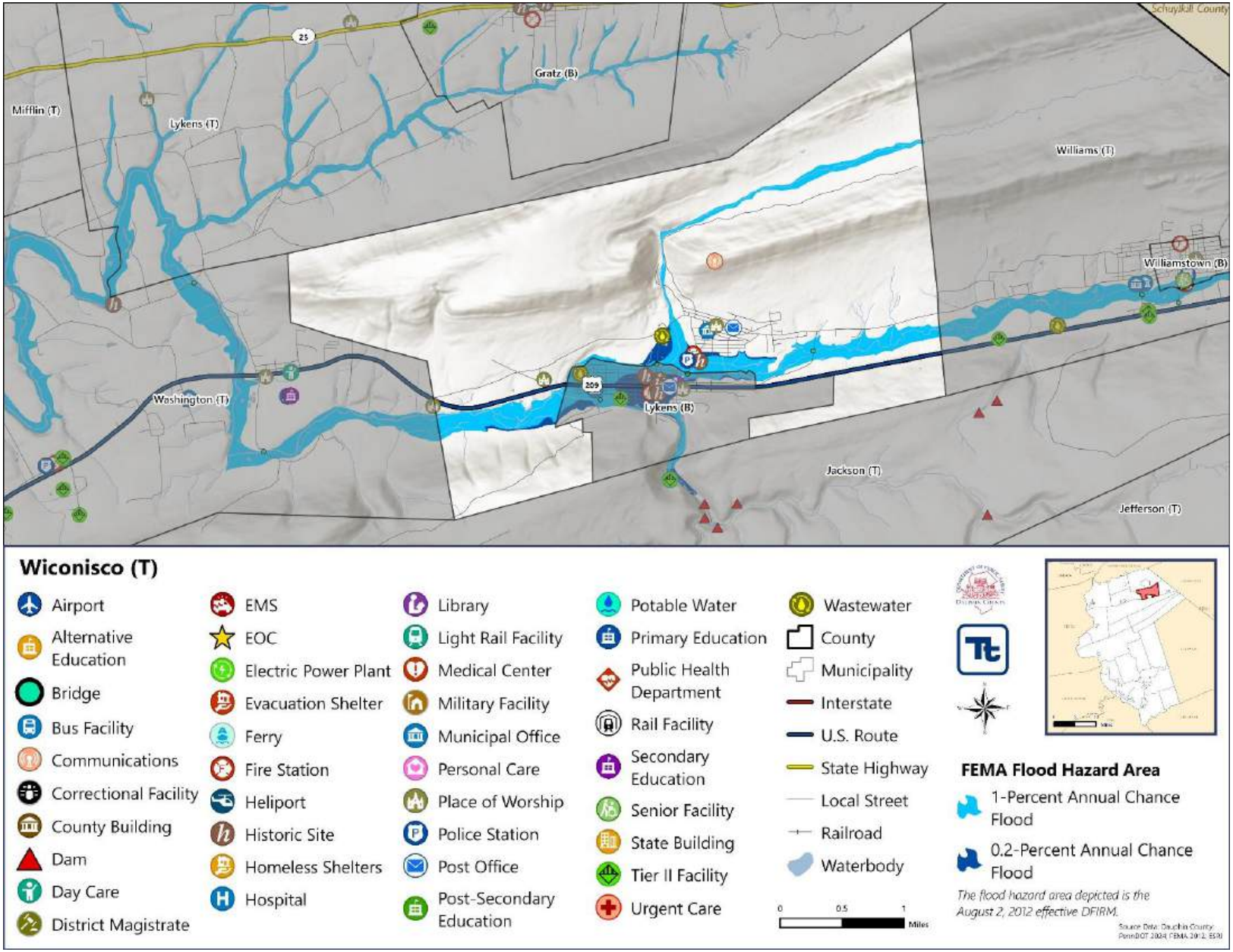

Penbrook (B)
Susquehanna (T)
Lower Paxton (T)
South Hanover (T)
Hummelstown (B)
Harrisburg (C)
Paxtang (B)
Derry (T)
Susquehanna River
Steelton (B)
Lower Swatara (T)
York County
Londonderry (T)
Highspire (B)
Middletown (B)
Swatara (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 0.5 1 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.

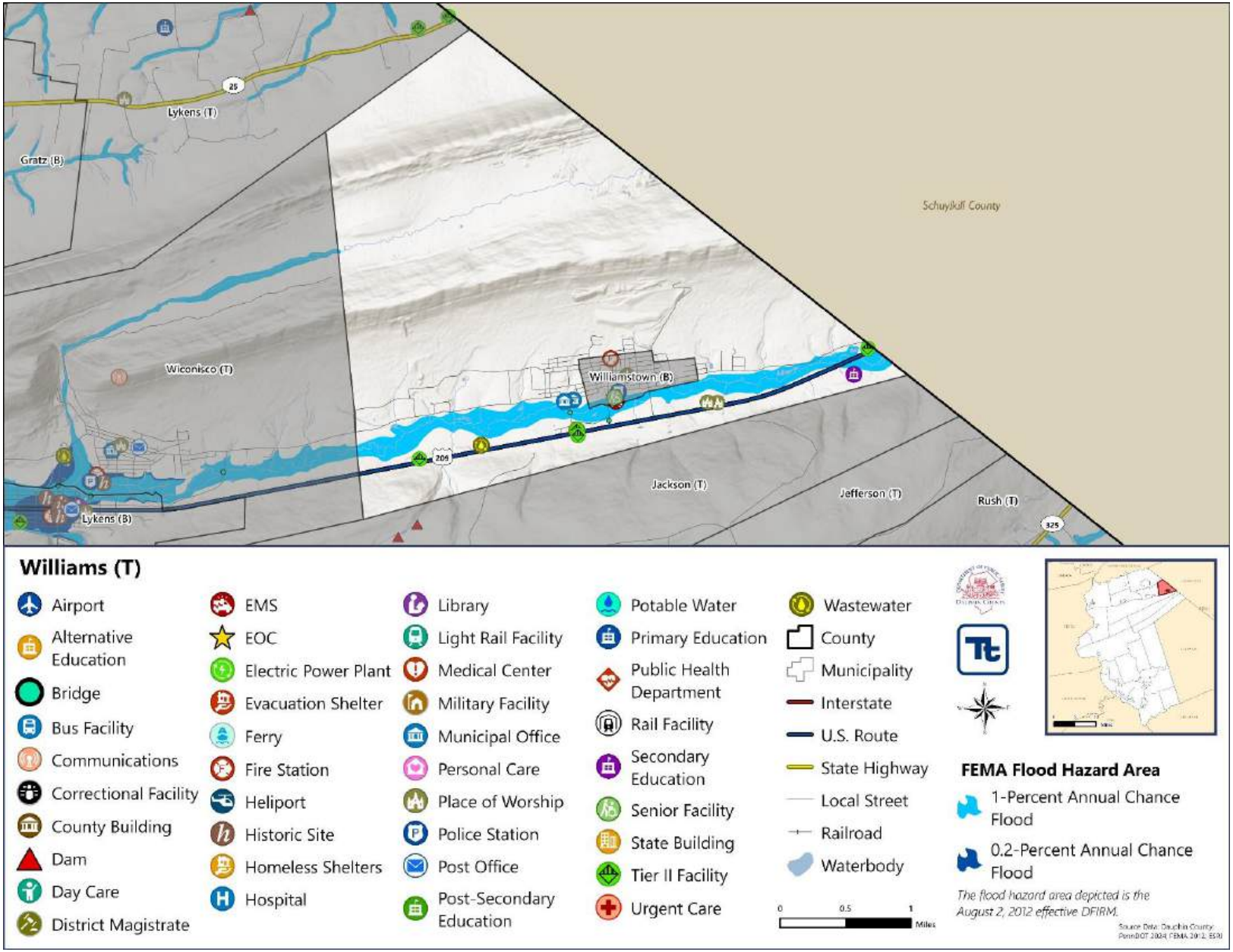

Northumberland County
Juniata County
Perry County
Susquehanna River
Mifflin (T)
Berrysburg (B)
Lykens (T)
Wiconisco (T)
Washington (T)
Elizabethville (B)
Millersburg (B)
Halifax (T)
Jackson (T)
Jefferson (T)
25
147
225
209
Upper Paxton (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 1 2 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Gratz (B)
Lykens (T)
Mifflin (T)
Wiconisco (T)
Lykens (B)
Upper Paxton (T)
Elizabethville (B)
Jackson (T)
Halifax (T)
Jefferson (T)
Washington (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 0.5 1 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Jackson (T)
Jefferson (T)
Halifax (B)
Halifax (T)
Dehart Reservoir
Rush (T)
Middle Paxton (T)
East Hanover (T)
West Hanover (T)
147
225
325
Wayne (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 0.5 1 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Halifax (T)
Wayne (T)
Middle Paxton (T)
Dauphin (B)
East Hanover (T)
Lebanon County
Lower Paxton (T)
Susquehanna (T)
Harrisburg (C)
South Hanover (T)
Derry (T)
West Hanover (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 1 2 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Schuylkill County
Gratz (B)
Mifflin (T)
Lykens (T)
Williams (T)
Williamstown (B)
Washington (T)
Lykens (B)
Jackson (T)
Jefferson (T)
Wiconisco (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
Post Office
Post-Secondary Education
Potable Water
Primary Education
Public Health Department
Rail Facility
Secondary Education
Senior Facility
State Building
Tier II Facility
Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 0.5 1 Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Lykens (T)
Gratz (B)
Schuylkill County
Wiconisco (T)
Williamstown (B)
Jackson (T)
Jefferson (T)
Rush (T)
Lykens (B)
Williams (T)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
Library
Light Rail Facility
Medical Center
Military Facility
Municipal Office
Personal Care
Place of Worship
Police Station
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Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0
0.5
1
Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.


Williams (T)
209
Williamstown (B)
Airport
Alternative Education
Bridge
Bus Facility
Communications
Correctional Facility
County Building
Dam
Day Care
District Magistrate
EMS
EOC
Electric Power Plant
Evacuation Shelter
Ferry
Fire Station
Heliport
Historic Site
Homeless Shelters
Hospital
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Urgent Care
Wastewater
County
Municipality
Interstate
U.S. Route
State Highway
Local Street
Railroad
Waterbody
0 0.05 0.1
Miles
FEMA Flood Hazard Area
1-Percent Annual Chance Flood
0.2-Percent Annual Chance Flood
The flood hazard area depicted is the August 2, 2012 effective DFIRM.

4.3.8 Hurricane, Tropical Storm, Nor'easter

The following section provides the hazard profile (hazard description, location, extent, previous occurrences and losses, probability of future occurrences, and impact of climate change) and vulnerability assessment for the hurricane, tropical storm, and nor'easter hazard in Dauphin County.

4.3.8.1 Hurricanes and Tropical Storm

Tropical cyclones are fueled by a different heat mechanism than other cyclonic windstorms, such as nor'easters and polar lows. The characteristic that separates tropical storms from other cyclonic systems is that at any height in the atmosphere, the center of a tropical storm will be warmer than its surroundings, a phenomenon called *warm core* storm systems (NOAA 2023). Tropical cyclones strengthen when water evaporated from the ocean is released as the saturated air rises, resulting in condensation of water vapor in the moist air. Tropical cyclones begin as disturbed areas of weather, often referred to as tropical waves. As the storm organizes, it is designated as a tropical depression.

A tropical storm system is characterized by a low-pressure center and numerous thunderstorms that produce strong winds of 39 to 73 mph and heavy rain. A hurricane is a tropical storm that attains hurricane status when its wind speed reaches 74 mph or higher. Tropical systems can develop in the Atlantic between the Lesser Antilles and the African coast or in the warm tropical waters of the Caribbean Sea and Gulf of Mexico. These storms can move up the Atlantic Coast of the United States, impacting the eastern seaboard, or move into the United States through the states along the Gulf Coast, bringing wind and rain as far north as New England before moving eastward offshore.

The effects of hurricanes and tropical storms can impact Dauphin County from June to November, the official Atlantic hurricane season (NHC 2024).

4.3.8.2 Location and Extent

Dauphin County is not located along the Atlantic Coast, but hurricanes and tropical storms can track inland, bringing heavy rainfall, strong winds, and flooding. These storms 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 Dauphin County are equally subject to the impacts of hurricanes and tropical storms. Areas in Dauphin County that are subject to flooding and wind damage are particularly vulnerable.

Tropical Storm and Hurricane Tracks

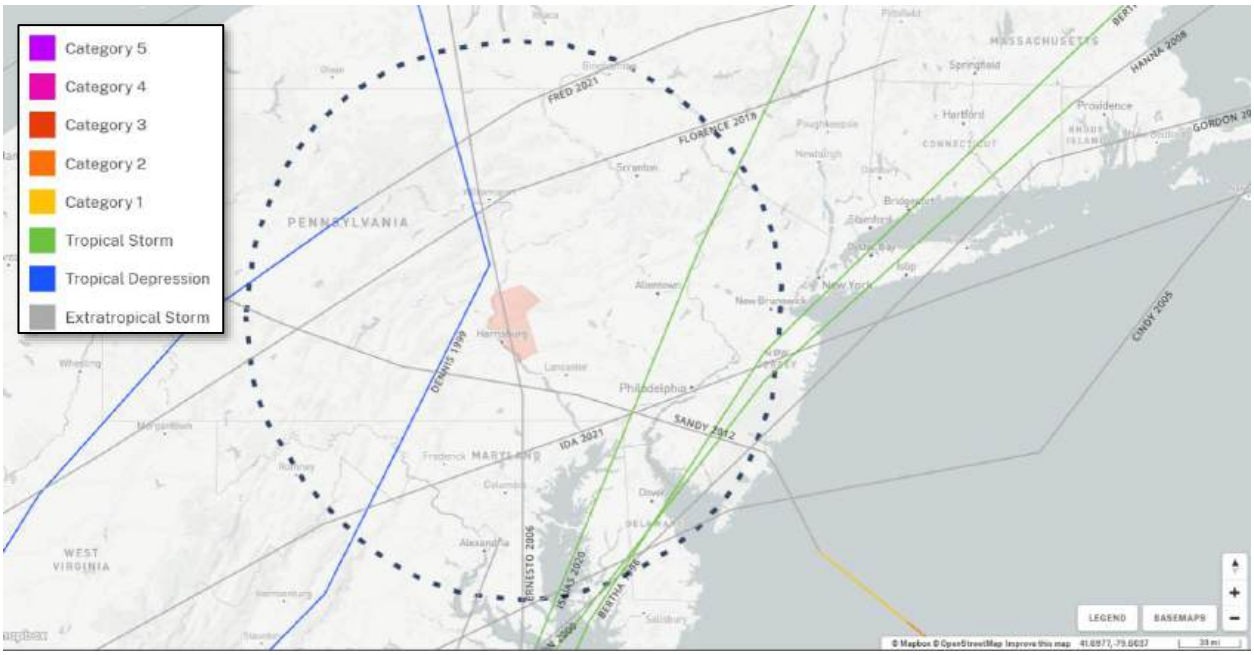
NOAA's Historical Hurricane Tracks tool is a public interactive mapping application that displays Atlantic Basin and East-Central Pacific Basin tropical cyclone data. This interactive tool catalogs tropical cyclones that have occurred from 1842 to 2022 (the latest data available from the data source). Between 1842 and 2022, 37 events classified as either a hurricane, tropical storm, tropical depression, or extra-tropical storm tracked within 60 nautical miles of Dauphin County. Table 4.3.8-1 displays tropical cyclone tracks for Dauphin County that tracked 60 nautical miles between 1842 and 2022. Any events not displayed in the figure below did not track within 60 nautical miles of the County. However, these events could have severely impacted the County with strong winds, power outages, and other damage. Section 4.3.8.4 provides further information regarding hurricane and tropical storm events that have impacted Dauphin County.

The National Weather Service (NWS) issues hurricane and tropical storm watches and warnings. These watches and warnings are issued or will remain in effect after a tropical cyclone becomes post-tropical when such a storm

poses a significant threat to life and property. The NWS allows the NHC to issue advisories during the post-tropical stage. The following are the definitions of the watches and warnings (NHC 2024):

- A *Hurricane/Typhoon Warning* is issued when sustained winds of 74 mph or higher are expected somewhere within the specified area in association with a tropical, subtropical, or post-tropical cyclone. Because hurricane preparedness activities become difficult once winds reach tropical storm force, the warning is issued 36 hours in advance of the anticipated onset of tropical-storm-force winds. The warning can remain in effect when dangerously high water or a combination of dangerously high water and waves continue, even though winds may be less than hurricane force.
- A *Hurricane Watch* is issued when sustained winds of 74 mph or higher are possible within the specified area in association with a tropical, subtropical, or post-tropical cyclone. Because hurricane preparedness activities become difficult once winds reach tropical storm force, the hurricane watch is issued 48 hours prior to the anticipated onset of tropical-storm-force winds.
- A *Tropical Storm Warning* is issued when sustained winds of 39 to 73 mph are expected somewhere within the specified area within 36 hours in association with a tropical, subtropical, or post-tropical storm.
- A *Tropical Storm Watch* is issued when sustained winds of 39 to 73 mph are possible within the specified area within 48 hours in association with a tropical, subtropical, or post-tropical storm.

Figure 4.3.8-1. Tropical Systems Tracking within 100 mi of Dauphin Co. (1996-2024)



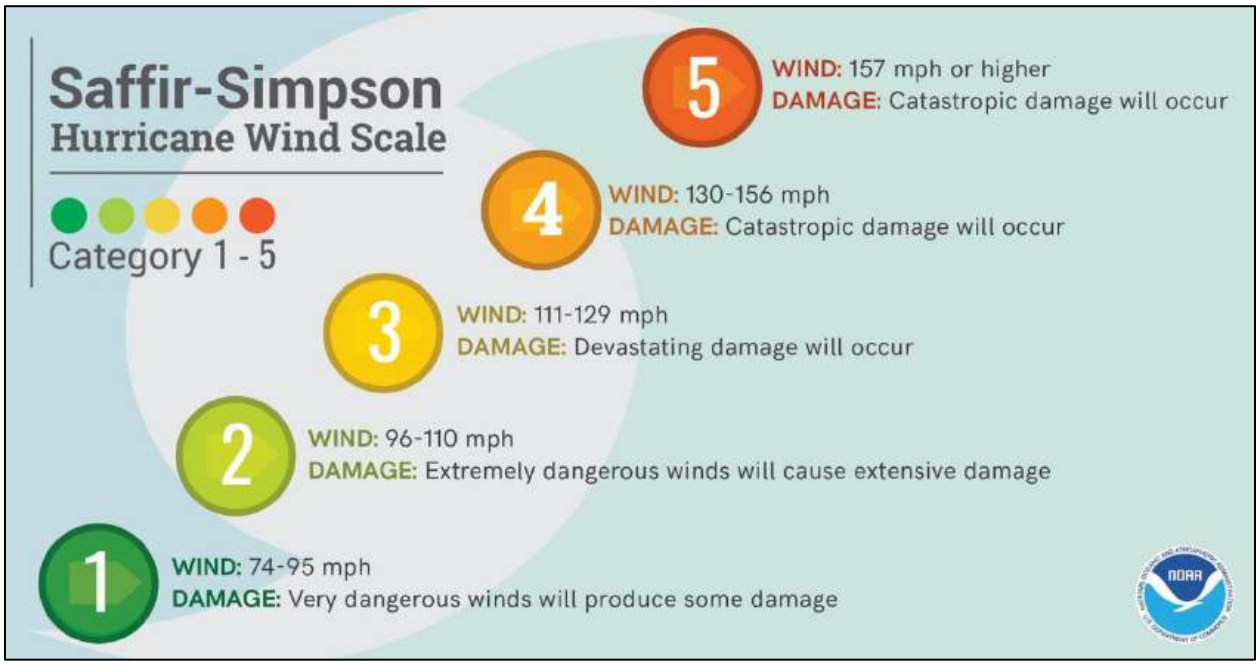
Source: (NOAA 2024)

4.3.8.3 Range of Magnitude

The extent of a hurricane or tropical storm is commonly categorized in accordance with the Saffir-Simpson Hurricane Wind Scale, which assigns a designation of tropical storm for storms with sustained wind speeds below 74 mph and a hurricane category rating of 1–5 based on a hurricane's increasing sustained wind speed. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered *major hurricanes* because of their potential for significant loss of life and damage. Tropical Storms and Category 1 and

2 storms are still dangerous and require preventative measures (NOAA 2024). Figure 4.3.8-1 presents this scale, which is used to estimate the potential property damage and flooding expected when a hurricane makes landfall.

Figure 4.3.8-1. The Saffir-Simpson Scale

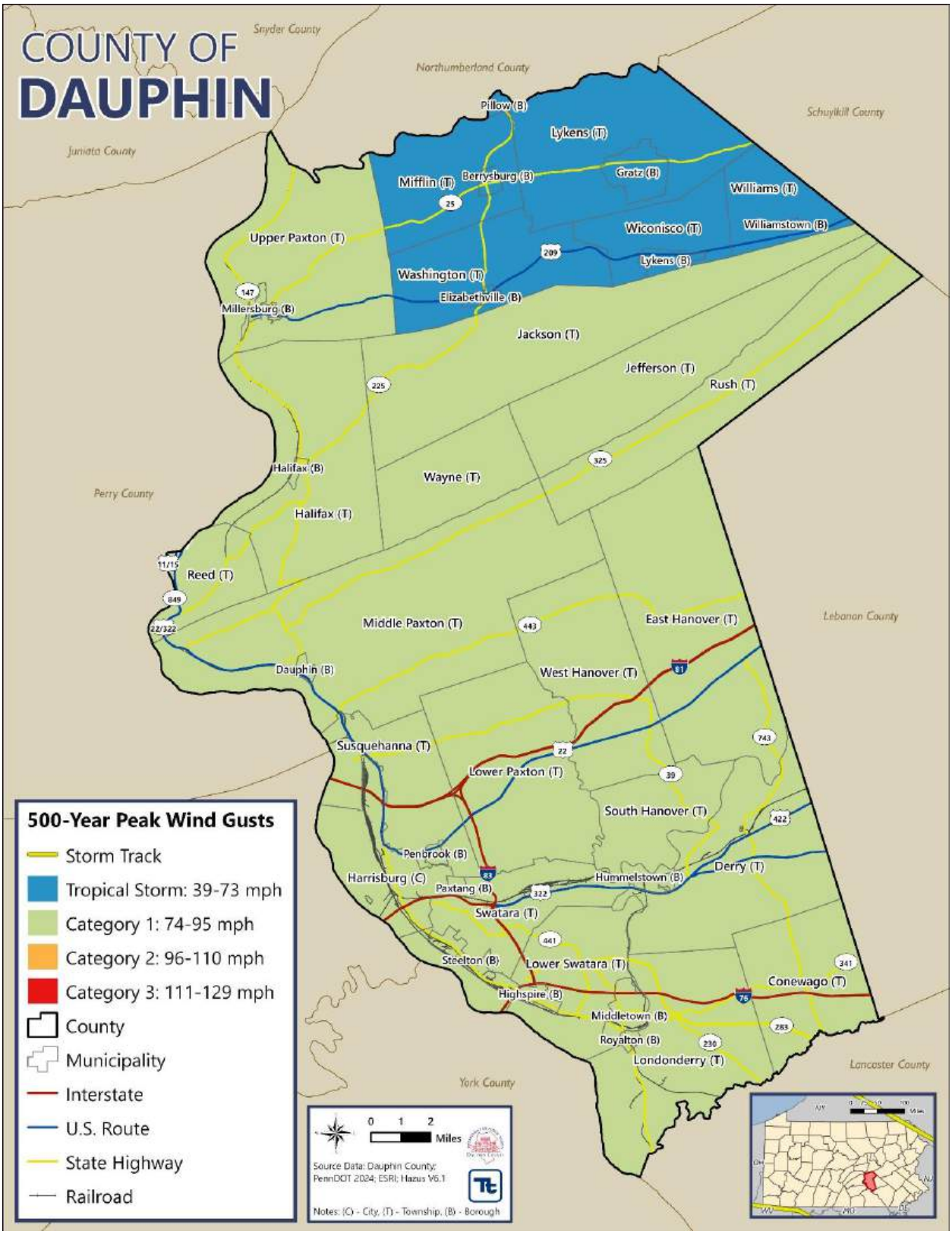


Source: NOAA, 2024; Martin, 2018

Mean Return Period

Peak wind speed projections were generated using Hazus. For the 100-year MRP event, the maximum 3-second wind speeds range from 6.56–70.5 miles per hour (mph), characteristic of a tropical storm. For the 500-year MRP event, the maximum 3-second gust wind speeds range from 83.3-87.4 mph, characteristic of a high-level tropical storm or Category 1 hurricane. Hazus did not generate the hurricane track for the 100-year probabilistic events. The associated impacts and losses from the 500-year MRP hurricane event model run are reported in the vulnerability assessment. Figure 4.3.8-2 shows the estimated maximum 3-second gust wind speeds that can be anticipated in the study area associated with the 500-year MRP events.

Figure 4.3.8-2. Wind Speeds for the 500-Year Mean Return Period Event



4.3.8.4 Past Occurrence

Between 1842 and 2021, 52 events classified as either hurricanes, tropical storms, or tropical depressions were tracked within 60 nautical miles of Dauphin County (NOAA NCEI 2024).

FEMA Major Disasters and Emergency Declarations

Between 1954 and 2024, Dauphin County was included in 22 FEMA-declared major disaster (DR) and/or emergency declaration (EM) disasters, and of these, ten were related to hurricanes and tropical systems. Table 4.3.8.4-1 profiles these ten declarations along with some basic event information as listed in the FEMA disaster declaration archives. (FEMA 2024)). The most recent was when the remnants of Hurricane Ida tracked NE across Tennessee and West Virginia in 2021.

Table 4.3.8.4-1. Hurricane/Tropical Storm-Related Declarations for Dauphin County, 1954 to 2024

FEMA Declaration Number	Declaration Date	Date(s) of Incident	Incident Type	Declaration Title
DR-340-PA	June 23, 1972	June 23, 1972	Flood	Tropical Storm Agnes
DR-1298-PA	September 22, 1999	September 6-7, 1999	Flood	Tropical Depression Dennis PA
DR-1555-PA	September 19, 2004	September 8-9, 2004	Severe Storm	Severe Storms and Flooding Associated with Tropical Depression Frances
DR-1557-PA	September 19, 2004	September 17–October 1, 2004	Tropical Depression Ivan	Tropical Depression Ivan
EM-3235	September 10, 2005	August 29–October 1, 2005	Hurricane	Hurricane Katrina, the County was impacted by assisting in the evacuation and relocation of residents in impacted areas along the Gulf Coast
EM-3340-PA DR-4030-PA	September 8, 2011 September 12, 2011	September 3 – October 15, 2011	Flood	Remnants of Tropical Storm Lee Tropical Storm Lee
EM-3356-PA DR-4099-PA	October 29, 2012 January 10, 2013	October 26-November 8, 2012	Hurricane	Hurricane Sandy
DR-4618-PA	September 10, 2021	August 31, 2021 - September 5, 2021	Hurricane	Remnants of Hurricane Ida

Source: (FEMA 2024)

USDA Declarations

The Secretary of Agriculture from the U.S. Department of Agriculture (USDA) is authorized to designate counties as disaster areas to make emergency loans to producers suffering losses in those counties and contiguous counties. Between 2021 and 2024, Dauphin County was not included in any USDA hurricane-, tropical storm-, or nor'easter-related agricultural disaster declarations (USDA 2024).

Previous Events

For this 2024 Hazard Mitigation Plan (HMP) update, hurricane and tropical storm events, including FEMA disaster declarations that impacted Dauphin County between September 2021 and September 2024, are identified in Table 4.3.8.4-2. Because documentation for these types of events is so extensive, not all sources have been identified or researched. Therefore, Table 4.3.8.4-2 may not include all events that occurred throughout the County. For events that have occurred prior to 2021, refer to the 2021 Dauphin County HMP.

Table 4.3.8.4-2. Tropical Cyclone Events Impacting Dauphin County, PA from 2021 to 2024

Date(s) of Event	Event Type	FEMA Declaration Number (if applicable)	County Designated?	Event Details
August 18, 2021	Remnants of Tropical Storm Fred	N/A	No	The remnants of Tropical Storm Fred brought heavy rain and strong thunderstorms to central Pennsylvania, as well as an EF1 tornado all of which produced an estimated $31,000 in cumulative damage to Dauphin County property.
August 31-September 5, 2021	Remnants of Hurricane Ida	DR-4618-PA	Yes	Post-Tropical Cyclone Ida brought heavy rain to eastern Pennsylvania on September 1. Rainfall totals were as high as 5 to 10 inches. The heavy rain caused significant flash flooding, mainly in the southeastern part of the state. It resulted in widespread property damage. There were several fatalities. Widespread flash flooding occurred in Dauphin County with numerous road closures. Many creeks in the County overflowed their banks, including Chester Creek, Ridley Creek, Crum Creek, and Cobbs Creek. $15 million in damage was reported.
September 21-24, 2023	Remnants of Tropical Storm Ophelia	N/A	No	Widespread rainfall fell across Dauphin County after Tropical Storm Ophelia initially made landfall in the Carolinas a few days earlier. Dissipating quickly over NC and VA, the center of Ophelia curved eastward across the northern Chesapeake Bay region,

Sources: (FEMA 2024); (NOAA NCEI 2024)

4.3.8.5 Future Occurrence

For the 2024 HMP update, the most up-to-date data was collected to calculate the probability of future occurrence of hurricane and tropical storm events for Dauphin County. Table 4.3.8.5-1 below are these statistics as well as the annual average number of events and the estimated percent chance of an incident occurring each year.

Table 4.3.8.5-1. Probability of Future Hurricane and Tropical Storm Events in Dauphin Co.

Hazard Type	Number of Occurrences Between 1996 and 2024	Percent chance of occurrence in any given year
Tropical Depression	2	6.9%
Tropical Storm	3	10.3%
Extratropical Storms	7	24.1%
Total	**12**	**34.5%**

Source: (NOAA NCEI 2024); (FEMA 2024); (NOAA 2024)

Notes: Due to data limitations and reporting inconsistencies between various federal agencies, the NHC Historical Hurricane Tracks (Figure 4.3.8-) database provided the bulk of storm impacts since it shows previous tracks coming within 100 miles of the Co.

It is estimated Dauphin County will continue to experience direct and indirect impacts of hurricanes, and tropical storms annually that can induce secondary hazards, such as flooding, extreme wind, infrastructure deterioration or failure, utility failures, power outages, water quality, and supply concerns, and transportation delays, accidents, and inconveniences. Therefore, the future occurrence of hurricanes and tropical storms in Dauphin County can be characterized as *possible*, as defined by the Risk Factor Methodology probability criteria, as provided in Table 4.4-1.

4.3.8.6 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed and vulnerable in the identified hazard area. For hurricanes and tropical storms, the entirety of Dauphin County has been identified as a hazard area. Therefore, all assets in the County (population, structures, critical facilities, and lifelines), as described in the county profile, are vulnerable. Potential losses associated with high-wind events were calculated for the County for one probabilistic hurricane event: the 500-year MRP hurricane events. The following section evaluates and estimates the potential impact of the hurricane, tropical storm, and nor'easter hazard on the County, including:

- Impact on (1) life, health, and safety; (2) general building stock; (3) critical facilities; (4) economy; (5) environment; and (6) future growth and development.
- Effects of climate change on vulnerability.
- Further data collection that will assist in understanding this hazard over time.

Impact on Life, Health, and Safety

Overall Population

For the purposes of this HMP, the entire population of Dauphin County (289,401 people) is exposed to hurricane, tropical storm, and nor'easter events (U.S. Census Bureau 2020). Residents might be displaced or require temporary to long-term sheltering. In addition, downed trees, damaged buildings, and debris carried by high winds can lead to injury or loss of life. Socially vulnerable populations are most susceptible based on several factors, including their physical and financial ability to react or respond during a hazard and the location and construction quality of their housing. Hazus estimates no households will be displaced and temporary shelter will not be required as a result of the 500-year MRP event.

Socially Vulnerable Population

Factors that make populations vulnerable to hurricanes, tropical storms, and nor'easters include the physical and financial ability to react or respond during a hazard and the location and construction quality of their housing. Economically disadvantaged populations might lack funds to evacuate or pay for alternative sheltering such as a hotel. The population over the age of 65 might require extra time or outside assistance during evacuations and are more likely to need medical attention that might not be available due to isolation during a storm event. Section 2 (County Profile) provides statistics on these populations.

Impact on General Building Stock

It is assumed that the entire County's general building stock is exposed to the severe storm wind hazard ($90,860,263). Building construction plays a major role in the extent of damage resulting from a severe storm event. Due to differences in construction, residential structures are generally more susceptible to wind damage than commercial and industrial structures. Wood and masonry buildings, in general, regardless of their occupancy class, tend to experience more damage than concrete or steel buildings. High-rise buildings are also very vulnerable structures. Mobile homes are the most vulnerable to damage, even if tied down, and offer little protection to people inside.

The Hazus wind model was run to estimate potential losses to buildings. Expected building damage was evaluated across the following wind damage categories: no damage/very minor damage, minor damage, moderate damage, severe damage, and destruction. Table 4.3.8.6-1 summarizes the definition of the damage categories.

Table 4.3.8.6-1. Description of Damage Categories

Qualitative Damage Description	Roof Cover Failure	Window Door Failures	Roof Deck	Missile Impacts on Walls	Roof Structure Failure	Wall Structure Failure
No Damage or Very Minor Damage Little or no visible damage from the outside. No broken windows, or failed roof deck. Minimal loss of roof cover, with no or very limited water penetration.	≤2%	No	No	No	No	No
Minor Damage Maximum of one broken window, door, or garage door. Moderate roof cover loss that can be covered to prevent additional water from entering the building. Marks or dents on walls require painting or patching for repair.	>2% and ≤15%	One window, door, or garage door failure	No	<5 impacts	No	No
Moderate Damage Major roof cover damage, and moderate window breakage. Minor roof sheathing failure. Some resulting damage to the interior of a building from water.	>15% and ≤50%	> one and ≤ the larger of 20% & 3	1 to 3 panels	Typically 5 to 10 impacts	No	No
Severe Damage Major window damage or roof sheathing loss. Major roof cover loss. Extensive damage to the interior from water.	>50%	> the larger of 20% & 3 and ≤50%	>3 and ≤25%	Typically 10 to 20 impacts	No	No
Destruction Complete roof failure and/or, failure of wall frame. Loss of more than 50% of roof sheathing.	Typically >50%	>50%	>25%	Typically >20 impacts	Yes	Yes

Source: HAZUS-MH Hurricane Technical Manual

Table 4.3.8.6-2 summarizes the building value damage estimated for the 500-year MRP hurricane events. Damage estimates are reported for the County's probabilistic Hazus model scenarios. The data shown indicates total losses associated with wind damage to building structure and content.

The total damage to buildings for all occupancy types across Dauphin County is estimated to be approximately $3,614,272 for the 500-year MRP hurricane event, respectively. Most of these losses are to the residential building category. Due to differences in building construction, residential structures are generally more susceptible to hurricane damage than commercial and industrial structures. The damage counts include buildings damaged at all severity levels from minor damage to destruction. Total dollar damage reflects the overall impact on buildings at an aggregate level. The City of Harrisburg would experience the greatest damage, losing approximately $626,911 in a 500-year MRP event.

Table 4.3.8.6-2. Estimated Building Value Damaged by the 500-Year MRP Hurricane

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Building Loss - 500-Year Mean Return Period Hurricane				
	Estimated Building Losses (All Occupancies)	Estimated Building Losses (Residential)	Estimated Building Losses (Commercial)	Estimated Building Losses (Industrial)	Estimated Damages (All Other Occupancies)
Berrysburg (B)	$92,435	$71,785	$5,100	$2,282	$13,267
Conewago (T)	$1,846,930	$1,660,753	$78,158	$5,931	$102,088
Dauphin (B)	$162,878	$152,805	$5,553	$232	$4,288
Derry (T)	$12,065,236	$7,355,504	$4,287,126	$54,883	$367,723

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Building Loss - 500-Year Mean Return Period Hurricane				
	Estimated Building Losses (All Occupancies)	Estimated Building Losses (Residential)	Estimated Building Losses (Commercial)	Estimated Building Losses (Industrial)	Estimated Damages (All Other Occupancies)
East Hanover (T)	$2,242,952	$1,811,110	$305,263	$10,502	$116,078
Elizabethville (B)	$247,594	$202,718	$23,072	$3,948	$17,856
Gratz (B)	$193,535	$150,300	$10,679	$4,778	$27,778
Halifax (B)	$169,958	$141,099	$14,924	$1,083	$12,852
Halifax (T)	$1,159,889	$964,313	$98,515	$7,297	$89,765
Harrisburg (C)	$11,966,492	$8,127,138	$3,137,618	$74,824	$626,911
Highspire (B)	$938,617	$867,453	$56,472	$1,234	$13,458
Hummelstown (B)	$1,433,941	$1,339,947	$66,885	$2,834	$24,275
Jackson (T)	$564,306	$478,789	$24,604	$2,866	$58,047
Jefferson (T)	$154,096	$130,787	$6,612	$780	$15,916
Londonderry (T)	$3,052,933	$2,415,765	$501,990	$1,395	$133,782
Lower Paxton (T)	$15,142,246	$13,566,781	$1,372,515	$12,870	$190,079
Lower Swatara (T)	$4,656,964	$2,851,231	$1,395,583	$63,882	$346,267
Lykens (B)	$246,535	$236,093	$6,107	$1,620	$2,716
Lykens (T)	$556,293	$432,018	$30,696	$13,734	$79,845
Middle Paxton (T)	$1,460,031	$1,369,665	$49,840	$2,085	$38,441
Middletown (B)	$2,687,789	$2,447,977	$181,884	$2,617	$55,312
Mifflin (T)	$317,263	$246,387	$17,506	$7,833	$45,537
Millersburg (B)	$642,802	$575,077	$39,903	$7,163	$20,659
Paxtang (B)	$425,264	$378,533	$39,265	$0	$7,466
Penbrook (B)	$747,447	$690,233	$42,442	$0	$14,772
Pillow (B)	$76,307	$59,260	$4,211	$1,884	$10,952
Reed (T)	$105,059	$87,220	$9,225	$670	$7,944
Royalton (B)	$404,394	$319,915	$66,577	$183	$17,719
Rush (T)	$123,709	$116,058	$4,217	$176	$3,257
South Hanover (T)	$2,737,805	$2,300,684	$57,117	$3,683	$376,321
Steelton (B)	$2,075,685	$1,424,541	$328,576	$296,864	$25,705
Susquehanna (T)	$8,641,269	$7,436,085	$821,431	$12,135	$371,619
Swatara (T)	$7,662,292	$6,254,668	$1,183,622	$77,743	$146,258
Upper Paxton (T)	$1,079,510	$938,885	$57,804	$19,053	$63,768
Washington (T)	$596,796	$488,665	$55,580	$9,515	$43,035
Wayne (T)	$330,681	$280,246	$15,199	$1,703	$33,534
West Hanover (T)	$3,365,723	$3,028,956	$254,857	$6,273	$75,636
Wiconisco (T)	$190,645	$182,570	$4,723	$1,252	$2,100
Williams (T)	$157,110	$144,848	$5,486	$805	$5,971
Williamstown (B)	$138,855	$128,018	$4,849	$711	$5,277
Dauphin County (Total)	**$90,860,263**	**$71,854,881**	**$14,671,786**	**$719,324**	**$3,614,272**

Source: Hazus v6.1; Dauphin County 2024; RS Means 2024

Notes: The Total Damages column represents the sum of damages for all occupancy classes (residential, commercial, industrial, agricultural, educational, religious, and government) based on improvement value.

Impact on Critical Facilities

Utility infrastructure could suffer damage from high winds associated with falling tree limbs or other debris, resulting in the loss of power. Loss of service can impact residents and business operations alike. Interruptions in heating or cooling utilities can affect populations such as the young and elderly, who are particularly vulnerable to temperature-related health impacts. Loss of power can impact other public utilities, including potable water, wastewater treatment, and communications. In addition to public water services, property owners with private wells might not have access to potable water due to pump failure until power is restored. Lack of power to emergency facilities, including police, fire, EMS, and hospitals, will inhibit a community's ability to effectively respond to an event and maintain the safety of its citizens.

Overall, all critical facilities are exposed to wind hazards. Hazus estimates the probability that critical facilities (i.e., medical facilities, fire/EMS, police, EOC, schools, and user-defined facilities such as shelters and municipal buildings) could sustain damage as a result of a 500-year MRP wind event. Additionally, Hazus estimates the loss of use for each facility in several days. Due to the sensitive nature of the critical facility dataset, individual facility estimated loss is not provided.

Table 4.3.8.6-3 and summarizes the percent probability that each facility type may experience damage as a result of the 500-year MRP event.

Table 4.3.8.6-3. Estimated Impacts to Critical Facilities for the 500-Year Mean Return Period Hurricane-Related Winds

Lifeline Category	Loss of Days	Average Percent Probability of Sustaining Damage 500-Year Mean Return Period Hurricane			
		Minor	Moderate	Severe	Complete
Communications	0	0.6%	0.1%	<0.1%	0.0%
Energy	0	1.6%	0.3%	<0.1%	0.0%
Food, Hydration, Shelter	0	1.7%	0.2%	<0.1%	0.0%
Hazardous Materials	0	2.1%	0.6%	0.1%	0.0%
Health and Medical	0	0.7%	<0.1%	0.0%	0.0%
Safety and Security	0	1.2%	0.1%	<0.1%	0.0%
Transportation	0	0.7%	0.1%	<0.1%	0.0%
Water Systems	0	1.4%	0.2%	<0.1%	0.0%

Source: Hazus v6.1, Dauphin County 2024; HIFLD 2020, 2023; Department of Human Services 2024

Impact on Economy

Hurricanes and tropical storms also impact the economy, including loss of business function (e.g., tourism, recreation), damage to inventory, relocation costs, wage loss, and rental loss due to the repair/replacement of buildings. Hazus estimates the total economic loss associated with each storm scenario (direct building losses and business interruption losses). Direct building losses are the estimated costs to repair or replace the damage caused to the building. This is reported in the "Impact on General Building Stock" subsection discussed earlier. Business interruption losses are the losses associated with the inability to operate a business because of the wind damage sustained during the storm or the temporary living expenses for those displaced from their home because of the event

Impacts on transportation lifelines affect both short-term (e.g., evacuation activities) and long-term (e.g., day-to-day commuting and goods transport) transportation needs. Utility infrastructure (power lines, gas lines,

electrical systems) could suffer damage and impacts can result in the loss of power, which can impact business operations and heating or cooling provisions to the population.

Debris management can be costly and impact the local economy. Hazus estimates the amount of debris that might be produced as a result of the 500-year MRP wind event. Table 4.3.8.6-4 summarizes the estimated debris by a municipality, which should be considered a lower-bound analysis. Because the estimated debris production does not include debris generated by flooding, this is likely a conservative estimate and could be higher if multiple impacts occur.

Table 4.3.8.6-4. Debris Production for a 500-Year Mean Return Period Hurricane-Related Winds

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Estimated Debris Created During 500-Year Mean Return Period Hurricane Wind Event			
	Brick & Wood (tons)	Concrete & Steel (tons)	Tree (tons)	Eligible Tree Volume (tons)
Berrysburg (B)	10	0	0	0
Conewago (T)	136	0	2,665	3,732
Dauphin (B)	13	0	251	226
Derry (T)	984	0	2,823	8,284
East Hanover (T)	201	0	0	0
Elizabethville (B)	20	0	0	0
Gratz (B)	20	0	0	0
Halifax (B)	14	0	0	0
Halifax (T)	95	0	0	0
Harrisburg (C)	1,124	0	1,811	14,062
Highspire (B)	72	0	169	1,501
Hummelstown (B)	97	0	252	2,212
Jackson (T)	45	0	0	0
Jefferson (T)	12	0	0	0
Londonderry (T)	271	0	4,623	8,782
Lower Paxton (T)	1,254	0	2,432	17,600
Lower Swatara (T)	500	0	2,839	8,164
Lykens (B)	12	0	0	0
Lykens (T)	59	0	0	0
Middle Paxton (T)	118	0	2,246	2,021
Middletown (B)	237	0	403	3,226
Mifflin (T)	34	0	0	0
Millersburg (B)	37	0	97	862
Paxtang (B)	35	0	39	334
Penbrook (B)	63	0	86	778
Pillow (B)	8	0	0	0
Reed (T)	9	0	0	0
Royalton (B)	36	0	613	1,164
Rush (T)	10	0	190	171
South Hanover (T)	227	0	729	2,478
Steelton (B)	223	0	364	2,199
Susquehanna (T)	683	0	1,912	11,790
Swatara (T)	689	0	2,458	13,759
Upper Paxton (T)	80	0	0	3

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Estimated Debris Created During 500-Year Mean Return Period Hurricane Wind Event			
	Brick & Wood (tons)	Concrete & Steel (tons)	Tree (tons)	Eligible Tree Volume (tons)
Washington (T)	47	0	0	0
Wayne (T)	27	0	0	0
West Hanover (T)	252	0	321	1,317
Wiconisco (T)	9	0	0	0
Williams (T)	9	0	0	0
Williamstown (B)	8	0	0	0
Dauphin County (Total)	**7,780**	**0**	**27,324**	**104,665**

Source: Hazus v6.1

Impact on the Environment

Severe wind from a tropical storm can escalate the impacts of flooding and severe winter weather. A severe storm may carry extreme rainfall that could exacerbate flooding and could increase the intensity of snow and blizzard events. More information about flooding and severe winter storms can be found in Section 4.3.7 and Section 4.3.19, respectively.

The impacts of hurricane-related windstorms on the environment typically take place over a larger area. Where these events occur, widespread, severe damage to plant species is likely. This includes uprooting or destruction of trees and an increased threat of wildfire in areas where dead trees are not removed (PEMA 2023). Section 4.3.15 (Tornado, Windstorm) provides additional environmental impacts due to wind, and Section 4.3.8 (Flood, Flash Flood, and Ice Jam) provides additional environmental impacts due to flooding from heavy rainfalls.

Future Growth and Development

Understanding future changes that impact vulnerability in Dauphin County can assist in planning for future development and ensuring that appropriate mitigation, planning, and preparedness measures are in place. It is anticipated that any new development and new residents will be exposed to hurricane and tropical storm hazards. However, due to increased standards and codes, new development might be less vulnerable to wind-related hazards compared to the aging building stock. The tables and hazard maps included in the jurisdictional annexes contain additional information regarding the specific areas of development that would increase County vulnerability to a wind event.

Estimated population projections provided by The Center of Rural Pennsylvania indicate that Dauphin County's population will continue to increase into 2040, increasing the total population to approximately 296,766 persons (The Center of Rural Pennsylvania 2021). Persons who move into areas with steep slopes are at greater risk of being impacted if a landslide were to occur.

With the rise in population, additional persons will be exposed to hurricanes, tropical storms, and other associated hazard events.

Effect of Climate Change on Vulnerability

According to the National Oceanic and Atmospheric Administration (NOAA), climate change is likely increasing the intensity of tropical cyclones and other storms such as hurricanes (NOAA 2021). Warming of the surface ocean from anthropogenic (human-induced) climate change is likely fueling tropical storms to be more powerful and widespread. The destructive power of individual storms through flooding is amplified by rising sea levels, which very likely has a substantial contribution at the global scale from anthropogenic climate change.

In addition, precipitation rates during storm events are projected to increase due to enhanced atmospheric moisture associated with anthropogenic global warming.

As detailed in the recently published Fourth National Climate Assessment, annual precipitation since the beginning of the last century has consistently increased across most of the northern and eastern United States (NCA 2018). Over the coming century, significant increases in precipitation are expected across the northeast region. This observed increase is expected to continue for the foreseeable future. Heavy precipitation events have increased by 38 percent since the beginning of the century, and the new availability of climate data introduced in the last 50 years indicates this increase may be up to 55 percent (NCA 2018). Refer to Section 4.3.7 (Flood) for a discussion related to the impact of climate change due to increases in rainfall.

An increase in storms will produce more wind events and may increase hurricane and other storm activity. With an increased likelihood of strong winds and tornado events, all the County's assets may experience additional risk for losses as a result of extreme wind events.

Additional Data and Next Steps

Over time, Dauphin County may obtain additional data to support the analysis of this hazard. Data that will support the analysis would include additional detail on past hazard events and impacts, building footprints, and specific building information, such as details on protective features (e.g., hurricane straps).

4.3.9 Invasive Species

This section provides a profile and vulnerability assessment for the invasive species hazard. An invasive species is a species that is not indigenous to a given ecosystem and that, when introduced to a non-native environment, is likely to cause economic or environmental harm or pose a hazard to human health. To further assist and identify invasive species in Pennsylvania, the U.S. Department of Agriculture (USDA) has provided a suite of Invasive Species Resources located online at the USDA National Invasive Species Information Center. The following link provides access to the Pennsylvania Resource List: https://www.invasivespeciesinfo.gov/us/pennsylvania.

4.3.9.1 Location and Extent

The Commonwealth of Pennsylvania hosts several invasive pathogens, insects, plants, invertebrates, fish, and higher mammals. These species have largely been introduced by the actions of humans. Common pathways for invasive species include unintentional release, the movement of goods and equipment that may unknowingly harbor species, smuggling, emptying ship ballast water, hull fouling, and escape from cultivation (PDA Invasive Species Council 2023). Invasive species threats are generally divided into two main subsets, as described below.

- Aquatic invasive species are non-native viruses, invertebrates, fish, and aquatic plants that threaten the diversity or abundance of native species; the ecological stability of the infested waters; human health and safety; or commercial, agriculture, aquaculture, or recreational activities dependent on such waters.
- Terrestrial invasive species are non-native arthropods, vascular plants, higher vertebrates, or pathogens that complete their life cycle on land instead of water and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

The Pennsylvania Department of Agriculture Invasive Species Council has identified over 300 invasive plants, insects, pathogens, and animals that have the greatest negative impact on the state (PDA Invasive Species Council 2023). Of these threats, Dauphin County officials and municipal leaders have identified plants, insects, and diseases that have caused, or have the potential to cause, significant damage to the county's natural landscape and agricultural economy through defoliation and mortality, or out-competition for vital resources. Dauphin County recognizes the importance of preserving natural resources, promoting native species, and maintaining agricultural productivity for the county's cultural heritage and economic stability. The potential financial impact of invasive species on agriculture in Dauphin County was identified as having 1.20 percent of total state sales (PEMA 2023).

In Pennsylvania, there are 18 identified insect species that pose a threat to the natural environment. The insects and diseases that have caused the most damage in terms of defoliation and mortality during recent years include the emerald ash borer, gypsy moth, hemlock woolly adelgid, beech bark disease, and oak wilt (PDA Invasive Species Council 2023). These species also pose a threat to Dauphin County. Additionally, Dauphin County officials and municipal leaders identified several invasive insects, diseases, and plants of particular concern, which are discussed below.

Dauphin County officials and municipal leaders believe that the most significant are invasive pests such as the emerald ash borer, spotted lanternfly, Eurasian wood wasp, Asian longhorned beetle, hemlock woolly adelgid, and gypsy moth; pathogens such as *Phytophthora ramorum*, which causes sudden oak death; and plants like mile-a-minute weed, Oriental bittersweet, and the Japanese angelica tree. Wavy leaf basket grass has not been seen in the county but is expected to affect the county in the near future. The location and extent of these invasive threats depend on the preferred habitat of the species as well as the species' ease of movement and establishment.

The emerald ash borer was detected in 2007 in Butler and Allegheny Counties. The emerald ash borer is an invasive pest from Southeast Asia that kills all members of the genus *Fraxinus* in North America. It has caused massive devastation and prompted the USDA to form a national program for surveying, outreach, and management (USDA National Invasive Species Information Center 2023). As a result of the federal and state mitigation efforts, the state lifted all quarantines in the Commonwealth in 2011, and the USDA has rescinded its federal quarantine. Although the state's quarantine is no longer in effect, it is still possible for the emerald ash borer to impact Pennsylvania (PDA Invasive Species Council 2023).

The spotted lanternfly was first observed in Berks County in 2014. Since then, the pests have been found in 26 southeastern Pennsylvania counties, with an additional eight counties being added in 2021, including Dauphin County (PA DEP 2023). To feed, the spotted lanternfly (adult and juvenile) will suck the sap from the stem and branches from under the bark. When the spotted lanternfly is done feeding, sap will continue to ooze from the tree and attract other insects. If the sap continues to flow, this liquid then promotes mold. All these factors will damage a tree (USDA Animal and Plant Health Inspection Service n.d.). A recent economic impact study estimates Pennsylvania could lose more than $324 million annually and 2,800 jobs (PA DEP 2023). Because of the detrimental effects this insect has on Pennsylvania's ecosystem and economy, the Department of Agriculture has set up a hotline to report spotted lanternfly sightings: 1-888-4BAD-FLY (1-888-422-3359).

The Asian longhorned beetle species have not been confirmed within Pennsylvania but pose a threat to softer hardwood trees, including maples, birch, elm, willow, ash, and poplar trees. The Asian longhorned beetle will chew out a small area about an inch in size and lay eggs in the bark of a tree. When hatched, these larvae then bore into the tree and will continue to eat the wood for nearly a year, creating tunnels up to a half inch in size. After that year, the beetle will create a cocoon and merge as an adult Asian longhorned beetle. During the larval period, the beetle puts great strain on the feeding tree and eventually kills the tree (USDA, Forest Service, Animal and Plant Health Insepction Service 2008).

Several invasive plants also pose a significant threat to ecosystem biodiversity and agricultural productivity because of their ability to out-compete native species. Pennsylvania has identified 10 Class A noxious weeds as part of the Controlled Plant and Noxious Weed Act. These plants include Palmer amaranth, water hemp, animated oat, dodder, goatsrue, giant hogweed, hydrilla, wavyleaf basketgrass, broomrape, and kudzu (PA Agricultural Code Title 7). Some species (e.g., Palmer amaranth and water hemp) are prolific seed producers and have developed a potential resistance to traditional herbicides, making them challenging and expensive to manage. Others, such as kudzu, grow rapidly and prevent slower-growing native plants from establishing (PDA Invasive Species Council 2023).

Aquatic invasive species in Dauphin County, are primarily found in the Susquehanna River and its tributaries (SRBC 2024). These waterways provide ideal habitats for various aquatic invasive species due to their extensive reach and connectivity. The spread of aquatic invasive species is facilitated by human activities such as boating, fishing, and the release of aquarium species. The extent of aquatic invasive species infestation varies, with some areas experiencing higher densities and more severe impacts than others.

The location and extent of these invasive threats depend on the preferred habitat of the species as well as the species' ease of movement and establishment.

4.3.9.2 Range of Magnitude

The magnitude of invasive species threats ranges from nuisance to widespread killer. Some invasive species are not considered agricultural pests and do not harm humans. Other invasive species can cause significant changes in the composition of Pennsylvania's ecosystems. Forest or crop-impacting invasive species could have a

significant economic impact in Dauphin County because the county hosts both forest-based recreational land and agricultural land. Other invasive species can cause widespread illness or death in humans.

Invasive species contribute to a broad range of environmental impacts. The aggressive nature of many invasive species can cause significant reductions in biodiversity by crowding out native species. This can affect the health of individual host organisms as well as the overall well-being of the affected ecosystem.

Beyond causing human, animal, and plant harm, there are secondary impacts of invasive species in that they also cause harm to host species and ecosystems, particularly in the case of invasive species that attack forests or agricultural crops. Forests prevent soil degradation and erosion, protect watersheds, stabilize slopes, and absorb carbon dioxide emissions. The key role of forests in the hydrologic system means that if forest land is wiped out, the effects of erosion and flooding will be amplified. Invasive species would also negatively impact the county's agricultural economy by increasing the cost of pest control measures and decreasing harvest yields. Overall, invasive species reduce the productivity and profitability of agricultural land. Invasive species that affect the health of hardwood trees can have particularly damaging secondary impacts in urban and suburban areas. As the damage progresses, branches become less stable and are more susceptible to winds. Significant building and auto damage can result from falling trees.

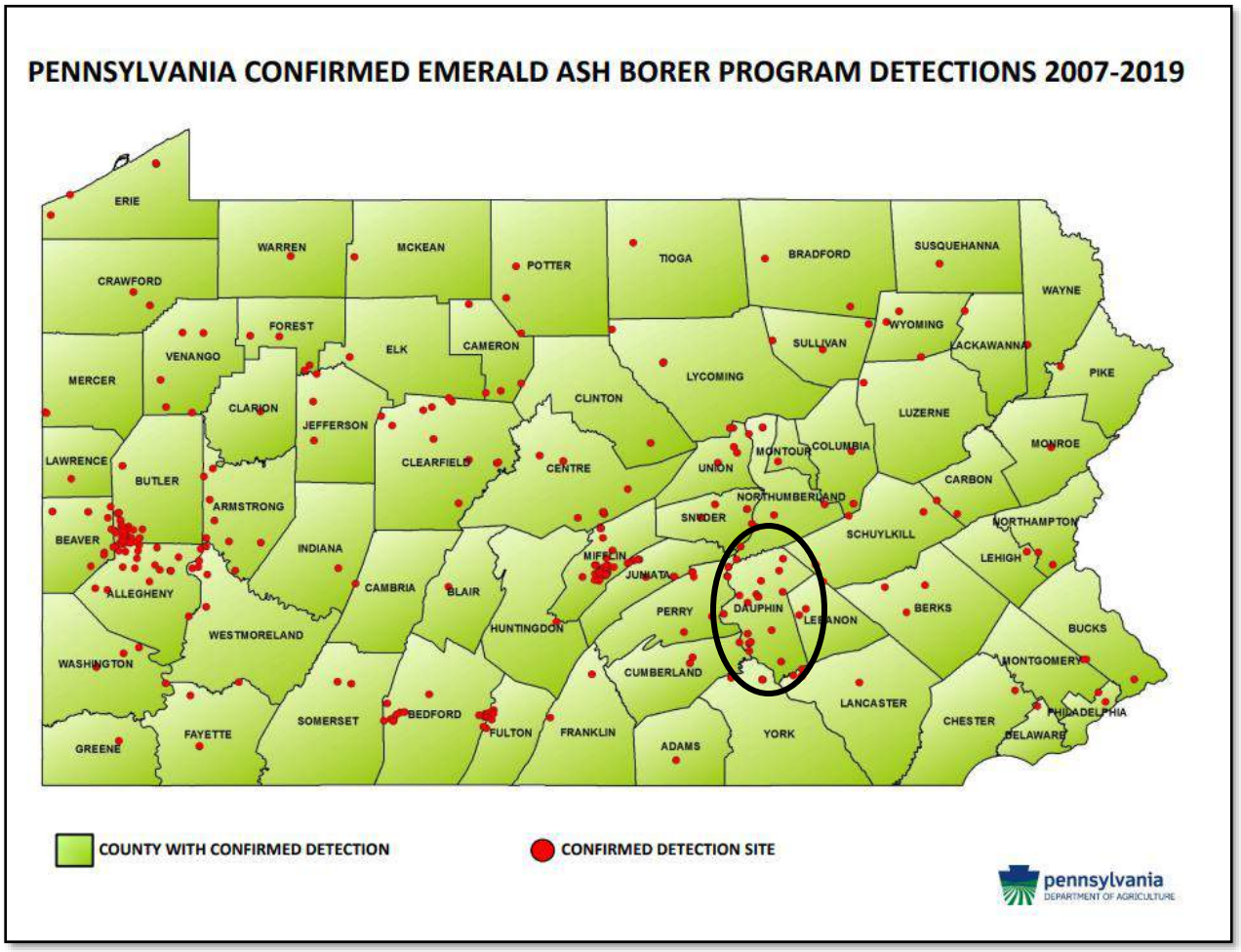
The range of magnitude for aquatic invasive species impacts in Dauphin County can be significant. Ecologically, aquatic invasive species can lead to the displacement of native species, alteration of habitat structures, and changes in water quality. Economically, the costs associated with managing aquatic invasive species, repairing infrastructure, and mitigating their impacts can be substantial. The severity of these impacts depends on the specific species involved, their population densities, and the effectiveness of management strategies in place.

The magnitude of an invasive species threat is generally amplified when the ecosystem or host species is already stressed, such as in times of drought. The already-weakened state of the native ecosystem causes it to succumb to an infestation more easily. An example of a possible worst-case invasive species scenario would be if the spotted lanternfly would continue to spread across Dauphin County and significantly destroy the county's crops. With the high mortality rate associated with the spotted lanternfly, crops, including grapes and apples, would be devastated. Farms, orchards, wineries, and lumber companies could experience a $324 million loss in Pennsylvania (PennState 2021). Such significant crop loss could cause farms to fail, resulting in the loss of jobs and valuable income to the county. If the land is no longer agriculturally profitable, arable land may have to be developed for residential or business use.

4.3.9.3 Past Occurrence

Invasive species have been entering Pennsylvania since the arrival of early European settlers. Dauphin County had several confirmed detection sites for emerald ash borer from 2007-2019 (PDA n.d.). Figure 4.3.9-1 illustrates the emerald ash borer program detections from 2007-2019. In 2022, Dauphin County faced significant challenges from invasive species, particularly the spotted lanternfly and snakehead fish. The persisted into 2023, with the addition of the rusty crayfish. These recurring invasions highlight the county's ongoing vulnerability to invasive species and the need for continued monitoring and management efforts.

Figure 4.3.9-1. Pennsylvania Confirmed Emerald Ash Borer Program Detections 2007-2019



Source: PDA, n.d.
Note: Dauphin County is indicated by a black oval.

4.3.9.4 Future Occurrence

According to the Pennsylvania Invasive Species Council (PISC), the probability of future occurrences of invasive species threats is on the rise due to several factors. The growing volume of transported goods, increasing technology, efficiency, and speed of transportation, and expanding international trade agreements have created opportunities for many organisms to be transported to and establish themselves in new countries and regions. Furthermore, climate change is contributing to the introduction of new invasive species. As maximum and minimum seasonal temperatures change, pests can establish themselves in previously inhospitable climates. This also gives introduced species an earlier start and increases the magnitude of their growth, potentially shifting the dominance of ecosystems in favor of non-native species.

Dauphin County faces potential future impacts from the Northern Snakehead fish, an invasive species that has already been detected in the lower Susquehanna River. The Pennsylvania Fish and Boat Commission (PFBC) has documented the reproduction of Northern Snakeheads in the river, raising concerns about their spread and impact on local ecosystems. These fish are known for their voracious predation, which can lead to declines in important sport fisheries, such as bass and panfish, and may hinder recovery efforts for species of conservation concern like American Shad and Chesapeake Logperch (Commonwealth of Pennsylvania 2023).

Given the established presence of Northern Snakeheads, there is a significant risk of further invasion into Dauphin County's waterways. The PFBC has been conducting surveillance monitoring since May 2020, following the passage of 21 fish through the Conowingo Dam during fish lift operations. This ongoing monitoring is crucial for early detection and management of the species (Commonwealth of Pennsylvania 2023).

The potential future impacts include disruption of the aquatic food web, competition with native species, and economic consequences for local fisheries. To mitigate these risks, it is essential to continue and expand monitoring efforts, promote public awareness, and implement control measures to prevent the spread of Northern Snakeheads. Anglers are encouraged to report and properly dispose of any Northern Snakeheads caught to help manage their population and protect the local ecosystem.

To combat the increase in future occurrences, the Pennsylvania Invasive Species Council (PISC), a collaboration of state agencies, public organizations, and federal agencies, released the Invasive Species Management Plan in May 2009, which was revised in 2016 (PISC 2016). This plan outlines the Commonwealth's goals for managing the spread of non-native invasive species and creates a framework for responding to threats through research, action, and public outreach and communication. More information on the Species Management Plan can be found online at PISC's website, https://www.pa.gov/agencies/pda/about-pda/boards-commissions/governors-invasive-species-council.html. It is reasonable to assume that current threats will continue to directly impact or threaten Dauphin County.

The Pennsylvania Department of Agricultural Entomology Programs regularly conducts surveys to monitor, control, and mitigate invasive species. Based on historical documentation, increased incidences of infestation throughout Pennsylvania, and the overall impact of changing climate trends, it is estimated that Dauphin County and all its jurisdictions will continue to experience the impacts of invasive species that may induce secondary hazards and health threats to the County population if they are not prevented, controlled, or eradicated effectively.

The future occurrence of invasive species is considered ***highly likely***, as defined by the Risk Factor Methodology probability criteria (further discussed in Section 4.4).

4.3.9.5 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed or vulnerable in the area identified. Dauphin County's exact vulnerability will depend on the invasive species in question. In general, though, the University of Arizona and the National Invasive Species Information Center have identified the following characteristics of areas that are more likely to be invaded by invasive species (NISIC n.d.):

- Lack of natural predators or diseases that kept the species under control in its native environment
- Present vacant ecological niches that can be exploited by non-native species
- Lack of species diversity
- Lack of a multi-tiered canopy (in the case of invasive plants)
- Disturbed by fire, construction, or agriculture prior to invasion.

The following sections discuss the potential impact of the invasive species hazard on Dauphin County, including:

- Impact on (1) life, health and safety; (2) general building stock; (3) critical facilities; (4) economy; (5) environment; and (6) future growth and development.
- Effects of climate change on vulnerability.
- Further data collection that will assist in understanding this hazard over time.

Impact on Life, Health, and Safety

The entire population of Dauphin County is vulnerable to invasive species to some extent, but direct impacts on life, health, and safety are minor. Indirect impacts such as the spread of disease by invasive species are possible.

Impact on General Building Stock

No structures are anticipated to be directly affected by infestation or invasive species; however, some species could lead to the death of vegetation and trees throughout the county, which could result in stream bank instability, erosion, and increased sedimentation, impacting ground stabilization and possibly causing foundation issues for nearby structures. Additionally, with an increased number of dead trees, there is an increased risk of trees falling on roadways, power lines, and buildings.

Some invasive plants have been shown to destabilize soil due to high densities and shallow root systems, negatively impacting nearby buildings and septic systems. Other invasive plant species have been known to clog culverts and streams, increasing flood risk.

Impact on Critical Facilities

Impacts on critical facilities and lifelines are specific to the type of facility and the species impacting it. Water treatment plants could be impacted by invasive species because of similar issues the general building stock may experience. Water that becomes polluted due to increased sedimentation and erosion will require additional treatment. If the system becomes clogged with these pollutants, the ability of water treatment plants to operate may become impaired. Additionally, soil that becomes unstable due to decaying vegetation can impact critical facilities built on or around these soils.

Impact on the Economy

Impacts of infestation and invasive species on the economy and estimated dollar losses are difficult to measure and quantify. Costs associated with activities and programs implemented to conduct surveillance and address a variety of infestations within Dauphin County have not been quantified in the available documentation.

Although the economic impact has not been quantified for Dauphin County, state-wide agricultural losses because of invasive species were estimated at $7.8 billion (PEMA 2023). The potential financial impact of invasive species on agriculture in Dauphin County was identified as having 1.20 percent of the state's total sales (PEMA 2023).

Future Growth and Development

As discussed in Section 2, areas targeted for future growth and development have been identified across Dauphin County. Any areas of growth could be impacted by the infestation hazard because the entire planning area is exposed and vulnerable.

Additional Data and Next Steps

Any additional information regarding localized concerns and past impacts will be collected and analyzed. These data will be developed to support future revisions to the plan. Future mitigation efforts could include partnering and collaborating with existing Commonwealth of Pennsylvania organizations and through local efforts.

4.3.10 Landslide

This section provides a profile and vulnerability assessment of the landslide hazard in Dauphin County. According to the U.S. Geological Survey (USGS), the term landslide includes a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows (USGS n.d.) . Landslides are classified by the type of material involved and the type of movement. In addition, they are classified by the rate of movement and the water content of the material. Movement rates range from inches over many years to many feet per second (USGS n.d.).

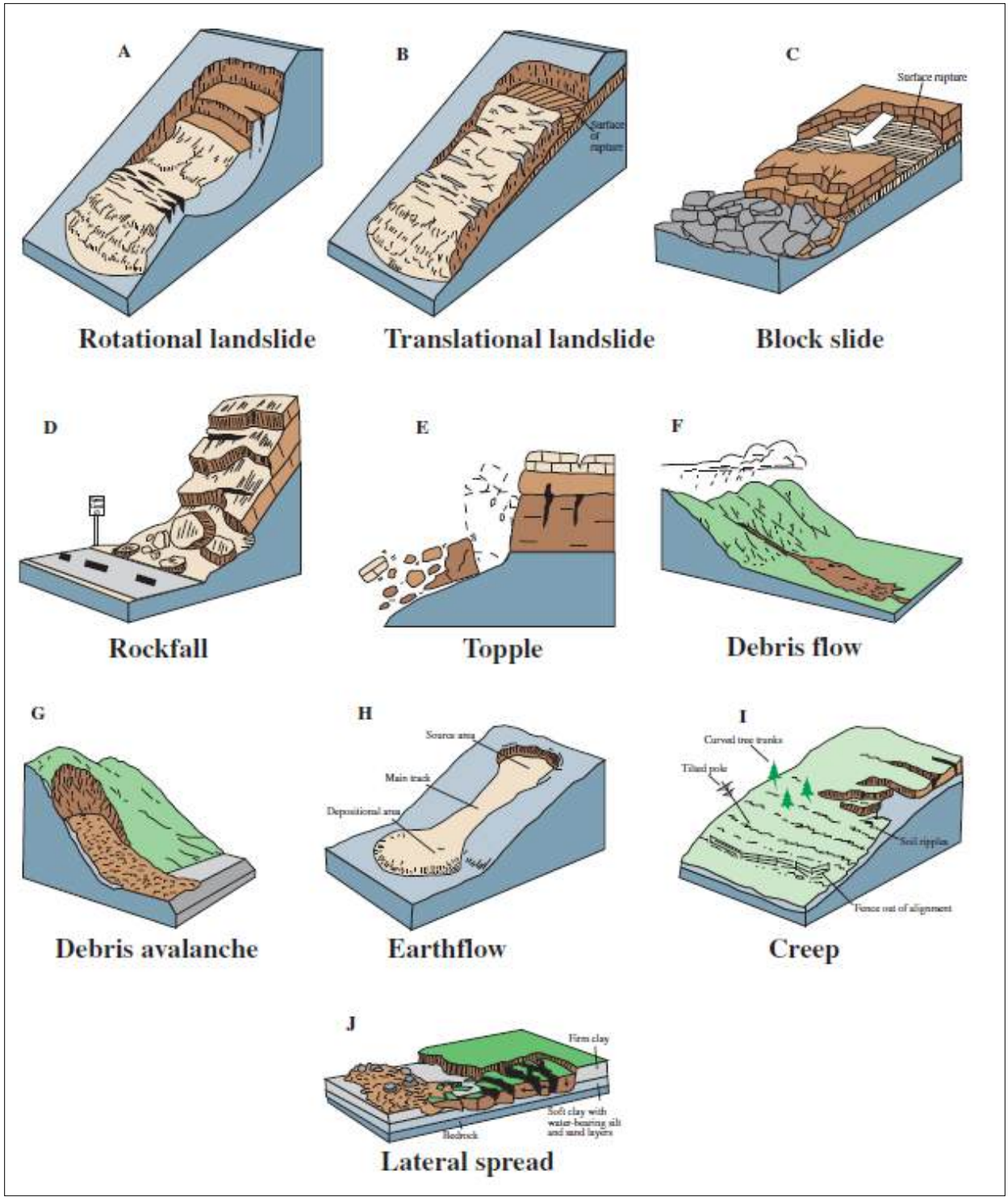
Landslides can be caused by a variety of factors, including earthquakes, storms, fire, and human modification of land. Areas that are generally prone to landslide hazards include previous landslide areas, areas on or at the base of slopes, the base of drainage hallows, developed hillsides with leach field septic systems, and areas recently burned by forest and brush fires (PEMA 2023). Human activities that contribute to slope failure include altering the natural slope gradient, increasing soil water content, and removing vegetation cover.

Landslide Types

The most common types of landslides are described as follows and are illustrated in Figure 4.3.10-1.

A. **Rotational slides—**Slides in which the surface of rupture is curved upward, and the slide movement rotates parallel to the ground surface.
B. **Translational slides—**Slides in which the mass moves along a roughly flat surface with little rotation.
C. **Block slide -** A translational slide in which the moving mass consists of a single unit or a few closely related units that move downslope as a relatively coherent mass.
D. **Falls—**Abrupt movements of geologic materials, such as rocks and boulders, that become detached from steep slopes or cliffs. Falls are strongly influenced by gravity, weathering, and the presence of water in a mineral's pores.
E. **Topples—**Slides involving the forward rotation of a unit about some point under the actions of gravity and forces exerted by surrounding objects or by fluids in cracks.
F. **Debris flows—**Rapid mass movements in which loose soil, rock, organic matter, air, and water mobilize as a slurry that flows downslope. Commonly caused by intense surface water flow due to heavy rain or rapid snowmelt that erodes loose soil or rock on steep slopes.
    a. **Post-Wildfire Debris Flows**—Debris flows resulting from post-fire conditions, where burned soil surfaces enhance rainfall runoff that concentrates and picks up debris as it moves.
G. **Debris avalanches—**Debris flows that travel faster than about 10 miles per hour (mph). Speeds over 20 mph are not uncommon, and speeds over 100 mph, although rare, can occur. The slurry can travel miles from its source, growing as it descends, picking up trees, boulders, cars, and anything else in its path.
H. **Earthflows—**Landslides with an "hourglass" shape. The slope material liquefies and runs out, forming a bowl or depression at the head.
    a. **Mudflow –** This is an earthflow consisting of material that is wet enough to flow rapidly and contains at least 50 percent sand-, silt-, and clay-sized particles. This is sometimes referred to as "mudslides".
I. **Creep—**Slow, steady, downward movements of slope-forming soil or rock. Creep is indicated by curved tree trunks, bent fences, or retaining walls, tilted poles or fences, and small soil ripples or ridges.
J. **Lateral Spreads—**Slides on very gentle slopes or flat terrain caused by liquefaction, the process whereby saturated, loose, sediments are transformed from a solid into a liquefied state. The failure starts suddenly in a small area and spreads rapidly.

Figure 4.3.10-1. Major Types of Landslides



Source: (USGS 2004)

4.3.10.1 Location and Extent

The entire country experiences landslides, with 36 states having moderate to highly severe landslide hazards. The expansion of urban and recreational developments into hillside areas exposes more people to the threat of landslides each year.

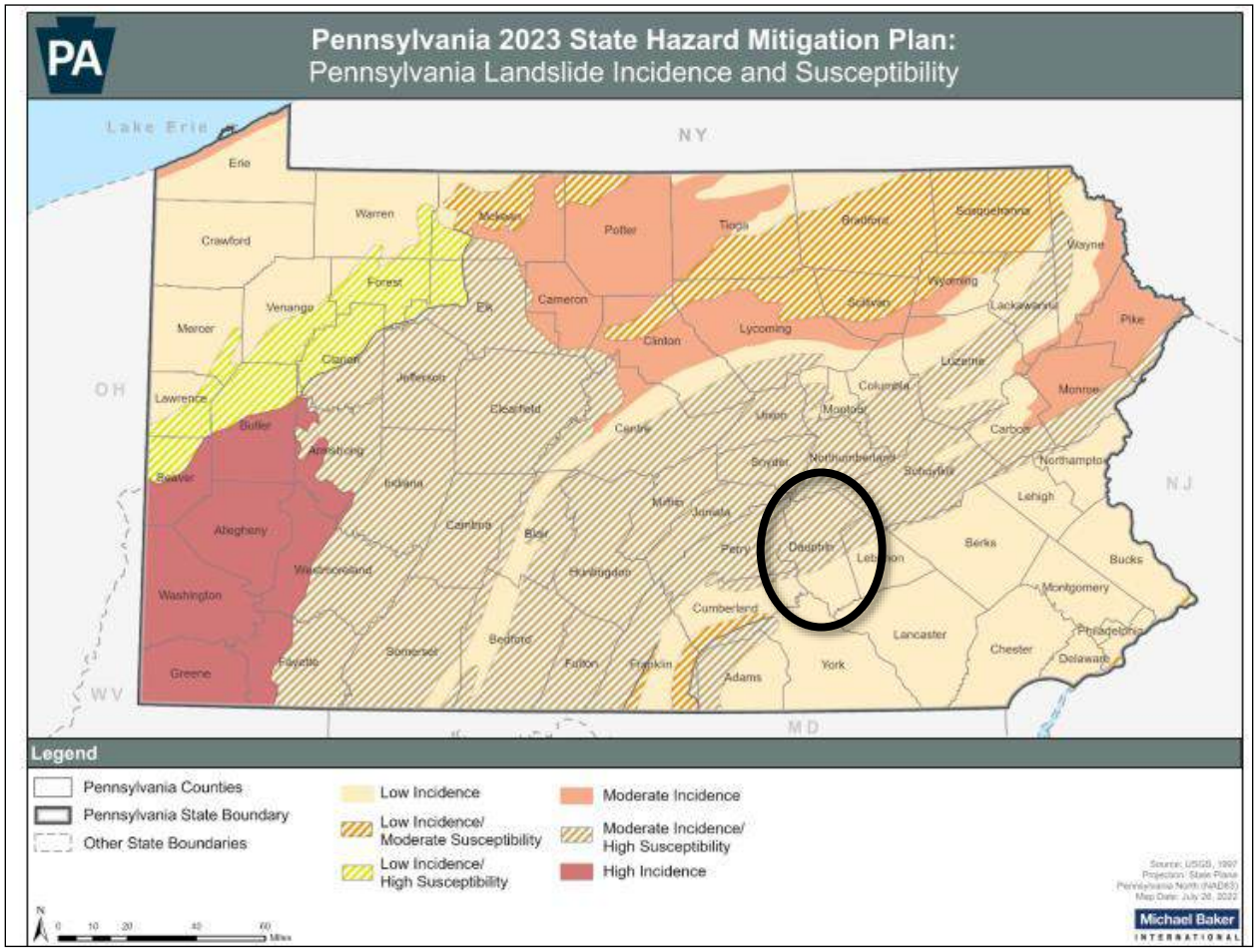
Rock falls and other slope failures occur in areas of Pennsylvania with moderate to steep slopes; however, most of Pennsylvania has areas susceptible to landslides. The southwestern area of Pennsylvania has the highest concentration of landslides (DCNR n.d.). According to the Pennsylvania Department of Conservation and Natural Resources (DCNR), most major and minor highways have sections cut in rock or soil that can lead to slope failure. Steep mountain slopes across Pennsylvania have experienced debris avalanches associated with extreme rainfall or rain-on-snow events. Additionally, urban and rural land development is increasing the number of landslide occurrences. Major highway construction with large excavations and fills creates the potential for landslides (DCNR n.d.).

To determine the extent of a landslide hazard, the affected areas need to be identified, and the probability of the landslide occurring within some time period needs to be assessed. Natural variables that contribute to the overall extent of potential landslide activity in any particular area include soil properties, topographic position and slope, and historical incidence. Predicting a landslide is difficult, even under ideal conditions and with reliable information. As a result, the landslide hazard is often represented by landslide incidence and/or susceptibility, as defined below (Radbruch-Hall, et al. n.d.):

- Landslide incidence is the number of landslides that have occurred in a given geographic area. High incidence means greater than 15 percent of a given area has been involved in a landslide; medium incidence means that 1.5 to 15 percent of an area has been involved, and low incidence means that less than 1.5 percent of an area has been involved.
- Landslide susceptibility is defined as the probable degree of response of geologic formations to natural or artificial cutting, loading of slopes, or unusually high precipitation. It can be assumed that unusually high precipitation or changes in existing conditions can initiate landslide movement in areas where rocks and soils have experienced numerous landslides in the past. Landslide susceptibility depends on the slope angle and the geologic material underlying the slope. Landslide susceptibility only identifies areas potentially affected and does not imply a time frame when a landslide might occur. High, medium, and low susceptibility are delimited by the same percentages used for classifying the incidence of landsliding.

Figure 4.3.10-2 shows the landslide-susceptible areas across the Commonwealth. Most of Dauphin County is noted as having low to moderate incidence and high susceptibility to landslides.

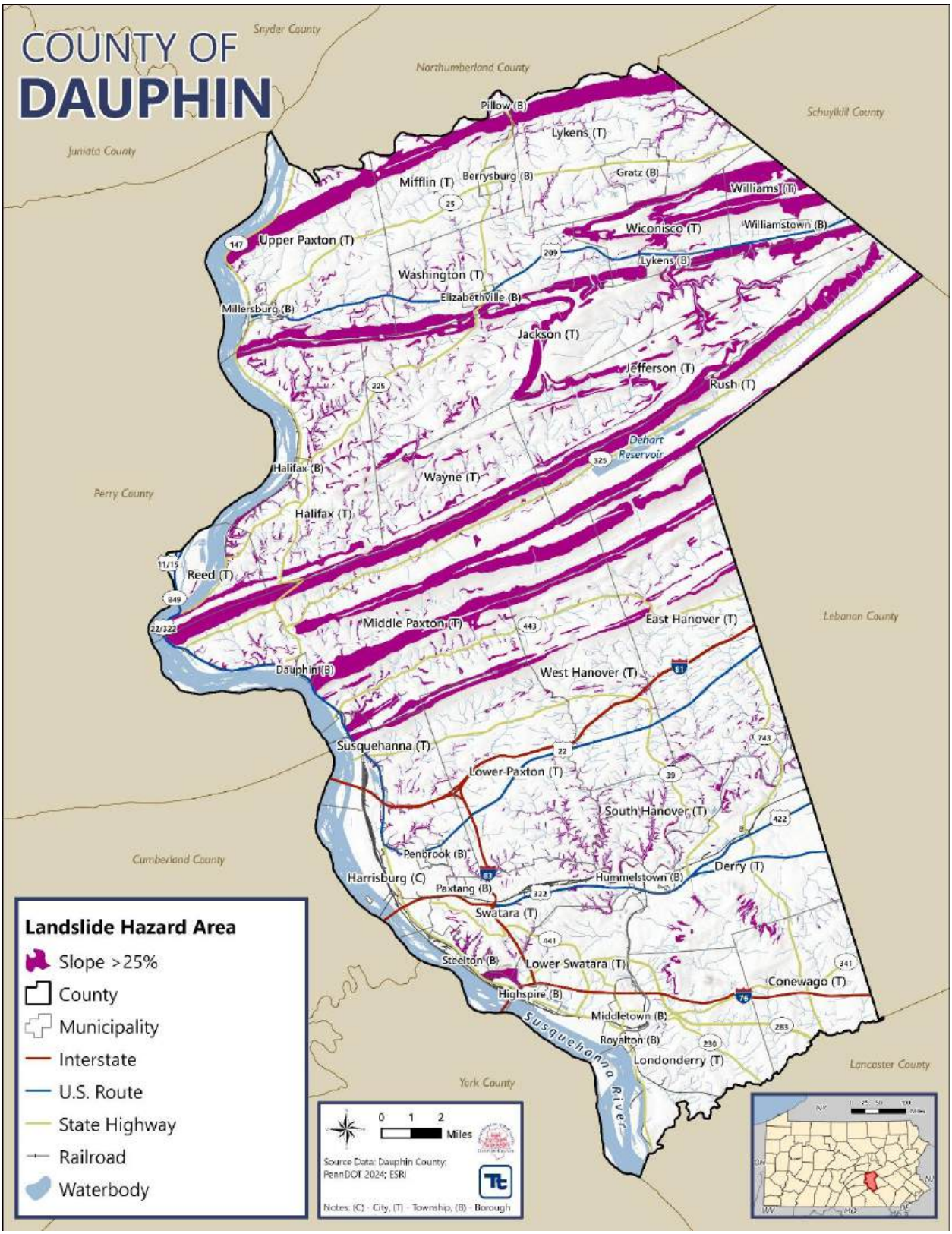
Figure 4.3.10-2. Areas of Pennsylvania Susceptible to Landslides



Source: PEMA 2023
Note: The black circle indicates the approximate location of Dauphin County.

For the purposes of this planning effort, any area with a slope greater than 25 percent is considered a hazard area. Dauphin County has a considerable amount of steep slope area. Figure 4.3.10-3 shows that steep slope occurs primarily in the central and northern parts of the county.

Figure 4.3.10-3. Landslide Hazard Area in Dauphin County



4.3.10.2 Range of Magnitude

Landslides have the potential to damage transportation routes, utilities, and buildings. They can also create travel delays and other side effects. Fortunately, deaths and injuries caused by landslides are rare in the Commonwealth of Pennsylvania, and most landslides in the Commonwealth are moderate to slow-moving, damaging objects rather than people. Almost all of the known deaths caused by landslides have occurred when rock falls or other slides along highways have involved vehicles. Storm-induced debris flows are another type of landslide likely to cause death and injuries. As residential and recreational development increases on and near steep mountain slopes, the hazards from these events will also increase (PEMA 2017).

According to DCNR, the Pennsylvania Department of Transportation (PennDOT) and large municipalities incur substantial costs because of landslide damage and from extra construction costs for new roads in known landslide-prone areas. One PennDOT estimate in 1991 showed an average of $10 million per year in landslide repair contracts across the Commonwealth and a similar amount in mitigation costs for grading projects (DCNR n.d.)

The impact of landslides on the environment depends on the size and specific location of the event. In general, impacts include (PEMA 2023):

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

4.3.10.3 Past Occurrence

Outside of impacts to important transportation routes, landslide history is not documented as completely (if at all) as other hazards, primarily because landslides are not always seen. Therefore, historical landslide occurrences in Dauphin County are not well known.

FEMA Major Disasters and Emergency Declarations

Between 1954 and 2024, Dauphin County was included in one major disaster (DR) or emergency (EM) declaration for landslide-related events (FEMA 2024). This declaration is listed in Table 4.3.10-1

Table 4.3.10-1. FEMA Declarations for Landslide Events in Dauphin County (1954 to 2024)

FEMA Declaration Number	Date(s) of Event	Event Type
DR-1649	June 23-July 10, 2006	Severe Storms, Flooding, and Mudslides

Source: (FEMA 2024)

USDA Declarations

The Secretary of Agriculture from the U.S. Department of Agriculture (USDA) is authorized to designate counties as disaster areas to make emergency loans to producers suffering losses in those counties and contiguous counties. Between 2021 and 2024, Dauphin County was not included in any USDA landslide-related agricultural disaster declarations (USDA 2024).

Municipal-Level Emergency Declarations

From 2021 to 2024, Dauphin County has not issued any municipal-level emergency declarations related to landslide incidents.

Previous Events

For this 2025 HMP update, there have been no known landslide events that have impacted Dauphin County between September 2021 and September 2024 (NOAA-NCEI 2024). For events that have occurred before 2021, refer to the 2021 Dauphin County HMP.

4.3.10.4 Future Occurrence

Dauphin County is noted to have a low to moderate incidence and high susceptibility to landslides. Based on risk factors and historical data, it is unlikely that landslides will occur frequently in the future. However, the severity of landslides can vary depending on the type and location of the event. Landslide probabilities are largely a function of surface geology but are also influenced by weather and human activities.

Intense development in steeply sloped areas, if mismanaged, could increase the frequency of landslide occurrences. Periods of intense rain or snowmelt can also elevate the risk of landslides. Building and road construction are contributing factors, as they can undermine or steepen otherwise stable soil. Increased deforestation and soil disturbances caused by the development of sloped areas further increase these risks. As timbering and development of sloped land continue, the risk of significant landslides increases.

According to FEMA's National Risk Index, the probability of future landslide occurrences in Dauphin County is relatively moderate, with a score of 82.2 (FEMA NRI 2024). Based on available historical data, the future occurrence of landslides is considered to be *possible* as defined by the Risk Factor Methodology probability criteria (refer to Section 4.4).

4.3.10.5 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed and/or vulnerable to the identified hazard. Because of the lack of spatially delineated landslide hazard areas in the County, a spatial analysis referenced areas with slopes greater than 25 percent to delineate the landslide hazard area. Slope degrees greater than 25 percent are categorized as the most at-risk slopes in the study. The following sections evaluate and estimate the potential impact of landslide in Dauphin County, presenting:

- Impact on (1) life, health, and safety; (2) general building stock; (3) critical facilities; (4) economy; (5) environment; and (6) future growth and development.
- Effects of climate change on vulnerability.
- Further data collection that will assist in understanding this hazard over time.

Impact on Life, Health, and Safety

Generally, a landslide event would be an isolated incident and impact the populations within the immediate area of the incident. Specifically, the populations located downslope of the landslide hazard areas are particularly vulnerable to this hazard. In addition to causing damage to residential buildings and displacing residents, landslide events can block off or damage major roadways and inhibit travel for emergency responders or populations trying to evacuate the area.

Table 4.3.10-2 summarizes the population located in the landslide-susceptible hazard area or areas where slopes have degree angles greater than 25 percent. Swatara Township has the greatest number of persons located in the landslide-susceptible hazard area, with 816 people, or 2.9 percent of its total population. The Borough of

Dauphin has the greatest percentage of its population located in the landslide-susceptible hazard area (15.3 percent of its total population).

Table 4.3.10-2. Estimated Dauphin County Population Vulnerable to the Landslide Hazard Area

Jurisdiction	Total Population (2020 Decennial)	Population in Steep Slopes Over 25-Percent	
		Number of Persons	% of Jurisdiction Total
Berrysburg (B)	326	0	0.0%
Conewago (T)	2,952	13	0.4%
Dauphin (B)	795	122	15.3%
Derry (T)	24,715	171	0.7%
East Hanover (T)	6,019	59	1.0%
Elizabethville (B)	1,357	0	0.0%
Gratz (B)	743	0	0.0%
Halifax (B)	796	9	1.1%
Halifax (T)	3,349	109	3.3%
Harrisburg (C)	50,099	72	0.1%
Highspire (B)	2,741	0	0.0%
Hummelstown (B)	4,544	64	1.4%
Jackson (T)	1,827	53	2.9%
Jefferson (T)	360	31	8.6%
Londonderry (T)	4,899	28	0.6%
Lower Paxton (T)	53,501	585	1.1%
Lower Swatara (T)	9,531	19	0.2%
Lykens (B)	1,873	0	0.0%
Lykens (T)	1,559	46	3.0%
Middle Paxton (T)	5,048	203	4.0%
Middletown (B)	9,533	0	0.0%
Mifflin (T)	816	17	2.1%
Millersburg (B)	2,545	0	0.0%
Paxtang (B)	1,648	0	0.0%
Penbrook (B)	3,274	0	0.0%
Pillow (B)	292	1	0.3%
Reed (T)	230	14	6.1%
Royalton (B)	1,138	0	0.0%
Rush (T)	228	1	0.4%
South Hanover (T)	7,209	351	4.9%
Steelton (B)	6,263	564	9.0%
Susquehanna (T)	26,736	340	1.3%
Swatara (T)	27,824	816	2.9%
Upper Paxton (T)	4,010	78	1.9%
Washington (T)	2,129	23	1.1%
Wayne (T)	1,266	18	1.4%
West Hanover (T)	10,697	113	1.1%
Wiconisco (T)	1,159	18	1.6%
Williams (T)	1,067	38	3.6%
Williamstown (B)	1,303	0	0.0%
Dauphin County (Total)	**286,401**	**3,976**	**1.4%**

Sources: U.S. Census Bureau 2020; Dauphin County OEM 2024
Note: Population results have been rounded down. (B)=Borough, (C)=City, (T)=Township

Impact on Socially Vulnerable Populations

Socially vulnerable populations (e.g., the elderly and low-income populations) are particularly vulnerable to a landslide event. In Dauphin County, there are approximately 707 persons over 65, and 1.1 percent of the population is living below the poverty level located in the landslide-susceptible hazard area or areas where slopes have degree angles greater than 25 percent (US Census Bureau 2020). Swatara Township has the greatest elderly population (130 people) exposed and the Borough of Steelton has the greatest low-income population exposed (133 people). Economically disadvantaged populations are more vulnerable because they may be unable to evacuate their homes due to a lack of transportation, lack of a safe place to which to evacuate, or lack of financial resources (e.g., cannot afford temporary lodging). The population over the age of 65 is more vulnerable because they are more likely to seek or need medical attention, which may not be available because of isolation during an emergency; they may also have more difficulty evacuating. Special consideration should be taken when planning for disaster preparation, response, and recovery for these vulnerable groups. Table 4.3.10-3 shows the estimated number of vulnerable persons located in the landslide-susceptible hazard area or areas where slopes have degree angles greater than 25 percent by jurisdiction.

Table 4.3.10-3. Estimated Number of Vulnerable Persons Located in the Steep Slopes over 25-Percent

Jurisdiction	Estimated Number of Vulnerable Persons Located in Steep Slopes Over 25-Percent									
	Persons Over 65	Percent of Total	Persons Under 5	Percent of Total	Non-English Speaking Persons	Percent of Total	Persons with a Disability	Percent of Total	Persons in Poverty	Percent of Total
Berrysburg (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Conewago (T)	2	0.4%	1	0.4%	0	0.0%	1	0.4%	0	0.0%
Dauphin (B)	28	14.9%	9	15.0%	0	0.0%	18	15.0%	18	15.1%
Derry (T)	31	0.7%	6	0.6%	1	0.5%	16	0.7%	14	0.7%
East Hanover (T)	11	1.0%	1	0.5%	0	0.0%	6	0.9%	2	0.8%
Elizabethville (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Gratz (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Halifax (B)	1	0.8%	0	0.0%	0	0.0%	1	0.6%	1	0.6%
Halifax (T)	27	3.2%	8	3.0%	0	0.0%	15	3.1%	10	3.2%
Harrisburg (C)	8	0.1%	6	0.1%	6	0.1%	12	0.1%	20	0.1%
Highspire (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Hummelstown (B)	9	1.3%	4	1.4%	0	0.0%	7	1.4%	7	1.3%
Jackson (T)	11	2.7%	1	1.6%	0	0.0%	5	2.8%	7	2.8%
Jefferson (T)	7	8.6%	1	5.0%	0	0.0%	3	7.5%	0	0.0%
Londonderry (T)	6	0.6%	2	0.4%	0	0.0%	2	0.4%	1	0.4%
Lower Paxton (T)	109	1.1%	33	1.1%	18	1.0%	58	1.1%	36	1.1%
Lower Swatara (T)	4	0.2%	1	0.2%	0	0.0%	2	0.2%	1	0.1%
Lykens (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Lykens (T)	5	2.7%	5	2.8%	1	1.6%	3	2.4%	5	2.9%
Middle Paxton (T)	59	4.0%	10	3.7%	1	2.2%	40	4.0%	8	3.8%
Middletown (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Mifflin (T)	2	1.8%	1	1.3%	0	0.0%	1	1.4%	4	1.7%
Millersburg (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Paxtang (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Penbrook (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Pillow (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Reed (T)	4	5.9%	0	0.0%	0	0.0%	2	4.4%	1	5.0%
Royalton (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Rush (T)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Jurisdiction	Estimated Number of Vulnerable Persons Located in Steep Slopes Over 25-Percent									
	Persons Over 65	Percent of Total	Persons Under 5	Percent of Total	Non-English Speaking Persons	Percent of Total	Persons with a Disability	Percent of Total	Persons in Poverty	Percent of Total
South Hanover (T)	52	4.9%	28	4.7%	0	0.0%	22	4.8%	14	4.7%
Steelton (B)	65	9.0%	34	8.8%	16	8.8%	133	9.0%	115	9.0%
Susquehanna (T)	71	1.3%	19	1.3%	10	1.2%	42	1.3%	28	1.2%
Swatara (T)	130	2.9%	35	2.9%	28	2.9%	91	2.9%	61	2.9%
Upper Paxton (T)	20	1.9%	3	1.5%	0	0.0%	12	1.9%	12	1.9%
Washington (T)	5	1.1%	0	0.0%	0	0.0%	2	0.7%	2	0.8%
Wayne (T)	2	1.4%	1	1.4%	0	0.0%	1	0.8%	0	0.0%
West Hanover (T)	29	1.1%	4	0.9%	0	0.0%	10	1.0%	3	1.0%
Wiconisco (T)	3	1.4%	0	0.0%	0	0.0%	2	1.2%	2	1.4%
Williams (T)	6	3.1%	1	2.9%	0	0.0%	7	3.2%	6	3.5%
Williamstown (B)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Dauphin Co. (Total)	**707**	**1.4%**	**214**	**1.2%**	**81**	**0.9%**	**514**	**1.4%**	**378**	**1.1%**

Source: US Census Bureau, American Community Survey 2018-2022; Dauphin County OEM 2024
Note: Population results have been rounded down. (B)=Borough, (C)=City, (T)=Township

Impact on General Building Stock

In general, the built environment located in the landslide-susceptibility area and the population, structures, and infrastructure located downslope are vulnerable to this hazard. Landslides also have the potential to destabilize the foundation of structures, which may result in monetary losses to businesses and residents. There are 2,455 buildings with a replacement cost value of $1,174,571,398 located in the landslide hazard area Countywide (1.0 percent of the total replacement cost value of the County). Swatara Township has the greatest number of buildings and estimated replacement cost value located in the landslide-susceptible hazard area, with 357 buildings totaling $259,414,815 in replacement cost value. Table 4.3.10-4 summarizes the exposed building stock located in the landslide-susceptibility area throughout the County by jurisdiction. Table 4.3.10-4 shows the number of buildings in the landslide-susceptibility area by general occupancy class.

Table 4.3.10-4. Estimated General Building Stock Exposure to the Landslide Hazard Area

Jurisdiction	Jurisdiction Total Buildings		Buildings in Steep Slopes Over 25-Percent			
	Count	RCV	Count	% of Jurisdiction Total	RCV	% of Jurisdiction Total
Berrysburg (B)	384	$155,707,892	0	0.0%	$0	0.0%
Conewago (T)	2,726	$1,408,072,267	13	0.5%	$3,845,988	0.3%
Dauphin (B)	499	$178,594,344	74	14.8%	$23,765,381	13.3%
Derry (T)	12,189	$16,562,878,409	83	0.7%	$54,292,393	0.3%
East Hanover (T)	5,424	$3,271,020,667	40	0.7%	$11,076,130	0.3%
Elizabethville (B)	1,022	$466,950,677	0	0.0%	$0	0.0%
Gratz (B)	804	$536,197,947	2	0.2%	$615,935	0.1%
Halifax (B)	529	$218,291,193	12	2.3%	$6,170,806	2.8%
Halifax (T)	3,714	$1,874,093,634	130	3.5%	$37,549,498	2.0%
Harrisburg (C)	19,455	$18,628,047,035	30	0.2%	$20,289,303	0.1%
Highspire (B)	1,481	$664,880,756	0	0.0%	$0	0.0%
Hummelstown (B)	2,488	$1,268,535,294	32	1.3%	$13,678,181	1.1%
Jackson (T)	2,533	$963,807,247	83	3.3%	$25,756,529	2.7%
Jefferson (T)	695	$279,826,276	43	6.2%	$8,215,487	2.9%

Jurisdiction	Jurisdiction Total Buildings		Buildings in Steep Slopes Over 25-Percent			
	Count	RCV	Count	% of Jurisdiction Total	RCV	% of Jurisdiction Total
Londonderry (T)	5,464	$3,122,384,091	19	0.3%	$7,226,325	0.2%
Lower Paxton (T)	22,715	$16,760,123,401	257	1.1%	$164,960,515	1.0%
Lower Swatara (T)	5,204	$7,181,289,637	17	0.3%	$9,068,629	0.1%
Lykens (B)	1,438	$620,374,667	1	0.1%	$605,424	0.1%
Lykens (T)	2,311	$1,144,139,161	66	2.9%	$22,025,759	1.9%
Middle Paxton (T)	4,472	$1,679,813,405	183	4.1%	$59,395,698	3.5%
Middletown (B)	3,849	$2,433,657,717	0	0.0%	$0	0.0%
Mifflin (T)	1,318	$762,373,861	20	1.5%	$4,301,559	0.6%
Millersburg (B)	1,518	$913,497,912	1	0.1%	$65,362	<0.1%
Paxtang (B)	900	$476,331,717	0	0.0%	$0	0.0%
Penbrook (B)	1,581	$698,112,706	0	0.0%	$0	0.0%
Pillow (B)	317	$115,637,971	7	2.2%	$3,207,513	2.8%
Reed (T)	327	$147,861,272	19	5.8%	$4,565,176	3.1%
Royalton (B)	724	$253,576,998	0	0.0%	$0	0.0%
Rush (T)	379	$88,377,859	2	0.5%	$583,944	0.7%
South Hanover (T)	4,275	$2,386,303,219	198	4.6%	$62,432,510	2.6%
Steelton (B)	2,867	$2,584,768,828	248	8.7%	$104,156,797	4.0%
Susquehanna (T)	12,511	$10,167,577,726	191	1.5%	$138,159,263	1.4%
Swatara (T)	12,223	$10,172,987,131	357	2.9%	$259,414,815	2.6%
Upper Paxton (T)	3,823	$1,780,080,745	76	2.0%	$20,069,656	1.1%
Washington (T)	2,464	$1,345,985,248	54	2.2%	$32,386,152	2.4%
Wayne (T)	1,460	$480,646,769	24	1.6%	$6,591,276	1.4%
West Hanover (T)	7,194	$3,876,826,721	72	1.0%	$19,419,811	0.5%
Wiconisco (T)	1,112	$351,954,145	53	4.8%	$38,257,043	10.9%
Williams (T)	1,093	$493,719,539	48	4.4%	$12,422,542	2.5%
Williamstown (B)	966	$399,114,521	0	0.0%	$0	0.0%
Dauphin County (Total)	**156,448**	**$116,914,420,604**	**2,455**	**1.6%**	**$1,174,571,398**	**1.0%**

Sources: RS Means 2024; Dauphin County 2024; Dauphin County OEM 2024
Notes: RCV = Replacement Cost Value ; (B)=Borough, (C)=City, (T)=Township

Table 4.3.10-5. Buildings in Steep Slopes Over 25-Percent by General Occupancy Class

Jurisdiction	Buildings in Steep Slopes Over 25-Percent by General Occupancy Class			
	Residential	Commercial	Industrial	Government, Religion, Agricultural, and Education
Berrysburg (B)	0	0	0	0
Conewago (T)	8	3	0	2
Dauphin (B)	65	8	0	1
Derry (T)	67	8	0	8
East Hanover (T)	33	4	0	3
Elizabethville (B)	0	0	0	0
Gratz (B)	0	0	0	2
Halifax (B)	5	7	0	0
Halifax (T)	72	22	2	34
Harrisburg (C)	24	6	0	0

Jurisdiction	Buildings in Steep Slopes Over 25-Percent by General Occupancy Class			
	Residential	Commercial	Industrial	Government, Religion, Agricultural, and Education
Highspire (B)	0	0	0	0
Hummelstown (B)	30	1	0	1
Jackson (T)	44	11	0	28
Jefferson (T)	33	5	0	5
Londonderry (T)	18	1	0	0
Lower Paxton (T)	211	35	1	10
Lower Swatara (T)	7	7	3	0
Lykens (B)	0	1	0	0
Lykens (T)	32	6	0	28
Middle Paxton (T)	140	29	0	14
Middletown (B)	0	0	0	0
Mifflin (T)	12	1	0	7
Millersburg (B)	0	1	0	0
Paxtang (B)	0	0	0	0
Penbrook (B)	0	0	0	0
Pillow (B)	1	4	0	2
Reed (T)	12	2	0	5
Royalton (B)	0	0	0	0
Rush (T)	2	0	0	0
South Hanover (T)	167	18	0	13
Steelton (B)	211	23	0	14
Susquehanna (T)	137	38	0	16
Swatara (T)	298	49	2	8
Upper Paxton (T)	50	17	0	9
Washington (T)	16	26	7	5
Wayne (T)	14	1	0	9
West Hanover (T)	60	4	1	7
Wiconisco (T)	14	22	2	15
Williams (T)	28	3	0	17
Williamstown (B)	0	0	0	0
Dauphin County (Total)	**1,811**	**363**	**18**	**263**

Source: Dauphin County 2024; Dauphin County OEM 2024
Note: (B)=Borough, (C)=City, (T)=Township

Impact on Critical Facilities

Landslides can also impact the critical facilities in Dauphin County. There are 48 critical facilities located in the identified landslide hazard area, with Safety and Security having the most (17 facilities). See Table 4.3.10-6 for all facilities by lifeline category exposed to the landslide hazard area for the County.

Table 4.3.10-6. Number of Critical Facilities and Lifeline Facilities Located in the Steep Slope (>25 Percent) Landslide Hazard Area

Jurisdiction	Number of Facilities in Steep Slopes Over 25-Percent Hazard Area, by Lifeline Category									Total Facilities in Landslide Hazard Area	
	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Count	% of Jurisdiction Total
Berrysburg (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Conewago (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Dauphin (B)	0	0	0	0	0	4	0	0	0	4	15.4%
Derry (T)	0	0	0	0	0	1	0	1	0	2	1.5%
East Hanover (T)	0	0	0	0	0	0	1	0	0	1	2.8%
Elizabethville (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Gratz (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Halifax (B)	0	0	0	0	0	0	0	0	1	1	11.1%
Halifax (T)	1	0	0	1	0	0	1	1	0	4	13.3%
Harrisburg (C)	0	0	0	0	0	0	0	0	0	0	0.0%
Highspire (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Hummelstown (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Jackson (T)	0	0	0	0	0	4	0	0	0	4	18.2%
Jefferson (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Londonderry (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Lower Paxton (T)	0	0	0	0	1	3	2	0	0	6	4.0%
Lower Swatara (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Lykens (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Lykens (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Middle Paxton (T)	1	0	0	1	0	1	0	0	1	4	12.1%
Middletown (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Mifflin (T)	1	0	0	0	0	0	0	0	0	1	12.5%
Millersburg (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Paxtang (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Penbrook (B)	0	0	0	0	0	0	0	0	0	0	0.0%

Jurisdiction	Number of Facilities in Steep Slopes Over 25-Percent Hazard Area, by Lifeline Category									Total Facilities in Landslide Hazard Area	
	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Count	% of Jurisdiction Total
Pillow (B)	0	0	0	0	0	1	0	0	0	1	16.7%
Reed (T)	0	0	0	0	0	1	0	0	0	1	16.7%
Royalton (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Rush (T)	0	0	0	0	0	0	0	0	0	0	0.0%
South Hanover (T)	0	0	0	1	0	1	0	0	0	2	8.3%
Steelton (B)	0	0	0	1	0	0	0	0	0	1	3.2%
Susquehanna (T)	0	0	0	0	0	0	1	0	2	3	2.5%
Swatara (T)	0	0	1	1	0	1	1	0	3	7	4.9%
Upper Paxton (T)	1	0	0	0	0	0	0	0	0	1	2.9%
Washington (T)	0	0	0	1	0	0	0	1	0	2	6.5%
Wayne (T)	0	0	0	0	0	0	0	0	0	0	0.0%
West Hanover (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Wiconisco (T)	1	0	0	1	0	0	0	1	0	3	23.1%
Williams (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Williamstown (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Dauphin County (Total)	**5**	**0**	**1**	**7**	**1**	**17**	**6**	**4**	**7**	**48**	**2.8%**

Source: Dauphin County 2024; HIFLD 2020/2023; Department of Human Services 2024; Dauphin County OEM 2024
Note: % = Percent; (B)=Borough, (C)=City, (T)=Township

Impact on the Economy

The landslide hazard can impose direct and indirect impacts on society. Direct costs include actual damage sustained by buildings, property, and infrastructure. Indirect costs, such as cleanup costs, business interruption, loss of tax revenues, reduced property values, and loss of productivity, are difficult to measure. Additionally, ground failure threatens transportation corridors, fuel and energy conduits, and communication lines (USGS 2003).

Impact on the Environment

A landslide event alters the landscape. In addition to changes in topography, vegetation and wildlife habitats may be damaged or destroyed. Soil and sediment runoff will accumulate downslope, potentially blocking waterways and roadways and impacting the quality of streams and other water bodies. Additional environmental impacts include loss of forest productivity.

Mudslides are a type of landslide that involve quick-moving debris rivers (WHO 2024). These types of landslides can destroy natural and man-made objects, ultimately settling in a level location and gathering into thick deposits.

Future Growth and Development

Any sections of growth located in the landslide-susceptible hazard areas could be potentially impacted by the geologic ground movement caused by landslides. It is recommended that the County and jurisdictional partners implement design strategies that mitigate the risk of landslides.

Estimated population projections provided by the US Census Bureau indicate that Dauphin County's population will continue to increase into 2040, increasing the total population to approximately 296,766 persons (US Census Bureau). Persons who move into areas with steep slopes are at greater risk of being impacted if a landslide were to occur.

Effects of Climate Change on Vulnerability

The direct impact of climate change on landslides is difficult to determine. However, multiple secondary effects of climate change have the potential to increase the likelihood of landslides. Warming temperatures resulting in wildfires would reduce vegetative cover along steep slopes and destabilize the soils because of the destruction of the root system. Additionally, increased intensity of rainfall events would increase the saturation of soils on steep slopes. Under these future conditions, the County's assets located on or at the base of these steep slopes will have an increased risk of landslides.

Additional Data and Next Steps

For future Hazard Mitigation Plan (HMP) updates, additional factors used to determine landslide susceptibility besides steep slope could allow for more accurate development of exposure and potential loss estimates.

4.3.11 Opioid Addiction Response

The following section provides the hazard profile (hazard description, location, extent, previous occurrences and losses, probability of future occurrences, and impact of climate change) and vulnerability assessment for the Opioid Addiction Response hazard in Dauphin County.

Opioid is a broad term including opiates, which are drugs naturally extracted from types of poppy plants, and narcotics that are generally synthetically made to mimic opiates (PEMA 2023). As determined by the Planning Team and planning partners, opioid addiction is a hazard of concern for Dauphin County.

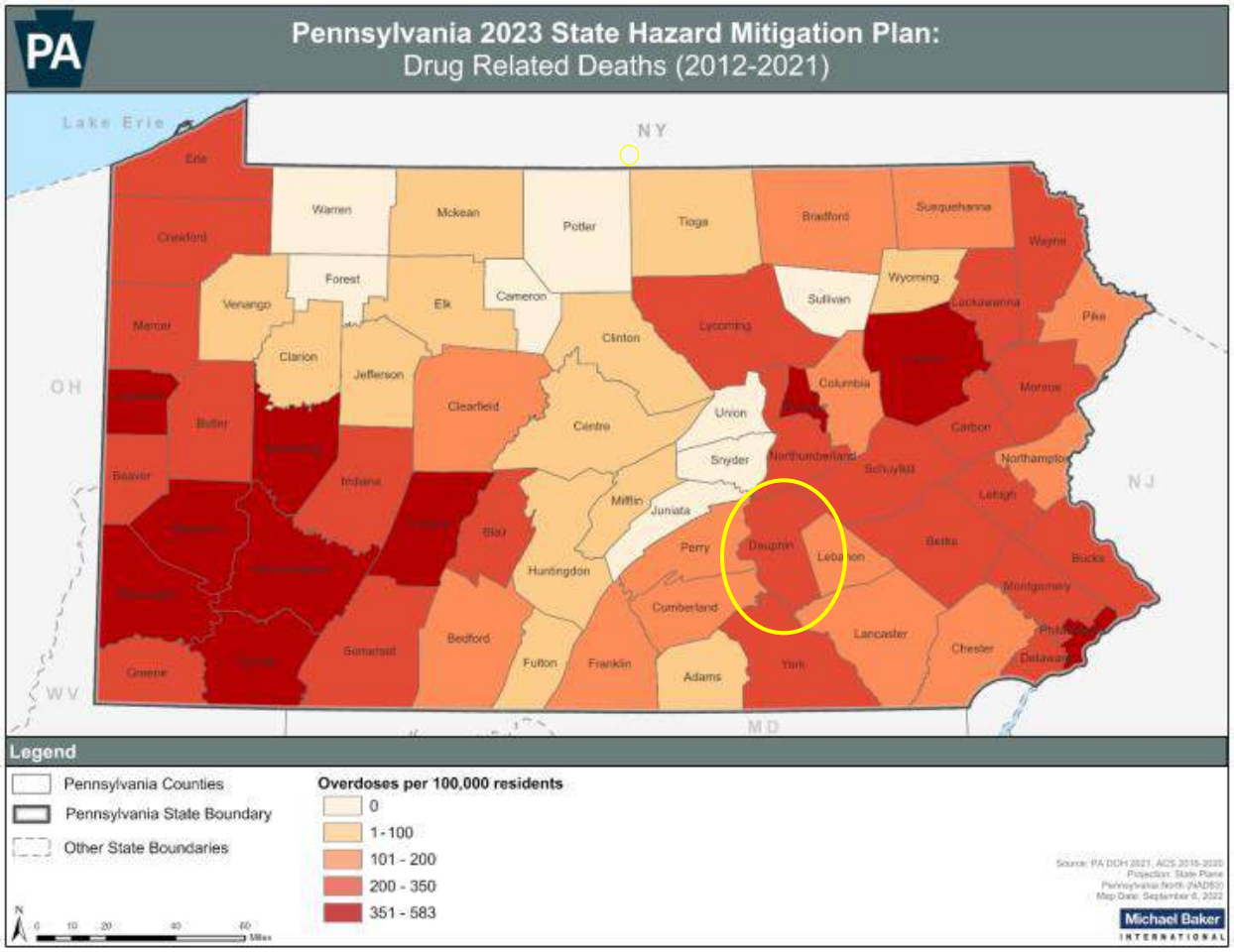
The Centers for Disease Control and Prevention (CDC) defines the following as the three most common types of opioids:

- **Prescription Opioids** are medications prescribed by doctors for pain treatment. Prescription opioids can be synthetic (methadone, oxycodone [OxyContin], or hydrocodone [Vicodin]) or natural (morphine).
- **Fentanyl** is a synthetic opioid that is 50 to 100 times more powerful than morphine and used for treating severe pain. Illegally made and distributed fentanyl is becoming more prevalent.
- **Heroin** is an illegal, highly addictive natural opioid processed from morphine that is also becoming more commonly used in the United States. It is commonly used along with other substances including cocaine and prescription opioids (PEMA 2023).

An opioid addiction is when an individual is physically dependent upon opioids to function. Opioids react with the nervous system by blocking the ability to feel pain and cause a sense of euphoria (PEMA 2020). Those who abuse opioids generally build a tolerance, requiring them to take more of the opioid to achieve the same effect.

Pennsylvania is experiencing an unprecedented epidemic of drug abuse and drug-related deaths, affecting residents throughout the state. Pennsylvania is typically among the hardest-hit states from total drug overdose deaths each year, ranking fourth in 2020 behind California, Florida, and New York (PEMA 2023). In 2023, 4,719 drug overdose deaths were identified statewide which is a 9 percent decrease compared to 2022 (ODSMP 2024). Of those deaths, 82.9 percent have been confirmed to be opioid-related (ODSMP 2024). Figure 4.3.11.1-1 shows the overall number of drug-related deaths per 100, 000 people in each Pennsylvania county between 2012 and 2020.

Figure 4.3.11.1-1. Number of Drug-Related Deaths Per 100,000 People



Source: (PEMA 2023)
Note: The yellow circle indicates the location of Dauphin County

In 2017, the U.S. Drug Enforcement Administration (DEA) Philadelphia Division and the University of Pittsburgh prepared a document titled, "Analysis of Overdose Deaths in Pennsylvania, 2016" to assist law enforcement's efforts to identify and combat drug suppliers, and ultimately drug abuse and related overdoses (DEA 2017). The drugs included in the analysis (listed in Table 4.3.11.1-1) were selected based on (1) law enforcement intelligence regarding the frequency of abuse and diversion, and (2) the most common drugs present in drug-related overdose deaths according to national public safety and public health sources.

Table 4.3.11.1-1. Drugs Included in Analysis of Drug-Related Overdose Deaths, Pennsylvania, 2017

Drug Category	Substances Included in Analysis		
Benzodiazepines	Alprazolam Chlordiazepoxide Clonazepam Delorazepam	Diazepam Estazolam Flurazepam Lorazepam	Midazolam® Oxazepam Temazepam
Cocaine			
Fentanyl/Fentanyl-Related Substances (FRS)/Non-Prescription Synthetic Opioids (NPSO)	3-Methylfentanyl 4-Methoxy-Butyryl Fentanyl Acetyl Fentanyl Acryl Fentanyl	Carfentanil Fentanyl Fluorobutyrfentanyl Fluorofentanyl	Furanyl Fentanyl Para-Fluoro-Isobutyryl Fentanyl/FIBF Sufentanil U-47700
Heroin			
Other Illicit Drugs	Lysergic Acid Diethylamide (LSD) Methylenedioxy-amphetamine (MDA) 3,4-Methylenedioxymethamphetamine (MDMA)		Methamphetamine Phencyclidine (PCP)
Prescription Opioids	Hydrocodone Hydromorphone Meperidine	Morphine Oxycodone Oxymorphone	Tapentadol Tramadol

Source: (DEA 2017)

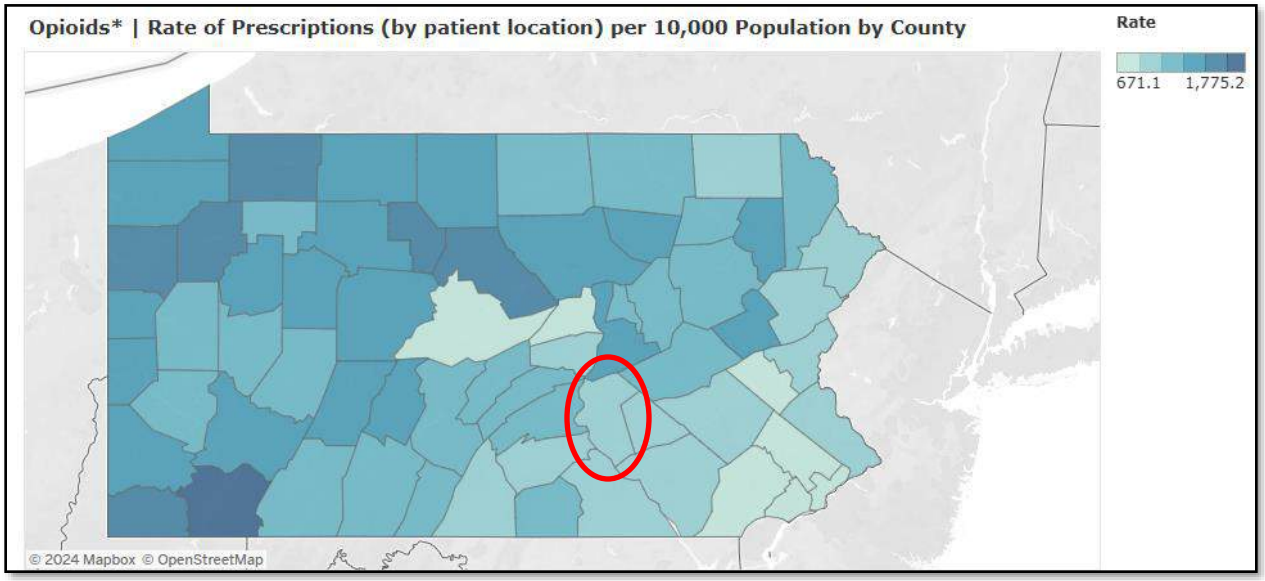
4.3.11.1 Location and Extent

Opioid addiction impacts the entire state. The PDH Office of Drug Surveillance and Misuse Prevention (ODSMP) tracks both prescriptions (the number of prescriptions written by a medical professional) and dispensations (the amount of medication provided by pharmacists). Figure 4.3.11.1-1 illustrates the rate of opioid prescriptions per 10,000 residents in each county. Dauphin County circled in red, has a low to moderate rate (939.9 per 10,000 population) of opioid prescriptions compared to the rest of the state (PDH-ODSMP 2024).

Although people under the age of 35 do not have the highest access to prescriptions, they are still particularly vulnerable to the opioid crisis. A contributing factor to this heightened susceptibility to prescription abuse could be that brain development is not complete until the age of 25 (Arain M 2013). During the brain development stage, substance use is increasingly more impactful on behavior and health. Conversely, those 65 and older have the most access to opioid drugs through a high prescription and dispensation rate but have the lowest vulnerability to opioid addiction due to the lifespan rate (PDH-ODSMP 2024). Figure 4.3.11.1-2 illustrates the distribution by age of the total number of dispensations in Dauphin County for the second quarter (Q2) of 2024. Figure 4.3.11.1-3 illustrates the distribution by age of the total number of prescriptions in Dauphin County in 2024 Q2.

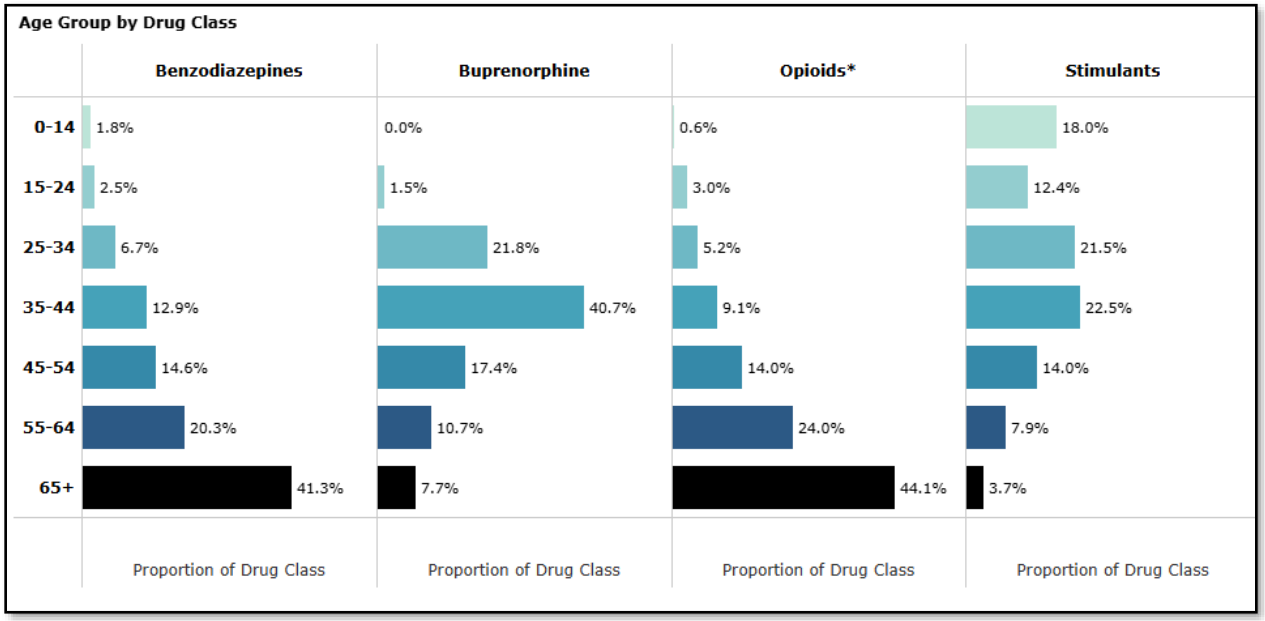
PDH ODSMP has found opioids were involved in 83.3 percent of drug overdose deaths across the state in 2023. At least 76.7 percent of these drug overdose deaths resulted from fentanyl. See Figure 4.3.11.1-4 for drug classes contributing to overdose mortality across the state.

Figure 4.3.11.1-1. Rate of Opioid Prescriptions per 10,000 Population by County



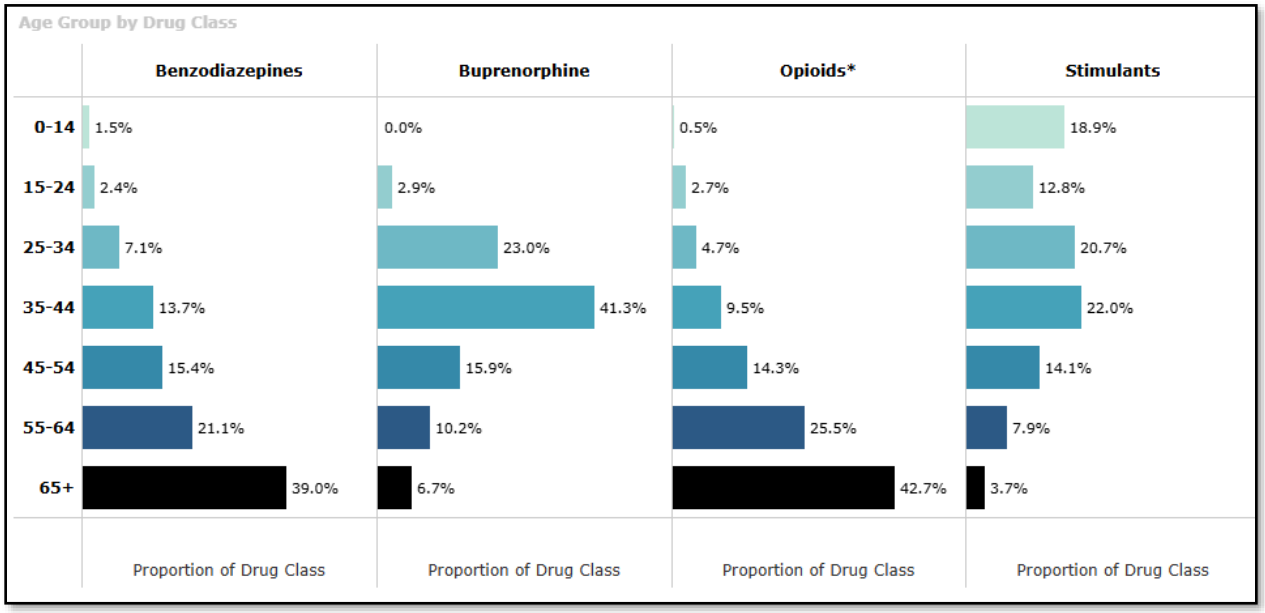
Source: PDH-ODSMP 2024
Note: Dauphin County indicated by red oval

Figure 4.3.11.1-2. Number of Dispensations by Age for Dauphin County in 2024 Q2



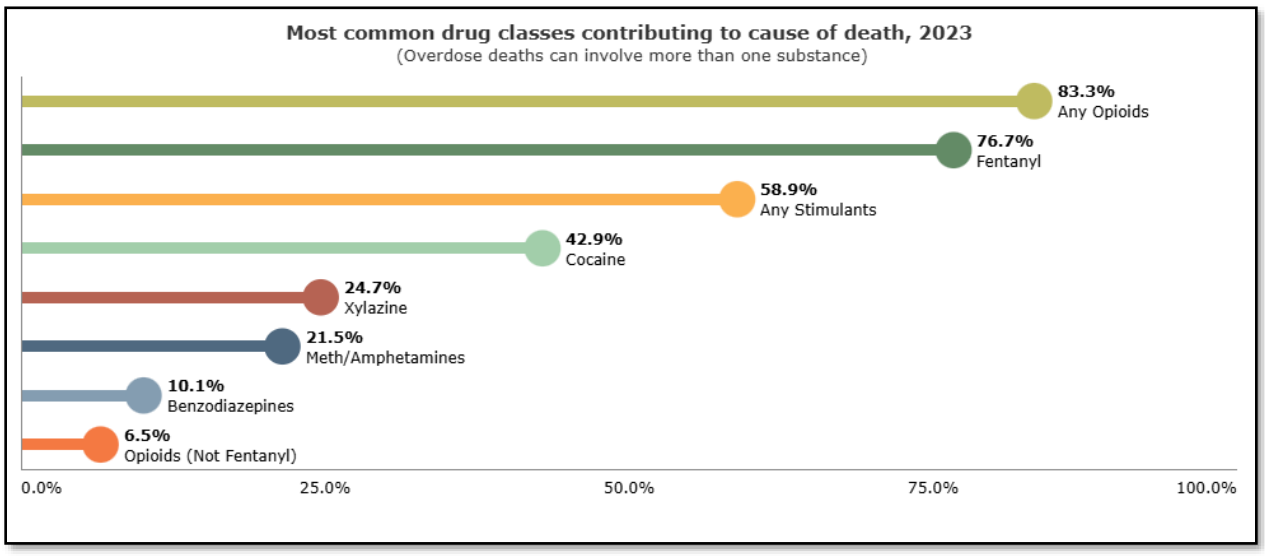
Source: PDH-ODSMP 2024
Note: This graphic shows the number of dispensations by pharmacy locations.

Figure 4.3.11.1-3. Number of Prescriptions by Age for Dauphin County in 2024 Q2



Source: PDH-ODSMP 2024
Note: This graphic shows the number of dispensations by patient location.

Figure 4.3.11.1-4. Most Common Drug Classes Contributing to Cause of Death in Pennsylvania, 2023



Source: PDH-ODSMP 2024

4.3.11.2 Range of Magnitude

Opioid addiction often develops over time in a three-step process—opioid tolerance, opioid dependence, and opioid addiction—and can go undetected until it is too late:

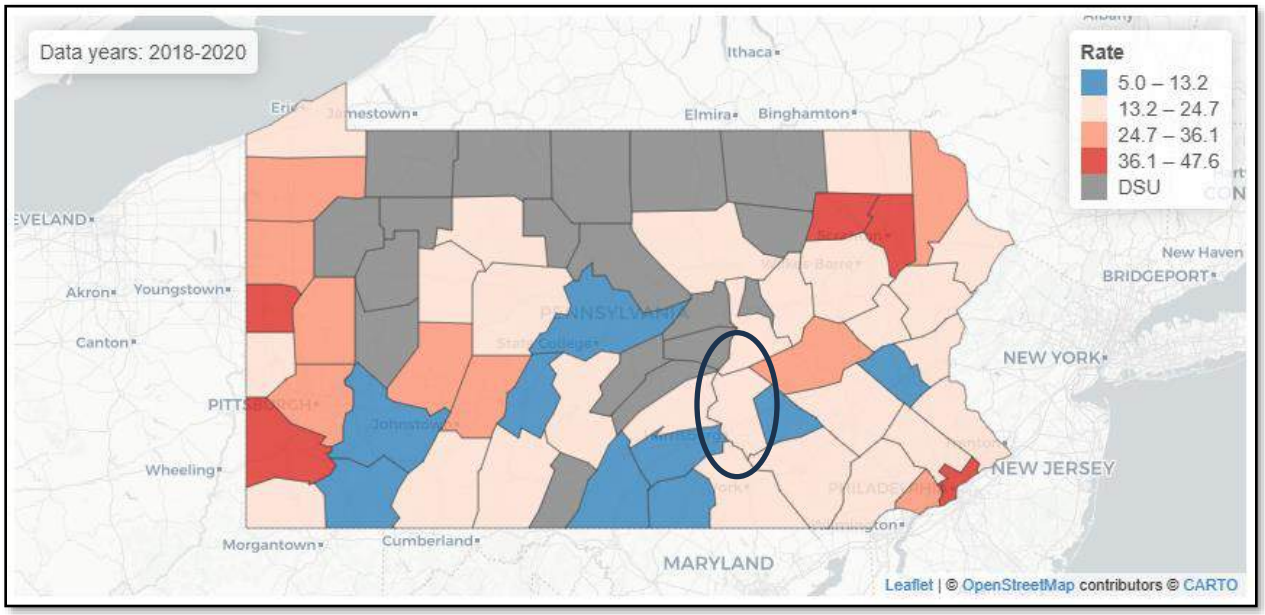
- **Opioid tolerance** is defined by the CDC as a person who has a "reduced response to medication" and in turn, "requires more opioids to experience the same effect" (CDC 2021). It is not always easy to recognize opioid tolerance, but many people can comfortably stop the usage of opioids during this phase.

- **Opioid dependence** is when the "body adjusts its normal functioning around regular opioid use" (CDC 2021). When a person is in this phase, it is more difficult to stop opioid usage as it often will cause "unpleasant" physical symptoms to occur (CDC 2021). Sometimes rehabilitation and hospitalization are needed to quit opioids at this stage of the process.
- **Opioid addiction** is the last phase and most dangerous to overcome. It is often called "opioid use disorder." It occurs when a person is physically and mentally unable to stop the usage of opioids (CDC 2021). Often, the person who presents opioid addiction struggles with social problems and upholding obligations. This stage is the most dangerous and increases the risk of withdrawal. Generally, a person with opioid addiction will need further medical assistance and rehabilitation to return to normal.

4.3.11.3 Past Occurrence

PDH data show that Dauphin County has one of the lower rates of opioid overdose mortality in the state, with 21.3 deaths per 100,000 residents between 2018 and 2020, as shown in Figure 4.3.11.3-1 (PDH 2020). This rate is up from the 2017 to 2019 period when the opioid mortality rate was 16.0 deaths per 100,000 residents.

Figure 4.3.11.3-1. Opioid Overdose Death Rate, 2018 to 2020



Source: PDH 2020
Note: Dauphin County is indicated by a black oval.

Publicly available data on the annual number of fatal overdoses includes not only opioid-related deaths but all deaths related to substance use (excluding alcohol) (ODSMP 2024), Based on that data, overdose deaths decreased from 115 in 2018 to 101 in 2019, then fluctuated, reaching 115 again in 2023, refer to Table 4.3.11.3-1.

Table 4.3.11.3-1. Any Drug* Overdose Deaths in Dauphin County, 2018 to 2023

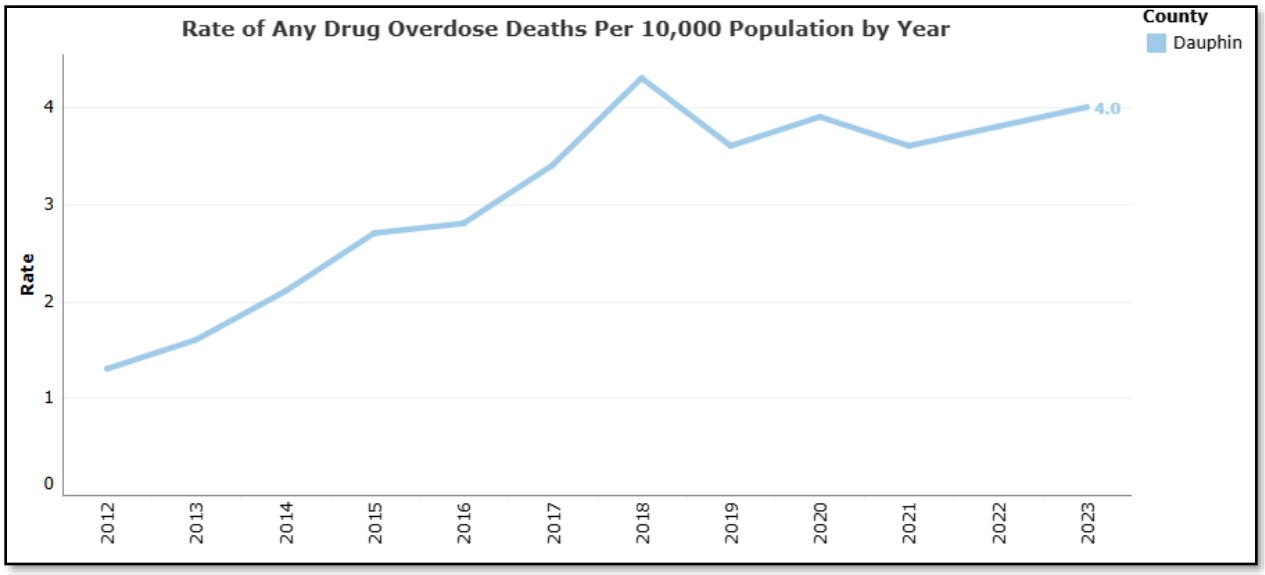
Year	Overdose Deaths
2018	115
2019	101
2020	111
2021	104
2022	108

Year	Overdose Deaths
2023	115
Total	**654**

Source: ODSMP 2024
*Note: *Any Drug overdoses include overdoses from illicit, prescription, or over-the-counter drugs, excluding alcohol-only related overdoses.*

Figure 4.3.11.3-2 shows the changes in overdose death rates per 10,000 population from 2012 to 2023 for Dauphin County. In 2023, Dauphin County's rate was 4.0 deaths per 10,000 persons (ODSMP 2024).

Figure 4.3.11.3-2. Any Drug-Related Overdose Deaths, Dauphin County, 2012–2023

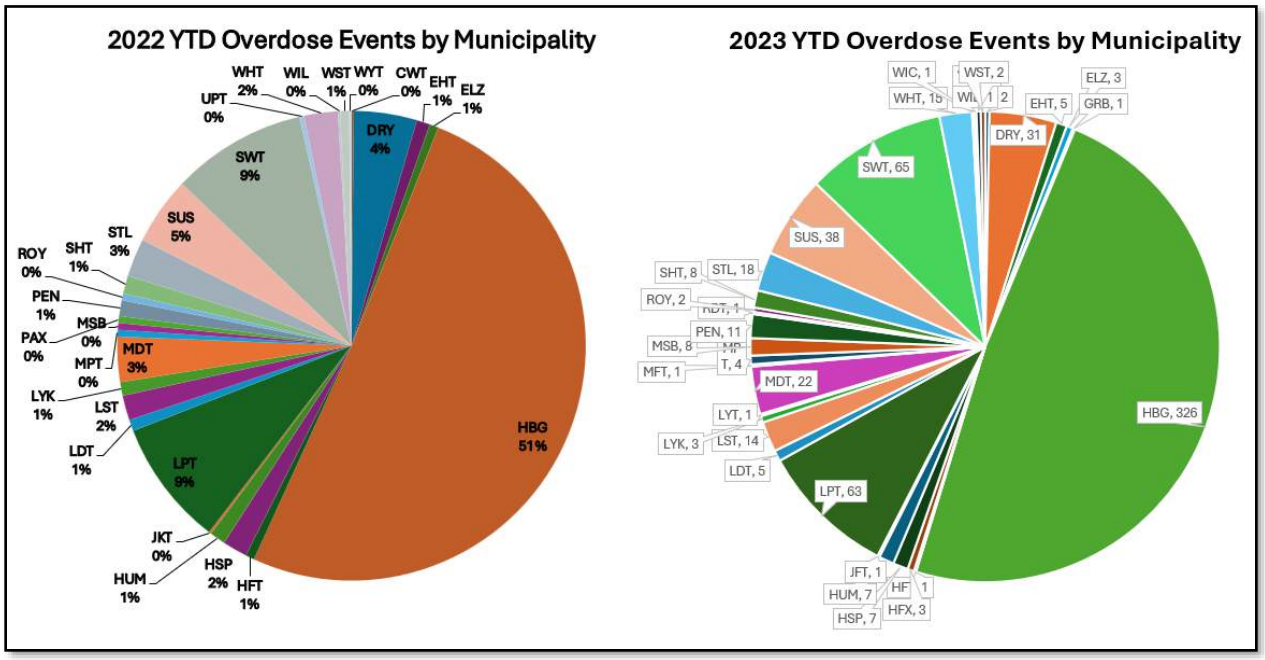


Source: ODSMP 2024

According to the Dauphin County 2022 and 2023 Annual Reports, there have been 644 overdoses for 2022 and 672 overdoses for 2023 (Dauphin County OEM 2022, 2023). Refer Figure 4.3.11.3-3 and

Table 4.3.11.3-2 for a breakdown of overdose events by the municipality.

Figure 4.3.11.3-3. Overdose Events by Dauphin County Municipalities, 2022 and 2023



Source: Dauphin County OEM 2022, 2023

Table 4.3.11.3-2. Overdose Events by Dauphin County Municipalities, 2022 and 2023

Jurisdiction	Overdose Events	
	2022	2023
Berrysburg (B)	-	-
Conewago (T)	1	2
Dauphin (B)	-	-
Derry (T)	28	31
East Hanover (T)	6	5
Elizabethville (B)	4	3
Gratz (B)	-	1
Halifax (B)	-	3
Halifax (T)	4	1
Harrisburg (C)	327	326
Highspire (B)	11	7
Hummelstown (B)	7	7
Jackson (T)	1	-
Jefferson (T)	-	1
Londonderry (T)	5	5
Lower Paxton (T)	56	63
Lower Swatara (T)	11	14
Lykens (B)	6	3
Lykens (T)	-	2
Middle Paxton (T)	3	4
Middletown (B)	20	22
Mifflin (T)	-	-
Millersburg (B)	3	8
Paxtang (B)	3	-
Penbrook (B)	7	11
Pillow (B)	-	-
Reed (T)	-	1
Royalton (B)	3	2
Rush (T)	-	-
South Hanover (T)	8	8
Steelton (B)	17	18
Susquehanna (T)	30	38
Swatara (T)	60	65
Upper Paxton (T)	2	-
Washington (T)	4	2
Wayne (T)	1	-
West Hanover (T)	15	15
Wiconisco (T)	-	1
Williams (T)	-	2
Williamstown (B)	1	1
Dauphin County (Total)	**644**	**672**

Source: Dauphin County OEM 2022, 2023
Note: "-" none listed in the report; Totals for 2023 include 28 events from 2022 per annual report.

4.3.11.4 Future Occurrence

One of the most important components in reducing drug-related deaths is to prevent initial drug use; as such, the impact of education and prevention strategies in use today are geared to reduce the number of overdose deaths that will be shown in future years. The DEA Philadelphia Field Division will continue efforts, in conjunction with law enforcement and public health partners, to define and address the factors impacting the availability and abuse of illicit drugs and diverted pharmaceuticals in Pennsylvania, which will ultimately impact the number of overdose deaths.

Future occurrences of substance use and misuse, overdose, and fatalities are ever-changing as the state moves forward with overdose prevention initiatives. In January 2018, Governor Tom Wolf declared Pennsylvania's opioid addiction epidemic a disaster emergency. This declaration enhanced coordination and data collection between state and local responders, improved tools for families and first responders, and expanded treatment access. Naloxone, a lifesaving drug that reverses the effects of a drug overdose, has become more available as a result. In addition, a new Opioid Coordination Group was housed within the Pennsylvania Emergency Management Agency (Commonwealth of Pennsylvania 2018). These measures may have contributed to the large decreases in deaths from 2017-2019, yet deaths increased to similar levels to 2017 in both 2020 and 2021.

These increases may not be the fault of inadequate policies, but instead an unfortunate consequence of how the COVID-19 pandemic increased opioid and stimulant use across the country (PEMA 2023). Research has documented that isolation and solitude negatively impact the experience of those in recovery and the survival of those with substance use disorder frequently depends upon maintaining social networks (Roe, et al. 2021). In addition to increased usage, the delivery and effectiveness of prevention and treatment programs may have been severely impacted by the pandemic. Our understanding of the factors, demographics, and substances involved in this crisis is constantly evolving, and treatments should reflect this (PEMA 2023).

The best available data on opioid-related events was used to calculate the probability of future such events in the County. Information from the PDH, the 2023 Commonwealth of Pennsylvania HMP, and the Dauphin County Office of Emergency Management were used to identify the number of events that occurred between 2018 and 2023. Table 4.3.11.4-1 shows these statistics, as well as the estimated percent chance of an incident occurring in a given year.

Table 4.3.11.4-1. Probability of Future Opioid Events

Hazard Type	Number of Occurrences Between 2018 and 2023	% Chance of Occurrence in Any Year
Opioid Response Events	1,747	100%

Source: (PDH 2023); PEMA 2023; Dauphin County OEM 2022, 2023

The identified hazards of concern for Dauphin County were ranked for relative risk in Section 4.4 of this plan. The probability of occurrence, or likelihood of the event, is one parameter used for ranking hazards. Based on historical records, the probability of occurrence of drug overdose events in Dauphin County is considered *highly likely*. Section 4.4 provides further information on PEMA's risk factor methodology and the risk factors used to determine each hazard's risk rank.

4.3.11.5 Vulnerability Assessment

To understand risk, a community must evaluate the assets that are exposed and potentially vulnerable to the identified hazard. The following sections evaluate and estimate the potential impact of drug overdose deaths on Dauphin County, including:

- Overview of vulnerability.
- Impact on (1) life, health, and safety; (2) general building stock and critical facilities; (3) economy; (4) the environment; and (6) future growth and development.
- Effects of climate change on vulnerability.
- Further data collection that will assist with understanding this hazard over time.

Overview of Vulnerability

This section is being added as an introductory representation, with hopes that future HMP updates will include more enhanced data for Dauphin County as well as successful mitigation actions. At this time, available data support the need to create awareness and provide education to Dauphin County residents regarding this hazard of concern.

Impact on Life, Health, and Safety

Overall Population

Opioid use disorder has significant life, health, and safety impacts on the residents of Dauphin County. Emergency medical services (EMS) and other emergency and medical service providers working in direct patient care are vulnerable to fentanyl exposure (PEMA 2023). According to DEA, it only takes 2 to 3 milligrams of fentanyl for respiratory depression, arrest, and even death to occur. Fentanyl is difficult to differentiate from other narcotics and powdered substances, therefore first responders take extra precautions when dealing with calls related to drug abuse (DEA 2022). The DEA recommends that all first responders carry personal protection equipment in case of fentanyl exposure.

Socially Vulnerable Population

A 2020 study found that poverty, disability, and educational attainment are key indicators of the risk of death due to opioid overdose across the United States. Unemployed residents who had a disability or had obtained only a high school degree were at higher risk of a fatal overdose than their peers (Altekruse, et al. 2020). Dauphin County has 12.0 percent (34,256 persons) of its total population that is below the poverty level and may be at higher risk for opioid use disorder and potentially fatal overdose.

Opioid addiction is also able to be passed along from a woman to a child in her womb. This condition is known as neonatal abstinence syndrome (PEMA 2023). According to the National Institute on Drug Abuse, neonatal abstinence syndrome increased in 2012, with over 22,000 babies born with this condition and $1.5 billion in hospital charges nationwide (Uma M. Reddy 2018).

Impact on General Building Stock and Critical Facilities

No structures are anticipated to be affected directly by opioid use. This hazard's impacts are on residents rather than structures.

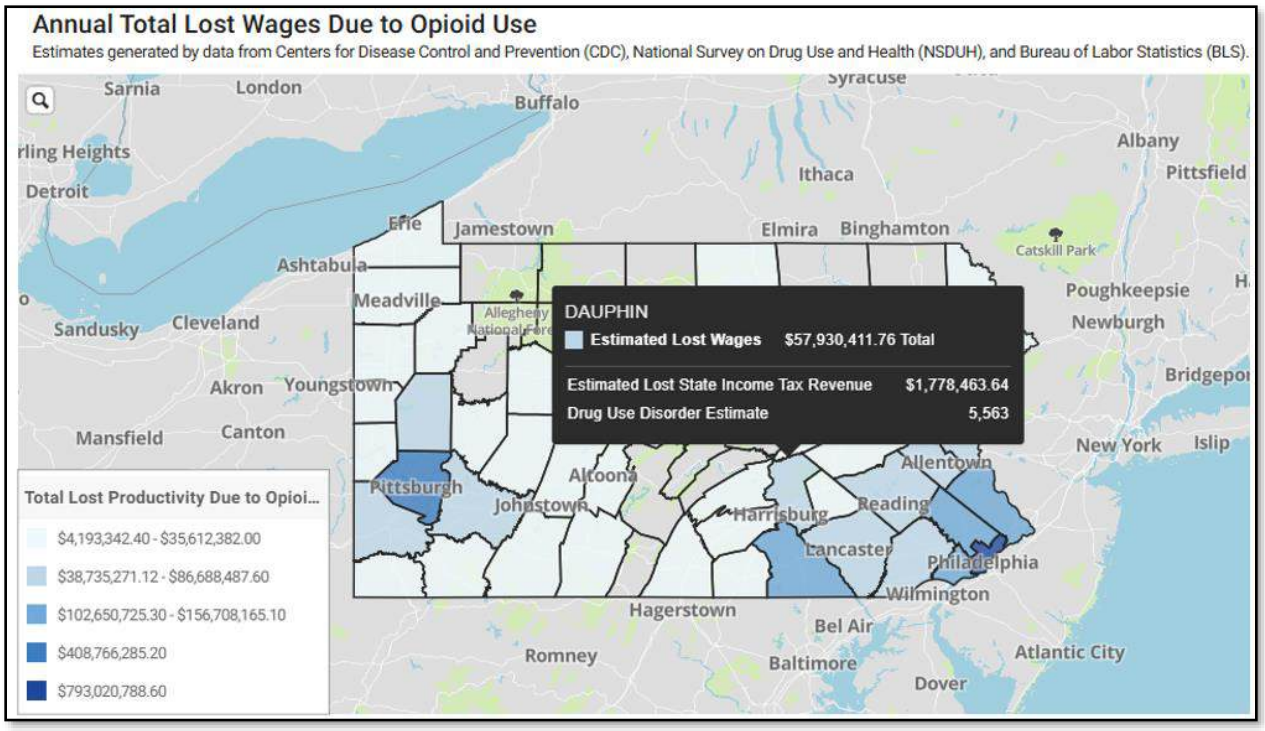
Impact on the Economy

Opioid addiction can directly impact the economy through unscheduled worker absenteeism, reduced productivity, hospitalizations that cost days of work, unemployment, and exits from the labor force (PDH; University of Pittsburgh n.d.).

On average, substance use disorder has been estimated to reduce total per-person productivity by 17 percent. Because wages are tied to productivity, PDH and University of Pittsburgh School of Public Health researchers multiplied the 17 percent reduction in productivity associated with substance use disorder by the estimated

number of people with substance use disorder and by the annual average wage in each Pennsylvania county (PDH; University of Pittsburgh n.d.). Based on that calculation, Dauphin County lost $58 million in wages due to opioid use disorder in 2020; this is a downward trend, nearly $5 million less than $63 million in 2019. See Figure 4.3.11.5-1 for 2020 annual lost wages (PDH; University of Pittsburgh n.d.).

Figure 4.3.11.5-1. Annual Total Lost Wages Due to Opioid Use, 2020



Source: Commonwealth of Pennsylvania 2020
Note: Estimates based on counts less than 11 are not displayed.

PDH and University of Pittsburgh researchers also estimated lost wages due to hospitalization for opioid use and estimated lost lifetime wages due to fatal opioid overdose. The 2020 estimate for lost wages due to hospitalization in the county was $100,250, with 597 hospitalization days. The 2020 estimate for lost lifetime wages due to fatal opioid overdose was over $13 million (Commonwealth of Pennsylvania 2020).

Impact on the Environment

According to a recent study, environmental scientists at the Cary Institute of New York found traces of opioids and other drugs in streams, rivers, and lakes. These traces came from human urine and feces, and medications that have been flushed down the toilet. However, the ecological and environmental impacts are unknown. The U.S. Environmental Protection Agency (EPA) suggests that while the risks of pharmaceuticals found in wastewater, ambient water, and drinking water are low, further research is needed (EPA 2023).

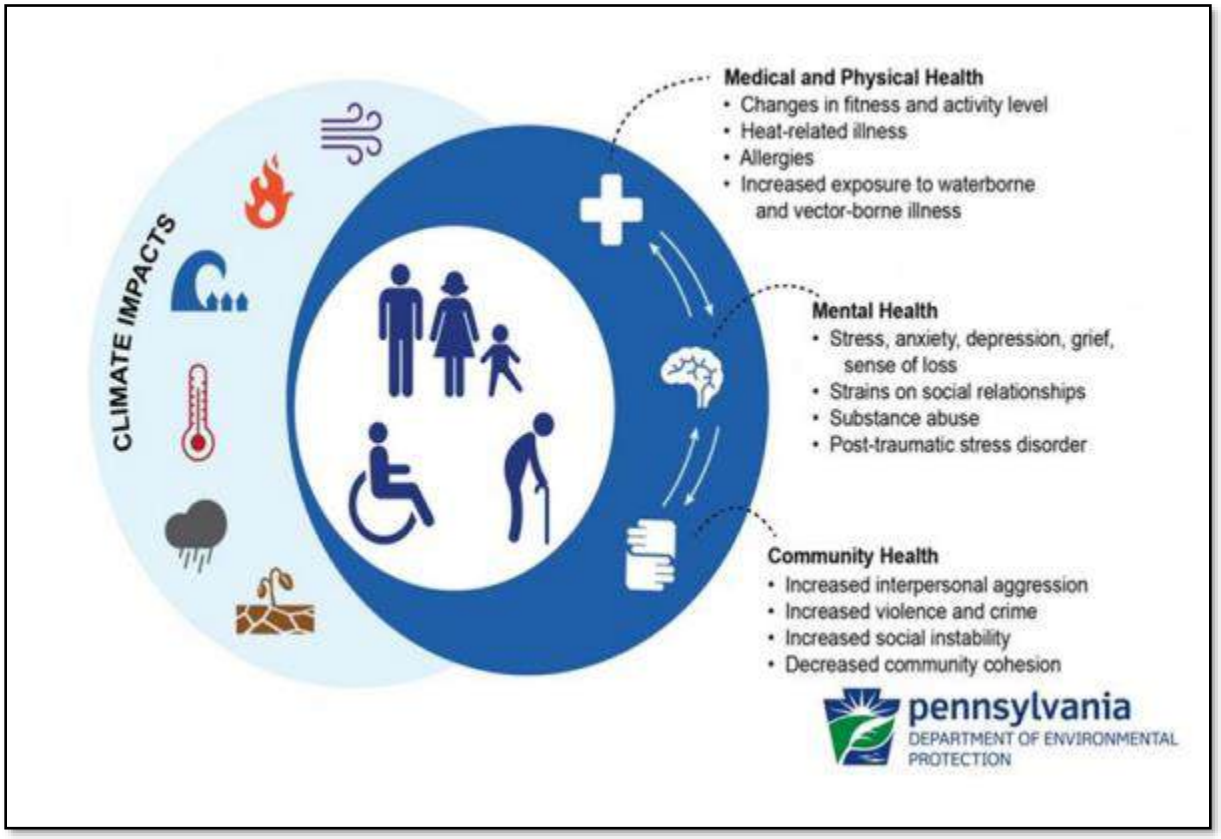
Future Growth and Development

Areas targeted for potential future growth and development in the next 5 to 10 years have been identified across Dauphin County (further discussed in Section 2.4 of this HMP). Any areas of growth could be potentially impacted by the drug overdose hazard because the entire county is exposed and potentially vulnerable.

Effect of Climate Change on Vulnerability

The impacts of climate change, such as increasing temperatures, flooding, and severe storms, are expected to affect mental and community health by increasing stress, straining social relationships, increasing social instability, and decreasing community cohesion (see Figure 4.3.11.5-2. Impacts of Climate Change on Public Health) (PEMA 2023). Negative impacts on mental and community health have the potential to contribute to opioid use.

Figure 4.3.11.5-2. Impacts of Climate Change on Public Health



Source: PEMA 2023

Additional Data and Next Steps

For the HMP update, any additional information regarding localized concerns and past impacts will be collected and analyzed. These data will be developed to support future revisions to the plan. Future mitigation efforts could include building on existing state, county, and local efforts.

4.3.12 Pandemic, Infectious Disease

A pandemic is a global outbreak of disease that occurs when a new virus causing serious illness emerges in the human population and spreads easily in a sustained manner. Infectious disease outbreaks may be widely dispersed geographically, impact large numbers of the population, and arrive in waves lasting several months at a time (PEMA 2023). The following infectious diseases will be discussed below; COVID-19, influenza, and West Nile virus.

This section describes the location and extent, range of magnitude, past occurrence, future occurrence, and vulnerability assessment for the pandemic and infectious disease hazard for the Dauphin County Hazard Mitigation Plan (HMP).

4.3.12.1 Location and Extent

Pandemic and infectious disease events can affect large populations, potentially including the entire population of Pennsylvania. The 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. Viruses that transmit from person to person generally spread much faster than vector-borne diseases. The transmission rates of pandemic illnesses are often higher in denser areas where there are large concentrations of people. Pandemic events can occur after other natural disasters, particularly floods when there is the potential for bacteria to grow and contaminate water (van Seventer and Hochberg 2017).

4.3.12.2 Range of Magnitude

The severity of a pandemic disease depends on several factors, including the aggressiveness of the disease, ease of transmission, and factors associated with the impacted community (e.g., access to medical care, demographic data, and population density). Advancements in medical technologies have greatly reduced the number of deaths caused by influenza, a disease most likely to reach pandemic scale in Pennsylvania. Consequently, the global effects of various influenza outbreaks have declined over the past century. High-risk populations considered more vulnerable to various pandemic diseases are described in the vulnerability assessment presented in Section 4.3.12.5.

COVID-19

Transmission and Symptoms

COVID-19 is a disease caused by a virus named SARS-CoV-2. It can be very contagious and spreads quickly from person to person. The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes (PEMA 2023). Viruses like COVID-19 constantly change through mutation, which sometimes results in a new variant of the virus. Some changes and mutations may allow the virus to spread more easily or make it resistant to treatments and vaccines. It is essential to track and monitor the incidence of variants during a pandemic to effectively respond to changing trends in transmission and patient care (CDC 2022).

COVID-19 most often causes respiratory symptoms that can resemble a cold, the flu, or pneumonia. COVID-19 may attack more than a person's lungs and respiratory system. Other parts of the body may also be affected by the disease. Most people with COVID-19 have mild symptoms, but some people become severely ill, and over 1 million people have died in the United States from COVID-19. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness (WHO n.d.).

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. General symptoms of PCC can include fatigue, fever, difficulty breathing, chest pain, heart palpitations, headache, dizziness, diarrhea, and joint or muscle pain. These are more often found in people who have 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, than people previously vaccinated. In some cases, a person with PCCs may not have tested positive for the virus or known they were infected (CDC 2024).

Prevention and Testing

There are several actions individuals and communities can take to reduce transmission of COVID-19 and reduce the risk of severe illness from the virus. Personal protective equipment such as N95 face masks can reduce spread by protecting the wearer from airborne particles. People infected with the COVID-19 virus can isolate themselves to prevent spreading the virus to others. Contact tracing is a practice that can help reduce the spread of infectious diseases. Someone who tests positive for COVID-19 identifies people they have been in close contact with recently to the contact tracer. The contact tracer then takes the time to reach out to each identified person to notify them that they may have been exposed to COVID-19. They can refer individuals to different support services as needed, with the primary goal of getting the individual tested for COVID-19 and following isolation guidelines to stop the spread (CDC n.d.).

There are four approved or authorized COVID-19 vaccines in the United States (CDC 2023). Two are mRNA vaccines, one is a protein subunit vaccine, and one is a viral vector vaccine. People who are up to date on COVID-19 vaccines and boosters have a lower risk of severe illness, hospitalization, and death from COVID-19 than those who are unvaccinated or who have only received the primary series.

There are different testing options to identify current infection with COVID-19 (PEMA 2023). The two main types of tests are nucleic acid amplification tests (NAATs) and antigen tests. NAATs, such as PCR-based tests, are most often performed in a laboratory. They are typically the most reliable tests for people with or without symptoms. Antigen tests are rapid tests that produce results in 15 to 30 minutes. They are less reliable than NAATs, especially for people who do not have symptoms. Antigen tests are also produced for at-home self-test options.

Influenza

Influenza, also known as the flu, is a contagious disease caused by the influenza virus that most commonly attacks the respiratory tract in humans. Pandemic influenza is easily transmitted, but advances in medical technologies have greatly reduced the number of deaths caused by influenza (Doshi 2008). The magnitude of a pandemic may be exacerbated by the fact that an influenza pandemic will cause outbreaks across the United States, limiting the ability to transfer assistance from one jurisdiction to another. Additionally, effective preventive and therapeutic measures, including vaccines and other medications, will likely be in short supply or will not be available (PEMA 2023).

Pandemic flu should not be confused with seasonal flu. Seasonal flu is a less severe concern because of its regularity of occurrence and predictability. Table 4.3.12-1 lists key differences between pandemic and seasonal flu.

Table 4.3.12-1. Seasonal Flu vs. Pandemic Flu

Pandemic Flu	Seasonal Flu
Rarely happens (three times in the 20th century).	Happens annually and usually peaks in January or February.
People have little or no immunity because they have no previous exposure to the virus.	Sufferers usually have some immunity built up from previous exposure.
Healthy people may be at increased risk for serious complications.	Usually, only people in vulnerable populations, not healthy adults, are at risk of serious complications.
Healthcare providers and hospitals may be overwhelmed.	Healthcare providers and hospitals can usually meet public and patient needs.
Vaccines probably would not be available in the early stages of a pandemic.	A vaccine is available for the annual flu season.
Effective antivirals may be in limited supply	Adequate supplies of antivirals are usually available.
The number of deaths could be high (the U.S. death toll during the 1918 pandemic was approximately 675,000).	Seasonal flu-associated deaths in the United States over 30 years ending in 2007 have ranged from about 3,000 per season to about 49,000 per season.
Symptoms may be more severe.	Symptoms include fever, cough, runny nose, and muscle pain.
May cause a major impact on the general public, such as widespread travel restrictions and school or business closings.	Usually causes minor impact on the general public; some schools may close, and sick people are encouraged to stay home.
Potential for severe impact on domestic and world economy.	Manageable impact on domestic and world economy.

Source: Flu.gov 2015

Approximately 12,470 Americans died from H1N1 within a roughly 1-year period from April 2009 to April 2010 (CDC 2019). Between October 2014 and late May 2015, 6.4 percent of deaths were attributable to pneumonia and influenza—below the epidemic threshold of 6.6 percent (an epidemic occurs when the incidence rate exceeds the expected rate but is not at the magnitude of a pandemic) (CDC 2015).

In 2014, the CDC updated the Pandemic Intervals Framework (PIF), which describes the progression of an influenza pandemic using six intervals. The framework is used to guide planning for an influenza pandemic and provides recommendations for risk assessment, decision-making, and action in the United States. Descriptions of the CDC pandemic intervals are presented in Table 4.3.12-2.

Table 4.3.12-2. CDC Pandemic Intervals Framework

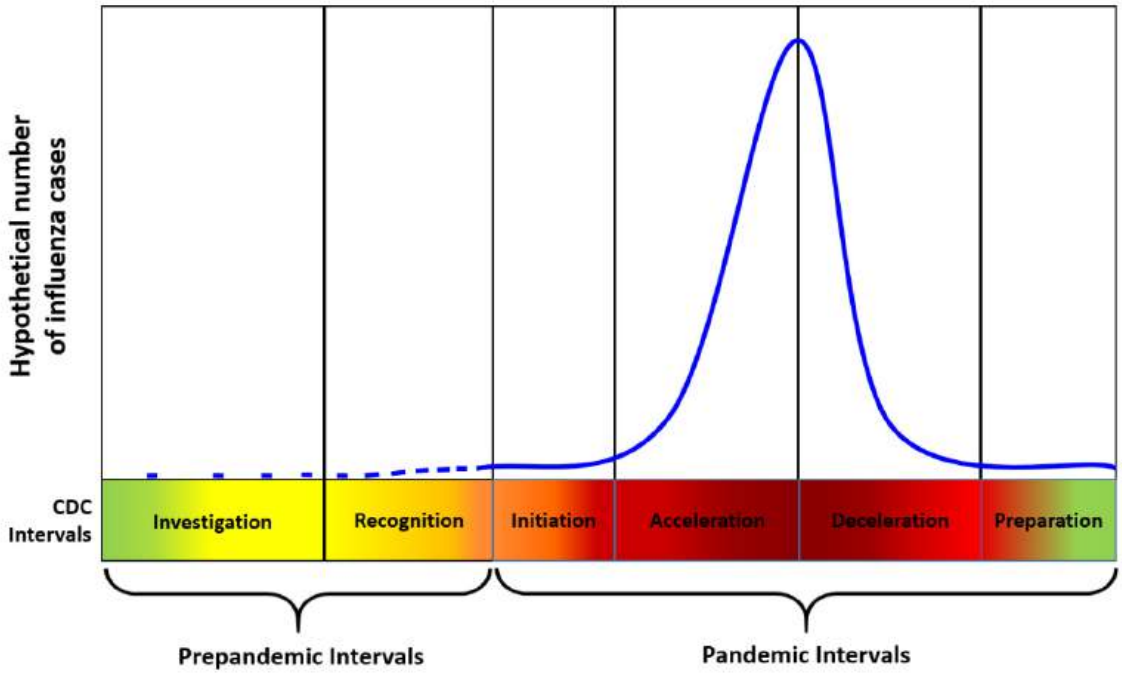
Interval	Description
Interval 1: Investigation of cases of novel influenza A virus infection in humans	When novel influenza A viruses are identified in people, public health actions focus on targeted monitoring and investigation. This can trigger a risk assessment of that virus with the Influenza Risk Assessment Tool (IRAT), which is used to evaluate whether the virus has the potential to cause a pandemic.
Interval 2: Recognition of increased potential for ongoing transmission of a novel influenza A virus	When increasing numbers of human cases of novel influenza A illness are identified and the virus has the potential to spread from person to person, public health actions focus on control of the outbreak, including treatment of sick persons.
Interval 3: Initiation of a pandemic wave	A pandemic occurs when people are easily infected with a novel influenza A virus that can spread in a sustained manner from person to person.
Interval 4: Acceleration of a pandemic wave	The acceleration (or "speeding up") is the upward epidemiological curve as the new virus infects susceptible people. Public health actions at this time may focus on the use of appropriate non-pharmaceutical interventions in the community (e.g., school and child-care facility closures, social distancing), as well as the use of medications (e.g., antivirals) and vaccines, if available. These actions combined can reduce the spread of the disease and prevent illness or death.

Interval	Description
Interval 5: Deceleration of a pandemic wave	The deceleration (or "slowing down") happens when the number of reported pandemic influenza cases consistently decreases in the United States. Public health actions include continued vaccination, monitoring of pandemic influenza A virus circulation and illness, and reducing the use of non-pharmaceutical interventions in the community (e.g., school closures).
Interval 6: Preparation for future pandemic waves	When pandemic influenza has subsided, public health actions include continued monitoring of pandemic influenza A virus activity and preparing for potential additional waves of infection. It is possible that a second pandemic wave could have higher severity than the initial wave. An influenza pandemic is declared "ended" when enough data show that the reported cases of influenza virus worldwide are similar to cases of seasonal influenza virus in the way they spread and the severity of the illness they can cause.

Source: CDC 2024

Conclusion of Interval 6 leads to the post-peak period, where the pandemic is declared "ended" when enough data show that the influenza virus, worldwide, presents similar to a seasonal influenza virus. Despite a decrease in activity, countries still must be prepared for additional waves of the pandemic. Pandemic waves can be separated by a period of months leading to a long recovery time, to guarantee entry of the pandemic into the post-pandemic interval (CDC 2014).Figure 4.3.12-1 illustrates the six intervals of pandemic influenza described by the CDC.

Figure 4.3.12-1. Preparedness and Response Framework for Novel Influenza A Virus Pandemics



Source: CDC 2024

West Nile Virus

West Nile virus is a vector-borne disease that can cause headaches, high fever, neck stiffness, disorientation, tremors, convulsions, muscle weakness, paralysis, and, in its most serious form, death. This virus is spread via mosquito bite and is therefore aided by warm temperatures and wet climates conducive to mosquito breeding.

West Nile Virus has a high rate of asymptomatic cases—almost 80 percent of cases. The other 20 percent of cases result in mild infection, called West Nile fever, lasting two to seven days. About one in 150 cases results in severe neurological disease or death. Since the appearance of the West Nile virus in Pennsylvania in 2000,

the worst year was 2003 when 237 Pennsylvanians were infected with the virus and 9 people died (PEMA 2023). The virus is typically more serious in older adults (Johns Hopkins Medicine 2024).

Ebola

Ebola disease is caused by a group of viruses known as orthoebolaviruses, previously referred to as ebolaviruses. These viruses can lead to severe illness and, without proper treatment, can be fatal. Discovered in 1976 in the Democratic Republic of the Congo, orthoebolaviruses are primarily found in sub-Saharan Africa (CDC 2024).

Four types of orthoebolaviruses cause illness in humans:

- **Ebola virus** (species orthoebolavirus zairense) causes Ebola virus disease.
- **Sudan virus** (species orthoebolavirus sudanense) causes Sudan virus disease.
- **Taï Forest virus** (species orthoebolavirus taiense) causes Taï Forest virus disease.
- **Bundibugyo virus** (species orthoebolavirus bundibugyoense) causes Bundibugyo virus disease.

Some orthoebolaviruses do not cause illness in humans. For example, the Reston virus (species Orthoebolavirus restonense) can cause illness in nonhuman primates and pigs, while the Bombali virus (species Orthoebolavirus bombaliense) has been identified in bats, but its impact on animals or humans is still unknown.

Those with Ebola disease may initially experience "dry" symptoms such as fever, aches, pains, and fatigue. As the illness progresses, it typically leads to "wet" symptoms, including diarrhea, vomiting, and unexplained bleeding (CDC 2024).

Mpox

Mpox, formerly known as Monkeypox, is a disease caused by the Monkeypox virus, which belongs to the same family as the virus responsible for smallpox. Unlike chickenpox, mpox is not related to it. Individuals infected with Mpox typically develop a rash that progresses through several stages, including scabbing, before healing. Other symptoms may accompany the rash (CDC 2024).

As a zoonotic disease, Mpox can be transmitted between animals and humans. It is endemic to parts of Central and West Africa, where the virus has been found in small rodents, monkeys, and other mammals. There are two distinct types of Mpox: clade I and clade II.

Clade I is currently causing a rise in cases in Central and Eastern Africa. Historically, Clade I has led to more severe illnesses, with mortality rates reaching up to 10 percent. However, recent outbreaks have shown lower death rates, ranging from 1 to 3.3 percent.

Clade II was responsible for the global outbreak that began in 2022. Infections from Clade II are generally less severe, with a survival rate exceeding 99.9 percent. This clade is endemic to West Africa. The rash associated with mpox can appear on various parts of the body, including the hands, feet, chest, face, mouth, and genital areas. The incubation period for mpox ranges from 3 to 17 days, during which individuals may not exhibit symptoms and feel well (CDC 2024).

4.3.12.3 Past Occurrence

Several pandemic influenza outbreaks have occurred worldwide over the past 100 years, as listed in Table 4.3.12-2. Deaths occurred in the U.S. because of Spanish Flu, Asian flu, and Hong Kong Flu outbreaks. In the U.S., approximately 675,000 people died while 22 million caught the Spanish Flu (1918-1920). Pennsylvania, one of the states that was hit the hardest, faced over 60,000 deaths (Shetty 2018). Most deaths resulting from Asian flu occurred between September 1957 and March 1958; within the United States, approximately 70,000

people died, and approximately 15 percent of the population of Pennsylvania was affected. The first cases of Hong Kong Flu in the United States were detected in September 1968, with deaths peaking between December 1968 and January 1969 (Rogers 2020). As of August 2010, H1N1 was in a post-pandemic period. The COVID-19 virus has no "past occurrence" data, as it was first reported in 2019

Table 4.3.12-3. Previous Pandemic Outbreaks

Date	Pandemic/Subtype	Worldwide Deaths (Approx.)
1918-1920	Spanish Flu/H1N1	17-50 Million
1957-1958	Asian Flu/H2N2	1.1 Million
1968-1969	Hong Kong Flu/H3N2	15-50 Million
2009-2010	Swine Flu/H1N1	> 18,000
2019- ongoing	COVID-19 (DR-4506)	7.1 Million of 9/25/2024

Source: CDC 2018; WHO 2024

Dauphin County was included in two major disaster (DR) or emergency (EM) declarations for pandemic or infectious disease-related events, as listed in Table 4.3.12-4 (FEMA 2024). Based on all sources researched, known pandemic and infectious disease events that have affected Dauphin County and its municipalities resulting in significant case counts, are also listed in Table 4.3.12-4. The table may not include all events that occurred in or impacted Dauphin County if additional events are reported in sources other than those reviewed for this HMP.

Table 4.3.12-4. Pandemic and Infectious Disease Events Between 1950 and 2024 in Dauphin County

Date of Event	Event Type	Location	FEMA Declaration Number	County Designated?	Details
2003	Biological	Countywide	N/A	N/A	West Nile Virus – Four cases reported in Dauphin County
2010	Biological	Countywide	N/A	N/A	West Nile Virus – One case reported in Dauphin County
2012	Biological	Countywide	N/A	N/A	West Nile Virus – Two cases reported in Dauphin County
2014	Biological	Countywide	N/A	N/A	West Nile Virus – One case reported in Dauphin County
2015	Biological	Countywide	N/A	N/A	West Nile Virus – Two cases reported in Dauphin County
2017	Biological	Countywide	N/A	N/A	West Nile Virus – One case reported in Dauphin County
2018	Biological	Countywide	N/A	N/A	West Nile Virus – Two cases reported in Dauphin County

September 2018 – September 2019	Biological	Countywide	N/A	N/A	Influenza – 1,890 cases reported in Dauphin County
September 2019 – September 2020	Biological	Countywide	N/A	N/A	Influenza – 3,384 cases reported in Dauphin County
January 20, 2020 – May 11, 2023	Biological	Statewide	EM-3441	Yes	COVID-19
January 20, 2020 – May 11, 2023	Biological	Statewide	DR-4506	Yes	COVID-19 Pandemic
October 2021 – October 2022	Biological	Countywide	N/A	N/A	Influenza – 2,351 cases reported in Dauphin County
October 2022 – September 2023	Biological	Countywide	N/A	N/A	Influenza – 4,550 cases reported in Dauphin County
2022	Biological	Countywide	N/A	N/A	West Nile Virus – One case reported in Dauphin County
2022	Biological	Countywide	N/A	N/A	Mpox – 6 cases reported in Dauphin County.
April, 2022	Biological	Countywide	N/A	N/A	Ebola was reported in the county.
October, 2022	Biological	Countywide	N/A	N/A	Highly Pathogenic Avian Influenza (HPAI) Virus reported in Dauphin County.

Source: FEMA 2024, PA DOH 2024, Dauphin County Annual Reports 2022, 2023
Note: West Nile Virus data goes from 1999 to 2023; Influenza data goes from 2018 to 2023, and the 2020-2021 data is not available because influence activity was abnormally low likely due to COVID-19 mitigation measures according to the PA DOH.

The 2019 to 2023 COVID-19 pandemic is the worst-case pandemic event on record in Pennsylvania and the United States. Between 2020 and 2023, there have been 1,074 deaths attributed to COVID-19 in Dauphin County and over 72,056 documented cases (PEMA 2023).

4.3.12.4 Future Occurrence

The best available data on infectious disease events was used to calculate the probability of future such events in the County. Information from the Pennsylvania Department of Health, the 2023 Commonwealth of Pennsylvania HMP, the Dauphin County Annual Reports, and FEMA were used to identify the number of events that occurred between 2003 and 2024. Table 4.3.12-5 shows these statistics, as well as the estimated percent chance of an incident occurring in a given year. Based on these statistics, there is an estimated 100 percent chance of a pandemic or infectious disease event occurring in any given year in Dauphin County. Therefore, the future occurrence of pandemic and infectious disease events in the County has been characterized as "highly likely," as defined by the probability criteria used in this plan.

Table 4.3.12-5. Probability of Future Pandemic or Infectious Disease Events

Hazard Type	Number of Occurrences Between 2003 and 2024	% Chance of Occurrence in Any Year
COVID-19	72,056	100%
Influenza	12,725	100%
West Nile Virus	14	63.6%
Monkey Pox	6	27.3%
Ebola	1	4.5%

Source: PA DOH 2024; Dauphin County 2022, 2023; FEMA 2024; PEMA 2023

4.3.12.5 Vulnerability Assessment

Impact on Life, Health, and Safety

Overall Population

Dauphin County remains vulnerable to pandemic and infectious disease events. The County has a higher population density, 660 persons per square mile, than the state average, 290 persons per square mile, which would make the County more vulnerable than other counties within the Commonwealth of Pennsylvania (US Census Bureau 2023).

Pandemics and infectious diseases can also affect first responders in many ways including the need for more personal protection equipment to keep them safe and able to perform job duties. There is also an added layer of complexity to triaging patient care and a higher patient volume during pandemics.

Socially Vulnerable Populations

Socially vulnerable populations are especially at risk during public health emergencies because of factors like socioeconomic status, household characteristics, racial and ethnic minority status, or housing type and transportation (ATSDR 2022). Depending on the characteristics of the disease or virus, certain population groups can be at higher risk of infection than others.

Impact on General Building Stock and Critical Facilities

No structures are anticipated to be directly impacted by a pandemic or infectious disease. However, structures, especially critical facilities, could be damaged due to the lack of maintenance personnel due to the personnel being sick. This is especially true of critical facilities and businesses with processes (e.g., chemical reactions) that occur continuously.

Impact on the Economy

The impact disease outbreaks have on the economy and estimated dollar losses are difficult to measure and quantify. Costs associated with the activities and programs implemented to conduct surveillance and address the pandemic have not been quantified in the available documentation. Instead, activities and programs implemented by the County to address this hazard are described below, all of which could impact the local economy.

The COVID-19 pandemic from 2019-2023 resulted in significant negative impacts on economic activity in the County, Commonwealth, and country due to the identified need to enforce social distancing and quarantine conditions until the disease spread was lessened. During the height of the COVID outbreak, all non-essential businesses were forced to close. The virus outbreak has also had a deleterious impact on government finances due to tax delinquency and user fee loss. Decreased revenues can lead to service cuts and prevent the county and community from procuring necessary supplies to weather the outbreak. Though the full scale of the economic fallout is yet to be quantified, the economic impact of the pandemic was felt in Dauphin County.

Smaller-scale disease outbreaks can also cause negative economic impacts, though the extent of impact is variable.

Impact on the Environment

A pandemic and infectious disease have no direct impact on the environment. However, pandemics and infectious diseases can have the following cascading impacts on the environment (not an exhaustive list):

- Pollution of land and waterways/waterbodies due to prophylactic supplies (e.g., masks) being improperly disposed of (e.g., littered).
- Environmental contamination due to waste being improperly disposed of or treated, due to lack of personnel to carry out proper disposal procedures.
- Environmental contamination due to runaway chemical reactions causing releases of hazardous materials from facilities (see Impact on General Building Stock and Critical Facilities).
- A lack of environmental regulators due to them being sick can reduce the effectiveness of environmental programs or requirements, having a detrimental impact on the environment.

Future Growth and Development

As the population increases, so too does the possibility of spreading an infectious disease. This is exacerbated by future growth causing higher density in populated areas.

Effect of Climate Change on Vulnerability

The relationship between climate change and an increase in infectious diseases is difficult to predict with certainty; however, there may be linkages between the two. Changes in the environment may create a more livable habitat for vectors carrying disease as suggested by the Centers for Disease Control and Prevention (CDC 2022). Localized changes in climate and human interaction may also be a factor in the spread of disease.

The relationship between climate change and infectious diseases is somewhat controversial. The notion that rising temperatures will increase the number of mosquitoes that can transmit malaria among humans (rather than just shift their range) has been the subject of debate over the past decade. Some believe that climate change may affect the spread of disease, while others are not convinced. However, many researchers point out that climate is not the only force at work in increasing the spread of infectious diseases into the future. Other factors, such as expanded rapid travel and the evolution of resistance to medical treatments, are already changing the ways pathogens infect people, plants, and animals. As climate change accelerates, it is likely to work synergistically with many of these factors, especially in populations increasingly subject to massive migration and malnutrition (WHO 2020).

Additional Data and Next Steps

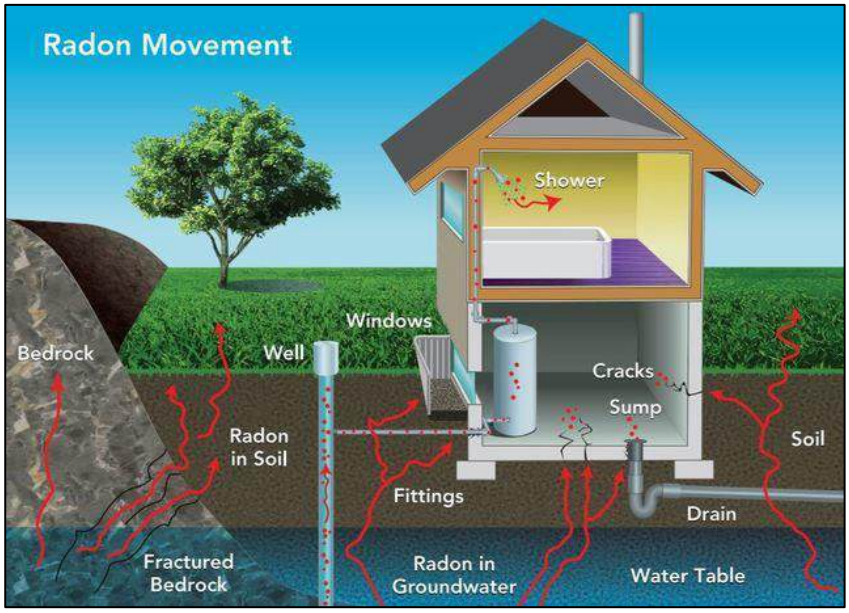
For future plan updates, Dauphin County will work with stakeholders to identify the long-term impacts of pandemics and infectious disease outbreaks and the long-term solutions that can be implemented to reduce vulnerability to these events. Dauphin County will work with the healthcare coalition and other health sector stakeholders to increase participation by these groups in future plan updates.

4.3.13 Radon Exposure

Radon is a natural gas that cannot be seen, smelled, or tasted. It is a noble gas that originates from the natural radioactive decay of uranium and thorium. It is a large component of the natural radiation to which humans are exposed and can pose a serious threat to public health when it accumulates in poorly ventilated residential and occupation settings. According to the U.S. Environmental Protection Agency (EPA), radon is estimated to cause more than 20,000 lung cancer deaths per year, second only to smoking as the leading cause of lung cancer (EPA 2022). An estimated 40 percent of the homes in Pennsylvania are believed to have elevated radon levels (PADEP 2022).

This section describes the location and extent, range of magnitude, past occurrence, future occurrence, and vulnerability assessment for the radon exposure hazard for the 2025 Dauphin County Hazard Mitigation Plan (HMP).

Figure 4.3.13-1. Radon Movement and Entry Points into a House



Source: (Advanced Basement Systems 2018)

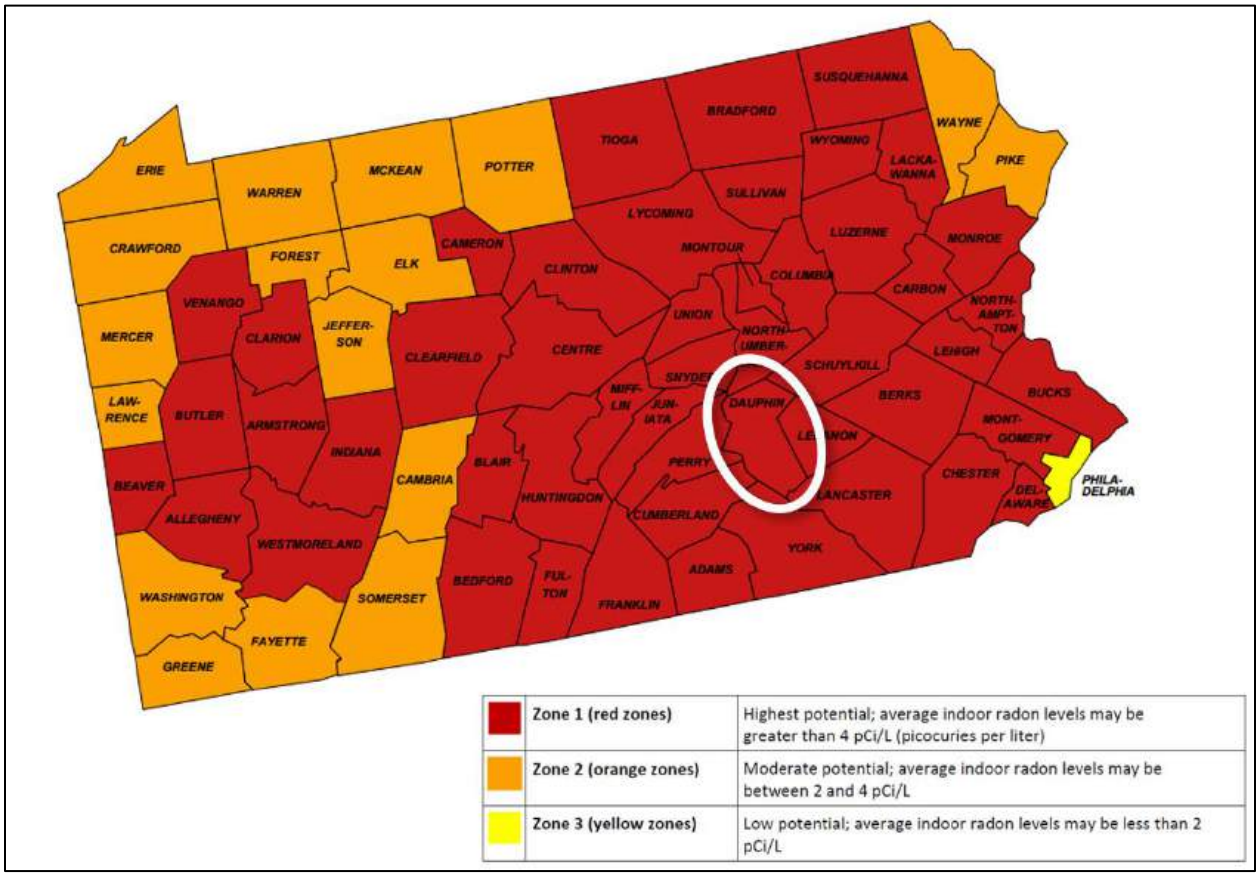
Location and Extent

Airborne radon is recognized as a major radioactive exposure pathway. Radon (Rn-222) is a widespread hazard. The distribution of radon (Rn-222) correlates with the distribution of radium (Ra-226) and uranium (U-238). Uranium decays (undergoes atomic changes) to become radium, which decays to radon. While radium has a half-life (the time it takes to decay) of 1600 years, radon has a half-life of 3.8 days. Because of the short half-life of radon, the distance radon atoms travel from their parent before they decay is generally limited to extents of feet or tens of feet (PEMA 2023). Figure 4.3.13-1 illustrates radon entry points into a home. The following three sources of radon in houses are now recognized, but the latter two sources are not frequently or known problems in Pennsylvania:

- Radon in soil air that flows into the house;
- Radon dissolved in water from private wells and exsolved during water usage;
- Radon emanating from uranium-rich building materials, such as concrete blocks or gypsum wallboard (PEMA 2023).

The Environmental Protection Agency (EPA) has created a map of radon zones that identifies areas across the U.S. with the potential for elevated indoor radon levels (EPA 2023). Each county across the country is classified as having a low (Zone 3), moderate (Zone 2), or high (Zone 1) radon hazard potential (Refer to Figure 4.3.13-2 for radon zones in the Commonwealth of Pennsylvania and zone thresholds). Most counties across the Commonwealth, particularly counties in eastern Pennsylvania, have a high hazard potential for indoor radon. According to the EPA map of radon zones, Dauphin County is in Zone 1 (counties with predicted average indoor radon screening levels greater than 4 pCi/L).

Figure 4.3.13-2. Radon Hazard Zones in Pennsylvania



Source: (EPA 2022); (EPA 2023)
Note: Dauphin County is identified by a white circle. The figure indicates that Dauphin County is in EPA Radon Zone 1 (high).

High radon levels were initially thought to be exacerbated in tightly sealed houses, although it is now recognized that rates of airflow into and out of houses, plus the location of air inflow and the radon content of the air in the surrounding soil, are key factors affecting radon concentrations. Air must be drawn into a house to compensate for outflows of air caused by a furnace, fan, thermal "chimney" effect, or wind effects. If the upper part of the house is tight enough to impede the influx of outdoor air (radon concentration generally below 0.1 pCi/L), an appreciable fraction of the air may be drawn in from the soil or fractured bedrock through the foundation and slab beneath the house, or cracks and openings for pipes, sumps, and similar features. Soil gas typically contains between a few hundred to a few thousand pCi/L of radon; therefore, even a small rate of soil gas inflow can lead to elevated radon concentrations in a house (PEMA 2023).

Radon concentration in soil gas depends on a number of soil properties, the importance of which is still being evaluated. In general, 10 to 50 percent of newly formed radon atoms escape the host mineral of their parent radium and gain access to the air-filled pore space. The radon content of soil gas tends to be higher in soils containing higher levels of radium and uranium, especially if the radium occupies a site on or near the surface of a grain from which the radon can easily escape. The amount of space between soil particles and soil permeability for airflow, including cracks and channels, are important factors determining radon concentration in soil gas and its flow rate into a house. Soil depth and moisture content, mineral host and form for radium, and other soil properties may also be important. Fractured areas in bedrock may supply air with radon concentrations similar to those in deep soil for houses built on bedrock (PEMA 2023).

Areas where houses have high levels of radon can be divided into three groups in terms of uranium content in rock and soil, which can be summarized as the following:

Areas of **very elevated uranium content** (above 50 parts per million [ppm]) around uranium deposits and prospects: have very high levels of radon, but the hazard normally is restricted to within a few hundred feet of the deposit. In Pennsylvania, these localities occupy an insignificant area.

Areas of common rock having **higher than average uranium content** (five to 50 ppm) include rock types such as granitic and felsic alkali igneous rocks and black shales in Pennsylvania. High uranium values in rock or soil and high radon levels in houses in the Reading Prong are associated with Precambrian granitic gneisses commonly containing 10 to 20 ppm uranium but locally containing more than 500 ppm uranium. Elevated uranium occurs in black shales of the Devonian Marcellus Formation and possibly the Ordovician Martinsburg Formation in Pennsylvania. High radon values are locally present in areas underlain by these formations.

Areas of soil or bedrock that have **normal uranium content but properties that promote high radon levels** in houses are incompletely understood at present. Relatively high soil permeability can lead to high radon concentrations, the clearest example being houses built on glacial eskers. Limestone-dolomite soils also appear to be predisposed to high radon levels in houses, perhaps because of the deep clay-rich residuum where radium is concentrated by weathering on iron oxide or clay surfaces, coupled with moderate porosity and permeability. The importance of carbonate soils is indicated by an exceedance of four pCi/L in 93 percent of a sample of houses built on limestone-dolomite soils near State College, Centre County, and an exceedance of 20 pCi/L in 21 percent of that sample of houses, even though uranium levels in the underlying bedrock are all within the normal range of 0.5 to five ppm (PEMA 2023).

Range of Magnitude

Radon exposure is the second leading cause of lung cancer after smoking. Radon exposure is the number one cause of lung cancer among nonsmokers. Radon is responsible for approximately 21,000 lung cancer deaths every year, approximately 2,900 of which occur among people who have never smoked. Lung cancer is the only known effect on human health from exposure to radon in the air and, thus far, no evidence indicates that children are at greater risk of lung cancer than adults. The main hazard is actually from radon daughter products—the elements that radon decays to, including polonium-218, lead-214, and bismuth-214. These products may become attached to lung tissue and induce lung cancer by their radioactive decay. Table 4.3.13-1 lists the following 3information for smokers and nonsmokers: cancer risks from exposure to radon at various levels, comparisons of lung cancer risks from radon exposure to comparable cancer risks from other hazards, and action thresholds (PEMA 2023).

Table 4.3.13-1. Radon Risk for Smokers and Non-Smokers

Radon Level (pCi/L)	Cancer Rate per 1,000 People with Lifetime Exposure	Comparative Cancer Risk of Radon Exposure	Action Threshold
SMOKERS			
20	About 260 people could get lung cancer	250 times the risk of drowning	Fix structure
10	About 150 people could get lung cancer	200 times the risk of dying in a home fire	
8	About 120 people could get lung cancer	30 times the risk of dying in a fall	
4	About 62 people could get lung cancer	5 times the risk of dying in a car crash	
2	About 32 people could get lung cancer	6 times the risk of dying from poison	Consider fixing structure between 2 and 4 pCi/L
1.3	About 20 people could get lung cancer	(Average indoor radon level)	Reducing radon levels below 2 pCi/L is difficult
0.4	About 3 people could get lung cancer	(Average outdoor radon level)	
NON-SMOKERS			
20	About 36 people could get lung cancer	35 times the risk of drowning	Fix structure
10	About 18 people could get lung cancer	20 times the risk of dying in a home fire	
8	About 15 people could get lung cancer	4 times the risk of dying in a fall	
4	About 7 people could get lung cancer	The risk of dying in a car crash	
2	About 4 people could get lung cancer	The risk of dying from poison	Consider fixing structure between 2 and 4 pCi/L

Radon Level (pCi/L)	Cancer Rate per 1,000 People with Lifetime Exposure	Comparative Cancer Risk of Radon Exposure	Action Threshold
1.3	About 2 people could get lung cancer	(Average indoor radon level)	Reducing radon levels below 2pCi/L is difficult
0.4	-	(Average outdoor radon level)	

Source: EPA 2023
Note: Risk may be lower for former smokers; "pCi/L" = picocuries per level, or a unit of measurement for radon levels in the air
** Lifetime risk of lung cancer deaths from EPA Assessment of Risks from Radon in Homes (EPA 402-R-03-003).*
*** Comparison data calculated using the Centers for Disease Control and Prevention's 1999-2001 National Center for Injury Prevention and Control Reports.*

The worst-case scenario for radon exposure would be a large area of tightly sealed homes in Dauphin County causing high levels of exposure over a prolonged period without the resident being aware. This worst-case scenario exposure could then lead to a large number of people with cancer attributed to radon exposure. The most likely scenario is a single household exposed to a very low concentration of radon, with no adverse health effects.

Past Occurrence

Current data on the abundance and distribution of radon as it affects individual houses in the Commonwealth of Pennsylvania in general is considered incomplete and potentially biased (PEMA 2023). Dauphin County is not an exception. The EPA has estimated the national average indoor radon concentration is 1.3 pCi/L and the level for action is four pCi/L; however, they have estimated the average indoor concentration in Pennsylvania basements is about 7.1 pCi/L and 3.6 pCi/L on the first floor (PA DEP n.d.).

The PA DEP Bureau of Radiation Protection provides information for homeowners on how to test for radon in their houses. If a test results in radon concentrations over four pCi/L, then the Bureau works to help the homeowners make repairs to their houses to mitigate against high radon levels. The total number of tests reported to the Bureau since 1990 and their results are provided by zip code on the Bureau's website and are summarized in Table 4.3.13-2 for Dauphin County. However, this information is only provided if over 30 tests total were reported to best approximate the average for the area (PA DEP n.d.).

In Dauphin County, 28 of 48 zip codes had reported results from enough tests to allow the Bureau to report the findings, which are shown in Table 4.3.13-2. The PADEP only publishes the average and maximum results for a zip code; it does not offer a range of results for a zip code, municipality, or region. The PADEP Radon Division recommends all homeowners test for radon within their respective zip codes, regardless of test results. Despite a low average test result within a zip code, many homes in that zip code may have elevated radon levels.

Table 4.3.13-2. Radon Level Tests and Results by Zip Codes in Dauphin County

ZIP Code	Location	Area in Home	Number of Tests	Maximum Result (pCi/L)	Average Result (pCi/L)
17112	Harrisburg	Basement	9,233	772.2	9.0
		First Floor	1,376	90.8	5.2
17111	Paxtang	Basement	7,467	918.2	15.9
		First Floor	1,410	367.0	8.9
17036	Hummelstown	Basement	7,563	435.5	12.7
		First Floor	1,143	224.0	7.2
17110	Harrisburg	Basement	4,760	250.3	6.6
		First Floor	1,208	66.0	3.0
17109	Colonial Park	Basement	4,092	148.0	10.5
		First Floor	869	60.6	4.7
17057	Middletown	Basement	2,368	231.0	6.8
		First Floor	399	60.6	3.2
17104	Harrisburg	Basement	1,009	134.1	9.7
		First Floor	328	72.8	4.6
17033	Hershey	Basement	4,948	140.2	7.5
		First Floor	2,210	113.3	2.9
17103	Harrisburg	Basement	521	147.8	7.1

		First Floor	138	40.5	2.6
17113	Steelton	Basement	888	346.0	12.6
		First Floor	172	439.6	12.0
17043	Harrisburg	Basement	1,224	90.9	8.1
		First Floor	259	48.9	4.1
17061	Millersburg	Basement	716	115.5	12.9
		First Floor	139	46.7	6.2
17102	Harrisburg	Basement	803	508.0	6.1
		First Floor	330	8.1	1.1
17032	Carsonville	Basement	1,314	416.3	28.3
		First Floor	182	303.3	14.3
17018	Dauphin	Basement	669	91.9	10.0
		First Floor	121	41.1	5.5
17048	Lykens	Basement	203	276.7	13.7
		First Floor	42	32.2	4.2
17980	Tower City	Basement	143	100.8	9.7
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data
17028	Grantville	Basement	396	565.3	11.3
		First Floor	63	34.1	4.6
17023	Elizabethville	Basement	359	94.5	11.1
		First Floor	50	50.3	8.0
17034	Highspire	Basement	236	38.1	3.9
		First Floor	36	4.8	1.4
17101	Harrisburg	Basement	225	81.3	6.1
		First Floor	77	12.3	1.1
17098	Williamstown	Basement	104	90.6	9.0
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data
17030	Gratz	Basement	73	78.4	10.2
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data
17105	Harrisburg	Basement	35	14.3	3.3
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data

Source: (PADEP 2022)

Probability of Future Occurrence

Radon exposure is inevitable given the present soil, geologic, and geomorphic factors across Pennsylvania. Residents who live in developments within areas where radon levels previously have been found significantly high will continue to be more susceptible to exposure. However, new incidents of concentrated exposure may occur with future development or deterioration of older structures. Exposure can be limited by conducting proper testing within both existing and future developments and implementing appropriate mitigation measures (PEMA 2018). As part of a 2014 initiative, EPA's "Test, Fix, Save a Life" radon action campaign strives to highlight radon testing and mitigation as a simple and affordable step to significantly reduce the risk for lung cancer. Through this initiative, the "Test, Fix, Save a Life" mantra specifies activities and facts for the public regarding radon poisoning, as indicated below:

- **Test**: All homes with or without basements should be tested for radon. Affordable do-it-yourself radon test kits are available online and at home improvement and hardware stores, or you can hire a qualified radon tester.
- **Fix**: EPA recommends taking action to fix radon levels at or above four pCi/L and contacting a qualified radon-reduction contractor. In most cases, a system with a vent pipe and fan is used to reduce radon. Addressing high radon levels often costs the same as other minor home repairs.
- **Save a Life**: 21,000 Americans die from radon-related lung cancer each year. By decreasing elevated levels in a home, residents can help prevent lung cancer while creating a healthier home (EPA 2014).

It is estimated that Dauphin County will continue to experience direct and indirect impacts from radon exposure events annually that may induce secondary hazards such as lung cancer. Therefore, the future occurrence of

radon exposure in the County has been adjusted and characterized as *highly likely*, as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1).

Vulnerability Assessment

To understand risk, a community must evaluate the assets exposed or vulnerable within the identified hazard area. This section evaluates and estimates the potential impact of the radon exposure hazard on Dauphin County in the following sections:

- Impacts on (1) life, health, and safety; (2) general building stock and critical facilities; (3) the economy; (4) the environment; (5) future growth and development
- Effect of climate change on vulnerability
- Further data collection that will increase understanding of this hazard over time

Impact on Life, Health, and Safety

For this plan, the entire population of the county is assumed to be at risk of radon exposure. Radon is responsible for more than 21,000 lung cancer deaths every year. Lung cancer is the only known effect on human health from exposure to radon in the air, and thus far, no evidence indicates that children are at greater risk of lung cancer than adults (US EPA 2023).

Impact on Socially Vulnerable Populations

There is little research or information exploring the disproportionate impact of indoor radon exposure on socially vulnerable populations in Dauphin County.

Impact on General Building Stock and Critical Facilities

While the entire general building stock and critical facility inventory in Dauphin County is exposed to radon, radon does not result in direct damage to structures and facilities. Rather, engineering methods installed to mitigate human exposure to radon in structures result in economic costs described in the following subsection.

Impact on the Economy

The EPA has concluded that an average radon mitigation system costs $1,200. EPA also states that current state surveys indicate one home in five has elevated radon levels. Based on this information, radon loss estimation is factored by assuming that 20 percent of the residential buildings within Zone 1 counties have elevated radon levels, and each would require a radon mitigation system installed at the EPA-estimated average of $1,200 (PEMA 2023). Therefore, estimated radon mitigation costs for residential structures in Dauphin County could exceed $46 million. However, this total could be higher based on the number of households in the County with radon levels exceeding four pCi/L.

Impact on the Environment

Radon exposure exerts minimal environmental impacts. Because of the relatively short half-life of radon, it tends to affect only living and breathing organisms such as humans or pets that are routinely within contained areas (basement or house) near the source from which the gas is released (PEMA 2023).

Future Growth and Development

Areas targeted for potential future growth and development within the next five years have been identified across the County (Section 2). Any new land development will be exposed to this hazard. Measures to reduce human exposure to radon in structures are readily available and can be incorporated during new construction at significantly lower cost and greater effectiveness than retrofitting existing structures to implement these measures.

Effect of Climate Change on Vulnerability

According to the EPA's *Climate Change and Indoor Air Quality* report, behavioral changes driven directly or indirectly by climate change may increase indoor radon exposure vulnerability in Dauphin County. For example, the increased use of ceiling fans could increase the deposition of radon decay products and reduce the delivered radon-related doses to the lungs (Field 2010).

Additional Data and Next Steps

The assessment above for Dauphin County identifies human health and economic losses associated with this hazard of concern; however, these estimates are based on national epidemiological statistics and generalized estimates of costs to mitigate structures in Dauphin County. Because specific structural conditions affect human exposure to radon, direct radon measurements within facilities are necessary to properly assess the level of health risk and indicate the need for mitigation measures. Furthermore, EPA recommends consideration of radon exposure risk and installation of mitigation measures as appropriate during all new construction.

4.3.14 Subsidence, Sinkholes

Subsidence is the sinking of ground due to underground movement, and sinkholes are a type of subsidence feature. It is most often caused by the removal of oil, natural gas, or mineral resources out of the ground by pumping, fracking, or mining activities. Subsidence can also be caused by earthquakes, soil compaction, erosion, and sinkholes (NOAA 2022). In Pennsylvania, mine subsidence is a concern due to the number of underground coal and clay mines. Mine subsidence is the movement of the ground surface as a result of the collapse of the roof, floor, or pillars of underground mines (DCNR, Mind Subsidence, Loss & Coverage 2022).

Figure 4.3.14-1 Water Flowing through Karst Geology

Source: (State College Borough 2020)

A sinkhole is a subsidence feature that results from the downward movement of surface material resulting in a hole or cavity (DCNR, Sinkholes 2022). Sinkholes are generally found in areas underlain by carbonate bedrock (such as limestone and dolomite), found in large areas of central and southeastern Pennsylvania. They occur naturally due to the physical and chemical weathering of the bedrock. Water passing through naturally occurring fractures and bedding planes dissolve 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, the sub-surface solution of limestone will not result in the immediate formation of karst features.

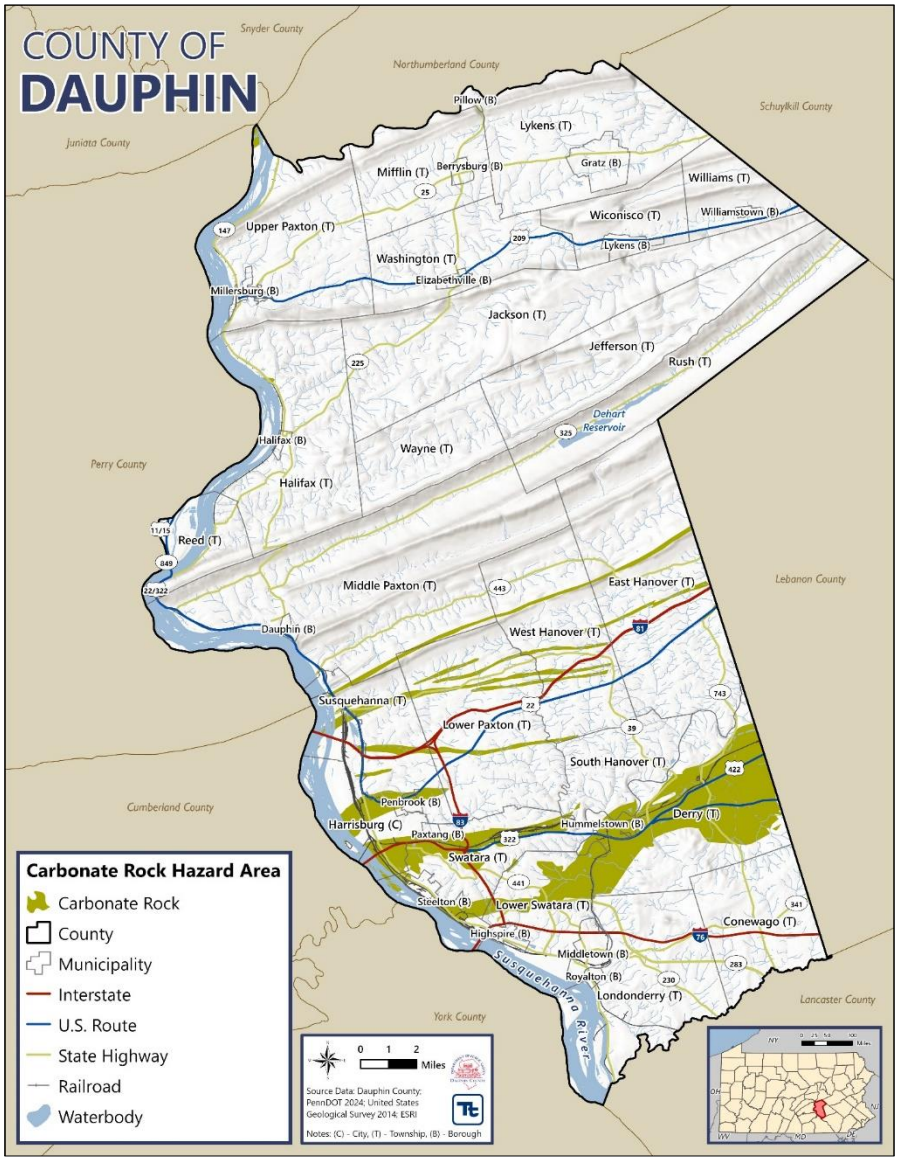
As stated in the 2023 Pennsylvania State Hazard Mitigation Plan, there are two common causes of subsidence in the State: 1) dissolution of carbonate rock such as limestone or dolomite and 2) mining activity. In the first case, water passing through naturally occurring fractures and bedding planes dissolves bedrock leaving voids below the surface. Eventually, overburden on top of the voids collapses, leaving surface depressions resulting in karst topography. Characteristic structures associated with karst topography include sinkholes, linear depressions, and caves. Often, the 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).

The following sections discuss the location and extent, range of magnitude, previous occurrence, future occurrence, and vulnerability assessment associated with the subsidence/sinkhole hazard for Dauphin County.

4.3.14.1 Location and Extent

According to the Pennsylvania Department of Conservation and Natural Resources (DCNR), the southern parts of Dauphin County have carbonate bedrock, and these are the locations where sinkholes can most frequently occur (see Figure 4.3.14-2). In addition to geological undertones of the land, sinkholes can also occur where abandoned mines may create unstable or shifting soils. Figure 4.3.14- shows the areas of the County where abandoned mines are concentrated.

Figure 4.3.14-2 Carbonate Rock Hazard Areas in Dauphin County, PA

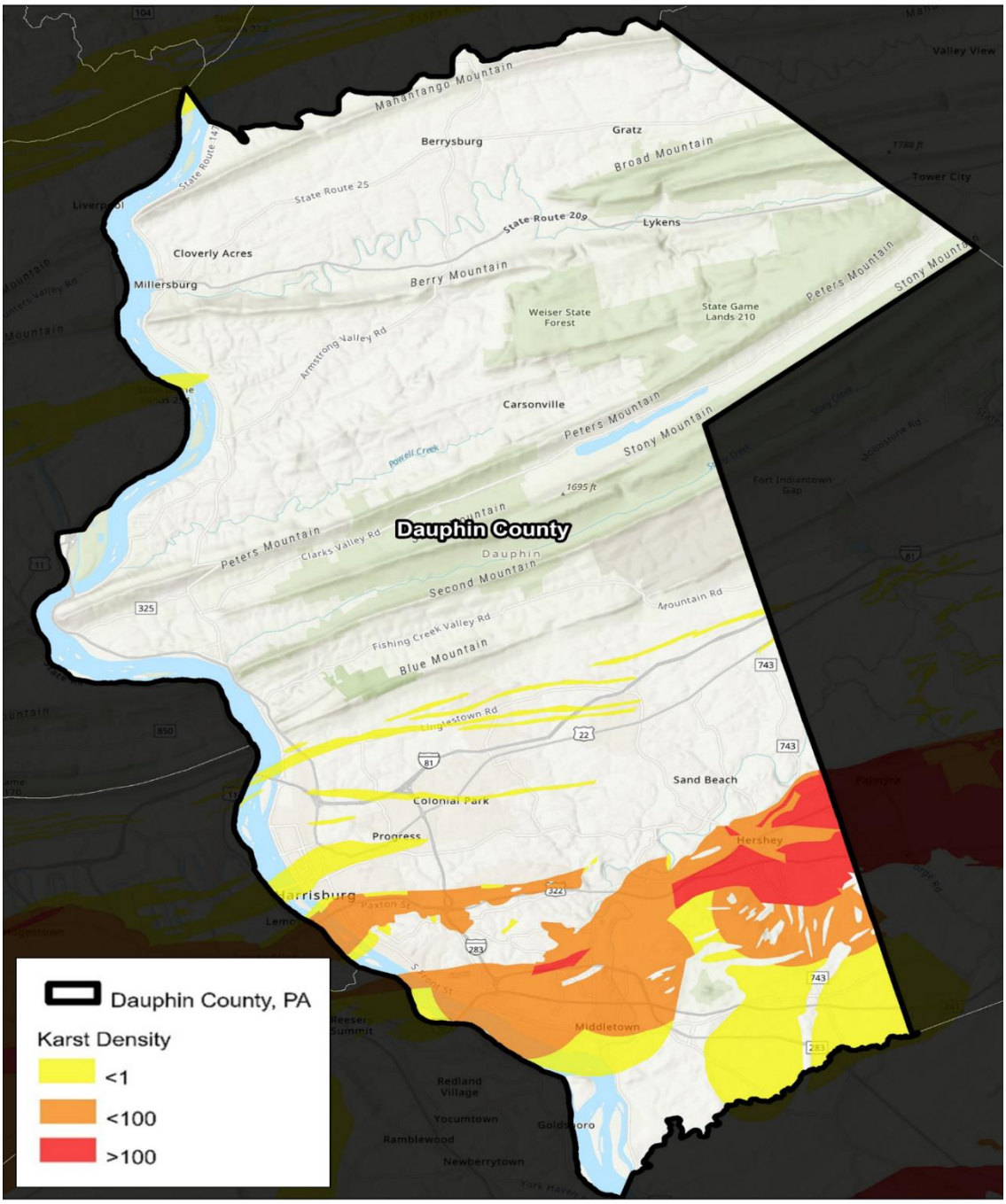


Beginning in 1985, the Pennsylvania Geological Survey began mapping and investigating areas of karst features of carbonate rocks. Locations of surface depressions, sinkholes, surface mines, and caves were compiled from municipal questionnaires, field surveys, published literature, and unpublished data. The outcome of these investigations was a series of maps showing where karst features of carbonate rocks were located, and after digitizing their findings, the Pennsylvania Geological Survey's findings are presented below.

Mapping the density of karst points is helpful for the assessment of potential structural and environmental problems associated with karst geology. High-density areas of karst points where land subsidence may be a problem are noted or where karst features can serve as direct recharge zones to the groundwater. These areas are highly vulnerable to groundwater contamination (USGS 2013).

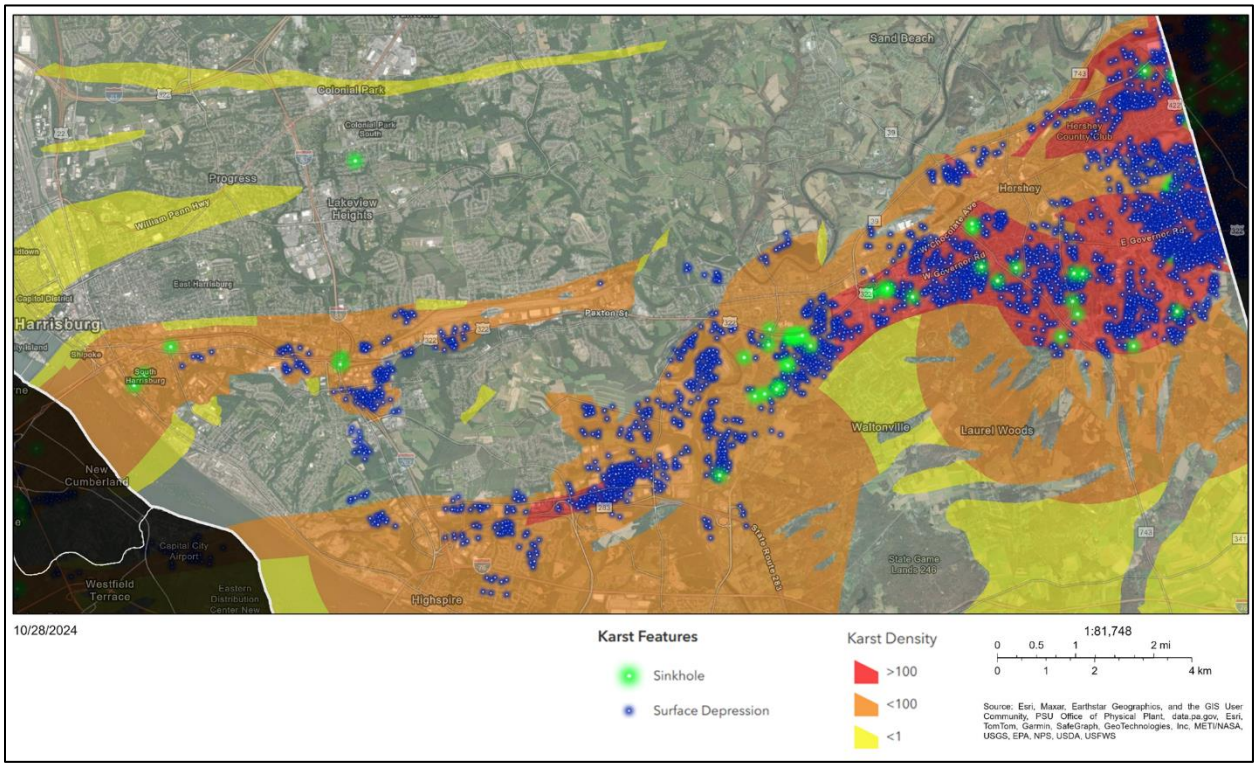
Figure 4.3.14-3 and Figure 4.3.14-4 below combines karst density mapping from the USGS along with karst features (sinkholes and surface depressions) across southern Dauphin County.

Figure 4.3.14-3 Mapped Karst Density Features across Dauphin County, PA



Sources: (USGS 2013); ArcGIS Online

Figure 4.3.14-4 Karst Features and Density across Southern Dauphin County



Sources: (USGS 2013); ArcGIS Online

Another area where sinkholes are more common is in areas of abandoned mines and caves. Figure 4.3.14-6 is a county-wide map showing the locations of abandoned mines.

Figure 4.3.14-5 Areas of Abandoned Mines and Sinkhole Hazard in Dauphin County, PA

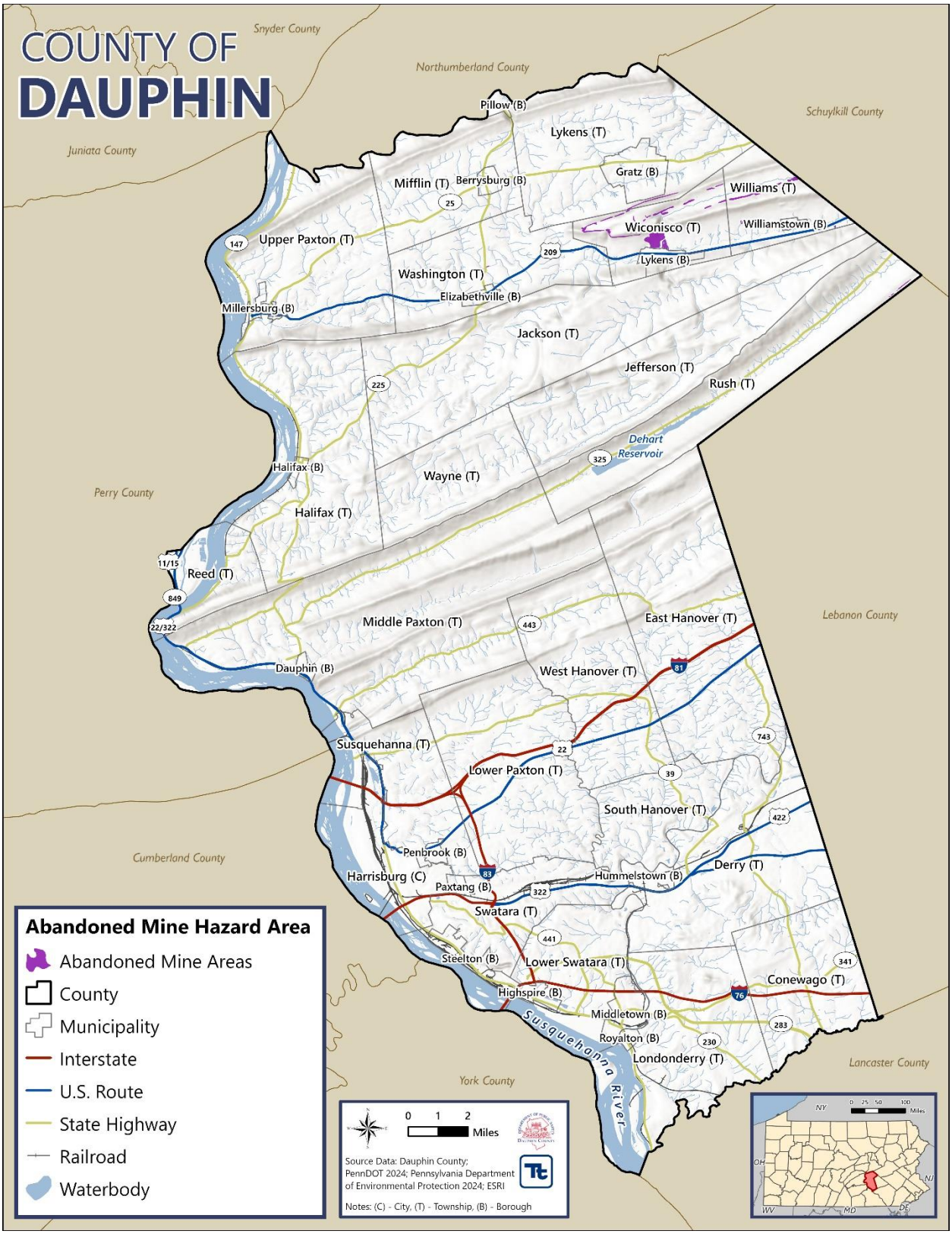
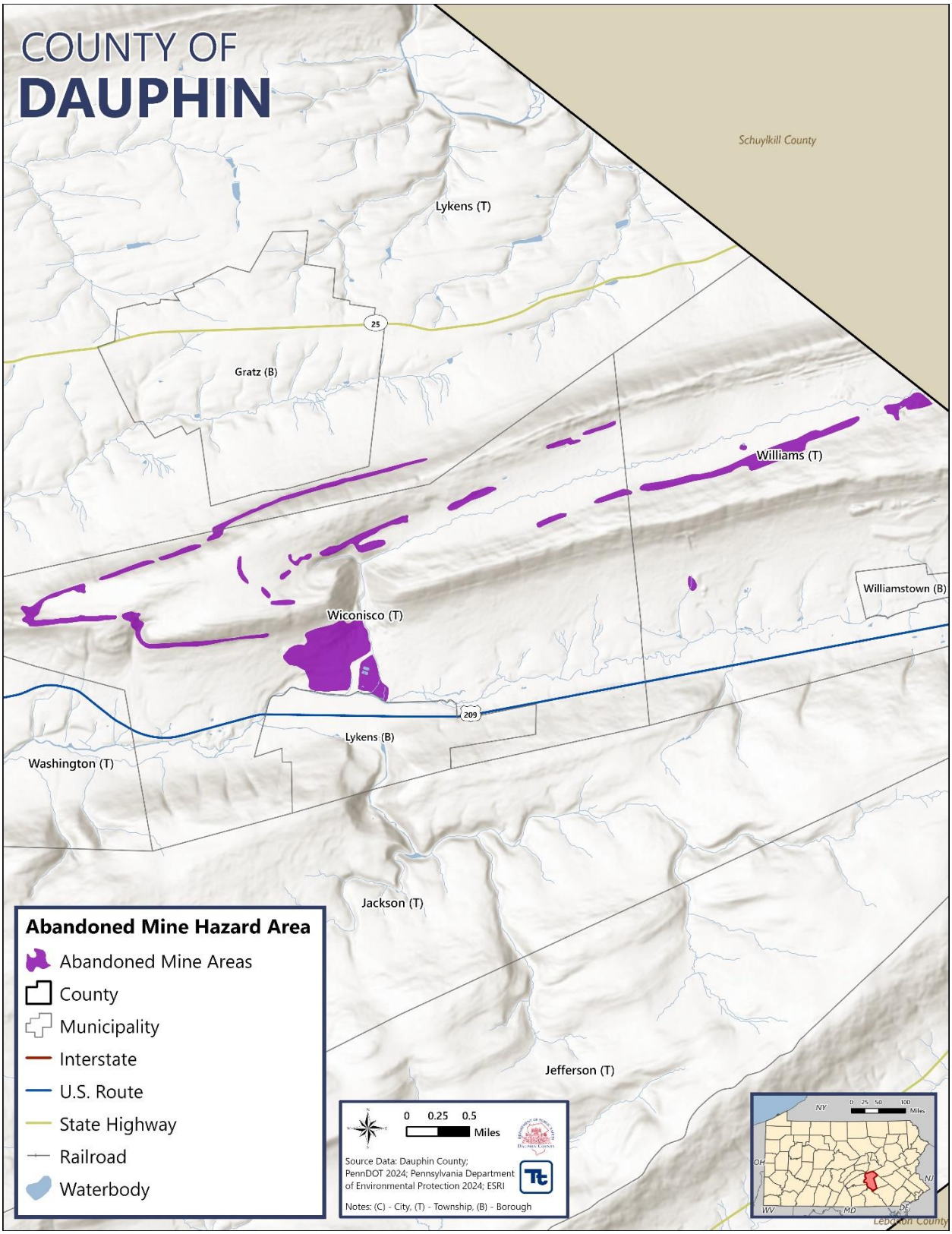


Figure 4.3.14-6 Areas of Abandoned Mines Hazard in Dauphin County, PA



4.3.14.2 Range of Magnitude

Subsidence and sinkhole events may occur gradually or abruptly. Events could result in minor elevation changes or deep, gaping holes in the ground surface. Subsidence and sinkhole events can cause severe damage in urban environments, although gradual events can be addressed before significant damage occurs. 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.

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 to repair the structural damage and this would reduce the hospital's capacity and ability to treat people with other illnesses and injuries

4.3.14.3 Past Occurrence

The 2023 Pennsylvania State Hazard Mitigation Plan described how areas of sinkholes and subsidence were noted in Dauphin County; however, the specifics surrounding each incident were not publicly available. To supplement maps provided by the Pennsylvania Geologic Survey, desktop research, and annual Dauphin County meeting notes helped to identify more recent sinkhole incidents across Dauphin County.

Table 4.3.14-1 Notable Sinkhole Incidents in Dauphin County, PA

Date	Jurisdiction(s)	Description
April 16, 1971	Derry (T)	
1999	Unknown	A sinkhole in Dauphin County exposed a utility pipeline. 
November 26, 2019	Swatara (T)	A large sinkhole formed in the area of Adams Drive and Milroy St. where, according to the township manager, the hole was in the area where a 36-inch stormwater pipe had rotted out. Crews worked to identify whether or not there

Date	Jurisdiction(s)	Description
		was a large cavern below, because they could not determine where the water was going.
September 23, 2021	Swatara(T)	A sinkhole opened Thursday morning on Grayson Road, near the entrance to Walmart. The township said an underground pipe was damaged, which led to the cavity forming.
January 28, 2022	Derry (T)	Sinkhole
February 14, 2022	Upper Paxton (T)	Sinkhole
April 7, 2022	Swatara (T)	Sinkhole
April 14, 2022	Lower Swatara (T)	Sinkhole
May 23, 2022	Susquehanna (T)	Pipe failure caused a sinkhole on westbound Union Deposit Road (Route 3020). The pipe causing the issue was located just east of Hill Street
June 3, 2022	Derry (T)	Sinkhole
April 7, 2022	Swatara (T)	Heavy rains were blamed for a sinkhole and flooding in Swatara Township. Located near the area of Derry St. and Old Nyes Rd, a portion of the road was shut down by the township public works.
August 15, 2022	Derry (T)	Sinkhole
March 2, 2023	Derry (T)	Sinkhole
March 31, 2023	Derry (T)	A section of Fishburn Road in Derry Township, Dauphin County will be closed for an undetermined period of time while crews work to repair the damage from a sinkhole. Fishburn Road is closed between Cocoa Avenue and Sand Hill Road. The Hershey Roadway was initially closed around 6:30 this morning because of the sinkhole. Crews later realized the hole was affecting gas and power utilities, forcing them to extend the road closure. A water main break led officials to issue a boil-water notice for those affected.
July 16, 2023	Millersburg (B)	Sinkhole
August 21, 2023	Millersburg (B)	Sinkhole

Sources: (ABC27 News 2022); (PennLive News 2022); (Fox43 News 2023); (PA DCNR 1999); (WGAL8 News 2021); (PennLive Patriot News 2019); Dauphin County

4.3.14.4 Probability of Future Occurrence

For the 2025 HMP update, the most up-to-date data was collected to calculate the probability of future occurrence of subsidence and sinkhole events for Dauphin County. Information from the 2023 Pennsylvania State HMP, PaGEODE Data Exploration tool, USGS, and local headlines helped identify some of the most recent sinkhole events in Dauphin County. As shown in Table 4.3.14-1, there have been 14 sinkhole incidents recorded in Dauphin County between January 1, 2019, and November 20, 2024. Based on these previous occurrences, the

probability of future sinkhole events on an annual basis is *highly likely*, as defined by the Risk Factor Methodology probability criteria (see Table 4.4.1-1)

Table 4.3.14-2. Probability of Future Sinkhole and Subsidence Events

Hazard Type	Number of Occurrences Between 2019 and 2024	Percent Chance of Occurrence in Any Given Year
Subsidence and Sinkholes	14	100%

Sources: (PEMA 2023); (PaGEODE 2022); (USGS 2013); Dauphin County

4.3.14.5 Vulnerability Assessment

To understand risk, a community must evaluate the assets that are exposed or vulnerable in the identified hazard area. The following section includes an evaluation and estimation of potential sinkhole and subsidence impacts on the County, including:

- Data and methodology used for the evaluation.
- Impacts on life, health, and safety; general building stock; critical facilities; economy; environment; and future growth and development.
- Effect of climate change on vulnerability.
- Further data collection that will increase understanding of this hazard over time.

Impact on Life, Health, and Safety

The impacts of land subsidence depend on several factors, including the scale and time of land collapse. Sinkhole events caused by karst terrain or abandoned mines are typically isolated and impact the population within the immediate area of the incident. Abandoned mines in Dauphin County remain confined to the northern areas of the County while the majority of karst terrain remains located in southern Dauphin County. In addition to causing damage to residential buildings and displacing residents, sinkholes can block off or damage major roadways and inhibit travel for emergency responders or populations trying to evacuate the area. Approximately 20.1 percent of Dauphin County's population is located in a subsidence hazard area. Table 4.3.14-3 below summarizes the risk to the population located in the subsidence hazard area.

Table 4.3.14-3. Estimated Population Located in the Subsidence Hazard Area

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Total Population (Census Bureau 2020 Decennial)	Estimated Population Located in the Abandoned Mine Hazard Area		Estimated Population Located in the Carbonate Rock Hazard Area	
		Number of People	Percent of Total	Number of People	Percent of Total
Berrysburg (B)	326	0	0.0%	0	0.0%
Conewago (T)	2,952	0	0.0%	0	0.0%
Dauphin (B)	795	0	0.0%	0	0.0%
Derry (T)	24,715	0	0.0%	17,713	71.7%
East Hanover (T)	6,019	0	0.0%	84	1.4%
Elizabethville (B)	1,357	0	0.0%	0	0.0%
Gratz (B)	743	0	0.0%	0	0.0%
Halifax (B)	796	0	0.0%	0	0.0%
Halifax (T)	3,349	0	0.0%	48	1.4%
Harrisburg (C)	50,099	0	0.0%	16,595	33.1%
Highspire (B)	2,741	0	0.0%	0	0.0%
Hummelstown (B)	4,544	0	0.0%	3,853	84.8%
Jackson (T)	1,827	0	0.0%	0	0.0%

Jurisdiction (B) = Borough (C) = City (T) = Township	Total Population (Census Bureau 2020 Decennial)	Estimated Population Located in the Abandoned Mine Hazard Area		Estimated Population Located in the Carbonate Rock Hazard Area	
		Number of People	Percent of Total	Number of People	Percent of Total
Jefferson (T)	360	0	0.0%	0	0.0%
Londonderry (T)	4,899	0	0.0%	1	<0.1%
Lower Paxton (T)	53,501	0	0.0%	4,844	9.1%
Lower Swatara (T)	9,531	0	0.0%	1,016	10.7%
Lykens (B)	1,873	94	5.0%	0	0.0%
Lykens (T)	1,559	1	0.1%	0	0.0%
Middle Paxton (T)	5,048	0	0.0%	18	0.4%
Middletown (B)	9,533	0	0.0%	0	0.0%
Mifflin (T)	816	0	0.0%	0	0.0%
Millersburg (B)	2,545	0	0.0%	0	0.0%
Paxtang (B)	1,648	0	0.0%	989	60.0%
Penbrook (B)	3,274	0	0.0%	1,740	53.1%
Pillow (B)	292	0	0.0%	0	0.0%
Reed (T)	230	0	0.0%	0	0.0%
Royalton (B)	1,138	0	0.0%	0	0.0%
Rush (T)	228	0	0.0%	0	0.0%
South Hanover (T)	7,209	0	0.0%	195	2.7%
Steelton (B)	6,263	0	0.0%	181	2.9%
Susquehanna (T)	26,736	0	0.0%	4,950	18.5%
Swatara (T)	27,824	0	0.0%	4,416	15.9%
Upper Paxton (T)	4,010	0	0.0%	0	0.0%
Washington (T)	2,129	0	0.0%	0	0.0%
Wayne (T)	1,266	0	0.0%	0	0.0%
West Hanover (T)	10,697	0	0.0%	868	8.1%
Wiconisco (T)	1,159	48	4.1%	0	0.0%
Williams (T)	1,067	41	3.8%	0	0.0%
Williamstown (B)	1,303	0	0.0%	0	0.0%
Dauphin County (Total)	**286,401**	**184**	**0.1%**	**57,511**	**20.1%**

Source: U.S. Census Bureau 2020; Pennsylvania Department of Environmental Protection 2024; United States Geological Survey 2014

Notes: Population results have been rounded down

Impact on General Building Stock

Standard loss estimation models do not exist for the subsidence/sinkhole hazard. In general, the built environment located on limestone (carbonate) and abandoned mines is exposed to this hazard. Table 4.3.14-4 below summarizes the risk to the building stock located in the subsidence hazard area.

Table 4.3.14-4. Estimated Building Stock Located in the Subsidence Hazard Area

Jurisdiction (B) = Borough (C) = City (T) = Township	Total Number of Buildings	Estimated Building Stock Located in the Abandoned Mine Hazard Area		Estimated Building Stock Located in the Carbonate Rock Hazard Area	
		Number of Buildings	Percent of Total	Number of Buildings	Percent of Total
Berrysburg (B)	384	0	0.0%	0	0.0%
Conewago (T)	2,726	0	0.0%	0	0.0%
Dauphin (B)	499	0	0.0%	0	0.0%

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Total Number of Buildings	Estimated Building Stock Located in the Abandoned Mine Hazard Area		Estimated Building Stock Located in the Carbonate Rock Hazard Area	
		Number of Buildings	Percent of Total	Number of Buildings	Percent of Total
Derry (T)	12,189	0	0.0%	8,928	73.2%
East Hanover (T)	5,424	0	0.0%	359	6.6%
Elizabethville (B)	1,022	0	0.0%	0	0.0%
Gratz (B)	804	0	0.0%	0	0.0%
Halifax (B)	529	0	0.0%	0	0.0%
Halifax (T)	3,714	0	0.0%	42	1.1%
Harrisburg (C)	19,455	0	0.0%	6,775	34.8%
Highspire (B)	1,481	0	0.0%	0	0.0%
Hummelstown (B)	2,488	0	0.0%	2,121	85.2%
Jackson (T)	2,533	0	0.0%	0	0.0%
Jefferson (T)	695	0	0.0%	0	0.0%
Londonderry (T)	5,464	0	0.0%	1	<0.1%
Lower Paxton (T)	22,715	0	0.0%	2,114	9.3%
Lower Swatara (T)	5,204	0	0.0%	728	14.0%
Lykens (B)	1,438	70	4.9%	0	0.0%
Lykens (T)	2,311	1	<0.1%	0	0.0%
Middle Paxton (T)	4,472	0	0.0%	18	0.4%
Middletown (B)	3,849	0	0.0%	0	0.0%
Mifflin (T)	1,318	0	0.0%	0	0.0%
Millersburg (B)	1,518	0	0.0%	0	0.0%
Paxtang (B)	900	0	0.0%	552	61.3%
Penbrook (B)	1,581	0	0.0%	874	55.3%
Pillow (B)	317	0	0.0%	0	0.0%
Reed (T)	327	0	0.0%	0	0.0%
Royalton (B)	724	0	0.0%	0	0.0%
Rush (T)	379	0	0.0%	0	0.0%
South Hanover (T)	4,275	0	0.0%	111	2.6%
Steelton (B)	2,867	0	0.0%	150	5.2%
Susquehanna (T)	12,511	0	0.0%	2,396	19.2%
Swatara (T)	12,223	0	0.0%	2,487	20.3%
Upper Paxton (T)	3,823	0	0.0%	0	0.0%
Washington (T)	2,464	2	0.1%	0	0.0%
Wayne (T)	1,460	0	0.0%	0	0.0%
West Hanover (T)	7,194	0	0.0%	539	7.5%
Wiconisco (T)	1,112	65	5.8%	0	0.0%
Williams (T)	1,093	54	4.9%	0	0.0%
Williamstown (B)	966	0	0.0%	0	0.0%
Dauphin County (Total)	**156,448**	**192**	**0.1%**	**28,195**	**18.0%**

Source: Dauphin County 2024; RS Means 2024; Pennsylvania Department of Environmental Protection 2024; United States Geological Survey

Impact on Critical Facilities

Of the 1,692 critical facilities located in Dauphin County, 479 are found in carbonate rock hazard areas (or 28.3%), while eight are found in abandoned mine hazard areas. Jurisdictions with the greatest number of facilities located in the subsidence hazard area include the City of Harrisburg as well as Derry Township. Table 4.3.14-5 below breaks down the specific critical/lifeline facilities by jurisdiction.

Table 4.3.14-5. Number of Critical/Lifeline Facilities Located in the Subsidence Hazard Area

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Total Critical Facilities Located in Jurisdiction	Total Lifelines Located in Jurisdiction	Number of Facilities Located in the Carbonate Rock Hazard Area		Number of Facilities Located in the Abandoned Mine Hazard Area	
			Count	*Percent of Jurisdictional Total*	*Count*	*Percent of Jurisdictional Total*
Berrysburg (B)	5	5	0	0.0%	0	0.0%
Conewago (T)	13	9	0	0.0%	0	0.0%
Dauphin (B)	26	24	0	0.0%	0	0.0%
Derry (T)	131	95	102	77.9%	0	0.0%
East Hanover (T)	36	28	2	5.6%	0	0.0%
Elizabethville (B)	12	10	0	0.0%	0	0.0%
Gratz (B)	9	7	0	0.0%	0	0.0%
Halifax (B)	9	8	0	0.0%	0	0.0%
Halifax (T)	30	22	0	0.0%	0	0.0%
Harrisburg (C)	392	280	141	36.0%	0	0.0%
Highspire (B)	12	8	0	0.0%	0	0.0%
Hummelstown (B)	35	26	33	94.3%	0	0.0%
Jackson (T)	22	18	0	0.0%	0	0.0%
Jefferson (T)	7	6	0	0.0%	0	0.0%
Londonderry (T)	45	30	0	0.0%	0	0.0%
Lower Paxton (T)	150	80	15	10.0%	0	0.0%
Lower Swatara (T)	87	79	31	35.6%	0	0.0%
Lykens (B)	18	16	0	0.0%	2	11.1%
Lykens (T)	15	11	0	0.0%	0	0.0%
Middle Paxton (T)	33	28	2	6.1%	0	0.0%
Middletown (B)	47	28	0	0.0%	0	0.0%
Mifflin (T)	8	6	0	0.0%	0	0.0%
Millersburg (B)	26	17	0	0.0%	0	0.0%
Paxtang (B)	11	9	9	81.8%	0	0.0%
Penbrook (B)	17	5	14	82.4%	0	0.0%
Pillow (B)	6	5	0	0.0%	0	0.0%
Reed (T)	6	6	0	0.0%	0	0.0%
Royalton (B)	11	9	0	0.0%	0	0.0%
Rush (T)	5	5	0	0.0%	0	0.0%
South Hanover (T)	24	20	0	0.0%	0	0.0%
Steelton (B)	31	16	7	22.6%	0	0.0%
Susquehanna (T)	118	73	31	26.3%	0	0.0%
Swatara (T)	144	106	86	59.7%	0	0.0%
Upper Paxton (T)	35	24	0	0.0%	0	0.0%
Washington (T)	31	26	0	0.0%	0	0.0%
Wayne (T)	8	8	0	0.0%	0	0.0%
West Hanover (T)	43	31	6	14.0%	0	0.0%
Wiconisco (T)	13	11	0	0.0%	6	46.2%
Williams (T)	14	12	0	0.0%	0	0.0%
Williamstown (B)	7	5	0	0.0%	0	0.0%
Dauphin County (Total)	**1,692**	1,212	**479**	**28.3%**	**8**	**0.5%**

Source: Dauphin County 2024; HIFLD 2020, 2023; Department of Human Services 2024; Pennsylvania Department of Environmental Protection (PA DEP) 2024

Table 4.3.14-6. Number of Lifeline Facilities Located in the Subsidence Hazard Area

FEMA Lifeline Category	Number of Lifelines	Number of Lifelines Located in the Carbonate Rock Hazard Area	Number of Lifelines Located in the Abandoned Mine Hazard Area
Communications	44	14	1
Energy	6	4	0
Food, Water, Shelter	26	6	0
Hazardous Materials	240	105	1
Health and Medical	103	33	0
Safety and Security	620	161	3
Transportation	131	27	2
Water Systems	42	10	1
Other Critical Facilities	480	119	0
Dauphin County (Total)	**1,692**	**479**	**8**

Source: Dauphin County 2024; HIFLD 2020, 2023; Department of Human Services 2024; Pennsylvania Department of Environmental Protection (PA DEP) 2024; United States Geological Survey 2014

Impact on the Economy

While no monetary value was available on the economic impact sinkholes have, their frequency in occurrence in the County as well as the State underscore the challenges faced by residents and officials. Subsidence and sinkholes have caused damage to buildings and roadways in other parts of the State, therefore, the possibility of incurring future costs remains likely. Subsidence and sinkholes can severely impact roads and infrastructure.

Impact on the Environment

The presence of sinkholes can result in increased potential for groundwater contamination. 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. 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.

Future Growth and Development

An increase in development and population can increase the likelihood of a sinkhole incident. Future migration to larger jurisdictions may also increase the likelihood of an incident.

Effect of Climate Change on Vulnerability

Climate is defined not simply as average temperature and precipitation but also by the type, frequency, and intensity of weather events. Both globally and at the local level, climate change has the potential to alter the prevalence and severity of weather extremes (EPA 2022).

Climate change factors such as an extended growing season, higher temperatures, and the possibility of more intense and less frequent summer rainfall may lead to changes in water resource availability. As stated earlier in this profile, changes to the water balance of an area (including over-withdrawal of groundwater, diverting surface water from a large area and concentrating it in a single point, artificially creating ponds of surface water, and drilling new water wells) will cause sinkholes. These actions can also serve to accelerate the natural processes of bedrock degradation, which can have a direct impact on sinkhole creation. The potential effects of climate change on Dauphin County's vulnerability to subsidence/sinkhole events will need to be considered as more information develops regarding regional climate change impacts.

Additional Data and Next Steps

Sinkholes at several locations in the County are believed to be caused by flooding, poor fill, and construction over streams. More data is needed to identify these past events and possible locations to properly mitigate this hazard.

4.3.15 Tornado, Windstorm

This section provides a profile and vulnerability assessment of the tornado and windstorm hazard. The wind hazard includes various types of wind events, including windstorms and tornadoes, which are defined below.

A tornado appears as a rotating, funnel-shaped cloud that extends from a thunderstorm to the ground with whirling winds that can reach 250 miles per hour (mph). Damage paths can be greater than 1 mile wide and 50 miles long. Tornadoes typically develop from either a severe thunderstorm or hurricane as cool air rapidly overrides a layer of warm air. Tornadoes typically move at speeds between 30 and 125 mph and can generate combined wind speeds (forward motion and speed of the whirling winds) exceeding 300 mph. The lifespan of a tornado rarely is longer than 30 minutes (FEMA 1997). Tornadoes can occur at any time of the year, with peak seasons at different times for different states (NSSL 2013). In Pennsylvania, the peak occurrence of tornadoes is from May through July (NWS 2023).

Wind is air moving from high to low pressure. It is the rough horizontal movement of air (as opposed to an air current) caused by uneven heating of the Earth's surface. It occurs at all scales, from local breezes generated by heating of land surfaces and lasting tens of minutes to global winds resulting from solar heating of the Earth (FEMA 1997). Types of damaging winds include straight-line winds, downdrafts, downbursts, microbursts, gust fronts, derecho, bow echoes, and hook echoes, described as follows (NSSL 2023):

- **Straight-line Wind** is any thunderstorm wind not associated with rotation (e.g., tornadic winds). Straight-line winds are movements of air from areas of higher pressure to areas of lower pressure—the greater the difference in pressure, the stronger the winds.
- A **Downdraft** is a small-scale column of air that rapidly sinks toward the ground and usually results in a downburst.
- A **Downburst** is a strong downdraft with horizontal dimensions larger than 2.5 miles, resulting in an outward burst of damaging winds on or near the ground. It is usually associated with thunderstorms but can occur with rainstorms too weak to produce thunder.
- A **Microburst** is a small, concentrated downburst that produces an outward burst of damaging winds near the surface. It is typically short-lived, lasting only 5 to 10 minutes, with maximum wind speeds of up to 168 miles per hour (mph).
- A **Gust Front** is the leading edge of rain-cooled air that clashes with warmer thunderstorm inflow. It is characterized by a wind shift, temperature drop, and gusty winds ahead of a thunderstorm.
- A **Derecho** is a widespread and long-lived windstorm associated with thunderstorms that are often curved. By definition, if the wind damage swath extends more than 240 miles (about 400 kilometers) and includes wind gusts of at least 58 mph (93 km/h) or greater along most of its length, then the event may be classified as a derecho.
- A **Bow Echo** is a radar echo that is linear but bent outward in a bow shape. Damaging straight-line winds often occur near the center of a bow echo (crest). Bow echoes can be more than 300 kilometers long, last for several hours, and produce extensive swaths of wind damage on the ground.
- A **Hook Echo** is a radar echo that is the most recognized and well-known radar signature for a tornadic supercell. This "hook-like" feature occurs when the strong counter-clockwise winds circling the mesocyclone (rotating updraft) are strong enough to wrap precipitation around the rain-free updraft area of the storm.

High winds other than tornados occur in all parts of the United States. Wind begins with differences in air pressures and occurs through rough horizontal movement of air caused by uneven heating of the earth's surface. Wind occurs at all scales, from local breezes lasting a few minutes to global winds resulting from solar heating of the earth. High winds are often associated with other severe weather events such as thunderstorms, tornadoes, nor'easters, hurricanes, and tropical storms. Table 4.3.15-1 lists wind classifications used by the National Weather Service (NWS).

Table 4.3.15-1. NWS Wind Descriptions

Descriptive Term	Sustained Wind Speed (mph)
Hurricane-force	≥74
Strong, dangerous, high, or damaging	40-73
Very windy	30-40
Windy	20-30
Breezy, brisk, or blustery	15-25
Light, or light and variable wind	5-15 or 10-20
None	0-5

Source: NWS 2024
Notes: mph = miles per hour, NWS = National Weather Service

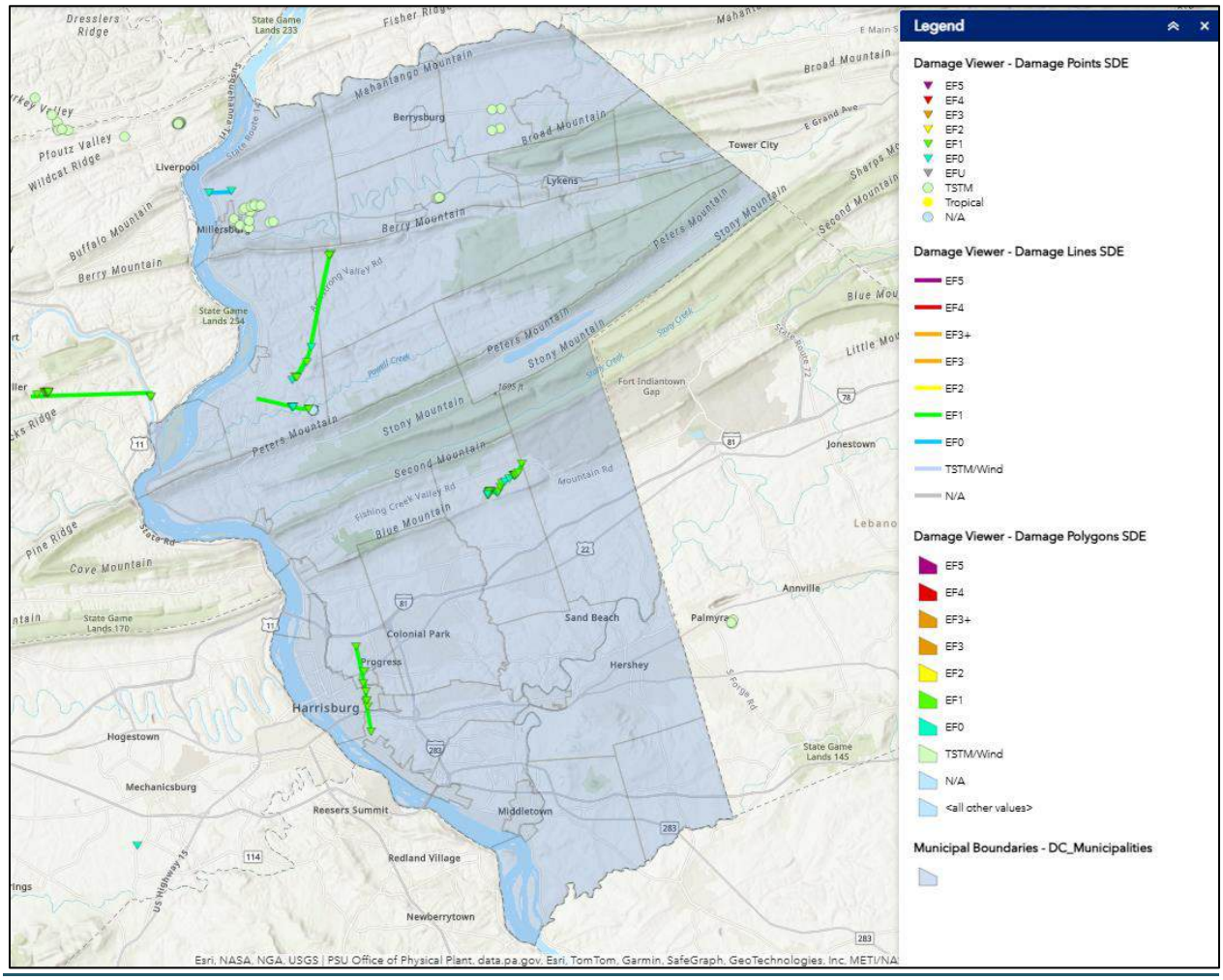
The following sections discuss location and extent, range of magnitude, past occurrences, future occurrences, and vulnerability assessment associated with the wind and tornado hazard within Dauphin County.

Location and Extent

Tornadoes and windstorms can occur throughout Dauphin County, though events are usually localized. Tornadoes can occur at any time during the day or night but are most frequent during late afternoon into early evening, the warmest hours of the day, and most likely to occur during the spring and early summer months of March through June. Tornado movement is characterized in two ways: direction and speed of spinning winds, and forward movement of the tornado, also known as the storm track (PEMA 2023). The forward motion of the tornado's path can be a few hundred yards or several hundred miles in length. The width of tornadoes can vary greatly but generally range in size from less than 100 feet to over a mile in width. Some tornadoes never touch the ground and are short-lived, while others may touch the ground several times. Between 1950 and 2024, 11 tornadoes have been recorded in Dauphin County. Figure 4.3.15-1 shows the tornadoes in Dauphin County (NOAA NCEI 2024).

All of Dauphin County experiences straight-line winds and windstorms. Straight-line winds and windstorms occur on a region-wide scale. While such winds usually accompany tornadoes, straight-line winds are caused by the movement of air from areas of higher pressure to areas of lower pressure. Stronger winds are the result of greater differences in pressure. 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. Wind events can vary in spatial size from small microscale events which take place over only a few hundred meters to large-scale synoptic wind events often associated with warm or cold fronts (PEMA 2023).

Figure 4.3.15-1. Tornadoes in Dauphin County, 2011 to 2024



Source: (NOAA/NWS 2024)
Note: The Damage Assessment Toolkit provides high wind and tornado event records beginning in 2011

Range of Magnitude

Windstorms are generally defined as sustained wind speeds of 40 mph or greater, lasting for 1 hour or longer, or winds of 58 mph or greater for any duration. A tornado's magnitude is classified according to the Enhanced Fujita Scale (EF Scale), further discussed below.

The magnitude or severity of a tornado was originally categorized according to the Fujita Scale (F Scale) or the Pearson Fujita Scale introduced in 1971, based on a relationship between the Beaufort Wind Scales (B-Scales) (a measure of wind intensity) and the Mach number scale (a measure of relative speed). The F Scale is used to rate the intensity of a tornado by examining the damage caused by the tornado after it has passed over a man-made structure (Tornado Project Date Unknown). The F Scale categorizes each tornado by intensity and area and is divided into six categories—F0 (Gale) to F5 (Incredible) (Edwards 2013).

Although the F Scale has been in use for more than 30 years, it has limitations. The primary limitations are a lack of Damage Indicators (DI), no account of construction quality and variability, and no definitive correlation between damage and wind speed. These limitations have led to inconsistent ratings of tornados and, in some cases, overestimates of tornado wind speeds. The limitations encouraged and induced the development of the Enhanced Fujita Scale (EF Scale). The Texas Tech University Wind Science and Engineering (WISE) Center,

along with a forum of nationally renowned meteorologists and wind engineers from across the country, developed the EF Scale (TTU 2006).

The EF Scale became operational on February 1, 2007. It is used to assign tornadoes a rating based on estimated wind speeds and related damage. When tornado-related damage is surveyed, it is compared to a list of DIs and Degrees of Damage (DOD), which help better estimate the range of wind speeds produced by the tornado. From that, a rating is assigned, similar to that of the F Scale, with six categories from EF0 to EF5, representing increasing degrees of damage. The EF Scale was revised from the original F Scale to reflect better examinations of tornado damage surveys. This scale was developed with consideration to the designs of most structures (TTU 2006). Table 4.3.15-2 details each of the six categories of the EF Scale.

Table 4.3.15-2. Enhanced Fujita Damage Scale

EF Scale Number	Intensity Phrase	Wind Speed (mph)	Type of Damage Done
EF0	Light tornado	65–85	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF1	Moderate tornado	86-110	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	Significant tornado	111-135	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off the ground.
EF3	Severe tornado	136-165	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	Devastating tornado	166-200	Devastating damage. Well-constructed houses and whole-frame houses are completely leveled; cars are thrown, and small missiles are generated.
EF5	Incredible tornado	>200	Incredible damage. Strong-frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air over distances exceeding 100 meters (109 yards); high-rise buildings undergo significant structural deformation; incredible phenomena occur.

Source: NWS 2022
Note: mph = Miles per hour

The EF Scale takes into account more variables than the original F Scale in assigning a wind speed rating to a tornado. The EF Scale incorporates 28 DIs, such as building type, structures, and trees. There are eight DODs for each DI, ranging from the beginning of visible damage to the destruction of the DI. Table 4.3.15-3 lists the 28 DIs, with a description of construction typical for each DI. Each DOD in every category is assigned an estimated expected wind speed, a lower boundary of wind speed, and an upper boundary of wind speed.

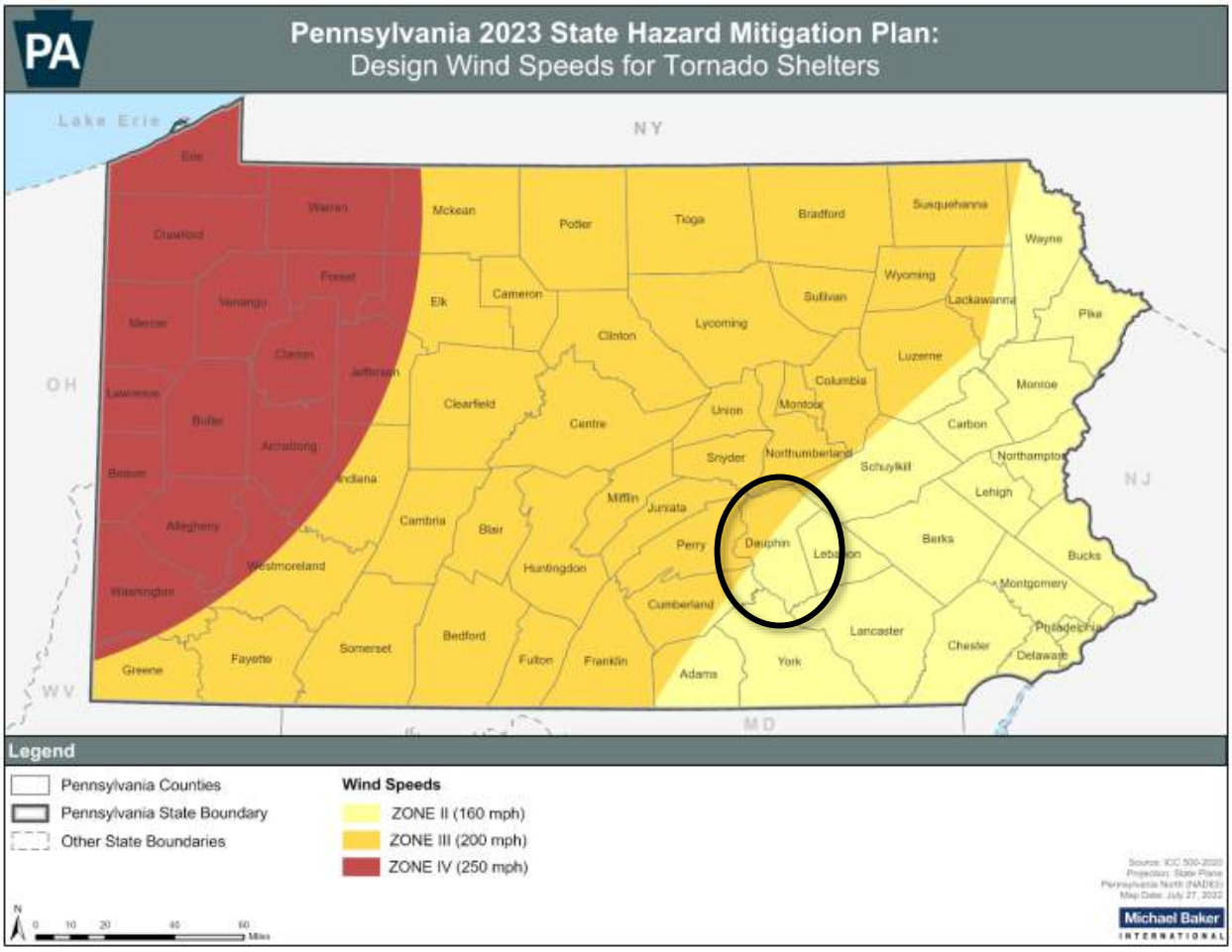
Table 4.3.15-3. EF Scale Damage Indicators

Number	Damage Indicator	Abbreviation
1	Small barns, farm outbuildings	SBO
2	One- or two-family residences	FR12
3	Single-wide mobile home	MHSW
4	Double-wide mobile home	MHDW
5	Apartment, condominium, townhouse (3 stories or less)	ACT
6	Motel	M
7	Masonry apartment or motel	MAM
8	Small retail building (fast food)	SRB
9	Small professional (doctor's office, branch bank)	SPB
10	Strip mall	SM
11	Large shopping mall	LSM
12	Large, isolated ("big box") retail building	LIRB
13	Automobile showroom	ASR
14	Automotive service building	ASB
15	School – 1-story elementary (interior or exterior halls)	ES
16	School – junior or senior high school	JHSH
17	Low-rise (1-4 story) building	LRB
18	Mid-rise (5-20 story) building	MRB
19	High-rise (over 20 stories)	HRB
20	Institutional building (hospital, government. or university)	IB
21	Metal building system	MBS
22	Service station canopy	SSC
23	Warehouse (tilt-up walls or heavy timber)	WHB
24	Transmission line tower	TLT
25	Free-standing tower	FST
26	Free-standing pole (light, flag, luminary)	FSP
27	Tree – hardwood	TH
28	Tree – softwood	TS

Source: Storm Prediction Center (SPC) 2006

Events after February 2007 are classified based on the EF Scale. Previous occurrences and losses associated with historical tornado events, described in the Past Occurrences section of this hazard profile, are classified based on the F Scale.

Figure 4.3.15-2. Design Wind Speeds for Tornado Shelters



Source: (PEMA 2023)
Note: *The black circle indicates the approximate location of Dauphin County.*

Figure 4.3.15-2, above, shows wind speed zones developed for the design of tornado shelters. It identifies worst-case wind speeds that could occur across the United States to be used as the basis for the design and evaluation of the structural integrity of shelters and critical facilities. Eastern Pennsylvania falls within Zone II, meaning design wind speeds for shelters and critical facilities should be able to withstand a 3-second gust of up to 160 mph, regardless of whether the gust is the result of a tornado, hurricane, tropical storm, or windstorm event. Central and parts of western Pennsylvania fall within 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. Western and northwestern Pennsylvania are located in Zone IV; design wind speeds for shelters and critical facilities should be able to withstand a 3-second gust of up to 250 mph. Also, it is important to note that eastern and south-central Pennsylvania is within a hurricane-susceptible wind zone (PEMA 2023).

Since tornado events are typically localized, environmental impacts are rarely widespread (PEMA 2023). However, where these events occur, severe damage to plant species is likely. This includes the loss 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 4.3.15-2 to prevent the release of hazardous materials into the environment.

Past Occurrence

In order to determine previous occurrences of Tornadoes/Windstorm events in Dauphin County, multiple agencies and different databases were used such as the NCEI Storm Events Database, previous disaster declarations with FEMA, and the U.S. Department of Agriculture (USDA).

FEMA Major Disasters and Emergency Declarations

Between 1954 and 2024, Dauphin County was included in 11 FEMA-declared tornado- and windstorm-related major disaster declarations (DR) or emergencies (EM). While most of the major declarations were in association with tropical hazards, they are included in Table 4.3.15-4 because of the high wind impacts they bring to the planning area. (FEMA 2024).

Table 4.3.15-4 FEMA Declarations for Tornado, Windstorm Events in Dauphin County (1954-2024)

Event Date	Declaration Date	Declaration Number	Description
June 23, 1972	June 23, 1972	DR-340-PA	Tropical Storm Agnes
January 19 – February 1, 1996	January 21, 1996	DR-1093-PA	Severe Storms & Flooding
September 6 – 7, 1999	September 22, 1999	Dr-1298-PA	Tropical Depression Dennis and Flash Flooding
September 17 – October 1, 2004	September 19, 2004	DR-1557-PA	Tropical Depression Ivan
September 8 – 9, 2004	September 19, 2004	DR-1555-PA	Severe Storms & Flooding Associated with Tropical Depression Frances
August 29 – October 1, 2005	September 10, 2005	EM-3235-PA	Hurricane Katrina
September 3 – October 15, 2011	September 12, 2011	DR-4030-PA	Tropical Storm Lee
September 3 – October 15, 2011	September 8, 2011	EM-3340-PA	Remnants of Tropical Storm Lee
October 26 – November 8, 2012	January 10, 2013	DR-4099-PA	Hurricane Sandy
October 26 – November 8, 2012	October 29, 2012	EM-3356-PA	Hurricane Sandy
August 31 – September 5, 2021	September 10, 2021	DR-4618-PA	Remnants of Hurricane Ida

Source: (FEMA 2024)

USDA Declarations

The Secretary of Agriculture from the U.S. Department of Agriculture (USDA) is authorized to designate counties as disaster areas to make emergency loans to producers suffering losses in those counties and contiguous counties. Between 2021 and 2024, Dauphin County has not been included in any USDA tornado- or windstorm-related agricultural disaster declarations (USDA 2024).

Previous Events

For this HMP update, known tornado and major windstorm events that have impacted Dauphin County between September 2021 and September 2024 are identified in Table 4.3.15-5. With documentation for Pennsylvania and Dauphin County being extensive, not all sources have been identified or researched. Events prior to 2021, refer to the 2021 Dauphin County HMP.

Table 4.3.15-5. Recent Tornado and Windstorm Events (2021 to 2024)

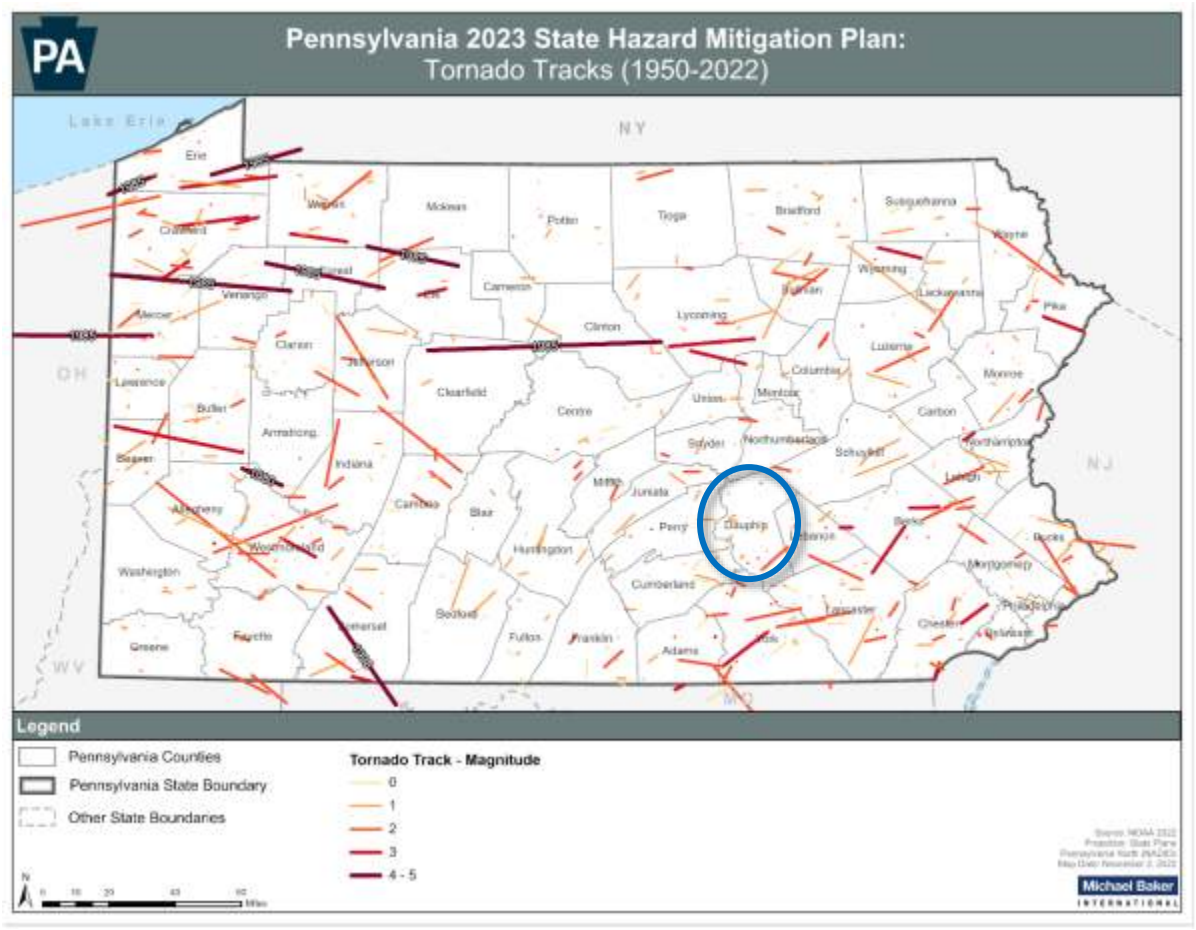
Dates of Event	Event Type	Location	Losses / Impacts
August 18, 2021	Tornado	Halifax (T)	An EF-1 tornado touched down east of Halifax during the early evening of August 18, 2021, and estimated peak winds approached 105 mph. Property damages were estimated to be around $20,000 as a result.
August 31 – September 5, 2021	Hurricane	Statewide	Remnants of Hurricane Ida DR-4618-PA
February 18, 2022	High Wind	Countywide	County officials noted a high wind event occurred countywide
March 7, 2022	Thunderstorm Wind	Colonial Park, Royalton	A severe thunderstorm producing winds estimated near 60 mph produced multiple reports of trees and wires down in Lower Paxton Township.
March 31, 2022	Thunderstorm Wind	Glenwood	A severe thunderstorm producing winds estimated near 60 mph knocked down trees onto wires near Progress.
March 26, 2023	Strong Wind	Countywide	Strong post-frontal winds estimated near 50 mph knocked down a tree and wires onto PA Route 325 in Rush Township, closing the road for more than two hours.
April 22, 2023	Thunderstorm Wind	Hockersville, Olmsted AFB, Horrnerstown, and Hershey Airport	A severe thunderstorm producing winds estimated near 60 mph tore half of the roof off of the Areba Barn on the Hershey Medical Center campus. A large piece of the roofing landed on a car, denting the car and breaking the rear window. There were also several trees down in a residential area across Route 322 from the Barn, along Hillview Lane and West Areba Drive.
June 03, 2023	Thunderstorm Wind	Carsonville, Pactonia, West End, and Oberlin	A severe thunderstorm producing winds estimated near 60 mph knocked down power lines near Carsonville.
June 26, 2023	Thunderstorm Wind	Deodate	A severe thunderstorm producing winds estimated near 60 mph knocked down a tree across Deodate Road to the east of Middletown.
June 27, 2023	Thunderstorm Wind	Hershey Airport	A severe thunderstorm producing winds estimated near 60 mph knocked down trees and wires along Sand Beach Road to the north of Hershey.
July 02, 2023	Tornado and Thunderstorm Wind	Upper Paxton (T) Mifflin (T)	A brief EF-0 tornado occurred near Route 147 in Upper Paxton Township, Dauphin County. Travelling just under one mile this tornado was also accompanied by strong thunderstorm winds, estimated to be near 60 mph. Multiple reports of trees down resulted.
July 07, 2023	Thunderstorm Wind	Elizabethville	A severe thunderstorm producing winds estimated near 60 mph knocked down wires onto Rutter Road near Enders.
July 09, 2023	Thunderstorm Wind	Lenkerville	A severe thunderstorm producing winds estimated near 60 mph knocked down trees across Route 147 near the VFW north of Millersburg.
July 17, 2023	Thunderstorm Wind	McClellan	A severe thunderstorm producing winds estimated near 60 mph knocked down trees and wires in the vicinity of Millersburg.
July 21, 2023	Thunderstorm Wind	Dauphin, Oberlin and Shope Gardens	A severe thunderstorm producing winds estimated near 60 mph knocked down multiple trees north of Dauphin.
July 25, 2023	Thunderstorm Wind	Camp Curtin, Harrisburg, and Penbrook	A severe thunderstorm producing winds estimated near 60 mph uprooted some trees along with causing damage to a large tent at the Pennsylvania Farm Show Complex and Expo Center. The tent also blew onto some classic cars that were part of an auction at the Farm Show Complex, damaging approximately 20 cars.
August 4, 2023	Thunderstorm Wind	Inglenook	A severe thunderstorm producing winds estimated near 60 mph knocked down trees and wires to the southeast of Halifax.
September 7, 2023	Thunderstorm Wind	Highspire	A severe thunderstorm producing winds estimated near 60 mph knocked down multiple trees and wires in Highspire.
January 14, 2024	High Wind	Countywide	A wind gust of 59 mph was recorded at KMDT.

Dates of Event	Event Type	Location	Losses / Impacts
June 29, 2024	Thunderstorm Wind	Millersburg	Multiple reports of thunderstorm wind damage around Millersburg as NWS surveyors found evidence of damage attributed to thunderstorm wind speeds ranging between 75-93 mph.
August 9, 2024	Tornado	Harrisburg	NWS Storm Surveys confirmed an EF1 tornado in the City of Harrisburg developed during the early morning hours of August 9th, bringing maximum estimated winds of 105mph. The twister traveled nearly 3.5 miles and produced an estimated $165,000 in property damage. A tornado began along Gibson Avenue and continued northward for 7 minutes as it produced structural and tree damage through East Harrisburg and into Susquehanna Township, lifting in front of the Pennsylvania State Police Headquarters on Elmerton Avenue. The most significant damage occurred at Brethren in Christ Church and in Bellevue Park

Source: (FEMA 2024); (NOAA NCEI 2024)

Figure 4.3.15-3 shows the paths of historical tornadoes in Pennsylvania between the years 1950 and 2022. Paths also display the reported magnitude of the event, with the strongest tornadoes being labeled with their corresponding year (PEMA 2023). The figure shows that a majority of Dauphin County experienced a lower frequency of tornado events than the eastern and northern portions of the Commonwealth.

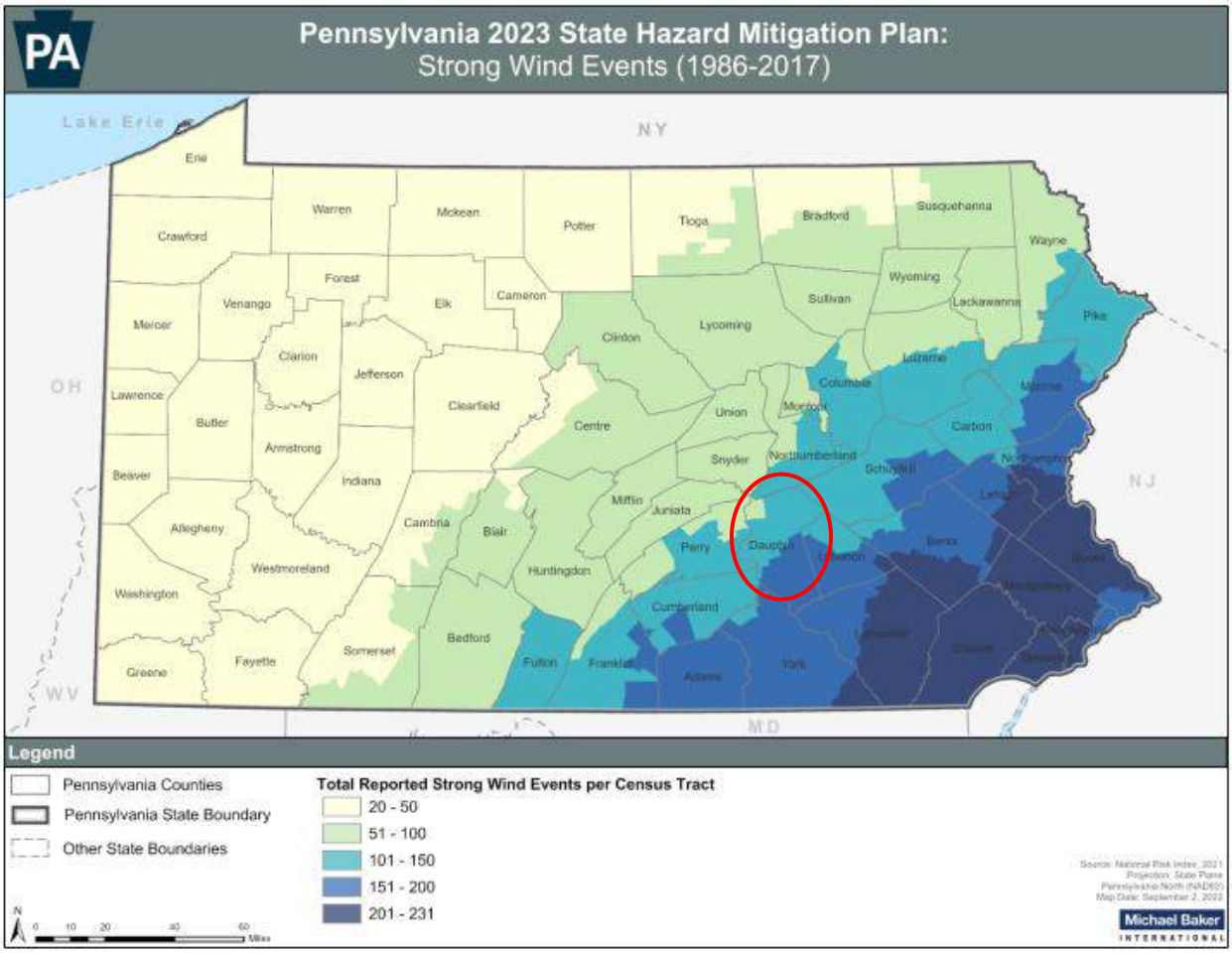
Figure 4.3.15-3. Tornado Tracks for Pennsylvania (1950 to 2022)



Source: (PEMA 2023)
Note: Dauphin County is represented by the blue oval.

Maximum number of strong wind events pre-census tract in Pennsylvania between 1986 and 2017 are shown in Figure 4.3.15-4. Events may be the result of thunderstorms, hurricanes, tropical storms, winter storms, or nor'easters. The most activity is recorded in the southeastern region of the state, with occurrences decreasing steadily as you move both west and north (PEMA 2023). Dauphin County is shown to have experienced anywhere from 50 to 200 strong wind events.

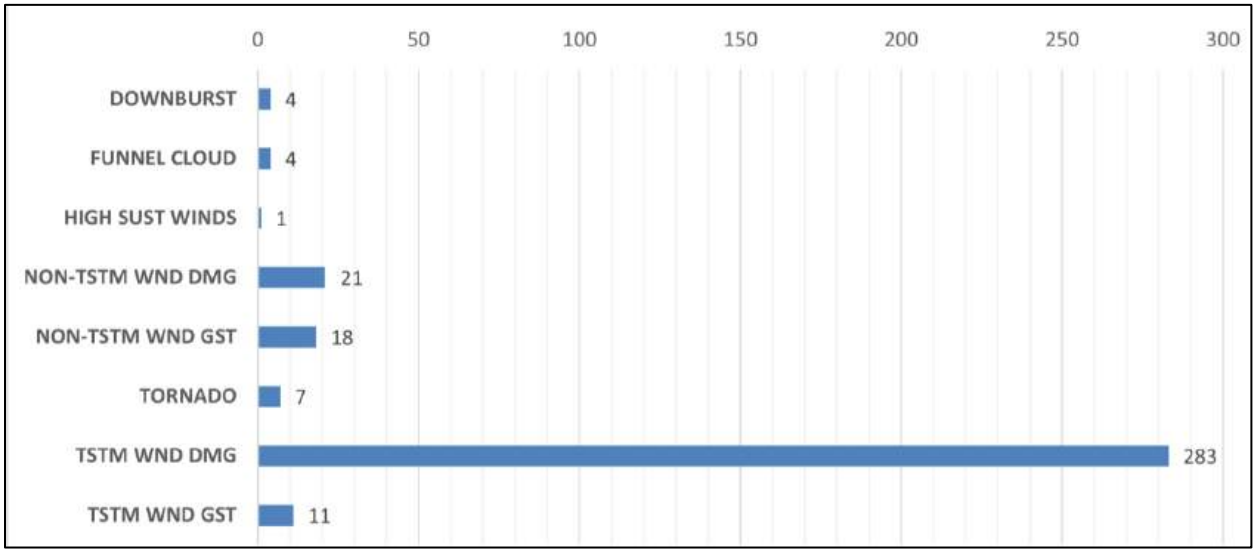
Figure 4.3.15-4. Strong Wind Events for Pennsylvania (1986 to 2017)



Source: (PEMA 2023)
Note: Dauphin County is represented by the red oval.

Local Storm Reports (LSRs) from the National Weather Service (NWS) were also used in determining previous occurrences, and the figure below represents a summary of all tornado and windstorm-related LSRs reported in the County between 2005 and September of 2024. Data before 2005 was not readily available, but what immediately stands out is that of the many types of high wind weather phenomena, tornados are grossly overshadowed by the amount of damaging thunderstorm wind reports. NWS data presented in Figure 4.3.15-5 is included with this update to convey the message that while NCEI event history can be helpful, it does not account for every storm report or storm event. NCEI provides a high-level overview of past storm events, but it does not catalog all events. For this reason, NWS data was utilized to gain a more comprehensive narrative of past tornadoes and high-wind reports.

Figure 4.3.15-5. NWS Local Storm Reports for Tornado, Windstorm Events in Dauphin Co. (2005-2024)



Source: (IEM 2024); (Iowa State University 2024)

Probability of Future Occurrence

Dauphin County experiences strong winds frequently, and when those winds occur, they can result in significant property damage, downed trees, and utility outages. It can be reasonably assumed that future tornadoes and windstorms will be similar in nature to those that have affected Dauphin County in the past. It is estimated that Dauphin County will continue to experience direct and indirect impacts of annual windstorms and tornadoes that may induce secondary hazards, such as infrastructure deterioration or failure; utility failures; power outages; water quality and supply concerns; and transportation delays, accidents, and inconveniences.

For the 2025 HMP update, the most up-to-date historical data was collected to calculate the probability of future occurrence of tornado and windstorm events for Dauphin County. Information and data from the NOAA-NCEI Storm Events database were used to identify the number of tornado and wind events that occurred between 1996 and 2024. Table 4.3.15-6 presents the probability of future occurrence of tornado events in Dauphin County. Based on these statistics, there is an estimated nearly 100 percent chance of a windstorm event occurring in any given year in Dauphin County.

Table 4.3.15-6. Probability of Future Tornado and Windstorm Events

NCEI Hazard Type	Number of Occurrences Between 1996 and 2024	Percent chance of occurrence in any given year
High Wind	20	69%
Strong Wind	5	14%
Thunderstorm Wind	293	100%
Funnel Cloud	4	14%
Tornado	12	41%
COMBINED TOTAL	**312**	**100%**

Source: (NOAA NCEI 2024)

Note: Due to limitations in data, not all Tornado/Windstorm events occurring between 1954 and 1996 are accounted for in the tally of occurrences. As a result, the number of hazard occurrences is calculated using the number of occurrences between 1996 and September 30, 2024

In Section 4.4, the hazards of concern identified for Dauphin County are ranked according to relative risk. The probability of occurrence, or likelihood of the event, is one parameter used for ranking hazards. The probability of occurrence for severe tornado and windstorm events in Dauphin County is considered ***highly likely*** (greater than 90% annual probability) as defined by the Risk Factor Methodology probability criteria.

Vulnerability Assessment

To understand risk, a community must evaluate assets exposed and vulnerable within the identified hazard area. The following section discusses the potential impacts of the tornado hazard on Dauphin County, including:

- Impacts on (1) life, health, and safety; (2) general building stock; (3) critical facilities; (4) the economy; and (5) the environment.
- Future growth and development.
- Effect of climate change on vulnerability.
- Additional data and next steps.

Impact on Life, Health, and Safety

The impacts of a tornado or windstorm on life, health, and safety depend on several factors, including the severity of the event and whether adequate warning time was provided to residents. All residents in Dauphin County are exposed to the tornado hazard.

Residents may be displaced or require temporary to long-term sheltering. In addition, downed trees, damaged buildings, and debris carried by high winds can lead to injury or loss of life. Similar to other natural hazards, socially vulnerable populations are most susceptible based on several factors, including their physical and financial ability to react or respond during a hazard, and the locations and construction quality of their housing.

Economically disadvantaged populations are more vulnerable because they are likely to evaluate their risk and make decisions based on the major economic impact on their family and may not have funds to evacuate. The population over the age of 65 is also more vulnerable and, physically, they may have more difficulty evacuating. The elderly are considered most vulnerable because they may require extra time or outside assistance during evacuations and are more likely to seek or need medical attention that may not be available due to isolation during a storm event. Section 2 (County Profile) presents the statistical information regarding these populations in the county. First responders' safety is also at risk during on-scene operations, and they may have limited access to roads to respond to incidents. First responders may experience a higher-than-normal call volume and demand and have additional duties such as traffic control.

Impact on General Building Stock and Critical Facilities

The entire County's building stock and critical facilities are exposed to the tornado hazard. Manufactured housing (i.e., mobile homes) is particularly vulnerable to high winds and tornadoes. The U.S. Census Bureau defines manufactured homes as "movable dwellings, 8 feet or wider and at least 40 feet in length, designed to be towed on its chassis, with transportation gear integral to the unit when it leaves the factory, and without the need of a permanent foundation (US Census 2020)." They can include multi-wide types and expandable manufactured homes but exclude travel trailers, motor homes, and modular housing. Because of their lightweight and often unanchored design, manufactured housing is extremely vulnerable to high winds and will generally sustain the most damage. Table 4.3.15-7 displays the number of manufactured housing units per municipality in Dauphin County.

Table 4.3.15-7. Manufactured Housing Units per Municipality in Dauphin County

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Number of Manufactured Homes	Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Number of Manufactured Homes
Berrysburg (B)	15	Middletown (B)	164
Conewago (T)	129	Mifflin (T)	33
Dauphin (B)	2	Millersburg (B)	5
Derry (T)	97	Paxtang (B)	0
East Hanover (T)	563	Penbrook (B)	6
Elizabethville (B)	5	Pillow (B)	6
Gratz (B)	28	Reed (T)	5
Halifax (B)	10	Royalton (B)	50
Halifax (T)	236	Rush (T)	15
Harrisburg (C)	0	South Hanover (T)	80
Highspire (B)	86	Steelton (B)	3
Hummelstown (B)	17	Susquehanna (T)	69
Jackson (T)	134	Swatara (T)	1
Jefferson (T)	39	Upper Paxton (T)	303
Londonderry (T)	874	Washington (T)	66
Lower Paxton (T)	85	Wayne (T)	89
Lower Swatara (T)	723	West Hanover (T)	243
Lykens (B)	59	Wiconisco (T)	61
Lykens (T)	68	Williams (T)	62
Middle Paxton (T)	112	Williamstown (B)	20
Dauphin County (Total)		**4,563**	

Source: Dauphin County 2021 HMP

Impact on Economy

Tornadoes also impact the economy, including loss of business function (e.g., tourism, recreation), damage to inventory, relocation costs, and wage loss and rental loss due to repair/replacement of buildings. Impacts on transportation lifelines affect both short-term (e.g., evacuation activities) and long-term (e.g., day-to-day commuting and goods transport) transportation needs. Utility infrastructure (power lines, gas lines, electrical systems) could sustain damage, and impacts could result in loss of power, which could also affect business operations and the provision of heating or cooling to the population.

Impact on the Environment

Tornado events are typically localized; therefore, environmental impacts are rarely widespread. The impacts of windstorms on the environment usually occur over a larger area. Severe damage to plant species is likely from both tornado and windstorm events. This includes uprooting or destroying trees and increased threat of wildfire in areas of tree debris.

Future Growth and Development

As discussed in Section 4.4 (Hazard Vulnerability Summary), areas targeted for future growth, development, and re-development have been identified across Dauphin County. Any areas of growth could be affected by the

tornado and windstorm hazard because the entire county is exposed and potentially vulnerable to the wind hazard. Residential development, specifically manufactured homes, may be considered more vulnerable to the tornado hazard.

Effect of Climate Change on Vulnerability

The May 2021 Pennsylvania Climate Impact Assessment indicated that Pennsylvania is very likely to undergo increased temperatures and precipitation in the 21st century. Increased average temperatures as a result of climate change make the occurrence of extreme heat more likely (Commonwealth of Pennsylvania 2021). While increased average temperatures would make the occurrence of extreme cold less likely, some climatologists have suggested that warming in the Arctic could impact the position of the jet stream, allowing for more extreme cold weather events to occur. While some research supports this concept, others do not and the impact of climate change on cold weather events is not fully understood (National Geographic 2019). Extreme heat and cold result in greater strain on utilities, increasing the likelihood of utility interruption.

An increase in the intensity of severe weather events is anticipated as the climate continues to change. This will include wind events such as hurricanes, tornadoes, and wind associated with thunderstorms, among other phenomena. More storms with higher winds will increase the chance that the utility infrastructure will be impacted by these storms. Additionally, an increase in precipitation is projected, which could come in the form of heavy downpours or winter weather, thus causing additional utility interruptions. Increased risk of drought may also threaten water utilities (Commonwealth of Pennsylvania 2021).

Additional Data and Next Steps

In time, HAZUS versions will be released with modules that address straight-line wind and tornado events. As updated versions are released, the County will be able to run analyses for an overall picture of the wind damages and debris generated from tornado events. Over time, Dauphin County can obtain additional data to support the analysis of this hazard. This additional data would include details on past hazard events and impacts and an updated building inventory that would provide specific building information, such as type of construction and details on protective features (for example, shutters and safe rooms).

4.3.16 Transportation Accident

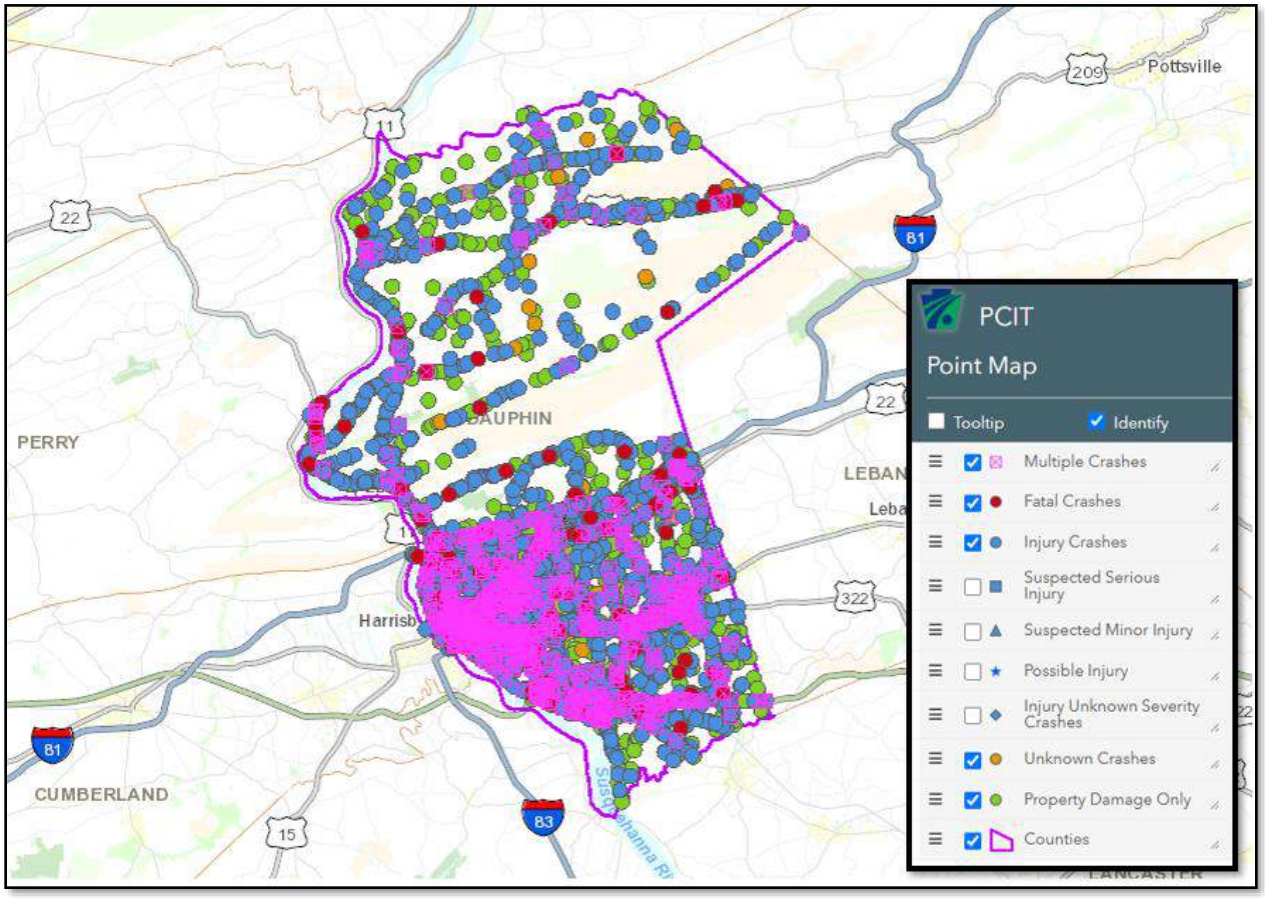
In alignment with the Pennsylvania State Hazard Mitigation Plan, this plan defines transportation accidents as technological hazards that involve the systems of land, sea, and air transportation infrastructure (PEMA 2023, PEMA 2020). The Pennsylvania Emergency Management Agency (PEMA) states that transportation systems can present flaws or break down easily, which often results in a major disaster involving injuries, loss of property, environmental damage, economic consequences, and even loss of life (PEMA 2020). For the entire Commonwealth, transportation accidents are one of the costliest of all hazards in terms of the number of fatalities, injuries, economic loss, and environmental impacts (PEMA 2023).

For this plan update, transportation accidents are defined as incidents involving highway, air, and rail travel that result in death, serious injury, extensive property loss or damage, or situations causing delay or closure. Dauphin County's transportation systems include roadways, rail lines, and airports. Major road accidents are probable, while major rail and aviation accidents are possible. All county systems and supporting transportation resources provide services locally, regionally, and nationally. Vehicular, aviation, and railway accidents are defined below:

- **Vehicular Accidents:** A vehicular accident is a road traffic incident that usually involves one vehicle colliding with another vehicle or other road user, such as an animal or a stationary roadside object. A vehicular accident may result in injury, property damage, or possible fatalities. Many factors contribute to vehicular accidents, including equipment failure, poor road conditions, weather, traffic volume, and driver behavior.
- **Aviation Accidents:** According to the International Civil Aviation Organization, an aviation accident occurs during the operation of an aircraft between the time a person boards the aircraft with intent to fly to a destination, to the time the person has disembarked the aircraft. Three different situations qualify as an aviation accident: (1) a person is fatally or seriously injured; (2) the aircraft sustains damage or structural failure; or (3) the aircraft is missing or inaccessible. An aviation incident is an occurrence, other than an accident, associated with the operation of an aircraft that affects or could affect the safety of the operation (International Civic Aviation Organization 2015). Airport accidents and incidents have the potential to occur while the plane is over County airspace, not only directly on airport property.
- **Railway Accidents:** Railway accidents involve one or more trains. They can involve a train derailment or one train impacting another train, vehicle, or pedestrian.

The Harrisburg Area Transportation Study (HATS) made a GIS-based web application (app) available to the public to reduce vehicle crashes. The app uses five years of data from the Pennsylvania Department of Transportation's (PennDOT) Pennsylvania Crash Information Tool (PCIT) and puts it in a format that makes it easy to visualize and analyze. The app includes filters such as county, year, and accidents involving attributes such as aggressive driving, alcohol, bicycle and pedestrian, deer, heavy trucks, fatalities, serious injuries, and speeding. Figure 4.3.16-1 shows vehicular accidents from 2019 to 2023 in the county. Between this timeframe, a total of 14,276 crashes occurred ranging in crash description and severity (PennDOT 2023).

Figure 4.3.16-1. 2019-2023 Vehicular Accidents in Dauphin County



Source: (PennDOT 2023)
Note: The last available year to choose is 2023.

Location and Extent

Vehicular Accidents

Dauphin County has more than 2,692 miles of roadways, and these include interstate highways, U.S. highways, State highways as well as County/Local roads. Table 4.3.16-1 breaks down the categories along with the total miles within the Dauphin County planning area. Transportation accidents can occur at any point along these roadways, with many occurring at an intersection of two or more roadways. Dauphin County, as a whole, is at risk for traffic accidents of all degrees. Transportation accidents occur throughout the county, and as noted in East Hanover Township, there has been an increase in traffic due to increasing commercial development and tourism in the area, and these more crowded roads are resulting in more motor vehicle accidents.

Table 4.3.16-1. Dauphin County Transportation Network

Road Type	Total Miles in Dauphin County
Interstate	80.3
U.S. Highways	106.3
State Highway	201.1

County/Local Roads	2,304.4
Total in Dauphin County	**2,692.2**

Source: Dauphin County 2024

Structurally deficient bridges pose a risk for transportation accidents. According to the PA Department of Transportation, Dauphin County has a total of 564 bridges within its jurisdictional boundaries, and of these structures, 122 are listed as being in "good condition", 396 are in "fair condition," and 46 are in "poor condition (PennDOT2024).

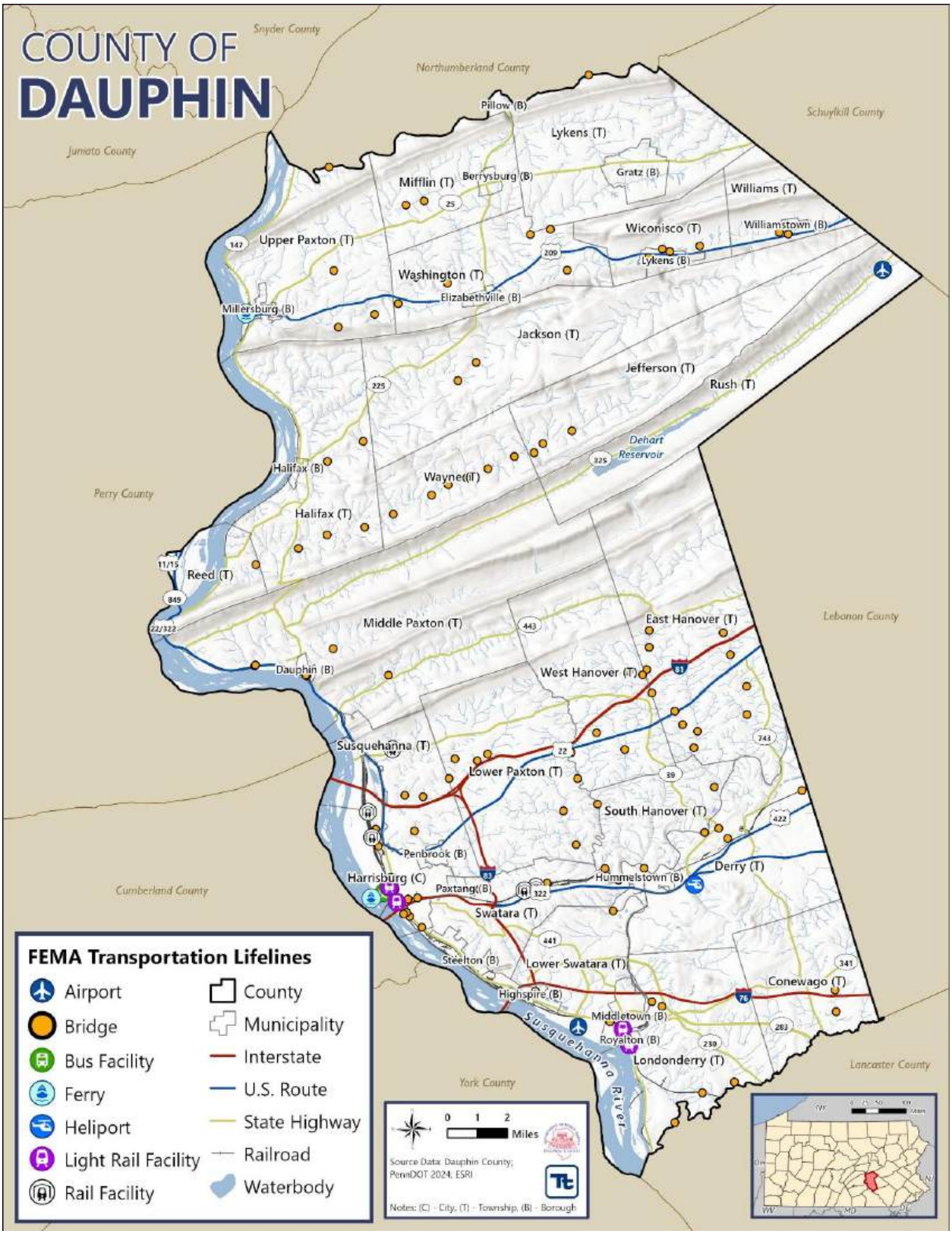
There is no warning time for vehicular accidents. Factors contributing to these accidents are typically associated with the driver, vehicle, and the environment. Factors associated with the driver include error, speeding, lack of experience, and blood-alcohol level. Factors associated with the vehicle include type, condition, and center of gravity. Environmental factors include the quality of infrastructure, weather, and obstacles. The majority of vehicular accidents are attributed to the driver. Vehicular accidents can severely affect those directly involved as well as others not directly involved. Other effects may include severe traffic delays, lost sales to businesses, delayed commodity shipments, and increased insurance costs (Cova and Conger 2004).

PennDOT identified the areas listed below as especially problematic for transportation accidents. The Tri-County Regional Planning Commission incorporated this information into the county's Long Range Transportation Plan.

Table 4.3.16-2. Transportation Routes across Dauphin County, PA

Interstate Roads	U.S. Highways	State Highways	
• Interstate 76 *(PA Turnpike)*	• US-11	• PA-25	• PA-325
• Interstate 81	• US-22	• PA-39	• PA-581
• Interstate 83	• US-322	• PA-147	• PA-341
• Interstate 283	• US-422	• PA-225	• PA-441
	• US 209	• PA-230	• PA-443
		• PA-283	• PA-743
		• PA-849	

Figure 4.3.16-2. Transportation Routes in Dauphin County



Railway Accidents

Dauphin County contains the Keystone Corridor, a 104-mile passenger railway corridor maintained by Amtrak, the Southeastern Pennsylvania Transportation Authority (SEPTA), and PennDOT which connects Harrisburg to Philadelphia (Tri-County Regional Planning Commission 2019). Additionally, Harrisburg is one of three eastern U.S. intermodal hubs for the Norfolk Southern freight railway system. 60-70 freight trains pass through Harrisburg daily. Derry Township has a high occurrence of freight train transit through residential, commercial, entertainment, and manufacturing districts while frequently hauling Hazardous Material commodities. Additional information on hazardous materials can be found in Section 4.3.6 (Environmental Hazard – Hazardous Materials Releases). This presents a heightened risk of contamination as well as impeding vehicular and pedestrian traffic should an accident occur. Railway accidents are classified into the following three types (PEMA 2023):

- **Derailment** is an accident on a railway when a train leaves the rails entirely.
- **Collision** is an accident in which a train strikes another train or a vehicle.
- **Other** accidents include those caused by other circumstances like obstructions, fire, or explosion.

Aviation Accidents

Dauphin County contains 23 airports and heliports; four of which are public, including the Harrisburg International Airport, and three state-owned heliports. In addition, Dauphin County is in the flight path of several airports.

Approximately 80 percent of all aviation accidents occur shortly before or during take-off and landing. Reportedly, most of these accidents are caused by human error. Mid-flight accidents are rare but not unheard of. A survey of 1,843 plane crashes between 1950 and 2006 showed that 53 percent were the result of pilot (human) error, 21 percent were caused by mechanical failure, 11 percent were caused by weather, 8 percent were attributed to other human error (lack of communication or improper maintenance), 6 percent were caused by sabotage and terrorism, and 1 percent resulted from other causes (Krasner 2009).

Aviation accidents are often devastating incidents that may result in serious injuries or fatalities. The Federal Aviation Administration (FAA) and the National Transportation Safety Board (NTSB) are the agencies responsible for monitoring air travel and investigating accidents. Some of the most common causes of aviation accidents occur as a result of violations of FAA and NTSB regulations. Some other causes of accidents include but are not limited to, those listed below.

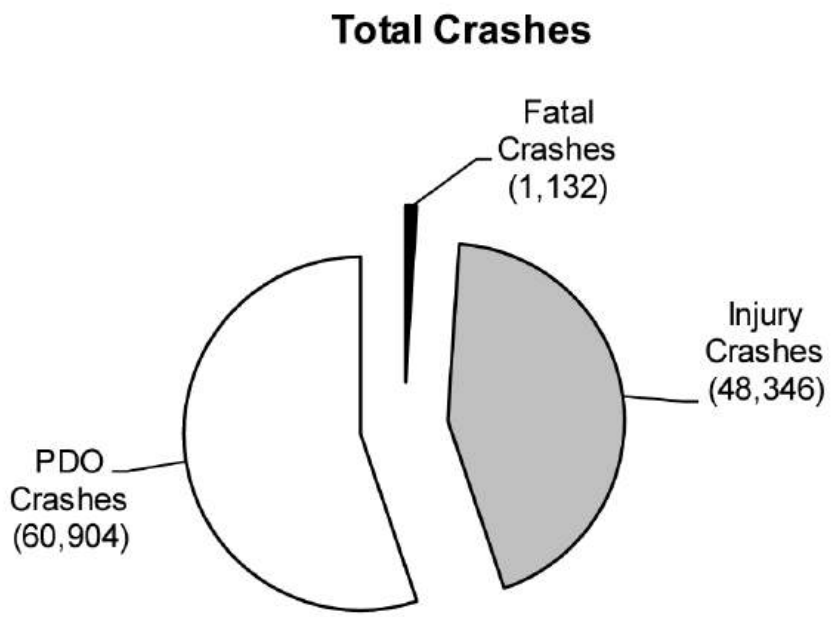
- **Pilot or flight crew errors** may include lack of experience, poor training, fatigue, or even intoxication. Pilot error is the number one cause of aviation accidents and accounts for the highest number of fatalities. Pilots have the responsibility to transport passengers safely from one place to another and follow the FAA and NTSB regulations to better ensure passenger safety. If a pilot or flight crew member makes an error, an accident may occur.
- **Faulty aircraft equipment** is another common cause of aviation accidents.
- **Aircraft design flaws** can lead to aviation accidents. The manufacturer of an aircraft is responsible for an aviation accident if the structural design is flawed and results in an accident.
- **Poor weather conditions**, such as snow, rain, wind, and fog, cause many of the accidents which occur during takeoff or landing. Adverse weather is generally considered when planning for departure and arrivals.
- **Safety standard violations**, such as failure to properly fuel or maintain the aircraft, can be very dangerous. If any regulations and safety standards set by the FAA or NTSB are violated, an accident may occur.

- **Failure of air traffic controllers to properly monitor the airways** is another cause of aviation accidents (NCI 2021).Range of Magnitude

Transportation accidents often result in injury, damages to property, environmental impacts, and in some cases, loss of life. Most air accidents that have been recorded in the Commonwealth have been non-fatal, causing minor injuries and property damages (PEMA 2023). Additionally, many highway/roadway accidents within the Commonwealth have also been non-fatal.

Figure 4.3.16-3 illustrates the total number of crashes in 2023 in the Commonwealth, based on PennDOT data. Over 1,100 crashes resulted in fatalities, which was the fourth lowest number of fatalities due to crashes in Pennsylvania to date (PennDOT 2024). In 2023 alone, there were 2,761 total crashes in Dauphin County, with 29 of these resulting in fatalities (PennDOT 2024).

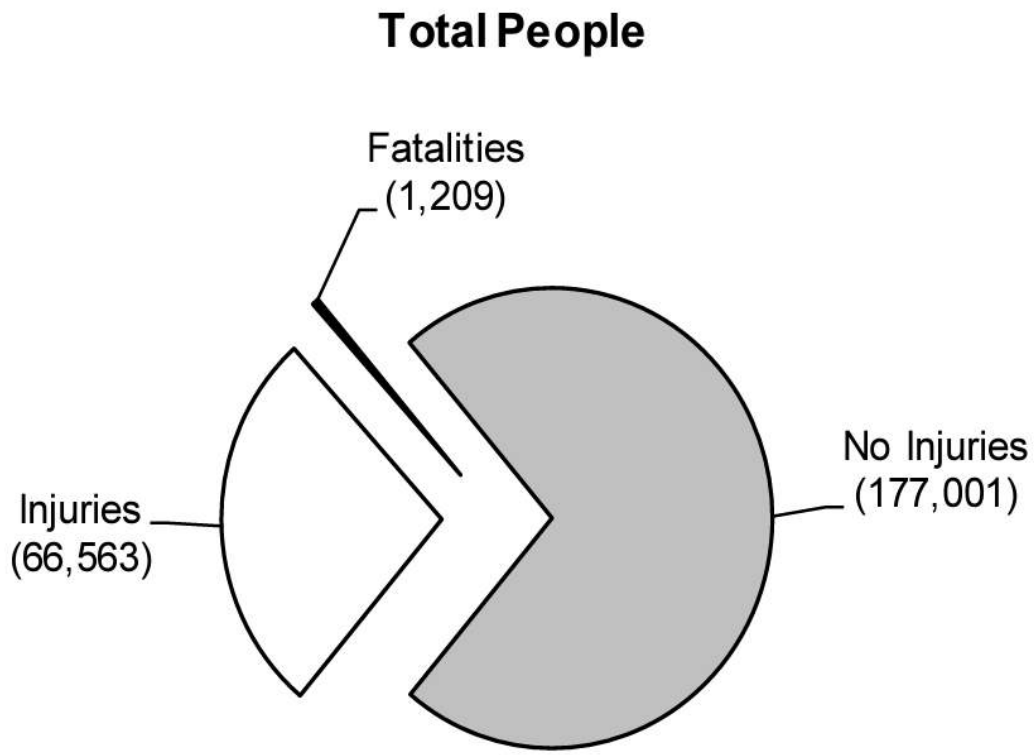
Figure 4.3.16-3. Total Crashes in Pennsylvania, PennDOT 2023



Source: (PennDOT 2024)

Figure 4.3.16-4 illustrates the total number of people involved in crashes in 2023, based on data from PennDOT, and compared to the year before, 2023 saw an increase of 2.3% (PennDOT 2024).

Figure 4.3.16-4. Total People Involved in Crashes in Pennsylvania, PennDOT 2023



Source: (PennDOT 2024)

A worst-case transportation accident scenario within the County would be the overturn of a semi-trailer carrying an extremely hazardous substance resulting in a massive release of its cargo on a major roadway. This incident would result in two hazards to occur, blocking traffic on Dauphin County's major transportation routes, and threatening the health and safety of individuals on the roadways and in surrounding neighborhoods. In addition, a release could necessitate the closure of the County's critical facilities near the accident. See Section 4.3.5 to learn more about hazardous material release hazards. The most likely transportation accident in the County would involve a single vehicle hitting an object and sustaining minimal damage.

PennDOT restricts highway travel during certain events, such as winter storms, for commercial motor vehicles (CMV). PennDOT, the Pennsylvania State Police, and the Pennsylvania Emergency Management Agency assess each winter weather forecast to determine if CMV restrictions are warranted (PennDOT n.d.). Then, they review the restrictions hourly once they have been initiated to determine if the conditions warrant the restriction or can be lifted. In certain instances, passenger cars are also restricted (PennDOT n.d.).

Rail accidents can vary widely in terms of injuries, fatalities, property damage, and interruption of service, depending on the nature and severity of the accident.

Aircraft accidents can vary from a single-engine aircraft having a "hard landing" causing damage to the aircraft, to a crash of a small turboprop or jet aircraft, to a crash of a large jet (such as a Boeing 737). Other aircraft accidents could include helicopter or experimental aircraft crashes. Aviation accidents can also involve radio-controlled or drone aircraft devices, many of which are experimental and not subject to defined regulatory oversight, potentially complicating issues that could arise if one of these devices crashes.

Past Occurrence

Major roadway accidents (such as multi-vehicle accidents, those that close roads or bridges, or those involving school buses) are reported by Dauphin County to PennDOT. Table 4.3.16-3 summarizes these accidents from 2019 to 2023. While this table lists accidents reported to the counties and Commonwealth, significantly more minor accidents are not reported.

Table 4.3.16-3. Summary of Transportation Accidents in Dauphin County, 2019 to 2023

Year	PennDOT Crashes	Railroad Incidents	Aircraft Accidents
2019	3,191	2	3
2020	2,537	2	0
2021	2,966	2	0
2022	2,811	1	0
2023	2,771	3	1
Total	**14,276**	**14**	**5**

Source: (PennDOT 2024); Federal Railroad Administration 2024; Aviation Data Base 2024, Tri-County Regional Planning Commission 2024
Note: TCRPC – Tri-County Regional Planning Commission

Information for this plan regarding fatalities associated with automobile crashes (Table 4) and fatalities of pedestrians involved in transportation incidents Table 4.3.16-4 was drawn from the Pennsylvania Department of Transportation Crash Facts and Statistics 2022 data (PennDOT 2022).

Table 4.3.16-4. Comparison of Fatalities in Dauphin County to the State of Pennsylvania

	Automobile Crash Fatalities		Pedestrian Fatalities	
Year	*Pennsylvania*	*Dauphin County*	*Pennsylvania*	*Dauphin County*
2019	1,059	16	154	4
2020	1,129	18	146	2
2021	1,230	37	182	7
2022	1,179	27	184	4
2023	1,209	29	186	5
Total	**5,806**	**127**	**852**	**22**

Source: (PennDOT 2024)

Future Occurrence

Considering the current transportation network within the County and the steady increase in traffic volume, it is safe to assume that the number of vehicle accidents will continue to increase. Incidents involving air or rail should remain low. The County's population has increased over the last decade, meaning it is likely that traffic volumes have also risen. New residents have limited knowledge of detour routes and alternate routes around accidents which contributes to the accident-related congestion experienced recently in the County. The trucking industry is expected to continue, maintaining and possibly increasing the number of tractor-trailers on the County's road system. Transportation accidents may increase slightly over the next five years without proper mitigation strategies in place.

For the 2025 HMP update, the most up-to-date data was collected to calculate the probability of future occurrence of transportation accident events for Dauphin County. Information from PennDOT, NTSB, and FRA was used to identify the number of transportation accident events that occurred between 2004 and 2023. Using these sources ensures the most accurate probability estimates possible. The table below shows these statistics, as well

as the annual average number of events and the estimated percent chance of an incident occurring in a given year. Based on these statistics, there is an estimated 100-percent chance of a transportation accident (any type) event occurring in any given year in Dauphin County.

Table 4.3.16-5. Probability of Future Transportation Accident Events

Hazard Type	Number of Occurrences Between 2004 and 2023	Percent Chance of Occurrence in any Given Year
Vehicular	57,560	100%
Railway	61	100%
Aviation	19	95%
TOTAL	**57,640**	**100%**

Sources: NTSB 2021; (PennDOT 2024)

Table 4.3.16-6 Transportation Incidents Resulting in Closure of Critical Routes

Date	Jurisdiction	Description
January 1, 2022	Harrisburg (C)	230/22 closure for a crash involving a tractor-trailer
February 11, 2022	Harrisburg (C)	83 closure due to a motor vehicle accident
March 16, 2022	Reed (T)	147 closure due to motor vehicle accident
March 27, 2022	West Hanover (T)	22 East closure due to motor vehicle accident
March 29, 2022	Middle Paxton (T)	325 closure due to trees across the roadway
March 31, 2022	West Hanover (T)	81 South closure due to motor vehicle accident
May 6, 2022	Conewago (T)	225 closure due to wires across the roadway
May 14, 2022	Susquehanna (T)	22/322 closure due to motor vehicle accident
May 22, 2022	Susquehanna (T)	22 closure due to structure fire
July 23, 2022	West Hanover (T)	81 closure due to motor vehicle accident
August 12, 2022	East Hanover (T)	22 closure due to motor vehicle accident
August 19, 2022	Conewago (T)	283 closure due to motor vehicle accident
September 2, 2022	West Hanover (T)	22 closure due to motor vehicle accident
September 10, 2022	West Hanover (T)	22 closure due to motor vehicle accident
October 2, 2022	Swatara (T)	322 closure due to motor vehicle accident
October 6, 2022	Swatara (T)	743 closure due to motor vehicle accident
October 10, 2022	Middle Paxton (T)	322 closure due to vehicle fire
October 12, 2022	Swatara (T)	441 closure due to tree and wires in the roadway
October 12, 2022	Lower Paxton (T)	22 closure due to a pedestrian being struck
October 13, 2022	Reed (T)	147 closure due to motor vehicle accident
October 13, 2022	Swatara (T)	283 closure due to motor vehicle accident
October 17, 2022	Harrisburg (C)	22 closure due to motor vehicle accident
October 21, 2022	Reed (T)	15 closure due to motor vehicle accident
January 24, 2023	Harrisburg (C)	230/22 closure due to crash involving tractor-trailer

Date	Jurisdiction	Description
	Halifax (T) Londonderry (T)	Road closure due to fatal crash on PA-147 Tractor-trailer fire on PA Turnpike
February 11, 2023	Harrisburg (C)	83 closure due to motor vehicle accident
March 2023	Reed (T) West Hanover (T) Middle Paxton (T) West Hanover (T)	Motor vehicle accident on 147 22 East due to motor vehicle accident 325 closure due to wires down across the roadway 81 South closure due to motor vehicle accident
April 2023	East Hanover (T)	Interstate 81 closure
May 2023	Halifax (T)/Middle Paxton (T) Conewago (T) Susquehanna (T) Susquehanna (T) West Hanover (T) Harrisburg (C)	225 closure due to trees down across the roadway 743 closure due to tree and wires down across the roadway 22/322 closure due to motor vehicle accident 22 closure due to structure fire Interstate 81 closure due to motor vehicle accident A tractor-trailer hauling avocados struck the I-81 bridge
June 2023	Conewago (T) East Hanover (T) West Hanover (T) Middle Paxton (T)	Tractor-trailer diesel fuel spill closed PA Turnpike Route 22 closure due to fatal accident I-81 closure due to tractor-trailer crash 22/322 closure due to a large wire across the road
July 2023	West Hanover (T)	81 closure due to motor vehicle accident
August 2023	Lower Paxton (T)	81 closure due to an overturned bus
September 2023	East Hanover (T)	81 closure due to tractor-trailer crash

Based on the Risk Factor Methodology Probability Criteria, the probability of a transportation accident is considered to be *highly likely* (see Table). However, the low number of rail and air traffic accidents in the County indicates that the bulk of future transportation accidents will be roadway accidents.

Vulnerability Assessment

The entire county has been identified as a hazard area for transportation accidents. This section evaluates and estimates the potential impact of transportation hazards on Dauphin County in the following sections:

- Impacts on (1) life, health, and safety; (2) general building stock; (3) critical facilities; (4) the economy; (5) the environment; and (6) future growth and development.
- Effect of climate change on vulnerability.
- Additional data and next steps.

A qualitative assessment of potential impacts on life, health, and safety; buildings and critical facilities; and the economy are summarized below.

Impact on Life, Health, and Safety

Transportation hazards could lead to potential losses in the categories of human health and life, property, and natural resources. Vehicular accidents, flooded roadways, and other roadway impairments may result in injury or death to

drivers and passengers on the road, the public in the immediate vicinity, and emergency services personnel. The number of people exposed to a hazard depends on population density, whether exposure occurs during the day or night, and the percentage of the population in the accident area located indoors and outdoors.

The county and its municipalities are prepared to manage and respond to transportation hazards. However, the risk to first responders increases when they respond to transportation accidents near trafficked areas. First responders may also have to take on the additional duty of controlling traffic and monitoring their surroundings for oncoming vehicles.

Impact on General Building Stock, Critical Facilities, and Economy

Because of insufficient data, a full loss estimate was not completed for the transportation hazard. Loss of roadway use and public transportation services would affect thousands of commuters, employment, day-to-day operations within the county, and delivery of critical municipal and emergency services. Disruption of one or more of these modes of transportation can lead to congestion of another and affect both the county and the region as a whole.

Impact on the Environment

Like the range of magnitude, the environmental impacts of transportation accidents can vary greatly. In the case of a simple motor vehicle crash, train derailment, or aviation accident, the environmental impact is minimal. However, if the accident 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 (refer to Section 4.3.6 – Environmental Hazard – Hazardous Materials Releases).

Future Changes that May Impact Vulnerability

Understanding future changes that impact vulnerability in the County can assist in planning for future development and ensuring that appropriate mitigation, planning, and preparedness measures are in place. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development.
- Projected changes in population.
- Other identified conditions as relevant and appropriate, including the impacts of climate change.

Future Growth and Development

As discussed in Section 2.4 of this HMP, areas targeted for future growth and development have been identified across Dauphin County. Increased development in the county and region will lead to increased road traffic, which could lead to increased transportation accidents.

Projected Changes in Population

Estimated population projections provided by the US Census Bureau indicate that Dauphin's population will continue to grow into 2040, increasing the total population to approximately 313,620 persons (US Census Bureau). A higher density of residents could mean that more community members are impacted by transportation accidents.

Effect of Climate Change on Vulnerability

The 2018 Fourth National Climate Assessment notes that the national transportation system is vulnerable to climate change impacts through infrastructure damages and electricity and communication outages (U.S. Global Change Research Program 2018). Damaged infrastructure and ineffective safety systems may lead to an

increased risk of transportation crashes. Continued use of transportation that uses fossil fuels also adds to the impact of climate change through the release of greenhouse gas emissions. According to the U.S. Environmental Protection Agency, 28 percent of total U.S. greenhouse gas emissions in 2021 came from the transportation sector (US EPA 2023).

Additional Data and Next Steps

Based on limited data regarding the probability and potential impact of this hazard, a quantitative loss estimate was not completed for this HMP. Over time, the county can collaborate with appropriate agencies, including the Tri-County Regional Planning Commission (TCRPC), to collect additional data and conduct long-range strategic planning. This will support mitigation planning, consideration of potential risks, and prioritization of mitigation measures for this hazard.

Dauphin County recognizes it must compile and maintain data regarding specific concerns and past losses from this hazard. These data should include specific information regarding damage or loss of life, property, or infrastructure; and any reports pertaining to potential or actual cost and logistics of responding to an event caused by this hazard (locations of road closures, map detours, traffic counts, durations of closures and detours; and costs to respond). These data will be included in future revisions of the HMP and can be used to support future mitigation grant efforts (benefit-cost analysis).

Studying traffic and potential transportation incident patterns could provide information on the vulnerability of specific road segments and nearby populations. Predicting costs needed to respond to an incident or repair damaged infrastructure would be useful for developing mitigation options.

4.3.17 Utility Interruption

Utility interruption includes power failure, potable water service outage, telecommunications infrastructure failure, natural gas infrastructure failure, or sewer infrastructure failure. These interruptions or outages occur because of geomagnetic storms, fuel or resource shortages, electromagnetic pulses, information technology failures, transmission facility or linear utility accidents, and major energy, power, or utility failure (PEMA 2023).

For the purpose of this plan, utility interruption focuses on power failure, because it is the major cause of utility failure and has had widespread impacts on Dauphin County. A power failure is defined as any interruption or loss of electrical service from disruption of power transmission caused by accident, sabotage, natural hazards, or equipment failure. A significant power failure is defined as any incident of a long duration that would require the involvement of local or state emergency management organizations to coordinate the provision of food, water, heating, cooling, and shelter. Interruptions in other basic utilities (such as data/telecommunications, water, natural gas, or sewer) can have a detrimental impact on Dauphin County. Utilities that employ aboveground wiring (power and data/telecommunications) are vulnerable to the effects of other hazards such as high wind, heavy snow, ice, rain, and vehicular accidents.

This section describes the location and extent, range of magnitude, past occurrence, future occurrence, and vulnerability assessment for the utility interruption hazard for the Dauphin County Hazard Mitigation Plan (HMP).

4.3.17.1 Location and Extent

Utility interruptions occur throughout Dauphin County and are often a secondary impact of another hazard. Severe thunderstorms, windstorms, tornadoes, and winter storms can also lead to more regional utility interruptions, while localized outages can be caused by traffic accidents or wind damage. Heat waves may also result in rolling blackouts where power may not be available for an extended period of time. Utility interruptions have the potential to take place throughout Dauphin County (PEMA 2023).

4.3.17.2 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. Regional loss of power affects lighting; heating, ventilation, and air conditioning (HVAC) and other support equipment; communications; fire and security systems; and refrigeration, which can in turn cause loss of water and sewer service, and food spoilage. At a minimum, utility interruptions can cause short-term disruption in the orderly functioning of business, government, and private citizen functioning and activities like traffic signals, elevators, and retail sales (PEMA 2023).

However, loss of heating and cooling capability is more dangerous in the winter and summer months, when heat-sensitive populations like the elderly count on utilities and fuel to maintain a safe temperature. A worst-case scenario for utility interruption in Dauphin County would be a fuel shortage or power outage in the winter months, especially during a severe winter weather event, which may leave many homes without a source of heat (PEMA 2023).

4.3.17.3 Past Occurrence

Every year, Dauphin County is susceptible to minor utility interruptions either through technological failure or as the result of inclement weather. Table 4.3.17-1able 4.3.17-1 below lists the more notable utility interruptions in the county since 1996. In all, the county experienced over 56 incidents including downed utility lines from 1996 to July 2024.

Table 4.3.17-1. Utility Interruptions from 1996–2024*

Date(s) of Event	Event Type	Fatalities	Injuries	Property Damage	FEMA Disaster Declaration Number (if applicable)	Description
June 17, 1996	Thunderstorm Wind	0	0	$0	N/A	Strong winds knocked trees down and blew limbs onto power lines in the Harrisburg area and Swatara Township.
June 24, 1996	Thunderstorm Wind	0	0	$0	N/A	Strong winds knocked a tree onto power lines in the Penbrook area.
September 28, 1996	Thunderstorm Wind	0	0	$0	N/A	Thunderstorms moved rapidly east across the area, taking down trees and power lines. A water spout was spotted on the Susquehanna River near Duncannon. Winds are estimated at 50 mph.
February 22, 1997	High Wind	0	0	$0	N/A	High winds gusting to 61 mph at State College and 58 mph at Middletown blew down trees and caused many power outages.
June 30, 1998	Thunderstorm Wind	0	0	$0	N/A	Trees blocked roads and winds downed powerlines in Hershey.
September 27, 2002	Thunderstorm Wind	0	0	$0	N/A	Trees were reported down on power lines in Hershey.
July 18, 2003	Thunderstorm Wind	0	0	$0	N/A	Numerous trees and power lines were reported down in Halifax. Winds estimated at 58 mph.
September 18, 2003	Tropical Storm	0	0	$0	N/A	Hurricane Isabel came ashore around midday on September 18th between Cape Hatteras and Cape Lookout, North Carolina. The storm continued on a northwesterly track up through Virginia where it was downgraded to a Tropical Storm, and by early Friday morning, September 19th, it was near Latrobe, PA, and heading northwest at about 30 miles per hour. The storm exited Pennsylvania by early afternoon, the 19th, with improving conditions beginning state-wide. Sustained winds of 30 mph on average accompanied Isabel as it tracked northward, but damaging gusts of between 50 and 60 mph occurred over a wide area. After a summer of above-normal rainfall, creating soft soils and with trees still in full bloom, the gusty winds resulted in hundreds of reports of trees or tree limbs being knocked down. These took down utility poles and power lines in many parts of the CWA, causing numerous power outages as well as property damage. Significant tree and power line damage was reported in 29 of State College's CWA counties, with the most significant damage over the lower Susquehanna region. Statewide, 1.4 million people lost power. The peak wind gust recorded was 73 mph in Lancaster County. One death (Lancaster County) was attributed to the storm when a car struck a downed tree.
November 13, 2003	High Wind	0	0	$0	N/A	A strong cold front swept across central Pennsylvania during the early morning hours of November 13th, 2003. Strong winds behind the cold front intensified as low pressure deepened north of the region. Reports of trees and wires down were common across all of central Pennsylvania. Earliest damage reports began around 5 AM EST on the morning of the 13th, with the final high wind damage reports

Date(s) of Event	Event Type	Fatalities	Injuries	Property Damage	FEMA Disaster Declaration Number (if applicable)	Description
						coming in around 17:00 EST. High wind speeds were mainly estimated based on reported damage. In addition to trees and wires being downed in the warned counties, additional damage reports included: A 71 mph wind gust was reported in Lancaster, Lancaster County at 5:28 AM EST, a barn blown over in Cambria County 5 miles east of Prince Gallitzin State Park at 13:15 EST, a roof blown off a home in Johnstown Pennsylvania at 12:00 EST, and three separate reports of roofs off homes in Franklin County. In addition, the roof of a state office building was damaged in Clearfield County, a vehicle repair facility in Snyder County was damaged, and a vacant building collapsed in Bedford County. Across all of Pennsylvania, more than 80,000 persons were without power from the high winds. One fatality occurred in Centre County, where a tree fell on a truck and killed the driver. Two other fatalities occurred in Perry County when a car struck a tree that had fallen across Route 233 in Southwest Madison Township.
June 8, 2007	Thunderstorm Wind	0	0	$0	N/A	Law Enforcement reported trees down in Londonderry Township.
June 8, 2007	Thunderstorm Wind	0	0	$0	N/A	Dauphin County Emergency Manager reported multiple trees down along Route 147.
August 25, 2007	Thunderstorm Wind	0	0	$0	N/A	Dauphin County officials reported large limbs down on power lines at the intersection of Route 25 and North Crossroads.
December 15, 2007	Winter Storm	0	0	$0	N/A	A moderate to heavy coating of ice was common across the entire Lower Susquehanna Valley, with over 64,000 power outages. Reports from emergency management officials, spotters, and local webcams suggested a quarter to one-half inch of ice build-up, which brought down numerous trees and wires across the southern half of Dauphin County. A brief period of sleet was observed at the onset of precipitation, but the primary cause of the icing was freezing rain Over 25,000 customers were without power in Dauphin County - many of them in the Harrisburg and Hershey areas.
December 23, 2007	High Wind	0	0	$0	N/A	Dauphin County emergency management reported trees and wires down in the Middletown area. The high winds were non-convective in nature.
March 8, 2008	High Wind	0	0	$0	N/A	The Middletown and Capital City ASOS recorded peak winds of 50 to 60 mph. The high winds downed numerous trees and utility lines, leaving several customers without power.
December 31, 2008	High Wind	0	0	$10,000	N/A	Non-thunderstorm winds knocked down several trees, large branches, and power lines across Dauphin County. A few trees fell on vehicles, but no injuries were reported. Over one thousand PPL customers were without power.

Date(s) of Event	Event Type	Fatalities	Injuries	Property Damage	FEMA Disaster Declaration Number (if applicable)	Description
January 6, 2009	Ice Storm	0	0	$0	N/A	Ice accumulation of one-quarter to one-half inch was reported across Dauphin County.
January 27, 2009	Winter Storm	0	0	$0	N/A	One to three inches of snow and sleet along with a significant ice accretion was reported across Dauphin County.
February 12, 2009	High Wind	0	0	$25,000	N/A	Non-thunderstorm wind gusts between 55 and 65 mph toppled numerous trees and power lines across Dauphin County. The high winds caused isolated power outages. The Capital City and Middletown Airports recorded peak gusts of 52 and 56 mph respectively.
July 25, 2010	Thunderstorm Wind	0	0	$5,000	N/A	Thunderstorm winds estimated near 60 mph knocked down several 5-inch diameter tree limbs and blew them through a house window. The severe winds also knocked down trees and wires, causing power outages.
August 4, 2010	Thunderstorm Wind	0	0	$5,000	N/A	Thunderstorm winds estimated near 60 mph knocked down trees and utility wires on Chocolate and Park Avenues.
May 26, 2011	Thunderstorm Wind	0	0	$5,000	N/A	Thunderstorm winds estimated near 60 mph knocked down utility wires and produced minor structural damage northeast of Dauphin in Middle Paxton Township.
July 21, 2011	Excessive Heat	0	0	$0	N/A	Heat index values exceeded 110 degrees. The most intense heat and humidity were felt across the Middle and Lower Susquehanna Valley, where poor air quality further contributed to extremely oppressive conditions. The heat wave lasted several days but peaked on July 21-22. Numerous cooling and senior centers were opened to provide relief from the dangerous heat. The heat also put significant stress on power stations and HVAC systems with localized rolling blackouts and loss of AC reported in some locations.
August 28, 2011	Strong Wind	1	1	$25,000	N/A	Strong to damaging non-thunderstorm winds associated with Hurricane Irene knocked down several trees and utility wires, causing widespread road closures and thousands of power outages. One tree fell and killed a 56-year-old man who was camping in a tent near Manda Gap. A woman who was also in the tent survived but sustained serious injuries. Peak wind gusts at Capital City (CXY) and Harrisburg International (MDT) were 44 and 51 mph respectively.
September 7, 2011	Flood	4	0	$150,000,000	N/A	Swatara Creek near Hershey crested at major flood stage, 26.8 feet. The flood stage is 7.0 feet. Swatara Creek at Middletown crested at a major flood stage, estimated at 26.30 feet. The flood stage is 11.0 feet. This is the 5th highest all time. The Susquehanna River at Harrisburg crested in a major flood stage at 25.17 feet. The flood stage is 17 feet. This is the 5th highest crest on record. While the Susquehanna River flooded a large area of Harrisburg, some areas were fortunate enough to escape the flood waters. Midtown and Uptown residents were largely unscathed, though widespread power outages were reported. The river levels crested several feet below that of Agnes, thanks in part to less contribution from the West Branch of the Susquehanna. Between 8,000 and 10,000 residents were evacuated. Major

Date(s) of Event	Event Type	Fatalities	Injuries	Property Damage	FEMA Disaster Declaration Number (if applicable)	Description
						damage was widespread in Hershey. Hershey Park and Zoo America both reported major damage with 8 feet of water in low-lying areas of Hershey Park. Many structures were flooded and many roads suffered damage. A ramp off Route 322 near the Penn State Hershey Medical Center had a 3-foot deep trench cut across the road. Swatara Creek cut a wide and devastating flood path. Evacuations were noted in Palmyra, Derry Township, and Middletown. A 70-year-old man died when a basement wall collapsed on him in Derry Township. He was pumping water from his flooded basement. A second man died in flood waters. While details surrounding his death are unknown, his mud-covered car and body were found in Swatara Township several days after the flooding. A third man, 81 years old, drowned after his car was washed into Clarks Creek in Middle Paxton Township. Finally, a fourth victim, a 54-year-old female, was swept away by flood waters. Her body was recovered weeks later in Swatara Creek. Water rescues were widespread in Dauphin County. One county rescuer was quoted, "We were rescuing people on the way to rescuing people," Leonard said. "There was no time for introductions or salutations. We were dispatched every 90 seconds for hours." Severe flooding occurred on Spring Creek. House flooding, closed roads, and water rescues using boats were conducted in Paxtang Borough and Swatara Township. Three-quarters of all roads were flooded in Derry Township. Middletown on the mouth of Swatara Creek, where it enters the Susquehanna River also reported major flooding. Five of the eighteen homes on Few Avenue were condemned for flood damage. The basements of these homes were visible from the street through giant holes in the foundation. Residents also reported a foul smell after the floods, with one resident saying, "Imagine the contents of a septic tank mixed with diesel and fuel oil." A preliminary total of 295 buildings were destroyed, 1040 suffered major damage, and 1273 suffered minor damage with a total of 3348 structures impacted. Overall damage was estimated at $150 million. In addition, 368 acres of crops were destroyed with an estimated value of $700,000.
September 28, 2011	Thunderstorm Wind	0	0	$5,000	N/A	Thunderstorm winds estimated near 60 mph knocked down several trees and utility wires near Dauphin. One tree fell on a house causing minor damage.
October 29, 2011	Heavy Snow	0	0	$0	N/A	Snow accumulations ranged from 4 to 8 inches.
June 29, 2012	Thunderstorm Wind	0	0	$20,000	N/A	Thunderstorm winds estimated near 95 mph knocked down hundreds of trees and numerous utility wires across Derry and South/East Hanover Townships near Hershey. The trees blocked several roads including sections of Routes 422/322/739/39. The most severely affected areas in Derry Township were the Pat's Hill, Village, and Palmdale sections. Two businesses and 8 homes were also damaged, mainly from falling trees. PPL reported about 7,000 people without power. Hershey Gardens was closed due to storm damage. The NWS conducted an

Date(s) of Event	Event Type	Fatalities	Injuries	Property Damage	FEMA Disaster Declaration Number (if applicable)	Description
						official storm survey with the Derry Township Police and confirmed a microburst. The microburst, straight-line wind event with estimated highest wind gusts to 95 mph (EF1 wind strength) was determined to have occurred over a broad area more than 3 miles wide just north of Hershey Park in Derry Township. The tree damage had mostly a north-to-south or NW-to-SE orientation. A notable destruction location included the area from Union Deposit in South Hanover township southeastward to the Swatara Creek where a house roof was lifted off and over 50 trees were damaged or destroyed. Another impressive damage location was found just west of the Hotel Hershey complex where a grove of tall pines were snapped or uprooted. There were scattered trees down throughout the area including those which fell onto structures in town. Throughout the area from 200 to 300 trees were estimated to have been damaged or downed including about 60 trees on the golf course according to the golf course manager. Within Hershey Park, the football stadium was set up for a Dave Matthews band concert for the evening. The protective field pads were all ripped up in the early morning wind gusts a strewn throughout the stadium.
July 23, 2012	Thunderstorm Wind	0	0	$5,000	N/A	Thunderstorm winds estimated near 60 mph knocked down trees and utility wires in East Hanover Township near Skyline View.
July 23, 2012	Thunderstorm Wind	0	0	$5,000	N/A	Thunderstorm winds estimated near 60 mph knocked down trees and utility wires in northern Derry Township near Hershey.
October 29, 2012	High Wind	0	0	$0	N/A	High winds knocked down several trees and utility wires, resulting in approximately 10,000 power outages. Several roads were also closed. Multiple homes sustained significant structural damage due to the high winds and falling trees.
April 19, 2013	Thunderstorm Wind	0	0	$20,000	N/A	A National Weather Service storm survey team concluded that straight-line winds affected a small area near Elizabethville along Route 209. Several homes sustained roof damage, and a small farm outbuilding collapsed from the wind. A fiberglass horse was removed from a business and deposited on Route 209. Several utility poles and trees were also knocked down in the area.
June 25, 2013	Thunderstorm Wind	0	0	$5,000	N/A	Thunderstorm winds estimated near 60 mph knocked down trees and utility wires in Mifflin Township near Berrysburg.
June 25, 2013	Thunderstorm Wind	0	0	$5,000	N/A	Thunderstorm winds estimated near 60 mph knocked down trees and utility wires in Upper Paxton Township near Millersburg.
July 19, 2013	Thunderstorm Wind	0	0	$5,000	N/A	Thunderstorm winds estimated near 60 mph knocked down several trees and utility wires on the south and east sides of the city.
September 12, 2013	Thunderstorm Wind	0	0	$2,000	N/A	Thunderstorm winds estimated near 60 mph knocked down trees and utility wires in Gratz.
February 4, 2014	Winter Storm	0	0	$0	N/A	Snow accumulations ranged from 1 to 2 inches. Ice accumulations from sleet and heavy freezing rain averaged between 0.25 and 0.50 inches.

Date(s) of Event	Event Type	Fatalities	Injuries	Property Damage	FEMA Disaster Declaration Number (if applicable)	Description
May 27, 2014	Thunderstorm Wind	0	0	$5,000	N/A	Thunderstorm winds estimated near 60 mph knocked down multiple trees and utility wires across Halifax Township.
July 8, 2014	Thunderstorm Wind	0	0	$1,000	N/A	Thunderstorm winds estimated near 60 mph knocked down trees and wires near Rockville.
July 8, 2014	Thunderstorm Wind	0	0	$1,000	N/A	Thunderstorm winds estimated near 60 mph knocked down trees and wires in Londonderry Township.
August 2, 2017	Thunderstorm Wind	0	0	$4,000	N/A	Severe thunderstorms producing winds estimated near 60 mph knocked down trees and power lines.
March 2, 2018	High Wind	0	0	$0	N/A	A non-thunderstorm wind gust was measured at 59 mph at Harrisburg International Airport. Trees and wires were reported down across Dauphin County.
February 24, 2019	High Wind	0	0	$0	N/A	Non-thunderstorm wind gusts near 60 mph were observed across Dauphin County from February 24-25, 2019. Trees and wires were reported down across the northern part of the county.
October 31, 2019	Thunderstorm Wind	0	0	$0	N/A	Severe thunderstorm winds knocked down multiple trees and caused power outages between Herndon and Berrysburg.
June 3, 2020	Thunderstorm Wind	0	0	$4,000	N/A	A severe thunderstorm producing winds estimated near 60 mph knocked down trees onto wires southeast of Pillow.
June 4, 2020	Thunderstorm Wind	0	0	$4,000	N/A	A severe thunderstorm producing winds estimated near 60 mph knocked down trees onto wires east of Halifax.
June 4, 2020	Thunderstorm Wind	0	0	$4,000	N/A	A severe thunderstorm producing winds estimated near 60 mph knocked down trees onto wires.
June 4, 2020	Thunderstorm Wind	0	0	$4,000	N/A	A severe thunderstorm producing winds estimated near 60 mph knocked down trees on wires east of Harrisburg.
June 4, 2020	Thunderstorm Wind	0	0	$4,000	N/A	A severe thunderstorm producing winds estimated near 60 mph knocked down trees and wires near Manada Gap.
April 30, 2021	High Wind	0	0	$0	N/A	High winds were estimated to have gusted to near 60 mph in Dauphin County on April 30, 2021. This wind event produced numerous downed trees and power lines in Dauphin County, particularly in the central and southern parts of the county. A 62 mph gust was measured by the ASOS at Harrisburg International Airport.
August 18, 2021	Thunderstorm Wind	0	0	$4,000	N/A	A severe thunderstorm producing winds estimated near 60 mph knocked down trees onto wires near Halifax.
January 7, 2022	Water main break	N/A	N/A	N/A	N/A	Water main break in Derry Township
January 25, 2022	Boil Water Advisory				N/A	Londonderry (T) experienced a boil water advisory
January 27, 2022	Water main break				N/A	Water main break reported in Susquehanna (T)

Date(s) of Event	Event Type	Fatalities	Injuries	Property Damage	FEMA Disaster Declaration Number (if applicable)	Description
February 6, 2022	Power outage				N/A	Power outage reported in Harrisburg (C)
February 17, 2022	Power outage				N/A	Power outage reported in Hummelstown (B)
March 23	Water main break				N/A	Lower Paxton (T) reported a power outage
March 31, 2022	Thunderstorm Wind	0	0	$3,000	N/A	A severe thunderstorm producing winds estimated near 60 mph knocked down trees onto wires near Progress.
April 10, 2022	Power outage				N/A	Power outage reported in Harrisburg (C)
April 24, 2022	Water Main Break				N/A	A water main break was reported in Lower Paxton (T)
May 3, 2022	Power outage				N/A	Power outage reported in Derry (T)
May 6, 2022	Steam leak				N/A	Steam leak was reported in Harrisburg (C)
May 7, 2022	Power outage				N/A	Power outage reported in Susquehanna (T)
May 18, 2022	Boil water advisory				N/A	A boil water advisory was issued for Londonderry (T)
June 1, 2022	Boil water advisory				N/A	A boil water advisory was issued for Harrisburg (C)
June 10, 2022	Water main break				N/A	A water main break occurred in Lower Paxton (T)
July 2, 2022	Power outage				N/A	Power outage reported in Lower Paxton (T)
July 8, 2022	Boild Water advisory				N/A	A boil water advisory was issued for Middle Paxton (T)
July 11, 2022	Boil Water Advisory				N/A	A boil water advisory was issued for Upper Paxton (T)
July 12, 2022	Do not consume an order				N/A	A “Do Not Consume” order was given for Elizabethville (B) for water
July 15, 2022	Water main break				N/A	A water main break was reported in Lower Paxton (T)
July 30, 2022	Water main break				N/A	A water main break was reported in Swatara (T)

Date(s) of Event	Event Type	Fatalities	Injuries	Property Damage	FEMA Disaster Declaration Number (if applicable)	Description
August 4, 2022	Power outage				N/A	A power outage was reported in Derry (T)
August 28, 2022	Power outage				N/A	A power outage was reported in Lykens (B)
September 1, 2022	Boil water advisory				N/A	A boil water advisory was issued for Halifax (T)
September 8, 2022	Boil water advisory				N/A	A boil water advisory was issued for Londonderry (T)
September 10, 2022	Water main break				N/A	A water main break was reported in Swatara (T)
September 29, 2022	Phone outage				N/A	Phones were out in Lower Swatara (T)
October 5, 2022	Power outage				N/A	A power outage was reported in Susquehanna (T)
December 2022	Boil Water Advisory, Power outage, steam leak, and water outage				N/A	In the month of December, there were a total of five Boil Water Advisories in Londonderry (T), Upper Paxton (T), Halifax (T), and Wiconisco (T). Also, this month was a steam leak at HMC, a water outage at Middletown Home, as well as a loss of power at the EMS station.
January 2023	Boil Water Advisory				N/A	A Boil Water Advisory was issued for Lower Paxton (T)
February 2023	Boil Water Advisory				N/A	A Boil Water Advisory was issued for East Hannover (T)
March 2023	Boil Water Advisory, Phone outage				N/A	During March, there were three Boil Water Advisories issued – one in East Hannover (T), and Londonderry (T). Also, this month was a phone outage reported in upper portions of Dauphin County.
April 22, 2023	Thunderstorm Wind	0	0	$6,000	N/A	A severe thunderstorm producing winds estimated near 60 mph knocked down five utility poles along West Harrisburg Pike between Meade Avenue and Rosedale Avenue just north of Harrisburg International Airport.
June 2023	Water main break				N/A	In addition to power outages, this month also saw a water main break in Harrisburg (C) as well as a Boil Water Advisory in East Hannover (T)
June 3, 2023	Thunderstorm Wind	0	0	$3,000	N/A	A severe thunderstorm producing winds estimated near 60 mph knocked down power lines near Carsonville.
July 2, 2023	Tornado	0	0	$0	N/A	A brief EF-0 tornado occurred near Route 147 in Upper Paxton Township, Dauphin County. Trees were downed by the tornado, blocking the roadway at 3462 PA 147. The tornado damage was intermittent as it traveled east for about 1 mile, downing more trees as it crossed over Shippen Dam Rd. The survey also found a larger area

Date(s) of Event	Event Type	Fatalities	Injuries	Property Damage	FEMA Disaster Declaration Number (if applicable)	Description
						of more sporadic, non-tornadic wind damage to the north of the tornado track, which extended nearly 20 miles from Seven Stars in Juniata County to Gratz in Dauphin County. This damage mostly consisted of downed trees and tree limbs, as well as downed powerlines on Specktown Road in Lykens Twp, Dauphin County. It was determined that this larger area of sporadic damage was associated with the forward flank downdraft of the same storm, which is an area of straight-line winds within a supercell. The tornado was rated an EF-0, with a path length of just under 1 mile and a max path width of approximately 50 yards.
August 2023	Phone outage				N/A	Phones were out to 674 people in Paxtang (B)
February 13, 2024	Heavy Snow	0	0	$20,000	N/A	A winter storm moving into Dauphin County on the late evening hours of February 12 and into the morning hours of February 13, 2024, brought a brief period of initial rain before producing 5 to 7 inches of snowfall, with higher elevations receiving up to 9 inches of snow. The heavy snowfall, coupled with gusty winds, throughout the day on February 13 produced numerous power outages throughout the county due to downed trees and power lines. This prompted multiple warming centers to open up throughout the county.

Source: NOAA NCEI 2024; PA PUC 2024; Dauphin County
** NCEI data was available up through June 30, 2024*

4.3.17.4 Future Occurrence

Minor power failure (in other words, short outage events) may occur several times a year for any given area in the County, while major events (long, widespread outage events) take place once every few years. Power failures often occur during severe weather; therefore, they should be expected during those events.

For the 2025 HMP update, the most up-to-date data was collected to calculate the probability of future occurrence of utility interruption events for Dauphin County. Information from the 2021 Dauphin County HMP, the NOAA NCEI Storm Events Database, the Pennsylvania Public Utilities Commission, and input from Dauphin County were used to identify the number of utility interruption events that occurred between 2002 and 2023. Using these sources ensures the most accurate probability estimates possible. The table below shows these statistics, as well as the annual average number of events and the estimated percent chance of an incident occurring in a given year. Based on these statistics, the probability of some sort of utility outage in any given year is *highly likely*, according to stats since 2019.

Table 4.3.17-2. Probability of Future Utility Interruption Events

Hazard Type	Number of Occurrences Between 2019 and 2024	Percent chance of occurrence in any given year
Utility Outage	52	100%

Sources: NOAA NCEI 2023; Dauphin County HMP 2021; Dauphin County OEM
Note: Information on events for 2009 to 2024 was limited and based on NOAA NCEI Storm Events and newspaper coverage. Therefore, it can be assumed that the number of events listed for that time period is conservative.

Based on available historical data, the future occurrence of utility interruption events can be considered *highly likely* as defined by the Risk Factor Methodology probability criteria (refer to Section 4.4), with minor events happening more frequently than major or long-term interruptions in the future.

4.3.17.5 Vulnerability Assessment

To understand risk, a community must evaluate the assets that are exposed or vulnerable in the identified hazard area. This section discusses the potential impact of the utility interruption hazard on Dauphin County in the following subsections:

- Impact on (1) life, health, and safety; (2) general building stock and critical facilities; (3) the economy; (4) the environment; and (5) future growth and development.
- Effect of climate change on vulnerability.
- Further data collection that will assist in understanding this hazard over time.

Impact on Life, Health, and Safety

First responders' safety may be at risk during on-scene operations, and they may not be able to respond promptly due to electrical or utility fires. First responders may need to take on additional duties due to a higher-than-normal call volume and demand, traffic control, and responding to transportation incidents.

Impact on Socially Vulnerable Populations

Utility interruptions most severely affect individuals with access and functional needs (such as children, the elderly, and individuals with special medical needs). Special medical equipment will not function without power. Likewise, a loss of air conditioning during periods of extreme heat or the loss of heating during extreme cold can be especially detrimental to those with medical needs, children, and the elderly. Table 4.3.17-3 shows the demographic change in the county for children and the elderly from 2010 through 2020. The population under

the age of 5, under 18 years, population over the age of 65 has increased, as shown in Table 4.3.17-3. Data on individuals with special medical needs were not available.

Table 4.3.17-3. Demographic Trends for Vulnerable Populations

Vulnerable Population	2010 Census	2020 Census	2010 to 2020 Change
Under 5 years	17,429	17,467	↑ 38
65 years and over	35,841	52,984	↑ 17,143

Source: US Census Bureau 2010, 2020;

Impact on General Building Stock and Critical Facilities

All critical infrastructure is vulnerable to utility interruptions, especially power loss. The establishment of reliable backup power at critical facilities is extremely important to continue to provide for the health, safety, and well-being of Dauphin County's population.

Impact on the Economy

During a utility interruption event, the County may experience losses due to an interruption of critical services. Further, increased costs such as providing shelters, and costs related to cooling and heating centers may be incurred. Extended power outages will require officials to shelter victims who require heat and power for activities of daily living.

Power interruptions can cause economic impacts stemming from lost income, spoiled food, and other goods, costs to the owners/operators of the utility facilities, and costs to government and community service groups. FEMA's benefit-cost analysis methodology measures the loss of electrical service on a per-person-per-day-of-lost-service basis for the service area affected.

Interruption of utility gas or potable water distribution could also cause significant economic impacts such as: additional costs for bringing in water tenders to maintain fire suppression capabilities; opening additional warming centers should electric and utility gas utility be interrupted to residential areas; and distribution of potable water for public consumption. There could be significant costs associated with reimbursing fire departments from other counties to travel, staff, and maintain water tenders within Dauphin County during the duration of a water outage event.

Potential modeling of economic impacts from utility interruption would be calculating interruption of service costs which is derived from a standard value per person per day multiplied by the number of customers served. This would help to provide an estimate of the impact of the interrupted utility service but may not be representative of the complete economic impact of a prolonged utility interruption.

The FEMA Benefit-Cost Analysis (BCA) Toolkit v.6.0 has standard values based on the daily cost per rate-paying connection. The daily cost-per-connection value is shown in Table 4.3.17-4.

Table 4.3.17-4. FEMA BCA Toolkit v6.0 Daily Standard Values of Utility Services

Utility	Daily Value (per person/per day)
Electric	$174.00
Potable Water	$114.00
Wastewater	$58.00

Source: FEMA 2020

Impact on the Environment

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. Sections 4.3.5 and 6, Environmental Hazards, include a complete discussion on the impacts of a hazardous materials release. Pipelines carrying flammable materials also have the possibility of exploding or starting a fire (PEMA 2023).

Future Changes that May Impact Vulnerability

Understanding future changes that impact vulnerability in the County can assist in planning for future development and ensuring that appropriate mitigation, planning, and preparedness measures are in place. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development.
- Projected changes in population.
- Other identified conditions as relevant and appropriate, including the impacts of climate change.

Future Growth and Development

Areas targeted for potential future growth and development in the next 5 to 10 years have been identified across Dauphin County (further discussed in Section 2.4 of this HMP). Any areas of growth could be potentially impacted by the utility interruption hazard because the entire county is exposed and potentially vulnerable. An increase in development and population will increase the demand for power supply and can increase the likelihood of utility interruption incidents.

Projected Changes in Population

Estimated population projections provided by the US Census Bureau indicate that Dauphin County's population will continue to increase into 2040, increasing the total population to approximately 296,766 persons (US Census Bureau). A higher density of residents could mean that more community members are impacted by utility interruptions.

Effect of Climate Change on Vulnerability

According to the Fourth National Climate Assessment, two climate-change scenarios were modeled, and temperature change in the northeastern United States is estimated to increase between 3.98 - 5.09 degrees Fahrenheit (°F) by 2036-2065, and between 5.27 - 9.11°F by 2071-2100. The annual mean temperature change in Pennsylvania is projected to increase between 5.9 - 6.3°F by 2041 - 2070. Some areas of the world may experience greater temperature changes than others. It is important to note that frequency estimates may not be an accurate representation of future conditions due to the unknown impacts of climate change (PEMA 2023).

Increased average temperatures as a result of climate change make the occurrence of extreme heat more likely. While increased average temperatures would make the occurrence of extreme cold less likely, some climatologists have suggested that warming in the Arctic could impact the position of the jet stream, allowing for more extreme cold weather events to occur (Lindsey 2021). While some research supports this concept, others do not and the impact of climate change on cold weather events is not fully understood. Extreme heat and cold result in greater strain on utilities, increasing the likelihood of utility interruption.

Climatologists expect an increase in the number and intensity of severe weather events. This will include wind events such as hurricanes, tornadoes, and wind associated with thunderstorms, among other phenomena. More storms with higher winds will increase the chance that the utility infrastructure will be impacted by these storms. Additionally, climatologists expect an increase in precipitation, which could come in the form of heavy downpours or winter weather thus causing additional utility interruptions. Increased risk of drought may also threaten water utilities (NIDIS n.d.).

Additional Data and Next Steps

For plan updates, Dauphin County can track data on power outage events and obtain additional information on past and future events, particularly in terms of any injuries, deaths, shelter needs, pipe-freeze incidents, and other impacts. These data will help to identify any concerns or trends for which mitigation measures should be developed or refined. In time, quantitative modeling of estimated power outage events may be feasible as data are gathered and improved.

4.3.18 Wildfire

This section provides a profile of and vulnerability assessment for wildfire hazards. A wildfire is an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures. Wildfires often begin unnoticed and can spread quickly, creating dense smoke that can be seen for miles. A wildland fire is a wildfire in an area where development is essentially nonexistent, except for roads, railroads, power lines, and similar facilities. There are two distinct types of Wildland-Urban Interface (WUI) zones, categorized based on the amount of vegetation and housing density: interface and intermix (Frontline Wildfire Defense 2025).

- **Interface** areas are characterized by a high density of homes and businesses situated within proximity to undeveloped land, typically within 1.5 miles of developed areas and urban centers. This means that while the area is predominantly developed, it is still within reach of significant undeveloped acreage, creating a boundary where urban development meets wildland.
- **Intermix** areas, on the other hand, consist of houses and businesses that are dispersed within wildlands. In these zones, the density is greater than one home or business for every 40 acres of open land. This results in a more integrated mix of developed and undeveloped land, with structures scattered throughout the wildland environment.

Location and Extent

Wildfires take place in less developed or completely undeveloped areas, spreading rapidly through vegetative fuels. They can occur any time of the year but mostly occur during long, dry, hot spells. Any small fire, if not quickly detected and suppressed, may become uncontrolled. Most wildfires are caused by human carelessness, negligence, and ignorance. However, some are precipitated by lightning strikes, and in rare instances, spontaneous combustion. Wildfires in Pennsylvania can occur in open fields, grass, dense brush, and forests.

Wildfires can occur at any time of the year but are most likely in Dauphin County during a drought, and can occur in fields, grass, and brush as well as in the forest itself. Under dry conditions or droughts, wildfires have the potential to burn forests as well as croplands.

Table 4.3.18-1 shows the majority of Dauphin County is forested (approximately 45.5 percent) and agricultural (approximately 25.8 percent) land. The majority of wildfires in Dauphin County are relatively small in size, ranging from 0–200 acres. The greatest potential for wildfires is in the spring months of March, April, and May and the autumn months of October and November. In the spring, bare trees allow sunlight to reach the forest floor, drying fallen leaves and other ground debris. In the fall, dried leaves are also fuel for fires (PEMA 2023).

Table 4.3.18-1. Land Use in Dauphin County

Land Use Category	2021 Data	
	Acreage	% of County
Agriculture	91,437	25.8%
Barren Land	632	0.2%
Forest	161,523	45.5%
Rangeland	3,291	0.9%
Urban Area	76,717	21.6%
Water	19,918	5.6%
Wetland	1,516	0.4%
Dauphin County (Total)	**355,034**	**100.0%**

Source: (USGS NLCD 2021)
Note: % = Percent

Figure 4.3.18-1 illustrates the land cover across Dauphin County. As the figure shows, half of Dauphin County is forested. Figure 4.3.18-2 shows the location and size of wildfires that occurred in Pennsylvania between 2014 and 2022 as compiled by the National Interagency Fire Center (NIFC) (PEMA 2023). Wildfires are known to be an underreported event. Many wildfires occur every year and are suppressed by volunteer fire departments without any response or assistance from the DNCR Bureau of Forestry (BOF). Also, some smaller fires may not be identified or responded to at all. Therefore, these locally controlled blazes may not be represented in BOF records.

Figure 4.3.18-1. Land Cover in Dauphin County

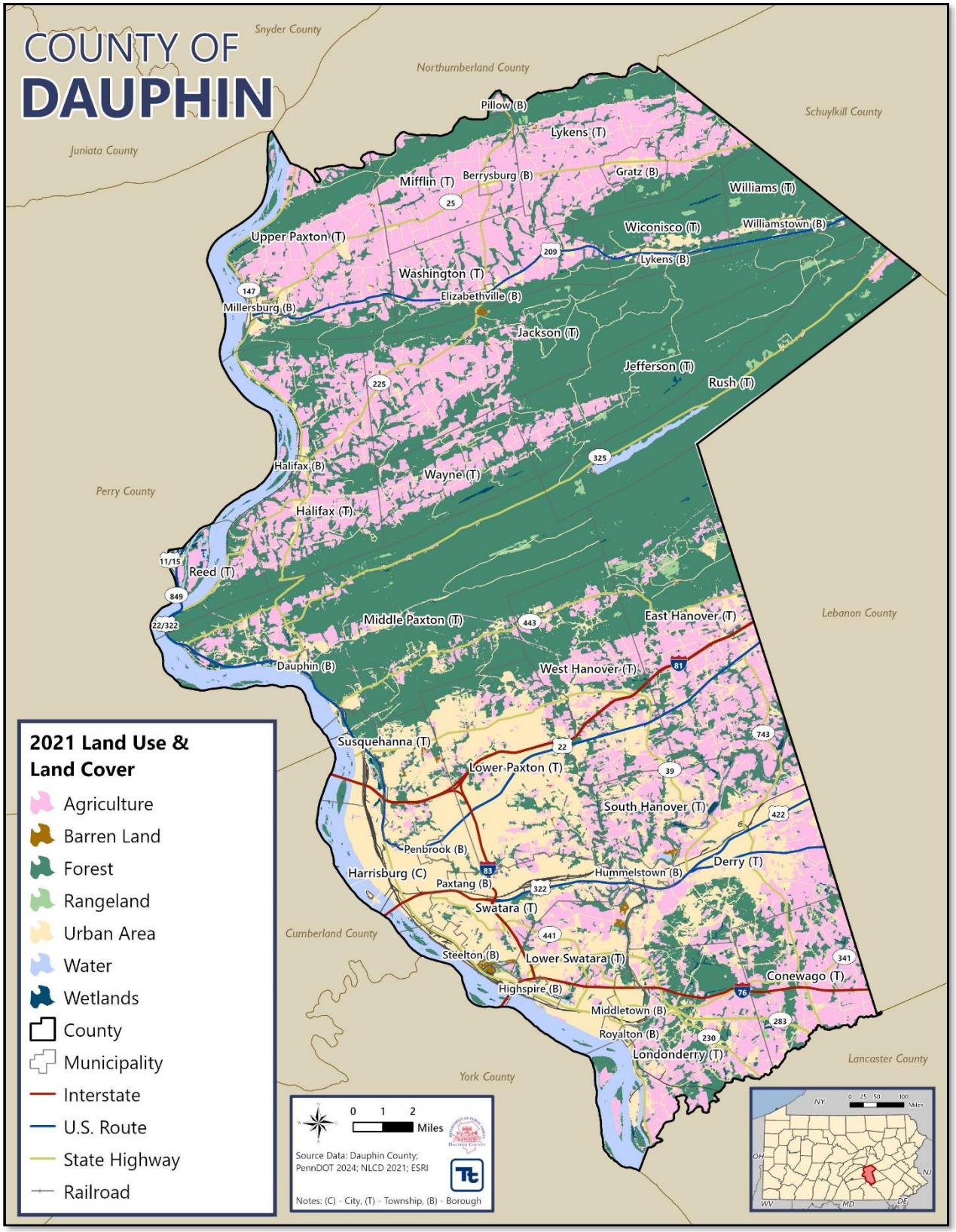
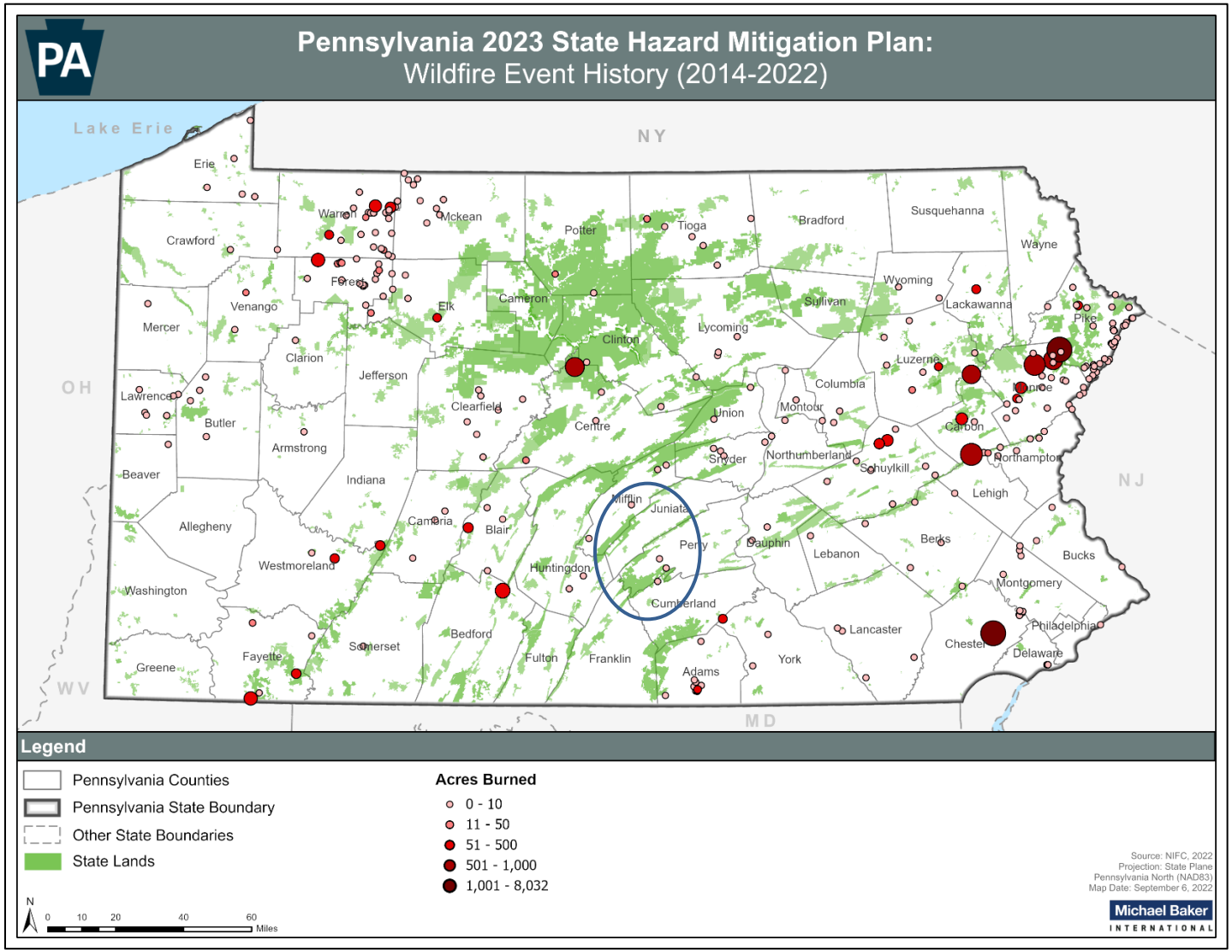


Figure 4.3.18-2. Location of Wildfire Events from 2014-2022



Source: PEMA 2023
Note: Blue oval was added to highlight Dauphin County's location within Pennsylvania.

According to the Commonwealth of Pennsylvania 2023 All-Hazard Mitigation Plan Update, areas of the Commonwealth that have large home developments built in volatile fuel types are at risk for catastrophic wildfires. Many areas of the state are at risk for large wildfires, but northeastern Pennsylvania is the most at risk for loss of life and/or property due to the number of homes at risk for wildfire (PEMA 2023).

Several tools are available to estimate fire potential location and extent, including but not limited to the Wildland/Urban Interface (WUI), Wildland Fire Assessment System, and Pennsylvania Department of Conservation and Natural Resources (PA DCNR) Priority Landscape Analysis. These tools are discussed in further detail below.

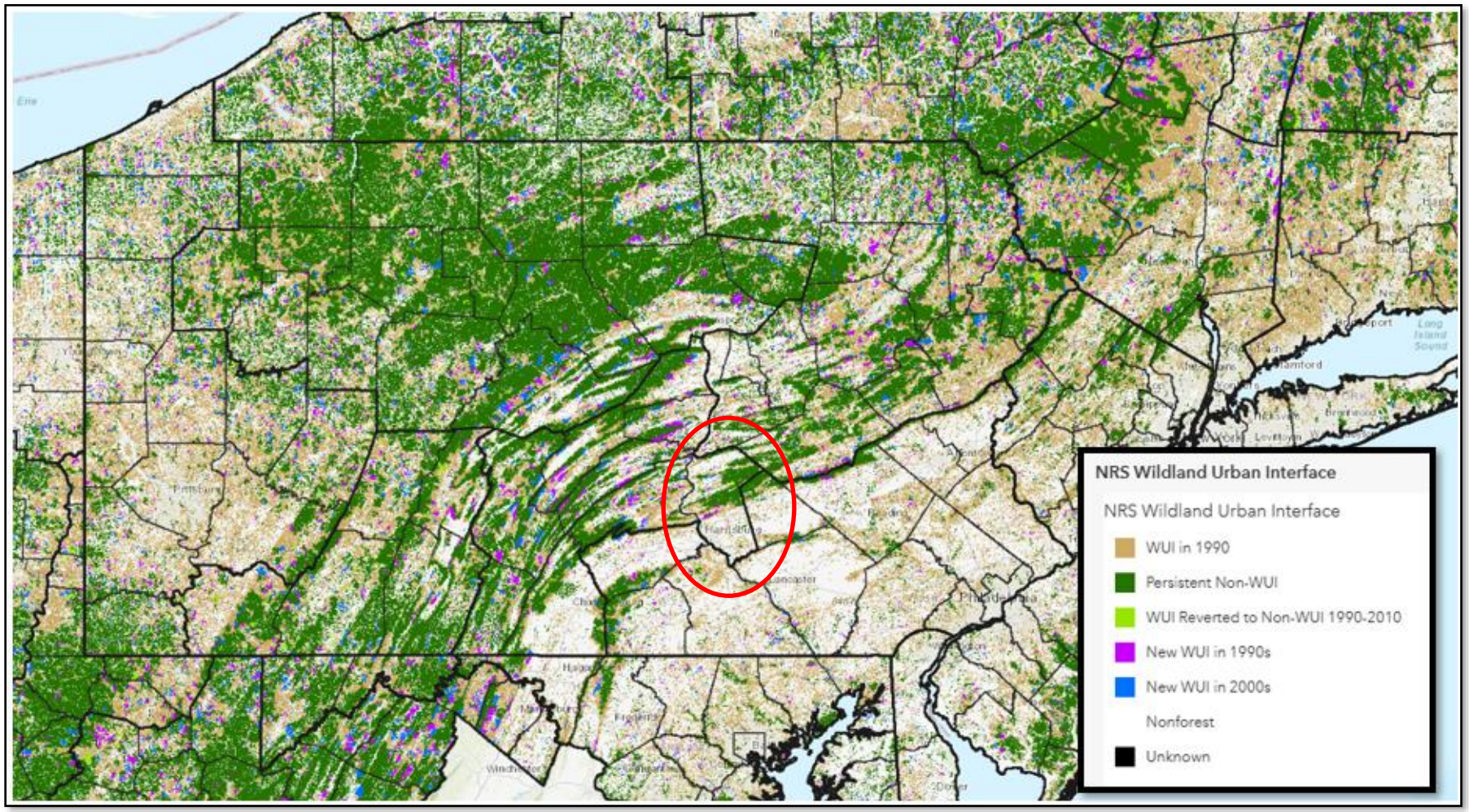
Wildland/Urban Interface (WUI)

The Wildland/Urban Interface (WUI) is considered the area where houses and wildland vegetation coincide. The WUI is divided into two categories: intermix and interface. Intermix WUI are areas where housing and vegetation "intermingle." Intermix areas have more than one house per 40 acres and have more than 50 percent vegetation. Interface WUI are areas with housing in the vicinity of contiguous wildland vegetation. Interface areas have more than one house per 40 acres, have less than 50 percent vegetation, and are within 1.5 miles of an area larger than 1,235 acres that is more than 75 percent vegetated (Stewart 2015).

The California Fire Alliance determined that areas within 1.5 miles of wildland vegetation are the approximate distance that firebrands can be carried from a wildland fire to the roof of a house. Therefore, even structures not located within the forest are at risk from wildfire. This buffer distance, along with housing density and vegetation type, was used to define the WUI (Stewart 2015).

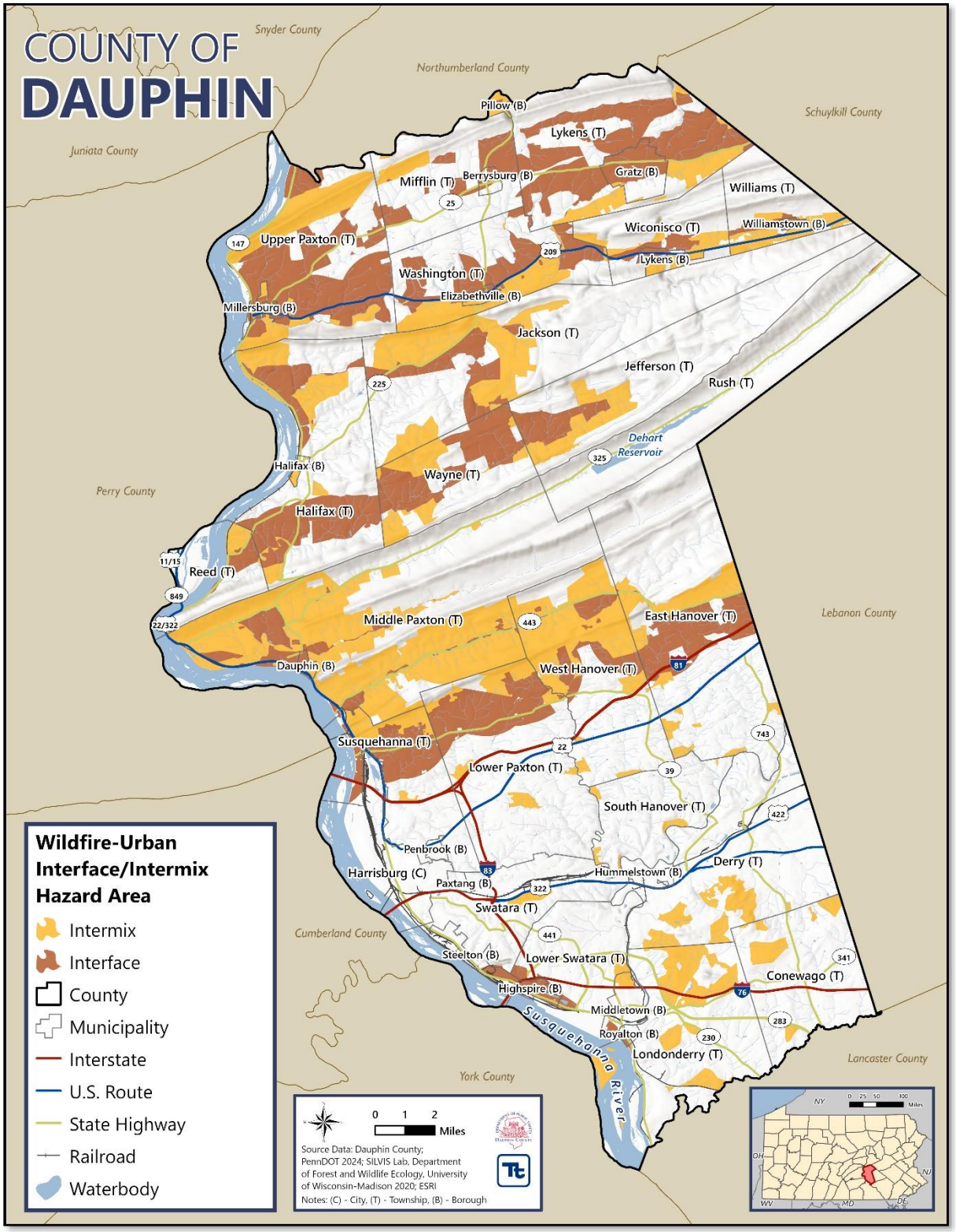
Concentrations of WUI can be seen along the east coast of the United States, including the area around Pittsburgh, Pennsylvania, and the eastern half of Pennsylvania. Dauphin County is identified as having many areas of low-density housing or very low-density housing because of the large amount of agricultural area. Areas where recreation and tourism dominate are also places where WUI is common (Stewart 2015). Figure 4.3.18-3 depicts the WUI for Pennsylvania as well as Dauphin County, and Figure 4.3.18-4 illustrates the WUI for Dauphin County. Concentrations of WUI areas greater than 50 percent are classified as WUI (intermix or interface) in the county.

Figure 4.3.18-3. WUI for Pennsylvania



Source: (USFS 2021)
Note: Red oval highlights Dauphin County's location within Pennsylvania.

Figure 4.3.18-4. Wildfire Urban Intermix/Interface for Dauphin County



Wildland Fire Assessment System (WFAS)

The WFAS is an Internet-based information system maintained at the National Interagency Fire Center (NIFC) in Boise, Idaho, that provides a national view of weather and fire potential, including national fire danger, weather maps, and satellite-derived "Greenness" maps (USFS 1993). Each day during the fire season, national maps of selected fire weather and fire danger components of the National Fire Danger Rating System (NFDRS) are produced by the (USFS, Wildland Fire Assessment System 2022). The Fire Danger Rating level, described in Table 4.3.18-2 below, takes into account current and antecedent weather, fuel types, and both live and dead fuel moisture. The adjective class rating is a method of normalizing rating classes across different fuel models, indexes, and station locations. It is based primarily on a fuel model cataloged for the station, the fire danger index selected to reflect staffing levels and climatological class breakpoints. Local station managers provide this information to USFS (USFS, Wildland Fire Assessment System 2022).

Table 4.3.18-2. Fire Danger Rating and Color Code

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

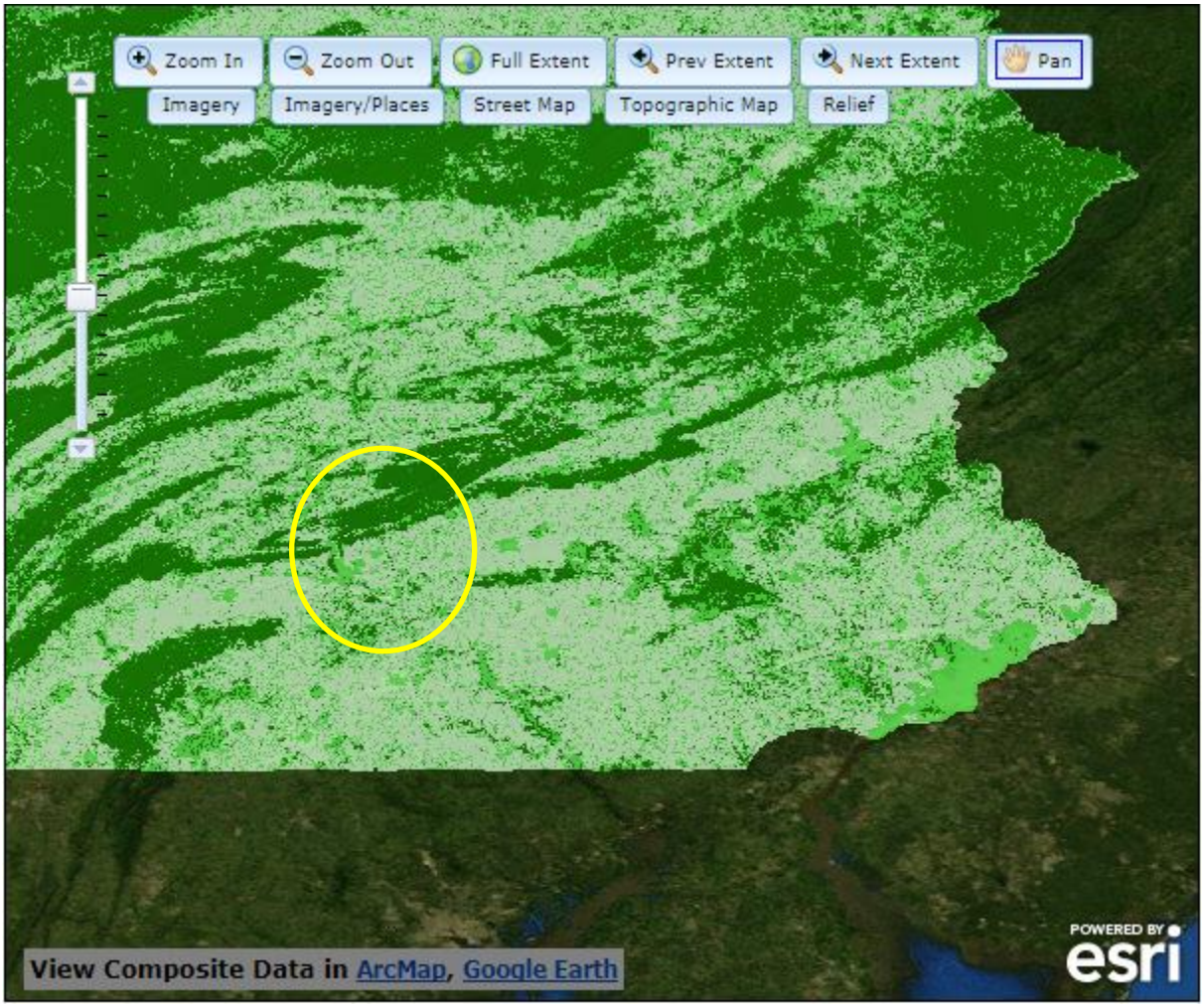
Source: USFS 2012

Pennsylvania Department of Conservation and Natural Resources (PA DCNR) Priority Landscape Analysis

The PA DCNR conducted a wildfire priority landscape analysis identifying areas where wildland fires are predicted to occur and become problematic. The areas are classified into high, medium, and low categories. The high classification is defined as an area prone to extreme fire behavior, with the potential to cause extensive property damage, or that could threaten the safety of the Commonwealth's citizens. Figure 4.3.18-5 illustrates the output for the wildfire priority landscapes model for Dauphin County. The following five datasets were used for this analysis:

- 2002 WUI
- 2006 LANDFIRE
- 2002–2008 Pennsylvania Wildfire Point Origin Occurrences
- Percent Slope
- 2009 Local Assessment of Values, Risks, Hazards

Figure 4.3.18-5. Wildfire Priority Landscapes in Dauphin County



Source: PA DCNR 2017
Notes: Low Priority = 0–0.21 (light green); Medium Priority = 0.21–0.35 (medium green); High Priority = 0.35–1 (dark green)
Dauphin County location within the yellow oval

Range of Magnitude

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

In addition to the risk wildfires pose to the general public and property owners, the safety of firefighters is also a concern. Although loss of life among firefighters does not occur often in Pennsylvania, it is always a risk. More common firefighting injuries include falls, sprains, abrasions, or heat-related injuries, such as dehydration. Response to wildfires also exposes emergency responders to the risk of motor vehicle accidents and can place them in remote areas away from the communities that they are chartered to protect.

While some fires are not human-caused and are part of natural succession processes, a wildfire can kill people, livestock, fish, and wildlife. They often destroy property, valuable timber, forage, and recreational and scenic values. The most significant environmental impact is the potential for severe erosion, silting of stream beds and reservoirs, and flooding due to ground-cover loss following a fire event. Wildfire can also have a positive environmental impact in that they burn dead trees, leaves, and grasses to allow more open spaces for new vegetation to grow and receive sunlight. Another positive effect is that it stimulates the growth of new shoots on trees and shrubs and its heat can open pinecones and other seed pods.

Past Occurrence

Many sources provided wildfire information regarding previous occurrences and losses associated with wildfire throughout Pennsylvania and Dauphin County. With so many sources reviewed for the purpose of this HMP Update, loss and impact information for many events could vary depending on the source. Therefore, the accuracy of the monetary figures discussed is based only on the available information identified during research for this HMP update.

FEMA Major Disasters and Emergency Declarations

Between 1954 and 2024, Dauphin County was not included in any major disaster (DR) or emergency (EM) declarations for flood-related events (FEMA 2024).

USDA Declarations

The Secretary of Agriculture from the U.S. Department of Agriculture (USDA) is authorized to designate counties as disaster areas to make emergency loans to producers suffering losses in those counties and contiguous counties. Between 2021 and 2024, Dauphin County was not included in any USDA wildfire-related agricultural disaster declarations (USDA 2024).

Previous Events

Table 4.3.18-3 below lists known wildfires that have occurred in Dauphin County from 2021 to 2024. With wildfire documentation being limited during the planning process, not all events have been identified or researched. For events that have occurred prior to 2021, refer to the 2021 Dauphin County HMP.

Table 4.3.18-3. Wildfire Events in Dauphin County, 2021 to 2024

Event Date	Event Type	FEMA Declaration or State Proclamation Number	Dauphin County included in Declaration?	Location Impacted	Description
March 2, 2022	Wildfire	N/A	No	Jefferson (T)	
March 5, 2022	Wildfire	N/A	No	Wayne (T)	
April 22, 2022	Wildfire	N/A	No	Halifax (T)	

April 30, 2022	Wildfire	N/A	No	Lykens (T)	
April 30, 2022	Wildfire	N/A	No	Jackson (T)	
April 11, 2023	Wildfire	N/A	No	Dauphin County	Fire on Peters Mountain along the Appalachian Trail.

Source: Fox43 2023, Dauphin County Annual Reports 2022, 2023

Future Occurrence

In Pennsylvania, wildfire events will continue to occur each year. However, the likelihood of one of those fires attaining significant size and intensity is unpredictable and highly dependent on environmental conditions and firefighting response. Weather conditions, particularly drought events, increase the likelihood of wildfires occurring. Additionally, invasive forest insects can increase the likelihood of wildfires occurring; insects that attack and kill trees increase the total wildfire fuel available in wooded areas. Climate change is also likely to increase the probability of future wildfires. 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 (PEMA 2023).

For this 2025 HMP update, the most up-to-date data was collected to calculate the probability of future occurrence of wildfire events for Dauphin County. Information from PA DCNR was used to identify the number of wildfire events that occurred between 2002 and 2023 to ensure the most accurate probability estimates possible. The table below shows these statistics as well as the annual average number of events and the estimated percent chance of an incident occurring in a given year, using the PA DCNR's complete records from 2002 to 2023 (Dauphin County HMP 2021). Based on these statistics, there is an estimated 100 percent chance of a wildfire event occurring in any given year in Dauphin County.

Table 4.3.18-4. Probability of Future Wildfire Events

Hazard Type	Number of Occurrences Between 2002 and 2023	% Chance of Occurrence in Any Given Year
Wildfires	161	100%

Source:NOAA NCEI 2024; Dauphin County HMP 2021; FEMA 2024

Based on available historical data, the future occurrence of wildfires in Dauphin County can be considered *likely* as defined by the Risk Factor Methodology probability criteria (refer to Section 4.4). However, the likelihood of one of those fires attaining significant size and intensity is unpredictable and highly dependent on environmental conditions and firefighting response. Weather conditions, such as drought and wind, can increase the likelihood of wildfires occurring. Any fire, without the quick response or attention of firefighters, forestry personnel, or visitors to the forest, has the potential to become a wildfire.

Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed and vulnerable in the identified hazard area. The following text evaluates and estimates the potential impact of the wildfire hazard on the county, including:

- Impact on (1) life, health, and safety; (2) general building stock; (3) critical facilities; (4) economy; (5) environment; and (6) future growth and development.
- Effects of climate change on vulnerability.
- Further data collection that will assist in understanding this hazard over time.

Impact on Life, Health, and Safety

Wildfires have the potential to impact human health and life of residents and responders, structures, infrastructure, and natural resources. The most vulnerable populations include emergency responders and those within a short distance of the interface between the built environment and the wildland environment. First responders are exposed to the dangers from the initial incident and after-effects from smoke inhalation and heat stroke. Table 4.3.18-5 summarizes the estimated population exposed to the wildfire hazard by the municipality.

Table 4.3.18-5. Population Located Within the (WUI) Wildfire Hazard Areas in Dauphin County

Jurisdiction *(B) = Borough (C) = City* ***(T)*** *= Township*	Total Population	Estimated Population Located Within Wildfire Hazard Areas			
		Number of People in the WUI Interface Wildfire Hazard Area	Percent of Total	Number of People in the WUI Intermix Wildfire Hazard Area	Percent of Total
Berrysburg (B)	326	279	85.6%	0	0.0%
Conewago (T)	2,952	0	0.0%	556	18.8%
Dauphin (B)	795	712	89.6%	82	10.3%
Derry (T)	24,715	0	0.0%	2,005	8.1%
East Hanover (T)	6,019	1,010	16.8%	712	11.8%
Elizabethville (B)	1,357	1,107	81.6%	229	16.9%
Gratz (B)	743	726	97.7%	4	0.5%
Halifax (B)	796	0	0.0%	11	1.4%
Halifax (T)	3,349	1,767	52.8%	362	10.8%
Harrisburg (C)	50,099	27	0.1%	0	0.0%
Highspire (B)	2,741	2,738	99.9%	0	0.0%
Hummelstown (B)	4,544	0	0.0%	19	0.4%
Jackson (T)	1,827	335	18.3%	674	36.9%
Jefferson (T)	360	112	31.1%	161	44.7%
Londonderry (T)	4,899	28	0.6%	1,813	37.0%
Lower Paxton (T)	53,501	10,692	20.0%	1,007	1.9%
Lower Swatara (T)	9,531	1,668	17.5%	244	2.6%
Lykens (B)	1,873	1,714	91.5%	158	8.4%
Lykens (T)	1,559	1,032	66.2%	221	14.2%
Middle Paxton (T)	5,048	1,747	34.6%	3,180	63.0%
Middletown (B)	9,533	682	7.2%	156	1.6%
Mifflin (T)	816	286	35.0%	51	6.3%
Millersburg (B)	2,545	2,450	96.3%	92	3.6%
Paxtang (B)	1,648	0	0.0%	0	0.0%
Penbrook (B)	3,274	0	0.0%	0	0.0%
Pillow (B)	292	264	90.4%	27	9.2%
Reed (T)	230	113	49.1%	85	37.0%
Royalton (B)	1,138	229	20.1%	0	0.0%
Rush (T)	228	28	12.3%	0	0.0%
South Hanover (T)	7,209	0	0.0%	264	3.7%
Steelton (B)	6,263	1,011	16.1%	0	0.0%
Susquehanna (T)	26,736	10,856	40.6%	1,711	6.4%
Swatara (T)	27,824	0	0.0%	444	1.6%
Upper Paxton (T)	4,010	3,104	77.4%	627	15.6%
Washington (T)	2,129	1,277	60.0%	477	22.4%
Wayne (T)	1,266	889	70.2%	212	16.7%
West Hanover (T)	10,697	1,216	11.4%	1,779	16.6%

Jurisdiction *(B) = Borough* *(C) = City* ***(T)** = Township*	Total Population	Estimated Population Located Within Wildfire Hazard Areas			
		Number of People in the WUI Interface Wildfire Hazard Area	Percent of Total	Number of People in the WUI Intermix Wildfire Hazard Area	Percent of Total
Wiconisco (T)	1,159	952	82.1%	191	16.5%
Williams (T)	1,067	610	57.2%	414	38.8%
Williamstown (B)	1,303	1,299	99.7%	3	0.2%
Dauphin County (Total)	**286,401**	**50,960**	**17.8%**	**17,971**	**6.3%**

Source: US Census Bureau 2020; SILVIS Lab, Department of Forest and Wildlife Ecology, University of Wisconsin-Madison 2020; Notes: Population results have been rounded down.

Impact on Socially Vulnerable Populations

Some populations are more susceptible to the adverse effects of wildfire. For example, individuals over the age of 65 or under the age of 5 may be more sensitive to resulting smoke, triggering other health impacts, like asthma. If an evacuation is ordered, individuals who do not speak English very well may be unaware of the potential hazard or oncoming danger. Those with disabilities may encounter mobility issues during an evacuation or getting to a safe location. Individuals experiencing poverty may be unable to afford out-of-pocket expenses resulting from a wildfire, such as if their home or vehicle is damaged and needs repairs. Table 4.3.18-6 and Table 4.3.18-7 show the estimates of Dauphin County residents exhibiting socially vulnerable characteristics that live in the WUI.

Table 4.3.18-6. Vulnerable Populations Located within the Wildfire Hazard Areas in Dauphin County

Jurisdiction *(B) = Borough (C) = City (T) = Township*	Total Vulnerable Populations (2022 ACS)					Estimated Number of Vulnerable Persons Located in the Wildland Urban Interface (WUI) Hazard Area									
	Over 65	Under 5	Non-English Speaking	Disability	Poverty Level	Over 65	Percent of Total	Under 5	Percent of Total	Non-English Speaking	Percent of Total	with a Disability	Percent of Total	Poverty	Percent of Total
Berrysburg (B)	65	33	0	53	20	55	84.6%	28	84.8%	0	0.0%	45	84.9%	17	85.0%
Conewago (T)	456	259	12	271	197	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Dauphin (B)	188	60	0	120	119	168	89.4%	53	88.3%	0	0.0%	107	89.2%	106	89.1%
Derry (T)	4,566	974	201	2,318	2,099	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
East Hanover (T)	1,153	184	0	662	237	193	16.7%	30	16.3%	0	0.0%	111	16.8%	39	16.5%
Elizabethville (B)	199	70	0	177	129	162	81.4%	57	81.4%	0	0.0%	144	81.4%	105	81.4%
Gratz (B)	114	28	0	214	168	111	97.4%	27	96.4%	0	0.0%	209	97.7%	164	97.6%
Halifax (B)	131	32	47	162	159	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Halifax (T)	852	263	0	482	312	449	52.7%	138	52.5%	0	0.0%	254	52.7%	164	52.6%
Harrisburg (C)	5,599	4,171	4,413	8,458	13,958	3	0.1%	2	<0.1%	2	<0.1%	4	<0.1%	7	0.1%
Highspire (B)	400	72	47	336	290	399	99.8%	71	98.6%	46	97.0%	335	99.7%	289	99.7%
Hummelstown (B)	690	280	38	511	557	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Jackson (T)	406	62	0	178	249	74	18.2%	11	17.7%	0	0.0%	32	18.0%	45	18.1%
Jefferson (T)	81	20	0	40	5	25	30.9%	6	30.0%	0	0.0%	12	30.0%	1	20.0%
Londonderry (T)	1,063	466	0	457	251	6	0.6%	2	0.4%	0	0.0%	2	0.4%	1	0.4%
Lower Paxton (T)	10,027	3,034	1,725	5,356	3,336	2,004	20.0%	606	20.0%	344	19.9%	1,070	20.0%	666	20.0%
Lower Swatara (T)	2,131	496	277	1,112	817	373	17.5%	86	17.3%	48	17.3%	194	17.4%	143	17.5%
Lykens (B)	271	71	9	322	336	248	91.5%	65	91.5%	8	84.4%	294	91.3%	307	91.4%
Lykens (T)	186	177	64	126	173	123	66.1%	117	66.1%	42	65.6%	83	65.9%	114	65.9%
Middle Paxton (T)	1,487	271	45	1,006	209	514	34.6%	93	34.3%	15	33.3%	348	34.6%	72	34.4%
Middletown (B)	1,480	712	223	1,534	1,491	105	7.1%	50	7.0%	15	6.7%	109	7.1%	106	7.1%
Mifflin (T)	114	75	14	71	232	40	35.1%	26	34.7%	4	28.1%	24	33.8%	81	34.9%
Millersburg (B)	427	211	0	369	301	411	96.3%	203	96.2%	0	0.0%	355	96.2%	289	96.0%
Paxtang (B)	256	104	47	148	173	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Penbrook (B)	319	344	43	633	500	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Jurisdiction (B) = Borough (C) = City (T) = Township	Total Vulnerable Populations (2022 ACS)					Estimated Number of Vulnerable Persons Located in the Wildland Urban Interface (WUI) Hazard Area									
	Over 65	Under 5	Non-English Speaking	Disability	Poverty Level	Over 65	Percent of Total	Under 5	Percent of Total	Non-English Speaking	Percent of Total	with a Disability	Percent of Total	Poverty	Percent of Total
Pillow (B)	63	34	9	37	12	57	90.5%	30	88.2%	8	84.4%	33	89.2%	10	83.3%
Reed (T)	68	3	0	45	20	33	48.5%	1	33.3%	0	0.0%	22	48.9%	9	45.0%
Royalton (B)	189	45	0	177	124	38	20.1%	9	20.0%	0	0.0%	35	19.8%	25	20.2%
Rush (T)	101	3	0	55	6	12	11.9%	0	0.0%	0	0.0%	6	10.9%	0	0.0%
South Hanover (T)	1,068	595	0	454	297	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Steelton (B)	725	386	182	1,483	1,282	117	16.1%	62	16.1%	29	15.9%	239	16.1%	207	16.1%
Susquehanna (T)	5,600	1,516	818	3,314	2,265	2,274	40.6%	615	40.6%	332	40.6%	1,345	40.6%	919	40.6%
Swatara (T)	4,446	1,223	974	3,110	2,100	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Upper Paxton (T)	1,066	202	0	645	648	825	77.4%	156	77.2%	0	0.0%	499	77.4%	501	77.3%
Washington (T)	461	77	0	268	258	276	59.9%	46	59.7%	0	0.0%	160	59.7%	154	59.7%
Wayne (T)	146	69	0	131	31	102	69.9%	48	69.6%	0	0.0%	92	70.2%	21	67.7%
West Hanover (T)	2,732	431	0	956	293	310	11.3%	49	11.4%	0	0.0%	108	11.3%	33	11.3%
Wiconisco (T)	213	60	9	164	138	175	82.2%	49	81.7%	7	73.8%	134	81.7%	113	81.9%
Williams (T)	192	35	0	216	173	109	56.8%	20	57.1%	0	0.0%	123	56.9%	99	57.2%
Williamstown (B)	205	60	2	237	291	204	99.5%	59	98.3%	1	42.2%	236	99.6%	290	99.7%
Dauphin County (Total)	**49,936**	**17,208**	**9,203**	**36,408**	**34,256**	**9,995**	**20.0%**	**2,815**	**16.4%**	**901**	**9.8%**	**6,764**	**18.6%**	**5,097**	**14.9%**

Source: (US Census Bureau 2022); (SILVIS Lab, Department of Forest and Wildlife Ecology, University of Wisconsin-Madison 2020)
Note: Population results have been rounded down.

Table 4.3.18-7. Estimated Number of Vulnerable Persons Located Within the Wildland-Urban Intermix (WUI) Wildfire Fuel Hazard Areas in Dauphin County

Jurisdiction (B) = Borough (C) = City (T) = Township	Total Vulnerable Populations (2022 ACS)					Estimated Number of Vulnerable Persons Located in the Wildland Urban Intermix (WUI) Hazard Area									
	Over 65	Under 5	Non-English Speaking	Disability	Poverty Level	Over 65	% of Total	Under 5	% of Total	Non-English Speaking	% of Total	With a Disability	% of Total	Poverty Level	% of Total
Berrysburg (B)	65	33	0	53	20	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Conewago (T)	456	259	12	271	197	85	18.6%	48	18.5%	2	16.9%	51	18.8%	37	18.8%
Dauphin (B)	188	60	0	120	119	19	10.1%	6	10.0%	0	0.0%	12	10.0%	12	10.1%
Derry (T)	4,566	974	201	2,318	2,099	370	8.1%	79	8.1%	16	7.9%	188	8.1%	170	8.1%
East Hanover (T)	1,153	184	0	662	237	136	11.8%	21	11.4%	0	0.0%	78	11.8%	28	11.8%
Elizabethville (B)	199	70	0	177	129	33	16.6%	11	15.7%	0	0.0%	29	16.4%	21	16.3%
Gratz (B)	114	28	0	214	168	0	0.0%	0	0.0%	0	0.0%	1	0.5%	0	0.0%
Halifax (B)	131	32	47	162	159	1	0.8%	0	0.0%	0	0.0%	2	1.2%	2	1.3%
Halifax (T)	852	263	0	482	312	92	10.8%	28	10.6%	0	0.0%	52	10.8%	33	10.6%
Harrisburg (C)	5,599	4,171	4,413	8,458	13,958	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Highspire (B)	400	72	47	336	290	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Hummelstown (B)	690	280	38	511	557	2	0.3%	1	0.4%	0	0.0%	2	0.4%	2	0.4%
Jackson (T)	406	62	0	178	249	149	36.7%	22	35.5%	0	0.0%	65	36.5%	91	36.5%
Jefferson (T)	81	20	0	40	5	36	44.4%	8	40.0%	0	0.0%	17	42.5%	2	40.0%
Londonderry (T)	1,063	466	0	457	251	393	37.0%	172	36.9%	0	0.0%	169	37.0%	92	36.7%
Lower Paxton (T)	10,027	3,034	1,725	5,356	3,336	188	1.9%	57	1.9%	32	1.9%	100	1.9%	62	1.9%
Lower Swatara (T)	2,131	496	277	1,112	817	54	2.5%	12	2.4%	7	2.5%	28	2.5%	20	2.4%
Lykens (B)	271	71	9	322	336	22	8.1%	5	7.0%	0	0.0%	27	8.4%	28	8.3%
Lykens (T)	186	177	64	126	173	26	14.0%	25	14.1%	9	14.1%	17	13.5%	24	13.9%
Middle Paxton (T)	1,487	271	45	1,006	209	937	63.0%	170	62.7%	28	62.2%	633	62.9%	131	62.7%
Middletown (B)	1,480	712	223	1,534	1,491	24	1.6%	11	1.5%	3	1.3%	25	1.6%	24	1.6%
Mifflin (T)	114	75	14	71	232	7	6.1%	4	5.3%	0	0.0%	4	5.6%	14	6.0%
Millersburg (B)	427	211	0	369	301	15	3.5%	7	3.3%	0	0.0%	13	3.5%	10	3.3%
Paxtang (B)	256	104	47	148	173	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Jurisdiction (B) = Borough (C) = City (T) = Township	Total Vulnerable Populations (2022 ACS)					Estimated Number of Vulnerable Persons Located in the Wildland Urban Intermix (WUI) Hazard Area									
	Over 65	Under 5	Non-English Speaking	Disability	Poverty Level	Over 65	% of Total	Under 5	% of Total	Non-English Speaking	% of Total	With a Disability	% of Total	Poverty Level	% of Total
Penbrook (B)	319	344	43	633	500	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Pillow (B)	63	34	9	37	12	5	7.9%	3	8.8%	0	0.0%	3	8.1%	1	8.3%
Reed (T)	68	3	0	45	20	25	36.8%	1	33.3%	0	0.0%	16	35.6%	7	35.0%
Royalton (B)	189	45	0	177	124	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Rush (T)	101	3	0	55	6	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
South Hanover (T)	1,068	595	0	454	297	39	3.7%	21	3.5%	0	0.0%	16	3.5%	10	3.4%
Steelton (B)	725	386	182	1,483	1,282	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Susquehanna (T)	5,600	1,516	818	3,314	2,265	358	6.4%	97	6.4%	52	6.4%	212	6.4%	144	6.4%
Swatara (T)	4,446	1,223	974	3,110	2,100	70	1.6%	19	1.6%	15	1.5%	49	1.6%	33	1.6%
Upper Paxton (T)	1,066	202	0	645	648	166	15.6%	31	15.3%	0	0.0%	100	15.5%	101	15.6%
Washington (T)	461	77	0	268	258	103	22.3%	17	22.1%	0	0.0%	60	22.4%	57	22.1%
Wayne (T)	146	69	0	131	31	24	16.4%	11	15.9%	0	0.0%	22	16.8%	5	16.1%
West Hanover (T)	2,732	431	0	956	293	454	16.6%	71	16.5%	0	0.0%	159	16.6%	48	16.4%
Wiconisco (T)	213	60	9	164	138	35	16.4%	9	15.0%	1	10.5%	27	16.5%	22	15.9%
Williams (T)	192	35	0	216	173	74	38.5%	13	37.1%	0	0.0%	83	38.4%	67	38.7%
Williamstown (B)	205	60	2	237	291	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Dauphin County (Total)	**49,936**	**17,208**	**9,203**	**36,408**	**34,256**	**3,942**	**7.9%**	**980**	**5.7%**	**165**	**1.8%**	**2,260**	**6.2%**	**1,298**	**3.8%**

Source: (US Census Bureau 2022); (SILVIS Lab, Department of Forest and Wildlife Ecology, University of Wisconsin-Madison 2020)
Notes: *Population results have been rounded down*

Impact on General Building Stock

The most vulnerable structures to wildfire events are those within the wildfire urban interface/intermix hazard area. Buildings constructed of wood or vinyl siding are generally more likely to be impacted by the fire hazard than buildings constructed of brick or concrete. To estimate the buildings exposed to the wildfire hazard, the WUI was overlaid upon the updated building inventory. The replacement cost value of the structures with their center in the WUI was totaled (refer to Table 4.3.18-8).

Out of the general building stock (156,448 buildings), 3.4 percent sit in the wildfire interface area and 9.0 percent sit in the wildfire intermix area. The Township of Lower Paxton has the greatest number of buildings within the wildfire interface area (4,520 buildings). The Township of Middle Paxton has the greatest number of buildings in the wildfire intermix area (2,888 buildings).

Table 4.3.18-8. Estimated Building Stock in Dauphin County Located Within the Wildfire Fuel Hazard Areas

Jurisdiction (B) = Borough (C) = City (T) = Township	Number of Buildings	Total Replacement Cost Value (RCV)	Wildfire Interface Area				Wildfire Intermix Area			
			Number of Buildings	% of Total	Replacement Cost Value (RCV)	Percent of Total	Number of Buildings	Percent of Total	Replacement Cost Value (RCV)	Percent of Total
Berrysburg (B)	384	$155,707,892	324	84.4%	$130,908,674	84.1%	0	0.0%	$0	0.0%
Conewago (T)	2,726	$1,408,072,267	0	0.0%	$0	0.0%	405	14.9%	$159,894,556	11.4%
Dauphin (B)	499	$178,594,344	442	88.6%	$142,666,511	79.9%	50	10.0%	$22,382,637	12.5%
Derry (T)	12,189	$16,562,878,409	0	0.0%	$0	0.0%	918	7.5%	$473,127,036	2.9%
East Hanover (T)	5,424	$3,271,020,667	1,472	27.1%	$1,287,666,835	39.4%	572	10.5%	$199,102,705	6.1%
Elizabethville (B)	1,022	$466,950,677	776	75.9%	$358,402,150	76.8%	223	21.8%	$90,620,089	19.4%
Gratz (B)	804	$536,197,947	782	97.3%	$529,191,010	98.7%	5	0.6%	$3,258,999	0.6%
Halifax (B)	529	$218,291,193	0	0.0%	$0	0.0%	37	7.0%	$9,663,613	4.4%
Halifax (T)	3,714	$1,874,093,634	1,801	48.5%	$658,606,444	35.1%	410	11.0%	$198,628,379	10.6%
Harrisburg (C)	19,455	$18,628,047,035	17	0.1%	$12,835,147	0.1%	0	0.0%	$0	0.0%
Highspire (B)	1,481	$664,880,756	1,442	97.4%	$568,215,139	85.5%	0	0.0%	$0	0.0%
Hummelstown (B)	2,488	$1,268,535,294	0	0.0%	$0	0.0%	12	0.5%	$3,272,594	0.3%
Jackson (T)	2,533	$963,807,247	518	20.5%	$229,007,361	23.8%	882	34.8%	$264,597,930	27.5%
Jefferson (T)	695	$279,826,276	229	32.9%	$123,456,377	44.1%	264	38.0%	$83,929,256	30.0%
Londonderry (T)	5,464	$3,122,384,091	23	0.4%	$5,301,451	0.2%	1,609	29.4%	$450,377,306	14.4%
Lower Paxton (T)	22,715	$16,760,123,401	4,520	19.9%	$2,639,380,939	15.7%	468	2.1%	$216,364,226	1.3%
Lower Swatara (T)	5,204	$7,181,289,637	882	16.9%	$359,759,548	5.0%	120	2.3%	$34,777,937	0.5%
Lykens (B)	1,438	$620,374,667	1,290	89.7%	$512,071,687	82.5%	117	8.1%	$35,562,292	5.7%
Lykens (T)	2,311	$1,144,139,161	1,389	60.1%	$694,916,604	60.7%	344	14.9%	$159,240,430	13.9%
Middle Paxton (T)	4,472	$1,679,813,405	1,459	32.6%	$569,485,381	33.9%	2,888	64.6%	$1,070,633,265	63.7%
Middletown (B)	3,849	$2,433,657,717	301	7.8%	$141,765,006	5.8%	59	1.5%	$54,478,704	2.2%
Mifflin (T)	1,318	$762,373,861	519	39.4%	$296,089,153	38.8%	65	4.9%	$16,945,021	2.2%
Millersburg (B)	1,518	$913,497,912	1,418	93.4%	$745,851,712	81.6%	61	4.0%	$49,976,792	5.5%
Paxtang (B)	900	$476,331,717	0	0.0%	$0	0.0%	0	0.0%	$0	0.0%
Penbrook (B)	1,581	$698,112,706	0	0.0%	$0	0.0%	0	0.0%	$0	0.0%
Pillow (B)	317	$115,637,971	252	79.5%	$88,033,465	76.1%	65	20.5%	$27,604,506	23.9%

Jurisdiction *(B) = Borough* *(C) = City* *(T) = Township*	Number of Buildings	Total Replacement Cost Value (RCV)	Wildfire Interface Area				Wildfire Intermix Area			
			Number of Buildings	% of Total	Replacement Cost Value (RCV)	Percent of Total	Number of Buildings	Percent of Total	Replacement Cost Value (RCV)	Percent of Total
Reed (T)	327	$147,861,272	147	45.0%	$62,764,804	42.4%	104	31.8%	$43,495,140	29.4%
Royalton (B)	724	$253,576,998	149	20.6%	$34,815,536	13.7%	0	0.0%	$0	0.0%
Rush (T)	379	$88,377,859	43	11.3%	$11,191,467	12.7%	0	0.0%	$0	0.0%
South Hanover (T)	4,275	$2,386,303,219	0	0.0%	$0	0.0%	154	3.6%	$47,407,014	2.0%
Steelton (B)	2,867	$2,584,768,828	432	15.1%	$130,755,441	5.1%	0	0.0%	$0	0.0%
Susquehanna (T)	12,511	$10,167,577,726	4,948	39.5%	$3,149,598,339	31.0%	722	5.8%	$330,223,946	3.2%
Swatara (T)	12,223	$10,172,987,131	0	0.0%	$0	0.0%	196	1.6%	$117,371,641	1.2%
Upper Paxton (T)	3,823	$1,780,080,745	2,870	75.1%	$1,371,580,442	77.1%	555	14.5%	$198,507,582	11.2%
Washington (T)	2,464	$1,345,985,248	1,353	54.9%	$719,721,041	53.5%	534	21.7%	$352,135,603	26.2%
Wayne (T)	1,460	$480,646,769	995	68.2%	$338,069,775	70.3%	241	16.5%	$66,066,702	13.7%
West Hanover (T)	7,194	$3,876,826,721	788	11.0%	$252,128,729	6.5%	1,316	18.3%	$463,508,241	12.0%
Wiconisco (T)	1,112	$351,954,145	886	79.7%	$269,553,681	76.6%	197	17.7%	$71,397,194	20.3%
Williams (T)	1,093	$493,719,539	536	49.0%	$211,914,806	42.9%	490	44.8%	$234,230,326	47.4%
Williamstown (B)	966	$399,114,521	950	98.3%	$358,275,215	89.8%	6	0.6%	$15,385,613	3.9%
Dauphin County (Total)	**156,448**	**$116,914,420,604**	**33,953**	**21.7%**	**$17,003,979,868**	**14.5%**	**14,089**	**9.0%**	**$5,564,167,275**	**4.8%**

Source:(Dauphin County 2024) (SILVIS Lab, Department of Forest and Wildlife Ecology, University of Wisconsin-Madison 2020); RS Means 2024

Impact on Critical Facilities

It is recognized that several critical facilities are located in the wildfire hazard area. Facilities at risk of impact from a wildfire include locations for vulnerable populations (i.e., schools and senior facilities) and emergency response agencies (i.e., fire and police). Table 4.3.18-9 summarizes the distribution of the 276 critical facilities located within the wildfire urban interface hazard area by jurisdiction. Of this total, 193 of the critical facilities are considered lifelines. Safety and Security has the greatest number of critical facilities built in the Wildland-Urban interface hazard areas (110).

Table 4.3.18-10 summarizes the distribution of the 97 critical facilities located within the wildfire urban intermix hazard area by jurisdiction. Of this total, 80 of the critical facilities are considered lifelines. Safety and Security have the greatest number of critical facilities built in the wildland-urban intermix hazard areas (36).

Table 4.3.18-9. Number of Lifelines Exposed to the Wildland Urban Interface Hazard Area

Jurisdiction *(B) = Borough (C) = City (T) = Township*	Number of Facilities in Wildland Urban Interface (WUI) Hazard Area, by Lifeline Category									Total Facilities in Hazard Area	
	Communications	Energy	Food, Hydration, Shelter	HazMat	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Count	% of Jurisdiction Total
Berrysburg (B)	0	0	0	0	0	5	0	0	0	5	100.0%
Conewago (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Dauphin (B)	1	0	0	1	0	12	0	0	2	16	61.5%
Derry (T)	0	0	0	0	0	0	0	0	0	0	0.0%
East Hanover (T)	0	0	0	1	0	2	4	0	1	8	22.2%
Elizabethville (B)	1	0	1	1	2	3	0	0	2	10	83.3%
Gratz (B)	0	0	0	1	0	6	0	0	2	9	100.0%
Halifax (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Halifax (T)	0	0	0	0	0	3	1	0	1	5	16.7%
Harrisburg (C)	0	0	0	0	1	1	0	0	0	2	0.5%
Highspire (B)	0	0	0	1	0	3	1	0	2	7	58.3%
Hummelstown (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Jackson (T)	0	0	0	0	0	2	1	0	1	4	18.2%
Jefferson (T)	0	0	0	0	0	3	1	0	0	4	57.1%
Londonderry (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Lower Paxton (T)	0	0	0	1	3	7	0	0	12	23	15.3%
Lower Swatara (T)	0	0	0	2	0	0	0	0	0	2	2.3%
Lykens (B)	0	0	0	2	1	8	3	1	2	17	94.4%
Lykens (T)	0	0	0	2	0	4	0	0	3	9	60.0%
Middle Paxton (T)	0	0	1	0	0	6	2	0	1	10	30.3%
Middletown (B)	0	0	0	1	0	0	0	1	3	5	10.6%
Mifflin (T)	0	0	0	0	0	0	0	0	1	1	12.5%
Millersburg (B)	0	0	0	2	1	6	0	0	8	17	65.4%
Paxtang (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Penbrook (B)	0	0	0	0	0	0	0	0	0	0	0.0%

Jurisdiction (B) = Borough (C) = City (T) = Township	Number of Facilities in Wildland Urban Interface (WUI) Hazard Area, by Lifeline Category									Total Facilities in Hazard Area	
	Communications	Energy	Food, Hydration, Shelter	HazMat	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Count	% of Jurisdiction Total
Pillow (B)	0	0	0	0	0	4	0	0	1	5	83.3%
Reed (T)	0	0	0	2	0	1	0	0	0	3	50.0%
Royalton (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Rush (T)	0	0	0	0	0	2	0	0	0	2	40.0%
South Hanover (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Steelton (B)	0	0	0	1	0	0	0	0	1	2	6.5%
Susquehanna (T)	0	0	1	3	5	14	1	3	20	47	39.8%
Swatara (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Upper Paxton (T)	0	0	1	6	2	2	1	2	11	25	71.4%
Washington (T)	0	1	0	3	1	5	1	1	5	17	54.8%
Wayne (T)	0	0	0	0	0	0	2	0	0	2	25.0%
West Hanover (T)	0	0	0	0	0	2	1	0	1	4	9.3%
Wiconisco (T)	0	0	0	0	0	7	1	0	2	10	76.9%
Williams (T)	0	0	0	1	0	1	1	0	0	3	21.4%
Williamstown (B)	0	0	0	0	0	1	0	0	1	2	28.6%
Dauphin County (Total)	**2**	**1**	**4**	**31**	**16**	**110**	**21**	**8**	**83**	**276**	**16.3%**

Source: (Dauphin County 2024); (SILVIS Lab, Department of Forest and Wildlife Ecology, University of Wisconsin-Madison 2020); (Department of Human Services 2024); (HIFLD 2020, 2023)

Table 4.3.18-10. Number Lifelines Exposed to the Wildland Urban Intermix Hazard Area

Jurisdiction *(B) = Borough (C) = City (T) = Township*	Number of Facilities in Wildland Urban Intermix (WUI) Hazard Area, by Lifeline Category									Total Facilities in Hazard Area	
	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Count	% of Jurisdiction Total
Berrysburg (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Conewago (T)	1	0	0	0	0	0	0	0	1	2	15.4%
Dauphin (B)	0	0	0	0	0	0	2	0	0	2	7.7%
Derry (T)	1	0	0	1	1	5	0	0	5	13	9.9%
East Hanover (T)	0	0	0	0	0	0	2	0	0	2	5.6%
Elizabethville (B)	0	0	0	0	1	0	0	0	0	1	8.3%
Gratz (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Halifax (B)	0	0	0	0	0	0	0	1	0	1	11.1%
Halifax (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Harrisburg (C)	0	0	0	0	0	0	0	0	0	0	0.0%
Highspire (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Hummelstown (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Jackson (T)	1	0	0	0	0	1	0	0	0	2	9.1%
Jefferson (T)	0	0	0	0	0	0	2	0	0	2	28.6%
Londonderry (T)	0	0	0	0	1	4	2	0	2	9	20.0%
Lower Paxton (T)	0	0	0	0	0	1	0	0	0	1	0.7%
Lower Swatara (T)	1	0	0	1	0	0	0	0	0	2	2.3%
Lykens (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Lykens (T)	0	0	0	0	0	1	0	0	1	2	13.3%
Middle Paxton (T)	2	0	0	0	0	11	2	0	4	19	57.6%
Middletown (B)	0	0	0	0	0	0	0	0	1	1	2.1%
Mifflin (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Millersburg (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Paxtang (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Penbrook (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Pillow (B)	0	0	0	0	0	1	0	0	0	1	16.7%

Jurisdiction *(B) = Borough (C) = City (T) = Township*	Number of Facilities in Wildland Urban Intermix (WUI) Hazard Area, by Lifeline Category									Total Facilities in Hazard Area	
	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health & Medical	Safety & Security	Transportation	Water Systems	Other Critical Facilities	Count	% of Jurisdiction Total
Reed (T)	0	0	0	0	0	1	1	0	0	2	33.3%
Royalton (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Rush (T)	0	0	0	0	0	0	0	0	0	0	0.0%
South Hanover (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Steelton (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Susquehanna (T)	0	0	0	0	0	0	1	0	0	1	0.8%
Swatara (T)	1	0	1	1	0	2	0	0	1	6	4.2%
Upper Paxton (T)	1	0	0	0	0	1	0	1	0	3	8.6%
Washington (T)	0	0	0	4	0	3	2	0	0	9	29.0%
Wayne (T)	0	0	0	0	0	1	0	0	0	1	12.5%
West Hanover (T)	0	0	0	1	0	2	1	1	0	5	11.6%
Wiconisco (T)	0	0	0	0	0	0	0	0	0	0	0.0%
Williams (T)	0	0	0	3	0	2	1	2	2	10	71.4%
Williamstown (B)	0	0	0	0	0	0	0	0	0	0	0.0%
Dauphin County (Total)	**8**	**0**	**1**	**11**	**3**	**36**	**16**	**5**	**17**	**97**	**5.7%**

Source: (Dauphin County 2024); (SILVIS Lab, Department of Forest and Wildlife Ecology, University of Wisconsin-Madison 2020); (Department of Human Services 2024); (HIFLD 2020, 2023)

Impact on the Economy

Wildfire events can have major economic impacts on a community from the initial loss of structures and the subsequent loss of revenue from destroyed businesses and decreases in tourism. Wildfires can also severely damage roads and infrastructure. Portions of Interstates I-76, I-81, US Routes US-209, US-22, US-322, and State Routes PA-283, PA-443, PA-39, PA-25, PA-225, PA-147, PA-743, PA-325, PA-441, PA-230 run through WUI areas. This factor should be considered to determine evacuation routes for Dauphin County residents. Table 4.3.18-11 indicates the length of roadways exposed to wildfire.

Table 4.3.18-11. Roadways Exposed to Wildland Urban Intermix/Interface

Road Type	Total Miles for County	Wildland Interface Area		Wildland Intermix Area	
		Miles	Percent of Total	Miles	Percent of Total
Interstate	80.3	4.8	6.0%	4.1	5.1%
U.S. Highways	106.3	8.6	8.1%	17.8	16.7%
State Highways	201.1	28.7	14.3%	49.6	24.7%
Local Roads	2,304.4	226.2	9.8%	455.8	19.8%
Dauphin County (Total)	**2,692.2**	**268.3**	**10.0%**	**527.3**	**19.6%**

Source: (Dauphin County 2024); (SILVIS Lab, Department of Forest and Wildlife Ecology, University of Wisconsin-Madison 2020)

Impact on the Environment

According to the USGS, post-fire runoff polluted with debris and contaminants can be extremely harmful to ecosystem and aquatic life (Neary 2015). Studies show that urban fires, in particular, are more harmful to the environment than forest fires (Volker C. Radeloff 2018) The age and density of infrastructure within Dauphin County can exacerbate the consequences of fires on the environment because of the increased amount of chemicals and contaminants that would be released from burning infrastructure. These chemicals, such as iron, lead, and zinc, may leach into the stormwater, contaminate nearby streams, and impair aquatic life.

Vegetation loss is often a concern, but it typically is not a serious impact since natural re-growth occurs with time. The most significant environmental impact is the potential for severe erosion, silting of stream beds and reservoirs, and flooding due to ground-cover loss following a fire event. Wildfires also have a positive environmental impact in that they burn dead trees, leaves, and grasses to allow more open spaces for new and different types of vegetation to grow and receive sunlight. Another positive effect of a wildfire is that it stimulates the growth of new shoots on trees and shrubs, and its heat can open pinecones and other seed pods (PEMA 2023).

Wildfires can increase the probability of other natural disasters, specifically floods and mudflows. Wildfires, particularly large-scale fires, can dramatically alter the terrain and ground conditions, making land already devastated by fire susceptible to floods. Lands impacted by wildfires increase the risk of flooding and mudflow in those areas. Normally, vegetation absorbs rainfall, reducing runoff. However, wildfires leave the ground charred, barren, and unable to absorb water, thus creating conditions perfect for flash flooding and mudflows. Flood risk in these impacted areas remains significantly higher until vegetation is restored, which can take up to five years after a wildfire (FEMA 2021).

Future Changes that May Impact Vulnerability

Understanding future changes that impact vulnerability in the County can assist in planning for future development and ensuring that appropriate mitigation, planning, and preparedness measures are in place. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development.
- Projected changes in population.

- Other identified conditions as relevant and appropriate, including the impacts of climate change.

Future Growth and Development

It is anticipated that any new development and new residents in the Wildfire Urban Intermix/Interface will be exposed to the wildfire hazard. Areas targeted for potential future growth and development in the next 5 years have been identified across the County at the municipal level.

Projected Changes in Population

Estimated population projections provided by The Center of Rural Pennsylvania indicate that Dauphin County's population will continue to increase into 2040, increasing the total population to approximately 296,766 persons (The Center of Rural Pennsylvania 2021). Persons who move into areas with steep slopes are at greater risk of being impacted if a landslide were to occur. A higher density of residents could mean that more community members are impacted by transportation accidents.

Effect of Climate Change on Vulnerability

According to USFS, climate change will likely alter the atmospheric patterns that affect fire weather. Changes in fire patterns will, in turn, affect carbon cycling, forest structure, and species composition. Climate change associated with elevated greenhouse gas concentrations may create an atmospheric and fuel environment that is more conducive to large, severe fires (USFS 2011).

Fire interacts with climate and vegetation (fuel) in predictable ways. Understanding the interactions of climate, fire, and vegetation is essential for addressing issues associated with climate change that include (USFS 2011):

- Effects on regional circulation and other atmospheric patterns that affect fire weather
- Effects of changing fire regimes on the carbon cycle, forest structure, and species composition, and
- Complications from land use change, invasive species, and an increasing WUI.

It is projected that higher summer temperatures will likely increase the fire risk by 10 to 30 percent. Fire occurrence and areas burned could increase across the United States as a result of the increase of lightning activity; the frequency of surface pressure and associated circulation patterns conducive to surface drying; and fire weather conditions, in general, which are conducive to severe wildfires. Warmer temperatures will also increase the effects of drought and increase the number of days each year with flammable fuels, extending fire seasons and areas burned (USFS 2011).

Pennsylvania's Department of Environmental Protection (PADEP) was directed by the Climate Change Act (Act 70 of 2008) to initiate a study of the potential impacts of global climate change on the Commonwealth. The June 2021 Pennsylvania Climate Impact Assessment's main findings indicate Pennsylvania may be at increased risk for wildfires; however, the findings could not determine how large the increase in risk would be.

Future changes in fire frequency and severity are difficult to predict. Global and regional climate changes associated with elevated greenhouse gas concentrations could alter large weather patterns, thereby affecting fire weather conditions that are conducive to extreme fire behavior (USFS 2011).

Additional Data and Next Steps

As the data and resources become available, a custom building inventory can be generated to capture the construction of structures (such as roofing material, fire detection equipment, and structure age) to further refine the vulnerability analysis. As stated earlier, buildings constructed of wood or vinyl siding are generally more likely to be damaged by fire hazards than buildings constructed of brick or concrete. The proximity of these

building types to the WUI should be identified for further evaluation. Development and availability of these data would permit a more detailed estimate of potential vulnerabilities, including loss of life and potential structural damages.

In locations where homes are at risk for wildfires, the WUI Guidance Document is available to assist homeowners, community associations, local government, and developers to assess and mitigate the potential dangers of a wildfire. The guidance also provides information for developing an action plan in coordination with local emergency managers. Communities at risk for wildfires can adopt by local ordinance the "International Wildland-Urban Interface Code" of the Uniform Construction Code.

4.3.19 Winter Storm

This section provides a profile and vulnerability assessment of the winter storm hazard for the Dauphin County Hazard Mitigation Plan (HMP). From November through March, Pennsylvania is exposed to winter storms that move up the Atlantic coast or sweep in from the west. Every county in the Commonwealth is vulnerable to severe winter storms; however, the northern tier, western counties, and mountainous regions tend to experience winter weather more frequently and with greater severity.

Winter storms can produce more damage than any other severe weather event, including tornadoes. Complications caused by winter storms can lead to road closures (especially secondary and farm roads); business losses to commercial centers built in outlying areas because of supply interruption and loss of customers; property losses and roof damages from snow and ice loading and fallen trees; utility interruptions; and loss of water supplies. Flooding can result from winter storm events as well.

Most severe winter storm hazards include heavy snow (snowstorms), blizzards, sleet or freezing rain, ice storms, and mid-Atlantic cyclones locally known as Northeasters or Nor'easters. Because most Nor'easters generally occur during winter weather months, these hazards have also been grouped as a type of severe winter weather storm. Types of severe winter weather events or conditions are further defined as follows:

- **Heavy Snow:** According to the National Weather Service (NWS), heavy snow is generally considered snowfall accumulating to a depth of 4 inches or more within 12 hours or less or snowfall accumulating to a depth of 6 inches or more within 24 hours or less. A snow squall is an intense but limited-duration period of moderate to heavy snowfall, also known as a snowstorm, accompanied by strong, gusty surface winds and possibly lightning (generally moderate to heavy snow showers) (NWS 2009).

- **Blizzard:** Blizzards are characterized by low temperatures, wind gusts of 35 miles per hour (mph) or more, and falling and/or blowing snow that reduces visibility to 0.25 mile or less for an extended period (3 or more hours). A severe blizzard is defined as having a wind velocity of 45 mph, temperatures of 10 °F or lower, and a high density of blowing snow with visibility frequently measured in feet over an extended period.

- **Sleet or Freezing Rain:** Sleet is defined as pellets of ice composed of frozen or mostly frozen raindrops or refrozen, partially melted snowflakes. These pellets of ice usually bounce after hitting the ground or other hard surfaces. Freezing rain is rain that falls as a liquid but freezes into a glaze upon contact with the ground. Both types of precipitation, even in small accumulations, can cause significant hazards to a community.

- **Ice Storm:** An ice storm is described as an occasion when damaging volumes of ice are expected to accumulate during freezing rain situations. Significant accumulations of ice pull down trees and utility lines, resulting in loss of power and means of communication. These accumulations of ice render walking and driving extremely dangerous and can create extreme hazards to motorists and pedestrians.

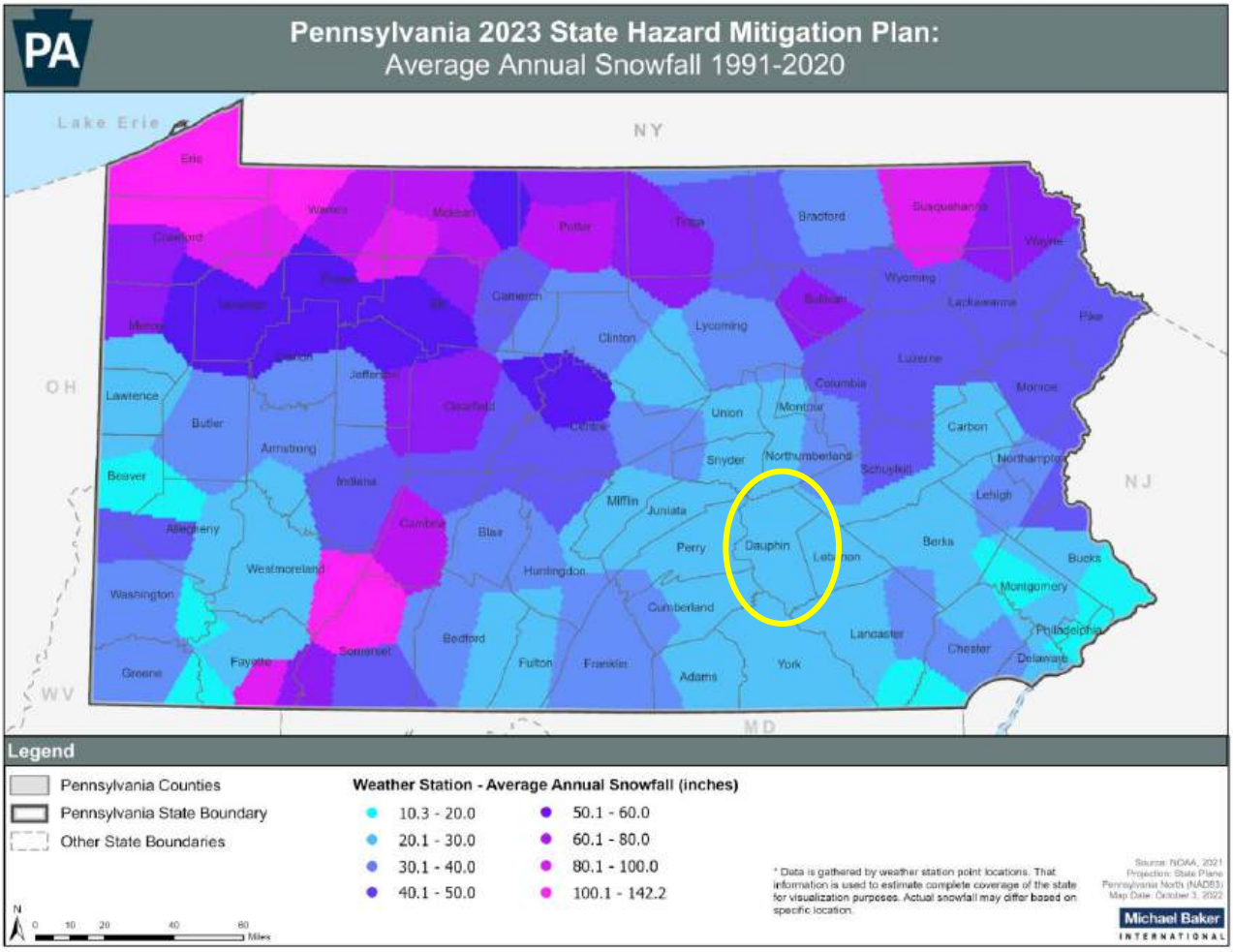
- **Nor'easter:** Nor'easters usually develop in the latitudes between Georgia and New Jersey, within 100 miles east or west of the East Coast. These storms progress generally northeastward and typically attain maximum intensity near New England and the Maritime Provinces of Canada. They nearly always bring precipitation in the form of heavy rain or snow, as well as winds of gale force, rough seas, and, occasionally, coastal flooding to the affected regions. These storms may occur at any time of year but are most frequent and most violent between September and April (NWS 2022). While some of the most devastating effects of Nor'easters occur in coastal areas (e.g., beach erosion, coastal flooding), effects on inland areas, like Dauphin County, may include heavy snow, strong winds, and blizzards. Section 4.3.8

profiles Nor'easters in greater detail as these types of events are grouped with hurricanes and tropical storms.

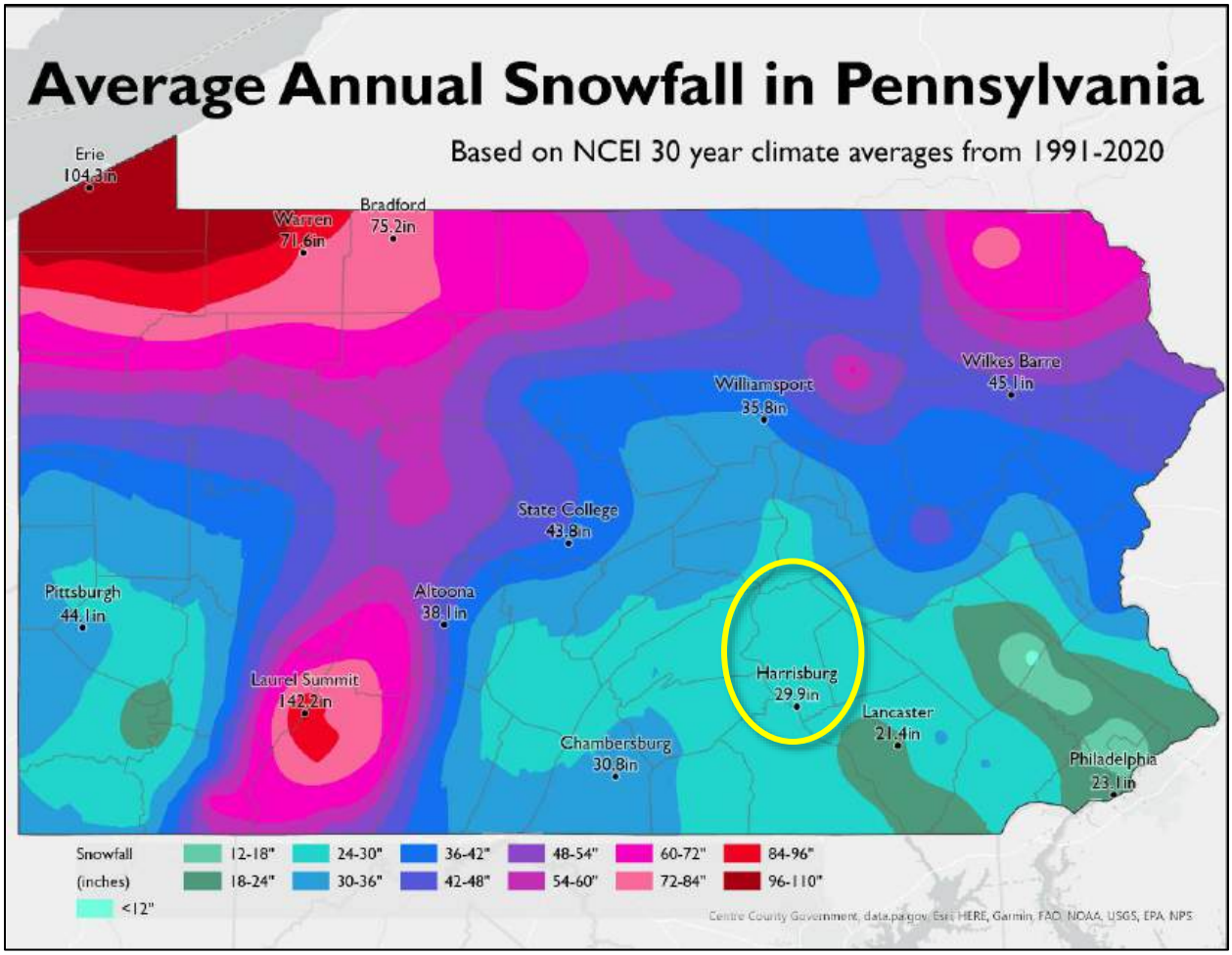
4.3.19.1 Location

Winter storms can consist of cold temperatures and heavy snow or ice. Major winter storms occur in Pennsylvania several times annually and are regional events. Every county in the Commonwealth, including Dauphin County, is subject to severe winter storms. According to Figure 4.3.19-1, between 1991 and 2020, Dauphin County experienced between 20 and 30 inches of snow each year (PEMA 2023).

Figure 4.3.19-1. Average Annual Snowfall (1991-2020) for Pennsylvania



Source: PEMA 2023
Note: Dauphin County is indicated by a yellow oval.



Source: (NWS State College PA 2024)
Notes: The yellow circle denotes where Dauphin County is located

The magnitude or severity of a severe winter storm depends on several factors including a region's climatological susceptibility to snowstorms, snowfall amounts, snowfall rates, wind speeds, temperatures, visibility, storm duration, topography, time of occurrence during the day (e.g., weekday versus weekend), and time of the season.

The extent of a severe winter storm can be classified by meteorological measurements and by evaluating its societal impacts. National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI) produces the Regional Snowfall Index (RSI) for significant snowstorms that affect the eastern two-thirds of the United States. The RSI ranks snowstorm impacts on a scale from 1 to 5. It is based on the spatial extent of the storm, the amount of snowfall, and the interaction of the extent and snowfall totals with population based on the 2010 Census. The NCEI has analyzed and assigned RSI values to over 500 storms since 1900 (NCEI 2022).

Table 4.3.199-1. Regional Snowfall Index (RSI) Ranking Categories for Significant Snowstorms

Category	Description	RSI Value
1	Notable	1-3
2	Significant	3-6
3	Major	6-10
4	Crippling	10-18
5	Extreme	18+

Source: NCEI 2023

4.3.19.2 Range of Magnitude

Winter storms consist of cold temperatures, heavy snow or ice, and sometimes strong winds. They begin as low-pressure systems that move through Pennsylvania following the jet stream. Being in the south-central portion of Pennsylvania, Dauphin County often experiences the effects of Nor'easter storms – low-pressure fronts that move northward along the Atlantic coastline, pulling large amounts of moisture off the Atlantic Ocean.

Due to their regular occurrence, these storms are considered hazards only when they result in damage to communications networks, impact vegetation, cause structural collapse, and/or cause very serious transportation problems and utility interruptions. Winter storms have also been known to contribute to severe flooding. A winter storm can adversely affect roadways, utilities, and business activities, and can cause frostbite or loss of life. These storms may include one or more of the following weather events:

- **Heavy Snowstorm:** Accumulations of four inches or more in six hours, or six inches or more in twelve hours.
- **Sleet Storm:** Significant accumulations of solid pellets that form from the freezing of raindrops or partially melted snowflakes causing slippery surfaces and posing hazards to pedestrians and motorists.
- **Ice Storm:** Significant accumulations of rain or drizzle freezing on objects (trees, power lines, roadways, etc.) as it strikes them, causing slippery surfaces and damage from the sheer weight of ice accumulation.
- **Blizzard:** Wind velocity of 35 miles per hour or more, temperatures below freezing, considerable blowing snow with visibility frequently below one-quarter mile prevailing over an extended period of time.
- **Severe Blizzard:** Wind velocity of 45 miles per hour, temperatures of 10 degrees Fahrenheit or lower, a high density of blowing snow with visibility frequently measured in feet prevailing over an extended period of time.

Any of the above events can result in the closing of major or secondary roads, particularly in rural locations, stranded motorists, transportation accidents, loss of utility services, and depletion of heating supplies. Environmental impacts often include damage to shrubbery and trees due to heavy snow loading, ice build-up, and/or high winds which can break limbs or even bring down large trees. Gradual melting of snow and ice provides excellent groundwater recharge. However, high temperatures following a heavy snowfall can cause rapid surface water runoff and severe flooding.

4.3.19.3 Past Occurrence

Many sources provided historical information regarding previous occurrences and losses associated with winter storm events throughout the Commonwealth of Pennsylvania and Dauphin County. With many sources reviewed for this plan, loss, and impact information for many events varied depending on the source. Therefore, the accuracy of the monetary figures discussed is based only on available information identified during research for

this plan. Monetary figures may also have been calculated for the region, based on entire storm damage, and include damage from other counties.

Between 1954 and 2024, the Federal Emergency Management Agency (FEMA) declared that the Commonwealth of Pennsylvania experienced eight winter storm-related disasters (DR) or emergencies (EM) classified as one or a combination of the following disaster types: severe winter storms, snowstorms, blizzards, winter storms, severe storms, and snowfalls. Generally, these disasters covered a wide region of the Commonwealth and therefore may have impacted many counties. However, not all counties were included in the disaster declarations. Dauphin County has been declared a disaster area as a result of four winter storm events (FEMA 2022).

Table 4.3.199-2. FEMA DR and EM Declarations for Winter Storm Events in Dauphin County

FEMA Declaration Number	Date(s) of Event	Incident Type	Title
EM-3105	March 13-17, 1993	Snowstorm	Severe Snowfall & Winter Storm
DR-1015	January 4 – February 25, 1994	Severe Storm	Severe Winter Storms
DR-1085	January 6-12, 1996	Snowstorm	Blizzard of '96
EM-3180	February 14-19, 2003	Severe Storm	Snow
DR-1898	February 5-11, 2010	Snowstorm	Severe Winter Storms and Snowstorms
DR-4267	January 22-23, 2016	Snowstorm	Severe Winter Storms and Snowstorms

Source: (FEMA 2024)

For this 2025 HMP update, known severe winter weather events that have impacted Dauphin County between 2019 and 2024 are identified in Table 4.3.199-3. This includes events presented in the 2020 Dauphin County HMP and events listed in the NOAA-NCEI storm events database. Only events that resulted in a disaster declaration or caused injuries, fatalities, or over $10,000 in damage are included in the table. With winter weather documentation being so extensive for Pennsylvania and Dauphin County, not all sources have been identified or researched. Therefore, the table below may not include all events that have occurred in the County.

Table 4.3.199-3. Notable Winter Storm Events in Dauphin County between 2019 and 2024

Dates of Event	Event Type	Fatalities	Injuries	Property Damage	FEMA Disaster Number	Description
February 11, 2019	Winter Storm	0	0	0	N/A	A Winter Storm produced 2 to 4 inches of snow and sleet, and greater than 0.25 of freezing rain across Dauphin County from February 11-12, 2019.
February 20, 2019	Winter Storm	0	0	0	N/A	A Winter Storm produced 6 to 8 inches of snow and sleet followed by greater than 0.25 of freezing rain across Dauphin County on February 20-21, 2019.
March 3, 2019	Winter Storm	0	0	0	N/A	A winter storm produced up to 6 inches of snow across Dauphin County from March 3-4, 2019.
December 16, 2020	Winter Storm	0	0	0	N/A	An early-season Nor'easter produced anywhere from 6 inches of snow and sleet in the Lower Susquehanna Valley up to 30 inches of snow in parts of Tioga County. Widespread travel impacts were observed, and it was the heaviest snowfall from a single event that many central Pennsylvania locations had seen in a few years. A winter storm produced 6 to 12 inches of snow across Dauphin County from December 16-17, 2020.
January 31, 2021	Winter Storm	0	0	0	N/A	A winter storm produced 9 to 16 inches of snow across Dauphin County from January 31 to February 2, 2021.
February 1, 2021	Winter Storm	0	0	0	N/A	A winter storm produced 9 to 16 inches of snow across Dauphin County from January 31 to February 2, 2021.
February 22, 2021	Winter Weather	0	0	0	N/A	A snow squall on the leading edge of a mesoscale band of heavy snow briefly dropped visibility to under one-quarter mile in and produced flash-freeze conditions in Dauphin County.

Dates of Event	Event Type	Fatalities	Injuries	Property Damage	FEMA Disaster Number	Description
January 6, 2022	Winter Storm	0	0	0	N/A	A quick-hitting winter storm produced 5 inches of snow across Dauphin County from the evening of January 6 through the early morning hours of January 7, 2022.
January 16, 2022	Winter Storm	N/A	N/A	N/A	N/A	Winter storm conditions were reported by county officials
March 12. 2022	Winter Storm	0	0	0	N/A	A winter storm produced 4 to 7 inches of snow across Dauphin County in less than 12 hours on March 12, 2022.
December 15, 2022	Winter Storm	0	1	0	N/A	A winter storm produced around an inch of snow, half an inch of sleet, and 0.10 to 0.20 of freezing rain across Dauphin County on December 15, 2022. As a result, a multi-vehicle accident occurred on the PA Turnpike westbound in Dublin Township. Some debris from that accident ended up in the eastbound lanes and caused another multi-vehicle accident there. There was one injury reported.

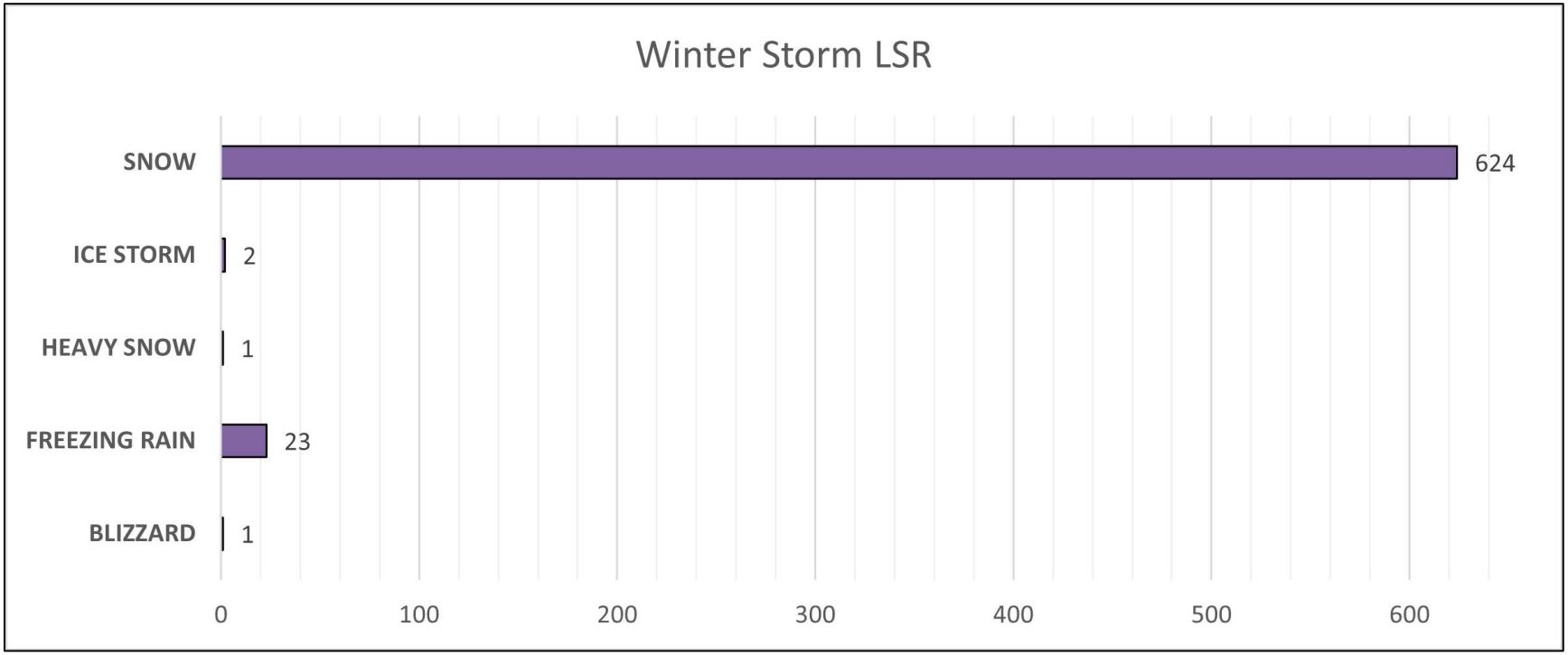
Source: NOAA-NCEI 2024; FEMA 2024

* *Many sources were consulted to provide an update on previous occurrences and losses; event details and loss/impact information may vary and have been summarized in the above table. No property damage or crop loss was reported by NOAA and USDA.*

DR *Major Disaster Declaration (FEMA)*
FEMA *Federal Emergency Management Agency*
Mph *Miles per Hour*
NCEI *National Centers for Environmental Information*
NOAA *National Oceanic and Atmospheric Administration*
N/A *Not Applicable*

Local Storm Reports (LSRs) from the National Weather Service were also used in determining previous occurrences, and the figure below represents a summary of all Winter Storm-related LSRs in the County between 2005 and September 2024. Data before 2005 was not readily available.

Figure 4.3.19-4 Winter Storm-Related LSRs for Dauphin County (2005-2024)



Source: (Iowa State University 2024)

4.3.19.4 Probability of Future Occurrence

Given the history of winter storm events that have impacted Dauphin County, future winter storm events of varying degrees will occur every year, and thus many people and properties are at risk from the winter storm hazard in the future.

For the 2025 HMP update, the most up-to-date data was collected to calculate the probability of future occurrence of winter storms (heavy snow, blizzard, sleet/freezing rain, winter weather, and winter storm) events for Dauphin County. Information from the NOAA-NCEI storm events database was used to identify the number of winter storm events that occurred between 1950 and 2024. Using these sources ensures the most accurate probability estimates possible. Table 4.3.19-4 below shows these statistics, as well as the annual average number of events and the estimated percent chance of an incident occurring in a given year. Based on these statistics, there is an estimated 100-percent chance of a winter storm event occurring in any given year in Dauphin County.

Table 4.3.199-4. Probability of Future Winter Storm Events

Hazard Type	Number of Occurrences Between 1950 and 2024	Percent Chance of Occurrence in Any Given Year
Blizzard	1	1.4%
Heavy Snow	23	31.0%
Ice Storm	6	8.1%
Winter Storm	32	43.2%
Winter Weather	2	2.7%
TOTAL:	64	85.3%

Sources: NOAA-NCEI 2024; FEMA 2024

Note: Disaster occurrences include federally declared disasters since the 1950 Federal Disaster Relief Act, and selected storm events since 1950. Due to limitations in data, not all severe winter weather events occurring between 1950 and 1996 are accounted for in the tally of occurrences. As a result, the number of hazard occurrences is underestimated.

Based on available historical data, future occurrences of winter storm events are considered *likely*, according to Risk Factor Methodology probability criteria further discussed in Section 4.4.

4.3.19.5 Vulnerability Assessment

To understand risk, a community must evaluate the assets that are exposed or vulnerable within the identified hazard area. Regarding winter storm events, all of Dauphin County has been identified as a hazard area. Therefore, all assets (population, structures, critical facilities, and lifelines), as described in Section 4.4, Hazard Vulnerability Summary, are potentially vulnerable. The following text evaluates and estimates the potential impact of the winter storm hazard on the county, including:

- Impact on (1) life, health, and safety; (2) general building stock; (3) critical facilities; (4) economy; (5) environment; and (6) future growth and development.
- Effects of climate change on vulnerability.
- Further data collection that will assist in understanding this hazard over time.

Impact on Life, Health, and Safety

Overall Population

According to the NOAA National Severe Storms Laboratory (NSSL), winter weather indirectly and deceptively kills hundreds of people in the United States every year, primarily from automobile accidents, overexertion, and exposure. Winter storms are often accompanied by strong winds creating blizzard conditions with blinding wind-driven snow, drifting snow, extreme cold temperatures, and dangerous wind chill. Winter storms are considered deceptive killers because most deaths and other impacts or losses are indirectly related to the storm. People can die in traffic accidents on icy roads, of heart attacks while shoveling snow, or of hypothermia from prolonged exposure to cold.

Heavy snow can immobilize a region and paralyze a city, shutting down air and rail transportation, stopping the flow of supplies, and disrupting medical and emergency services. First responders will have to take on additional responsibilities during winter storm events such as controlling traffic, debris removal from roads, answering a higher-than-normal call volume and demand, and responding to weather-related traffic accidents. First responders' safety may be at risk during on-scene operations and limited access to roads due to damaged infrastructure and debris may hinder their ability to respond to accidents promptly. Accumulations of snow can collapse buildings and knock down trees and power lines. In rural areas, homes and farms may be isolated for days, and unprotected livestock may be lost. In the mountains, heavy snow can lead to avalanches (NWS 2023).

Heavy accumulations of ice can bring down trees, electrical wires, telephone poles and lines, and communication towers. Communications and power can be disrupted for days while utility companies work to repair the extensive damage. Even small accumulations of ice may cause extreme hazards to motorists and pedestrians. Bridges and overpasses are particularly dangerous because they freeze before other surfaces (NWS 2023).

For the purposes of this HMP, the entire population of Dauphin County is considered exposed to winter storm events and death from falls, overexertion, and/or hypothermia from exposure while attempting to clear snow and ice.

Socially Vulnerable Populations

The homeless, elderly, and children are considered most susceptible to this hazard; the homeless due to their lack of shelter; the elderly and children due to their increased risk of injuries and death from falls and overexertion or hypothermia from attempts to clear snow and ice. Winter weather events can reduce the ability of these populations to access emergency services.

Residents with low incomes may not have access to housing, or their housing may be less able to withstand cold temperatures (e.g., homes with poor insulation and heating supply). Section 2, County Profile, of this HMP, provides population statistics regarding each participating municipality and a summary of the more vulnerable populations (over the age of 65 and individuals living below the U.S. Census poverty threshold).

Impact on General Building Stock

The entire general building stock inventory in Dauphin County is exposed and vulnerable to the winter storm hazard. In general, structural impacts include damage to roofs and building frames rather than building content. Current modeling tools are not available to estimate specific losses from this hazard.

An area especially vulnerable to the winter storm hazard is the floodplain. At-risk building stock and infrastructure in floodplains are presented in the flood hazard profile in Section 4.3.6. Generally, losses from flooding associated with winter storms should be less than those associated with a 1-percent or 0.2-percent flood.

Snow and ice melt can cause both riverine and urban flooding. Estimated losses caused by riverine flooding in the county are discussed in Section 4.3.6.

Impact on Critical Facilities

Full functionality of critical facilities such as police, fire, and medical facilities is essential for response during and after a severe winter storm event. These critical facility structures are largely constructed of concrete and masonry; therefore, they should only suffer minimal structural damage from severe winter storm events. Because power interruption can occur, backup power is recommended. Infrastructure at risk for this hazard includes roadways that could be damaged due to the application of salt and intermittent freezing and warming conditions that can damage roads over time. Severe snowfall requires the clearing of roadways and alerting citizens to dangerous conditions; following the winter season, resources for road maintenance and repair are required (NSSL 2022).

> Heavy accumulations of ice can bring down trees, electrical wires, telephone poles and lines, and communication towers. Communications and power can be disrupted for days while utility companies work to repair the extensive damage. Even small accumulations of ice may cause extreme hazards to motorists and pedestrians. Bridges and overpasses are particularly dangerous because they freeze before other surfaces (NSSL 2022).

Impact on the Economy

Infrastructure at risk from the winter storm hazard includes roadways that could be damaged by the application of salt and intermittent freezing and warming conditions that can damage roads over time. Costs of snow and ice removals, as well as repairs of roads undergoing freeze/thaw cycles, can drain local financial resources. Potential secondary impacts from winter storms also impact the local economy, including loss of utilities, interruption of transportation corridors, and loss of business function.

Impact on the Environment

Environmental impacts often include damage to trees and shrubs caused by heavy snow loading, ice build-up, and/or high winds, which can break limbs and down large trees. Indirect effects of winter storms include possible damage to surfaces and contamination of groundwater adjacent to roadway surfaces treated with salt, chemicals, and other de-icing materials (PEMA 2023).

Winter storms have a positive environmental impact, as the gradual melting of snow and ice annually recharges groundwater. However, abrupt high temperatures following a heavy snowfall can accelerate snowmelt, leading to rapid surface water runoff and severe flooding (PEMA 2023).

Future Changes that May Impact Vulnerability

Understanding future changes that impact vulnerability in the County can assist in planning for future development and ensuring that appropriate mitigation, planning, and preparedness measures are in place. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development.
- Projected changes in population.
- Other identified conditions as relevant and appropriate, including the impacts of climate change.

Future Growth and Development

Areas targeted for potential future growth and development within the next 5 to 10 years have been identified across the county at the municipal level and are further discussed in Section 2 of this HMP. Because Dauphin

County in its entirety has been identified as the hazard area vulnerable to the winter storm hazard, any new development will be exposed to associated risks. However, because of increased standards and codes, new development may be less vulnerable to severe winter weather hazards compared with the older building stock in the county.

Projected Changes in Population

As discussed in Section 2, County Profile, the Dauphin County population has been increasing and is projected to continue to increase in the coming decades. In addition, the population is aging. As the aging population grows, so too will the number of persons vulnerable to severe winter weather and extreme cold temperatures.

Effect of Climate Change on Vulnerability

Over the past 100 years, annual average temperatures have been rising across the Commonwealth. Warmer winters have led to a decrease in snow cover and an earlier arrival of spring. Recent analyses based on the Intergovernmental Panel on Climate Change models suggest a decrease in frequency and an increase in intensity of extra-tropical winter cyclones. However, based on the methodology applied, some models show no significant change in the storm track whereas others indicate a northward displacement of the storm track in the North Atlantic. For the mid-Atlantic region, there is little indication of a change in storm activity or track over Pennsylvania. An overall increase in winter precipitation is anticipated, with a decrease in snow and an increase in rain during the winter months. Projections regarding future occurrences of extra-tropical cyclones in Pennsylvania are substantially uncertain. Based on available information and projections, winter storms are anticipated to continue to affect Pennsylvania in the future.

Additional Data and Next Steps

The assessment above identifies vulnerable populations and economic losses associated with the winter storm hazard of concern. Historical data on structural losses to general building stock are not adequate to predict specific losses to this inventory; therefore, the percent of damage assumption methodology was applied. This methodology is based on the FEMA How-to Series (FEMA 386-2), Understanding Your Risks, Identifying and Estimating Losses (FEMA 2001), and FEMA's Using HAZUS-MH for Risk Assessment (FEMA 433) (FEMA 2015a). Acquisition of additional and actual valuation data regarding general building stock and critical infrastructure losses would further support future estimates of potential exposure of and damage to the general building stock inventory.

4.4 HAZARD VULNERABILITY SUMMARY

This section describes the methodology and tools used to support the risk assessment process.

4.4.1 Methodology

A risk assessment is a process that involves measuring the potential loss of life, personal injury, economic losses, and property damage resulting from identified hazards. It allows planning personnel to address and reduce hazard impacts and emergency management personnel to establish early response priorities by identifying potential hazards and vulnerable assets. Results of the risk assessment are used in subsequent mitigation planning processes, including determining and prioritizing mitigation actions that reduce each jurisdiction's risk to a specified hazard. Past, present, and future conditions must be evaluated to assess risk most accurately for the county and each jurisdiction. The process focuses on the following elements:

- **Hazard Identification** – Use all available information to determine what types of hazards might affect a jurisdiction
- **Profile Each Hazard** – Understand each hazard in terms of:
    - Location – the geographic area most affected by the hazard
    - Extent – the severity of each hazard
    - Range of magnitude
    - Previous occurrences and losses
    - Probability of future hazard events
- **Assess Vulnerability**
    - **Exposure identification** – Estimate the total number of assets in the jurisdiction that is likely to experience a hazard event by overlaying hazard maps with the asset inventories.
    - **Vulnerability identification and loss estimation** – Assess the impact of hazard events on the people, property, environment, economy, and lands of the region, including estimates of the cost of potential damage or costs that could be avoided by mitigation.

The following summarizes the asset inventories, methodology, and tools used to support the risk assessment process.

Asset Inventories

Tetra Tech identified Dauphin County assets to assess potential exposure and loss associated with the hazards of concern. For this Hazard Mitigation Plan (HMP) update, Dauphin County assessed the vulnerability of the following types of assets: population, buildings, critical facilities/infrastructure, and the environment. Some assets are more vulnerable because of their physical characteristics or socioeconomic uses. To protect individual privacy and the security of critical facilities, information on properties assessed is presented in aggregate without details about specific individual personal or public properties.

Population

Tetra Tech used the total population statistics from the 2020 Decennial Census data and 2018-2022 American Community Survey (ACS) 5-year estimates for vulnerable populations to estimate the exposure and potential impacts to the County's population in place of the 2020 U.S. Census block estimates. Borough and township populations were extracted directly from the Census Bureau and ACS. Population counts at the jurisdictional level were averaged among the residential structures in the County to estimate the population at the structure level. This estimate is a more precise distribution of population across the county compared to only using the Census block or Census tract boundaries. Limitations of these analyses are recognized, and thus the results are used only to provide a general estimate for planning purposes.

As discussed in Section 2 (County Profile), research has shown that some populations are at greater risk from hazard events because of decreased resources or physical abilities. Vulnerable populations in Dauphin County included in the risk assessment are children, the elderly, people living in low-income households, persons with a disability, and non-English speaking persons.

Buildings

Tetra Tech created a custom general countywide building stock inventory for the 2020 HMP. For the 2025 HMP, the 2020 building stock was used as a foundation, and new building centroids were added where there were previously no building footprints from the 2020 HMP. These new building centroids were building footprints that were provided by Dauphin County. The building inventory attributes were completed using parcel tax assessor information provided by Dauphin County.

Attributes provided in the spatial files were used to further define each structure, such as the year built, number of stories, occupancy class, and square footage. The centroid of each building footprint was used to estimate the building location. Structural and content replacement cost values (RCV) were calculated for each building using the available assessor data, the building footprint, and RSMeans 2024 values.

A regional location factor for Dauphin County was applied based on the individual building stock's zip code location:

RCV Regional Location Factor		
Zip Code	**Residential**	**Non-Residential**
17005 – 17177	0.96	0.99
17980	0.86	0.91

Replacement cost value is the current cost of returning an asset to its pre-damaged condition using the present-day cost of labor and materials. Total replacement cost value consists of both the structural cost to replace a building and the estimated value of building contents. The occupancy classes available in Hazus were condensed into the categories of residential, commercial, industrial, agricultural, religious, governmental, and educational to facilitate the analysis and presentation of results. Residential loss estimates addressed both multi-family and single-family dwellings.

Critical Facilities

The critical facility inventory, which includes essential facilities, utilities, transportation features, and user-defined facilities (as outlined in Section 2) was updated beginning with GIS data provided by the Dauphin County (2024), HIFLD (2020 & 2023) and Department of Human Services (2024). To protect individual privacy and the security of assets, information is presented in aggregate, without details about specific individual properties or facilities. Tetra Tech updated the default inventory in Hazus with the critical facility inventory generated for this plan.

New Development

The county has identified Growth Areas, as described in Section 4.4.4, below. The 2018-2023 American Community Survey estimates that Dauphin County has seen construction of 3,519 housing units across the planning area (U.S. Census Bureau, 2023).

Methodology

To address the requirements of the DMA 2000 and better understand potential vulnerability and losses associated with hazards of concern, Dauphin County used standardized tools, combined with local, state, and federal data

and expertise to conduct the risk assessment. Three different levels of analysis were used depending on the data available for each hazard, as described below.

1. ***Historical Occurrences and Qualitative Analysis*** – This analysis includes an examination of historical impacts to understand potential impacts of future events of similar size. In addition, potential impacts and losses are discussed qualitatively using the best available data and professional judgment.
2. ***Exposure Assessment*** – This analysis involves overlaying available spatial hazard layers, or hazards with defined extent and locations, with assets in GIS to determine which assets are located in the impact area of the hazard. The analysis highlights which assets might be affected by the hazard. If the center of each asset is located in the hazard area, it is deemed exposed and potentially vulnerable to the hazard.
3. ***Loss Estimation*** – The FEMA Hazus modeling software was used to estimate potential losses for the following hazards: flood, earthquake, and hurricane (wind). In addition, an examination of historical impacts and an exposure assessment were conducted for these spatially delineated hazards.

Table 4.4-1. Summary of Risk Assessment Analyses

Hazard	Data Analyzed			
	Population	General Building Stock	Critical Facilities	Environment
Building and Structure Collapse	Q	Q	Q	Q
Cyber Attack	Q	Q	Q	Q
Dam Failure	E	E	E	Q
Drought and Water Supply Deficiencies	Q	Q	Q	Q
Environmental Hazard – Hazardous Materials Release	E	E	E	Q
Environmental Hazard – Gas and Liquid Pipelines	E	E	E	Q
Flood, Flash Flood, Ice Jam	E, H	E, H	E, H	Q
Hurricane, Tropical Storm, Nor'easter	E, H	E, H	E, H	Q
Invasive Species	Q	Q	Q	Q
Landslide	E	E	E	Q
Opioid Addiction Response	Q	Q	Q	Q
Pandemic and Infectious Disease	Q	Q	Q	Q
Radon Exposure	Q	Q	Q	Q
Subsidence and Sinkholes	E	E	E	Q
Tornado, Windstorm	Q	Q	Q	Q
Transportation Accident	Q	Q	Q	Q
Utility Interruption	Q	Q	Q	Q
Wildfire	E	E	E	Q
Winter Storm	Q	Q	Q	Q

Notes: E – Exposure analysis; H – Hazus analysis; Q – Qualitative analysis

Hazards U.S. – Multi-Hazard (Hazus)

In 1997, FEMA developed a standardized model for estimating losses caused by earthquakes, known as Hazards U.S. or Hazus. Hazus was developed in response to the need for more effective national-, state-, and community-level planning and for the identification of areas that face the highest risk and potential for loss. Hazus was expanded into a multi-hazard (MH) methodology with new models for estimating potential losses from wind (severe storms) and flood (riverine) hazards. Hazus is a GIS-based software tool that applies engineering and

scientific risk calculations, which have been developed by hazard and information technology experts, to provide defensible damage and loss estimates. These methodologies are accepted by FEMA and provide a consistent framework for assessing risk across a variety of hazards. The GIS framework also supports the evaluation of hazards and assessment of inventory and loss estimates for these hazards.

Hazus uses GIS technology to produce damage reports, detailed maps, and analytical reports that estimate a community's direct physical damage to building stock, critical facilities, transportation systems, and utility systems. To generate this information, Hazus uses default Hazus-provided data for inventory, vulnerability, and hazards. This default data can be supplemented with local data to provide a more refined analysis. Damage reports can include induced damage (inundation, fire, threats posed by hazardous materials and debris) and direct economic and social losses (casualties, shelter requirements, economic impact) depending on the hazard and available local data. The open data architecture of Hazus can be used to manage community GIS data in a central location. The use of this software also promotes consistency of data output now and in the future and standardization of data collection and storage. More information on Hazus is available at http://www.fema.gov/hazus.

In general, probabilistic analyses were performed to develop the expected and estimated distribution of losses (mean return period losses) for the flood and wind hazards. The probabilistic model generates estimated damages and losses for specified return periods (e.g., 100- and 500-year). For annualized losses, Hazus calculates the maximum potential annual dollar loss resulting from various return periods averaged on a per-year basis. The model sums all Hazus-supplied return periods (e.g., 10, 50, 100, 200, 500) multiplied by the return period probability (as a weighted calculation) to calculate the estimated cost of a hazard each year. Table 4.4-2 displays the various levels of analyses that can be conducted using the Hazus software.

Table 4.4-2. Summary of Hazus Analysis Levels

Hazus-MH Analysis Levels	
Level 1	Hazus-MH provided hazard and inventory data with minimal outside data collection or mapping.
Level 2	The analysis involves augmenting the Hazus-MH-provided hazard and inventory data with more recent or detailed data for the study region, referred to as local data.
Level 3	The analysis involves adjusting the built-in loss estimation models used for the hazard loss analyses and is typically done in conjunction with the use of local data.

Source: FEMA 2019

Dam Failure

To assess the vulnerability of Dauphin County to dam failure, an exposure assessment was conducted. The county's assets (population, buildings, and critical facilities) were analyzed to determine if they were within the dam inundation areas (USACE 2024). Dam Safety organizations and regulations, including the PADEP, FEMA, U.S. Army Corps of Engineers, and Federal Energy Regulatory Commission were examined.

A vulnerability analysis was conducted for the County's assets using dam failure inundation mapping provided by Dauphin County for the following Dams:

- Center Campus Pond No. 1
- DeHart Dam
- Hidden Valley
- Jacobs Creek
- Manada Golf Club Pond
- Yingst

Environmental Hazard – Hazardous Material Release & Gas and Liquid Pipeline

Overall, potential losses from hazardous materials incidents are difficult to quantify due to the many variables and human elements. Data regarding this hazard were obtained from Dauphin County and the Planning Partnership as well as appropriate state and federal resources. The exposure analysis was conducted for the county's assets (population, building stock, critical facilities) using a radius around potential hazardous materials incident sites as follows: exposure within a half mile of major roadways, railways, and pipelines, as well as exposure within unique radii supplied by the county for hazardous material facilities.

Asset data (population, building stock, and critical facilities) presented in the County Profile (Section 2) were used to support an evaluation of assets exposed and potential impacts and losses associated with this hazard. To determine what assets are exposed to wildfire, available and appropriate GIS data were overlaid with the hazard area.

Flood, Flash Flood, Ice Jam

The 1-percent and 0.2-percent annual chance of flood events were examined to evaluate the county's risk from the flood hazard. These flood events are generally those considered by planners and evaluated under federal programs such as NFIP. The following data was used to evaluate exposure and determine potential future losses for this plan update:

- The effective Dauphin County FEMA Digital Flood Insurance Rate Maps (DFIRMs) dated August 2012.
- The 1-percent annual chance flood depth grid was generated using the 2012 FEMA DFIRM and Dauphin County Digital Elevation Model (DEM).

The effective Dauphin County FEMA DFIRM published in 2012 was used to evaluate exposure and determine potential future losses. The depth grid was integrated into the Hazus riverine flood model used to estimate potential losses for the 1-percent annual chance flood event. To estimate exposure to the 1-percent and 0.2-percent annual chance flood events, the DFIRM flood boundaries were overlaid on the centroids of updated assets (population, building stock, and critical facilities). Centroids that intersected the flood boundaries were totaled to estimate the building replacement cost value and population vulnerable to flood inundation areas. A Level 2 Hazus riverine flood analysis was performed. Both the critical facility and building inventories were formatted to be compatible with Hazus v6.1 and its Comprehensive Data Management System (CDMS).

Once updated with the inventories, the Hazus riverine flood model was run to estimate potential losses in Dauphin County for the 1 percent annual chance of flood events. A user-defined analysis was also performed for the building stock. Buildings located within the floodplain were imported as user-defined facilities to estimate potential losses to the building stock at the structural level. Hazus v6.1 calculated the estimated potential losses to the population (default 2020 U.S. Census data across dasymetric blocks), potential damages to the general building stock, and potential damages to critical facility inventories based on the depth grids generated and the default Hazus v6.1 damage functions in the flood model.

Hurricane

A Hazus probabilistic analysis was performed to analyze the wind hazard losses for Dauphin County for the 500-year mean return period (MRP) event. The probabilistic Hazus hurricane model activates a database of thousands of potential storms that have tracks and intensities reflecting the full spectrum of Atlantic hurricanes observed since 1886 and identifies those with tracks associated with Dauphin County. Hazus v6.1 contains data on historic hurricane events and wind speeds. It also includes surface roughness and vegetation (tree coverage) maps for the area. Surface roughness and vegetation data support the modeling of wind force across various types of land

surfaces. Default demographic and updated building and critical facility inventories in Hazus v6.1 were used for the analysis. Although damages are estimated at the Census tract level, results were presented at the municipal level. Since multiple census tracts contain more than one jurisdiction, a density analysis was used to extract the percentage of building structures that fall within each tract and jurisdiction. The percentage was multiplied against the results calculated for each tract and summed for each jurisdiction.

Wildfire

The Wildfire-Urban Interface (Interface and Intermix) obtained through the SILVIS Laboratory, Department of Forest Ecology and Management, University of Wisconsin – Madison, was referenced to delineate wildfire hazard areas. The University of Wisconsin – Madison wildland fire hazard areas are based on the 2020 Census and 2021 National Land Cover Dataset and the Protected Areas Database. For this risk assessment, the high-, medium-, and low-density interface areas were combined and used as the "Interface" hazard area, and the high-, medium-, and low-density intermix areas were combined and used as the "Intermix" hazard areas. Asset data (population, building stock, and critical facilities) presented in the County Profile (Section 2) were used to support an evaluation of assets exposed and potential impacts and losses associated with this hazard. To determine what assets are exposed to wildfire, available and appropriate GIS data were overlaid with the hazard area.

Winter Storm

All of Dauphin County is exposed and vulnerable to the winter storm hazard. In general, structural impacts include damage to roofs and building frames, rather than building content. Current modeling tools are not available to estimate specific losses for this hazard. A percentage of the custom-building stock structural replacement cost value was utilized to estimate damages that could result from winter storm conditions (i.e., 1 percent, 5 percent, and 10 percent of total replacement cost value). Given professional knowledge and currently available information, the potential losses for this hazard are considered to be overestimated, hence providing a conservative estimate for losses associated with winter storm events.

Qualitative Analyses

For many of the hazards evaluated in this risk assessment, historical data are not adequate to model future losses at this time. Where GIS data are not available, Tetra Tech conducted a qualitative analysis for the following hazards using the best available data and professional judgment. Multiple federal, state, and academic sources were used to evaluate these hazards:

- Building and Structure Collapse
- Cyber Attack
- Drought
- Invasive Species
- Opioid Addiction Response
- Pandemic
- Radon Exposure
- Tornado, Windstorm
- Transportation Accident
- Utility Interruption

Data Source Summary

Table 4.4-3 summarizes the sources of data used in the risk assessment.

Table 4.4-3. Data Source Summary

Data	Source(s)	Date(s)	Format
Population data	U.S. Census Bureau American Community Survey (ACS) 5-Year Estimates Department of Economic and Social Affairs Population Division	2020 2018-2022 2024	CSV converted to Digital (GIS) format Digital (GIS) format
Building Inventory	Dauphin Parcel Data Dauphin Building Footprints	2024	Digital (GIS) format
Critical Facilities	Dauphin County Planning Partnership and County Jurisdictions Department of Human Services HIFLD (Homeland Infrastructure Foundation-Level Data)	2024 2020/2023 2024	Digital (GIS) format
Digitized Effective Flood Insurance Rate Map (FIRM) maps	Federal Emergency Management Agency (FEMA)	2012	Digital (GIS) format
Digital Elevation Model	Dauphin County	n.d.	Digital (GIS) format
Road Network	Dauphin County	2024	Digital (GIS) format
Rail Network	Pennsylvania Department of Transportation (PennDOT)	2024	Digital (GIS) format
Wildfire-Urban Interface	Spatial Analysis For Conservation and Sustainability (SILVIS) Lab Department of Forest and Wildlife Ecology University of Wisconsin-Madison	2020	Digital (GIS) format
Subsidence Hazard Area (Karst)	United States Geological Survey (USGS)	2014	Digital (GIS) format
SARA Sites	Dauphin County	2024	CSV converted to Digital (GIS) format
Landslide Hazard Area (Steep Slope)	Dauphin County Tetra Tech	n.d.; 2021	Digital (GIS) format
Levee Protection Area	Federal Emergency Management Agency (FEMA)	2012	Digital (GIS) format
Natural Gas Pipelines	U.S. Energy Information Administration (US EIA)	2020	Digital (GIS) format

Limitations

For this risk assessment, the loss estimates, exposure assessments, and hazard-specific vulnerability evaluations rely on the best available data and methodologies. Uncertainties are inherent in any loss estimation methodology and arise in part from incomplete scientific knowledge concerning natural hazards and their effects on the built environment. Uncertainties also result from the following:

1) Approximations and simplifications necessary to conduct such a study.
2) Incomplete or dated inventory, demographic, or economic parameter data.
3) The unique nature, geographic extent, and severity of each hazard.
4) Mitigation measures already employed by the participating municipalities.
5) The amount of advance notice residents have to prepare for a specific hazard event.

These factors can result in a range of uncertainty in loss estimates, possibly by a factor of two or more. Therefore, potential exposure and loss estimates are approximate. These results do not predict precise results and should be used to understand relative risk. Over the long term, Dauphin County will collect additional data and update and refine existing inventories to assist in estimating potential losses.

Potential economic loss is based on the present value of the general building stock utilizing the best available data. The county acknowledges significant impacts could occur to critical facilities and infrastructure as a result of these hazard events, causing great economic loss. However, monetized damage estimates to critical facilities and infrastructure and economic impacts were not quantified and require more detailed loss analyses. In addition, economic impacts on industries such as tourism and the real estate market were not analyzed.

4.4.2 Ranking Results

As discussed in Section 4.2, Hazard Identification, Tetra Tech selected and considered a comprehensive range of natural and non-natural hazards that pose significant risks to Dauphin County. However, the communities in Dauphin County have differing levels of exposure and vulnerability to each of these hazards. It is important for each community participating in this plan to recognize those hazards that pose the greatest risk to their community and direct their attention and resources accordingly to manage risk effectively and efficiently.

To this end, a relative hazard risk ranking process was conducted for the county using the Risk Factor (RF) methodology identified in Section 5 and Appendix 9 of the Pennsylvania Emergency Management Agency's (PEMA) All-Hazard Planning Standard Operating Guide (Commonwealth of Pennsylvania, 2024). The guidance states:

> *The RF approach produces numerical values that allow identified hazards to be ranked against one another (the higher the RF value, the greater the hazard risk). RF values are obtained by assigning varying degrees of risk to five categories for each hazard: probability, impact, spatial extent, warning time, and duration.*
>
> *To calculate the RF value for a given hazard, the assigned risk value for each category is multiplied by the weighting factor. The sum of all five categories equals the final RF value, as demonstrated in the example equation below:*

Risk Factor Methodology Equation

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

Hazards identified as high-risk have RFs greater than or equal to 2.5. RFs ranging from 2.0 to 2.4 are considered moderate-risk hazards. Hazards with RFs less than 2.0 are considered low-risk.

Table 4.4-4 identifies the five risk assessment categories, the criteria, and associated risk level indices used to quantify their risk, and the suggested weighting factor (weight value) applied to each risk assessment category. Table 4.4-5 shows the values of five risk assessment categories for each of Dauphin County's hazards and each hazard's RF.

Table 4.4-4. Summary of Risk Factor (RF) Approach

Summary of Risk Factor (RF) Methodology				
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	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	1	10%
	LESS THAN 24 HRS	SELF-DEFINED	2	
	LESS THAN 1 WEEK	SELF-DEFINED	3	
	MORE THAN 1 WEEK	SELF-DEFINED	4	

(NOTE: Levels of warning time and criteria that define them may be adjusted based on hazard addressed.)

Source: (Commonwealth of Pennsylvania, 2024)

Table 4.4-5. Risk Ranking for Dauphin County

Risk	Hazard	Risk Assessment Category					Risk Factor (RF)
		Probability	Impact	Spatial Extent	Warning Time	Duration	
HIGH	Flood, Flash Flood, and Ice Jam	4	3	4	4	3	**3.6**
	Cyber Attack	4	2	4	4	2	**3.2**
	Drought	4	2	4	1	4	**3.1**
	Opioid Addiction Response	4	3	1	4	4	**3.1**
	Subsidence and Sinkholes	4	3	1	4	4	**3.1**
	Winter Storm	3	3	4	2	3	**3.1**
	Tornado, Windstorm	4	2	3	3	3	**3.0**
	Transportation Accident	4	2	4	3	1	**3.0**
	Utility Interruption	4	3	2	4	1	**3.0**
	Environmental Hazards – HazMat Release	4	2	2	4	2	**2.8**
	Invasive Species	4	1	4	1	4	**2.8**
	Pandemic and Infectious Diseases	3	2	4	1	4	**2.8**
	Hurricane, Tropical Storm, Nor'easter	2	3	4	1	3	**2.7**
	Wildfire	4	1	2	3	3	**2.5**
MODERATE	Radon Exposure	4	1	1	3	4	**2.4**
	Building and Structure Collapse	4	1	1	4	1	**2.2**
	Dam Failure	1	3	2	2	3	**2.1**
LOW	Environmental Hazards – Gas & Liquid Pipelines	1	1	2	4	2	**1.6**
	Landslide	1	1	2	2	2	**1.4**

Based on these results, there are 14 high-risk hazards, three moderate-risk hazards, and two low-risk hazards in Dauphin County. Mitigation actions were developed for all hazards (see Section 6.4). The threat posed to life and property by moderate-risk and high-risk hazards is considered significant enough to warrant the need for establishing hazard-specific mitigation actions. A risk assessment result for the entire county does not mean that each municipality is at the same amount of risk for each hazard. Table 4.4-6 shows the different municipalities in Dauphin County and indicates whether each municipality considers their risk to be greater than (>), less than (<), or equal to (=) the RF assigned to the county as a whole. Municipal officials' responses were then reviewed and updated (as appropriate) by the Planning Team.

Table 4.4-6. Jurisdictional Risk by Municipality

Municipality	Building or Structure Collapse	Cyber Attack	Dam Failure	Drought	Env. Haz.: Gas & Liquid Pipelines	Env. Haz.: HazMat Releases	Floods, Flash Floods, and Ice Jams	Hurricane, Tropical Storm, Nor'easter	Invasive Species	Landslide	Opioid Addiction Response	Pandemic and Infectious Disease	Radon Exposure	Subsidence, Sinkholes	Tornado, Windstorm	Transportation Accidents	Utility Interruption	Wildfire	Winter Storm
	2.2	3.2	2.1	3.1	1.6	2.8	3.6	2.7	2.8	1.4	3.1	2.8	2.4	3.1	3.0	3.0	3.0	2.5	3.1
Berrysburg (B)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Conewago (T)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Dauphin (B)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Derry (T)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
East Hanover (T)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Elizabethville (B)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Gratz (B)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Halifax (B)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Halifax (T)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Harrisburg (C)	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=	=	=	=
Highspire (B)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Hummelstown (B)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Jackson (T)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Jefferson (T)	=	<	<	=	=	=	=	=	=	=	=	=	=	=	=	=	=	>	=
Londonderry (T)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Lower Paxton (T)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Lower Swatara (T)	<	<	<	=	=	=	=	=	=	=	=	=	<	<	=	=	<	=	=
Lykens (B)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Lykens (T)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Middle Paxton (T)	>	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=	=	=
Middletown (B)	=	<	=	=	=	=	=	=	=	=	<	=	=	<	=	=	=	=	=
Mifflin (T)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=

Municipality	Building or Structure Collapse	Cyber Attack	Dam Failure	Drought	Env. Haz.: Gas & Liquid Pipelines	Env. Haz.: HazMat Releases	Floods, Flash Floods, and Ice Jams	Hurricane, Tropical Storm, Nor'easter	Invasive Species	Landslide	Opioid Addiction Response	Pandemic and Infectious Disease	Radon Exposure	Subsidence, Sinkholes	Tornado, Windstorm	Transportation Accidents	Utility Interruption	Wildfire	Winter Storm
	2.2	3.2	2.1	3.1	1.6	2.8	3.6	2.7	2.8	1.4	3.1	2.8	2.4	3.1	3.0	3.0	3.0	2.5	3.1
Millersburg (B)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Paxtang (B)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	<	=	=
Penbrook (B)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	<	=	=
Pillow (B)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Reed (T)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Royalton (B)	=	=	=	=	=	>	>	>	=	=	=	=	=	<	=	=	=	=	=
Rush (T)	=	<	>	=	=	=	=	=	=	=	=	=	=	=	=	=	=	<	=
South Hanover (T)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	>
Steelton (B)	=	=	<	=	>	=	=	=	<	=	=	>	=	>	=	=	=	=	=
Susquehanna (T)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Swatara (T)	=	=	=	=	=	=	=	=	=	=	=	=	>	=	>	=	=	=	=
Upper Paxton (T)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Washington (T)	=	=	=	=	<	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Wayne (T)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
West Hanover (T)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Wiconisco (T)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Williams (T)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
Williamstown (B)	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=

Notes: (B)=Borough; (C)=City; (T)=Township; Dauphin County's overall RF rankings are color-coded and displayed in the header row of this table and are pulled from Table 4.4-5

4.4.3 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. Localized events could yield lower losses, while regional events could yield higher losses.

The data utilized to conduct the vulnerability assessment came from a variety of sources, as noted throughout each hazard profile and Appendix A. As summarized in the Methodology subsection, the 2020 U.S. Census demographic data, a custom-built building inventory and its associated replacement cost value of the structures and contents, and a comprehensive critical facility inventory were used for Dauphin County.

Potential loss estimates provided in Section 4.3 (Hazard Profiles) were either based on historical losses, current-condition losses, and/or predictive losses by performing spatial analyses in GIS and hazard probabilistic modeling. In summary, HAZUS v6.1 was used to estimate potential losses for the flood, hurricane/tropical storm, and tornado/windstorm hazards. For many of the hazards evaluated, historical data are not adequate to model future losses at this time. For these hazards of concern, areas, and inventory susceptible to specific hazards were mapped, and exposure was evaluated to help guide mitigation efforts (mitigation efforts are discussed further in Section 6). Spatial analyses were conducted to assess potential exposure for hazards of concern with delineated hazard areas: dam failure; environmental hazard hazardous materials release; flood, flash flood, and ice jam; landslide; subsidence and sinkhole; and wildfire. Where GIS data are not available for some hazards, a qualitative analysis was conducted using the best available data and professional judgment.

4.4.4 Future Development and Vulnerability

Risk and vulnerability to natural and human-caused hazard events are not static. Risk will increase or decrease as counties and municipalities see changes in land use and development, as well as changes in population. Population change (in terms of total and demographics) and the age of the housing stock continue to be the main indicators of vulnerability change in Dauphin County.

Dauphin County experienced a 6.8 percent increase in population from 2010 to 2020, as summarized in Section 2 of this HMP. According to PA DEP, the population in Dauphin County is projected to continue to increase over the coming decades.

Continued analysis of the population's age structure in Dauphin County will provide a deeper understanding of future vulnerability to at-risk populations. Approximately six percent of the county's total population is aged 65 and older (U.S. Census 2020). As these residents continue to age in the county, they might have increased access and functional needs. For example, many residents in this age bracket might be unable to drive; therefore, the development of special evacuation plans for them will be necessary. They might also have hearing or vision impairments that could hinder their reception of emergency instructions. Both older and younger populations are at higher risk of contracting certain diseases. Dauphin County's combined under-5-years-of-age and over-65 populations constitute approximately 23 percent of its population (U.S. Census 2020).

According to the 2022 American Community Survey 5-Year Estimates, 12.7 percent of residents of Dauphin County are living with a disability. Many residents living in group quarters have special needs. It is important to ensure that each group-quarter facility has an emergency plan to account for the unique needs of its residents during a hazard event.

Future hazard mitigation strategies should consider addressing language barriers to ensure all residents can receive emergency instructions since 3.2 percent of Dauphin County's population is not proficient in English.

In addition, remote and sparsely populated municipalities face higher vulnerability to hazards because they do not have as easy access to care facilities or response personnel. For instance, sparsely populated municipalities such as Jefferson Township face increased vulnerability to tornadoes, windstorms, and winter storms due to isolation, access issues, and longer emergency response times.

The aging housing stock in Dauphin County is another source of current and future vulnerability in many hazard events. As discussed throughout Section 4, Risk Assessment, Dauphin County can experience strong gusts of wind during windstorms, tornadoes, hurricanes, tropical storms, or Nor'easters. The structures of these older buildings put them at greater risk of destruction under these strong wind conditions. These structures might also be at risk during flooding and winter storm events if the materials are either not strong enough to withstand the pressure or weight of the precipitation or are liable to leak, causing further risk of destruction to the house.

While any development increases the risk of damage and loss to natural hazards, several factors indicate that this increase in risk is low and mitigated by existing federal, state, county, and local regulations, policies, and programs. A total of 24 municipalities in Dauphin County have adopted subdivision regulations and 3 municipalities have adopted local zoning regulations.

Dauphin County and its municipalities' areas of potential growth have remained the same as the 2021 HMP. Figure 4.4.4-1 and Figure 4.4.4-2 show the Dauphin County growth areas and their vulnerability to hazards.

Figure 4.4.4-1. Dauphin County Growth Areas and Dam Hazard Areas

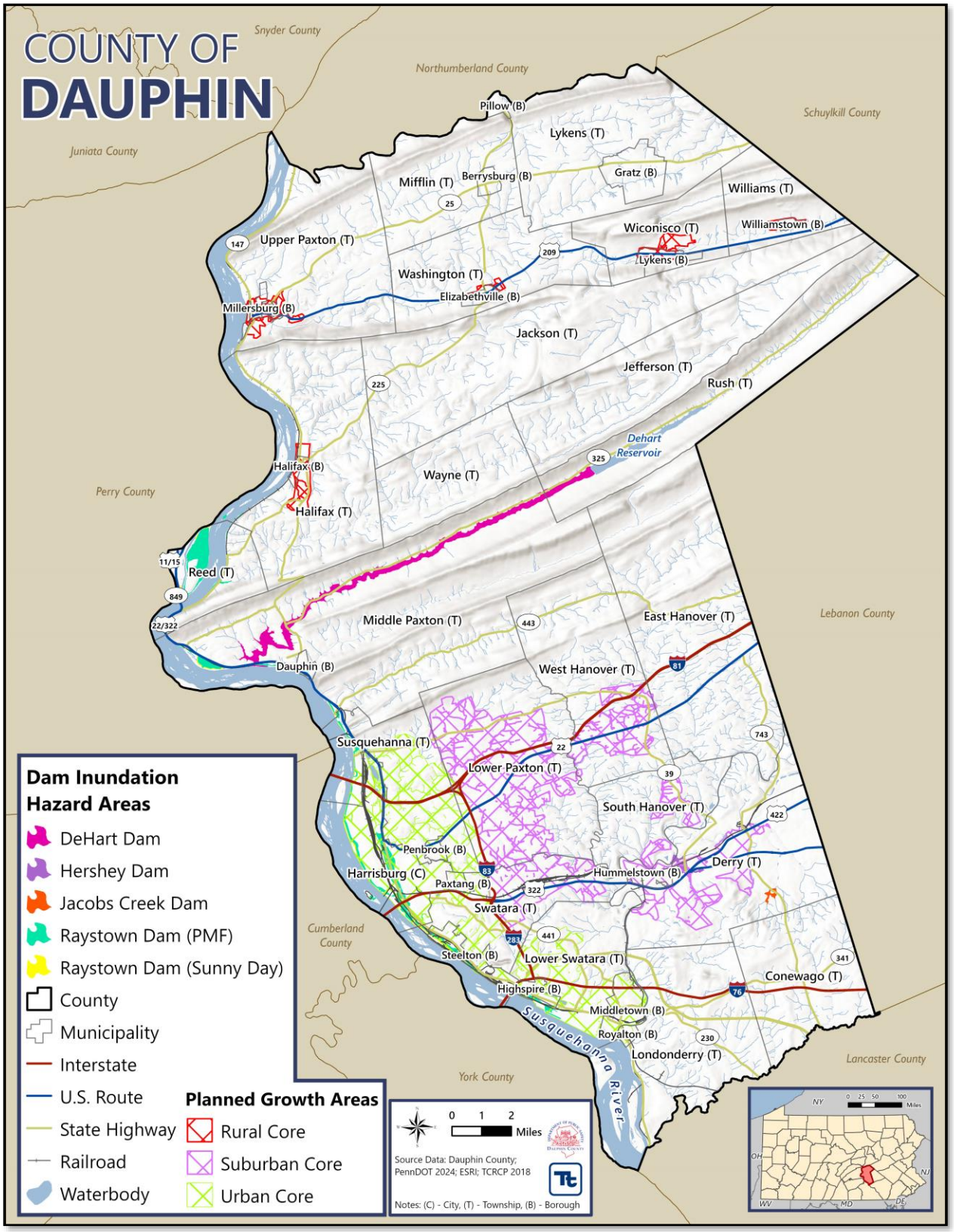


Figure 4.4.4-2. Dauphin County Growth Areas and Flood Hazards

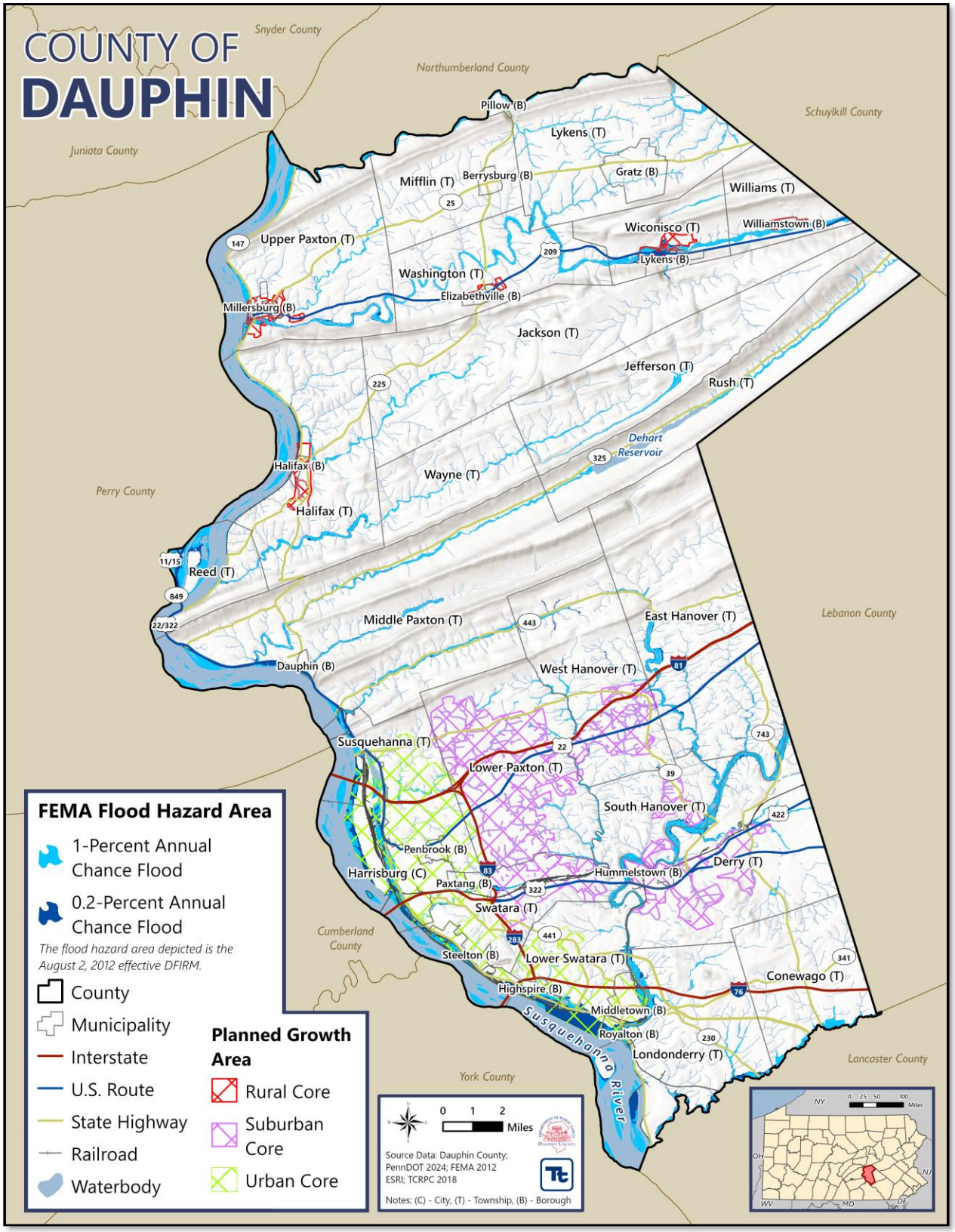


Figure 4.4.4-3. Dauphin County Growth Areas and Environmental Hazards – Hazardous Materials Releases Hazard

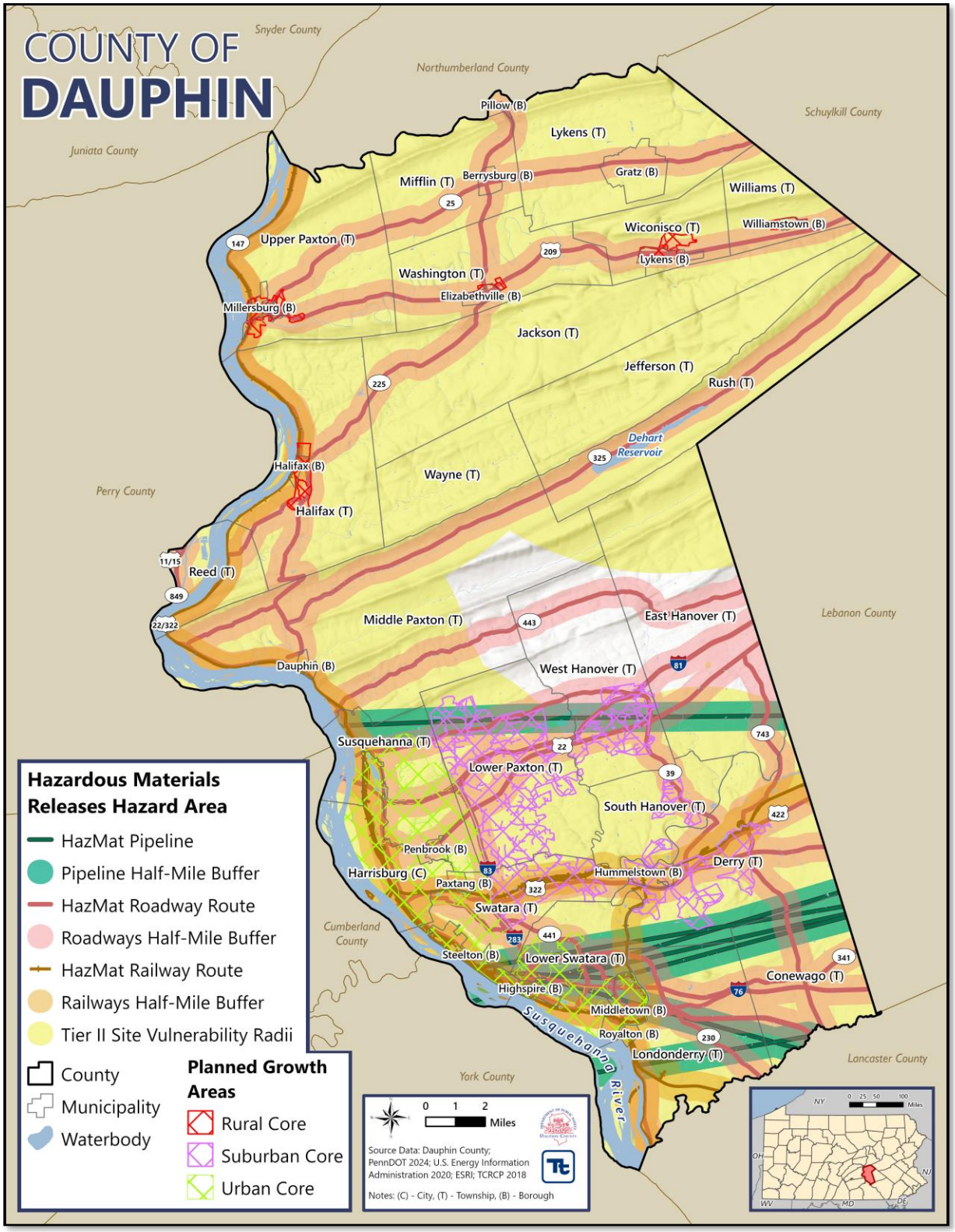


Figure 4.4.4-4. Dauphin County Growth Areas and Landslide Hazard

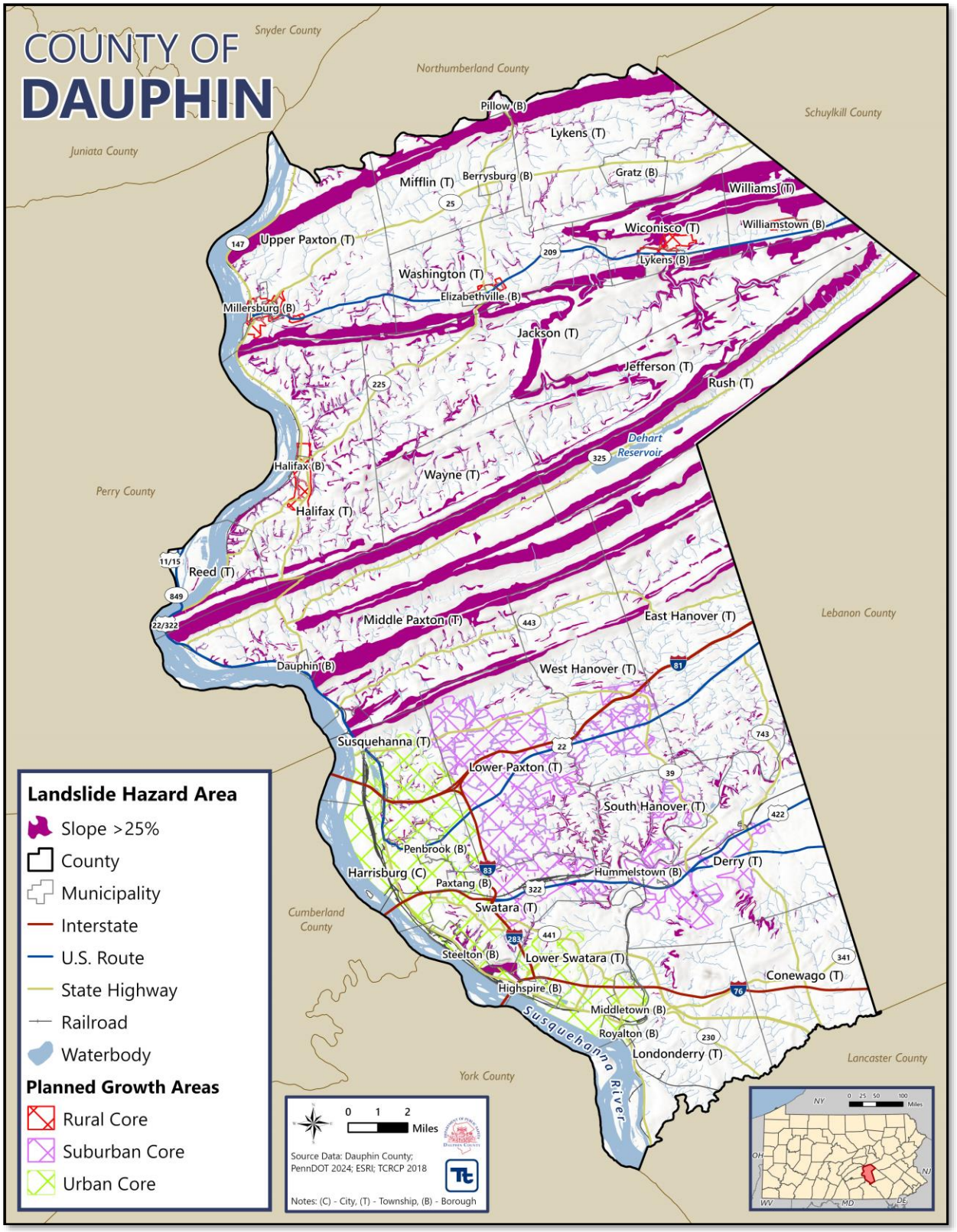


Figure 4.4.4-5 Dauphin County Growth Areas and Nuclear Hazard

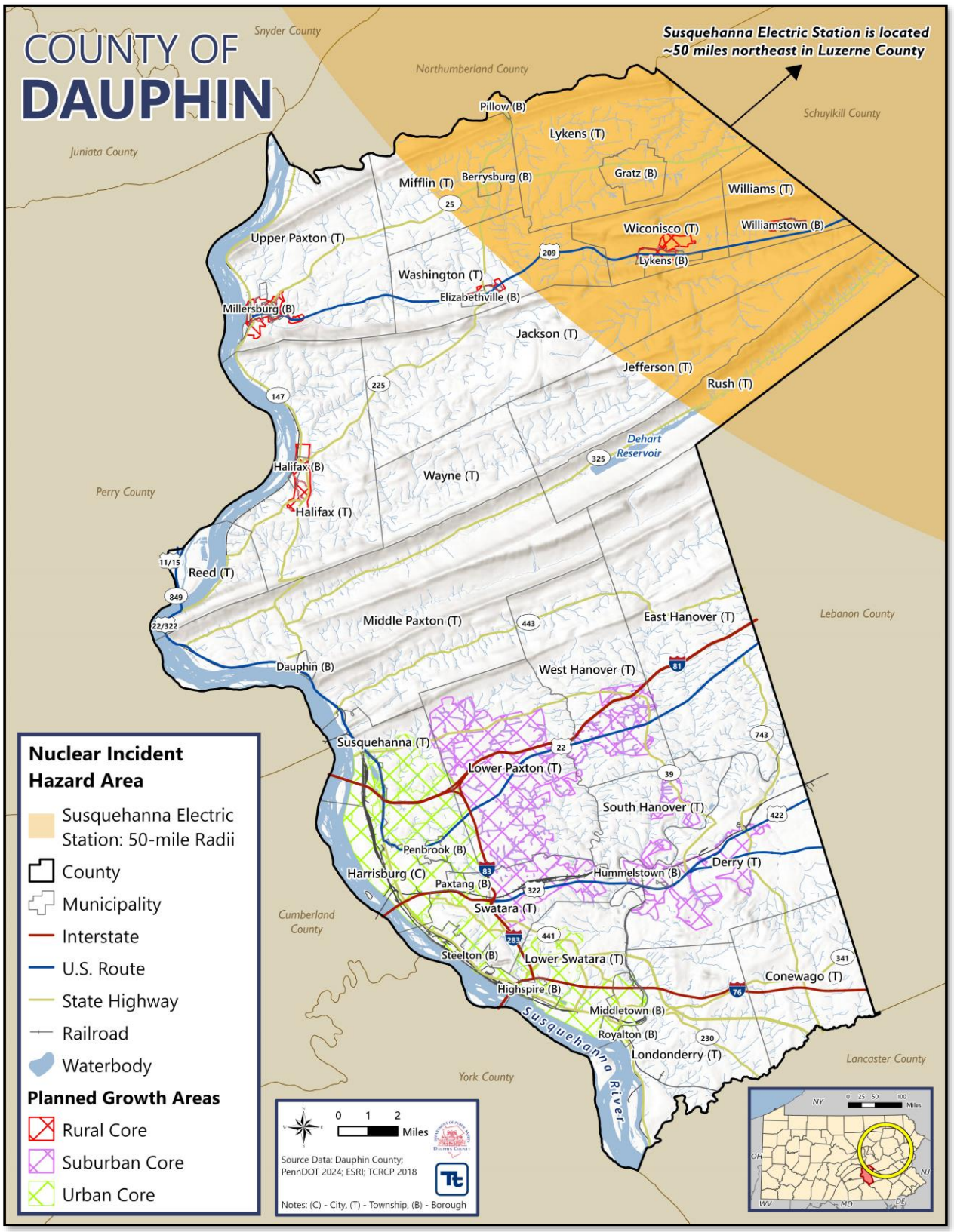


Figure 4.4.4-6.Dauphin County Growth Areas and Carbonate Rock Hazards

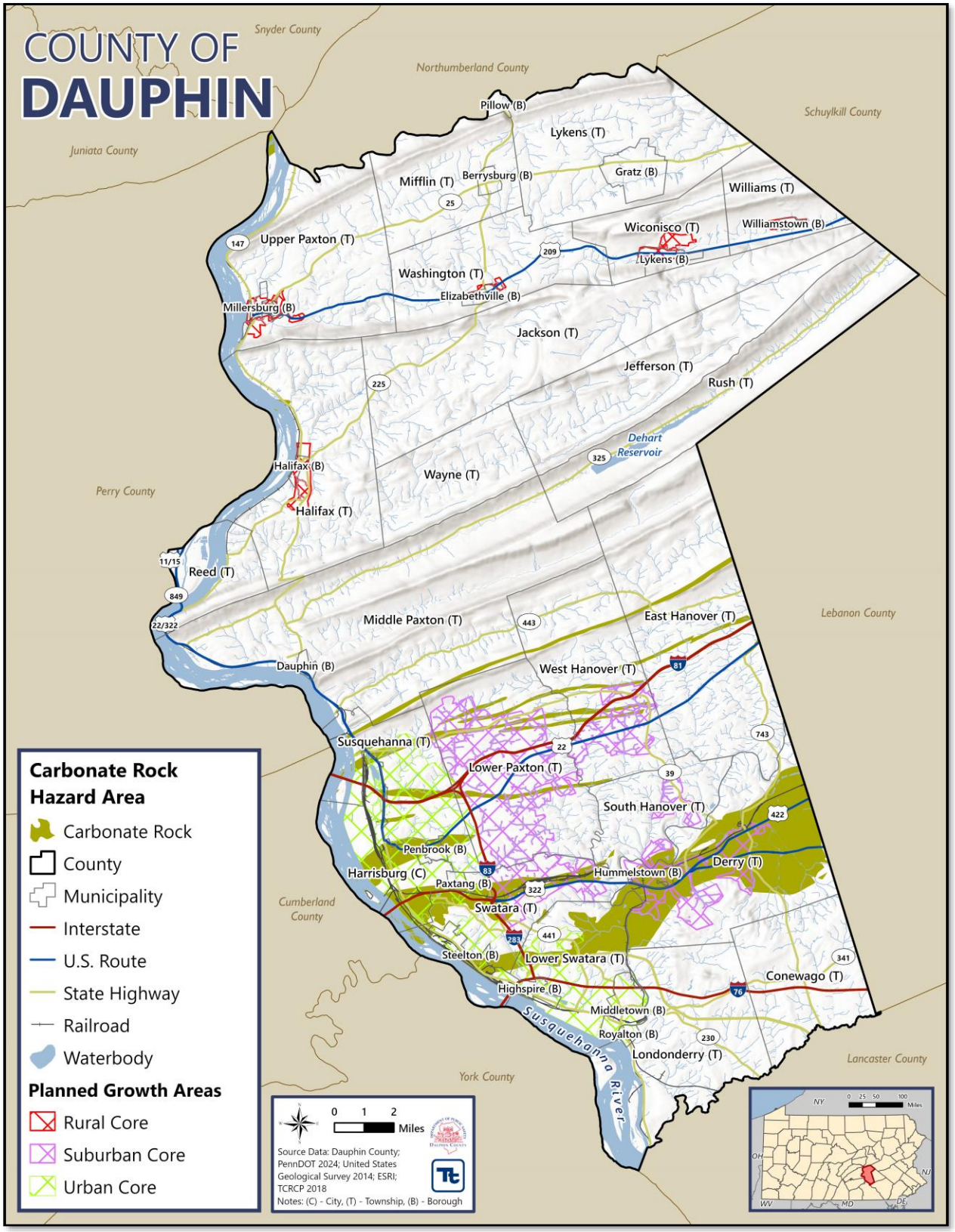


Figure 4.4.4-7. Dauphin County Growth Areas and Abandoned Mine Hazard Hazards

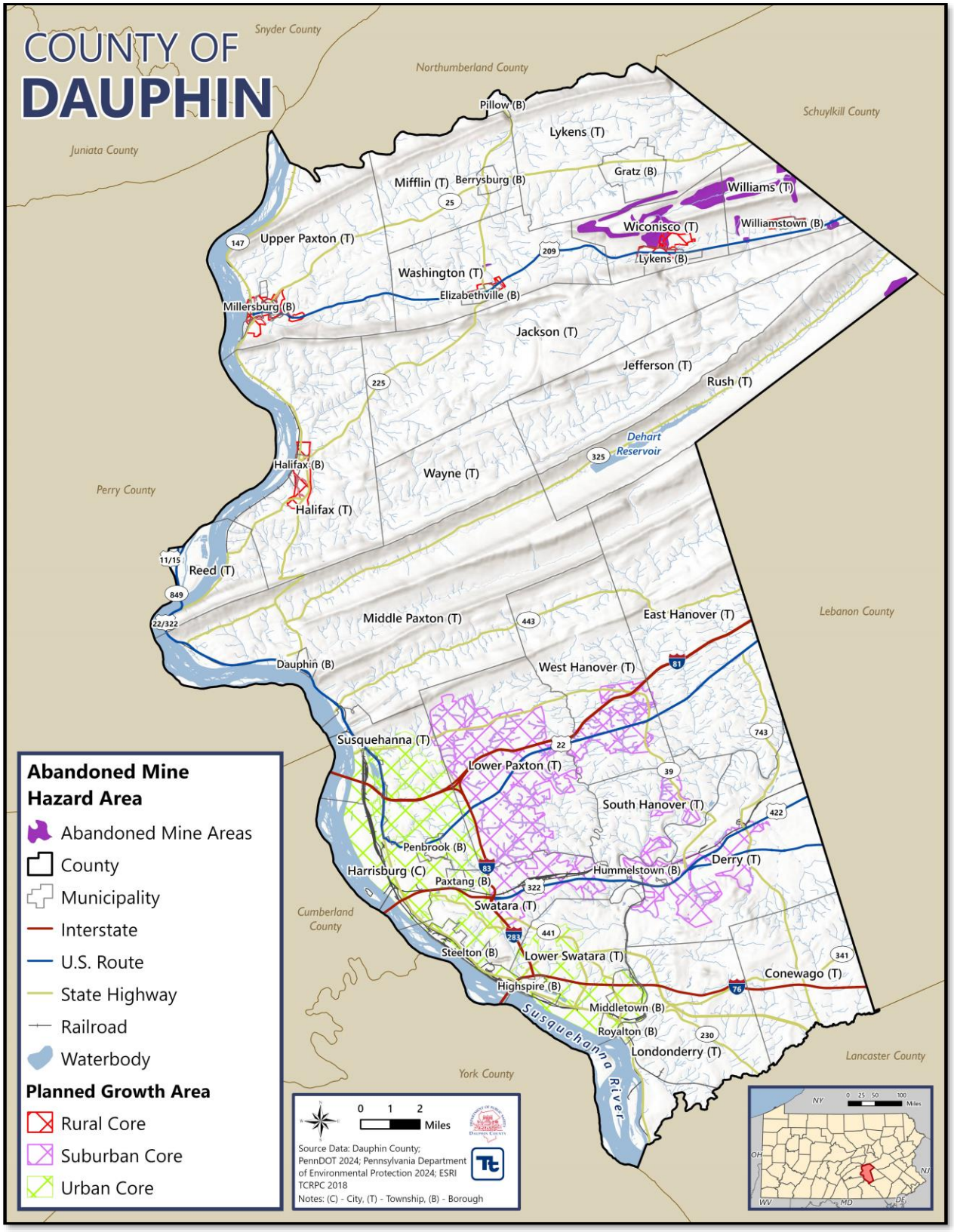
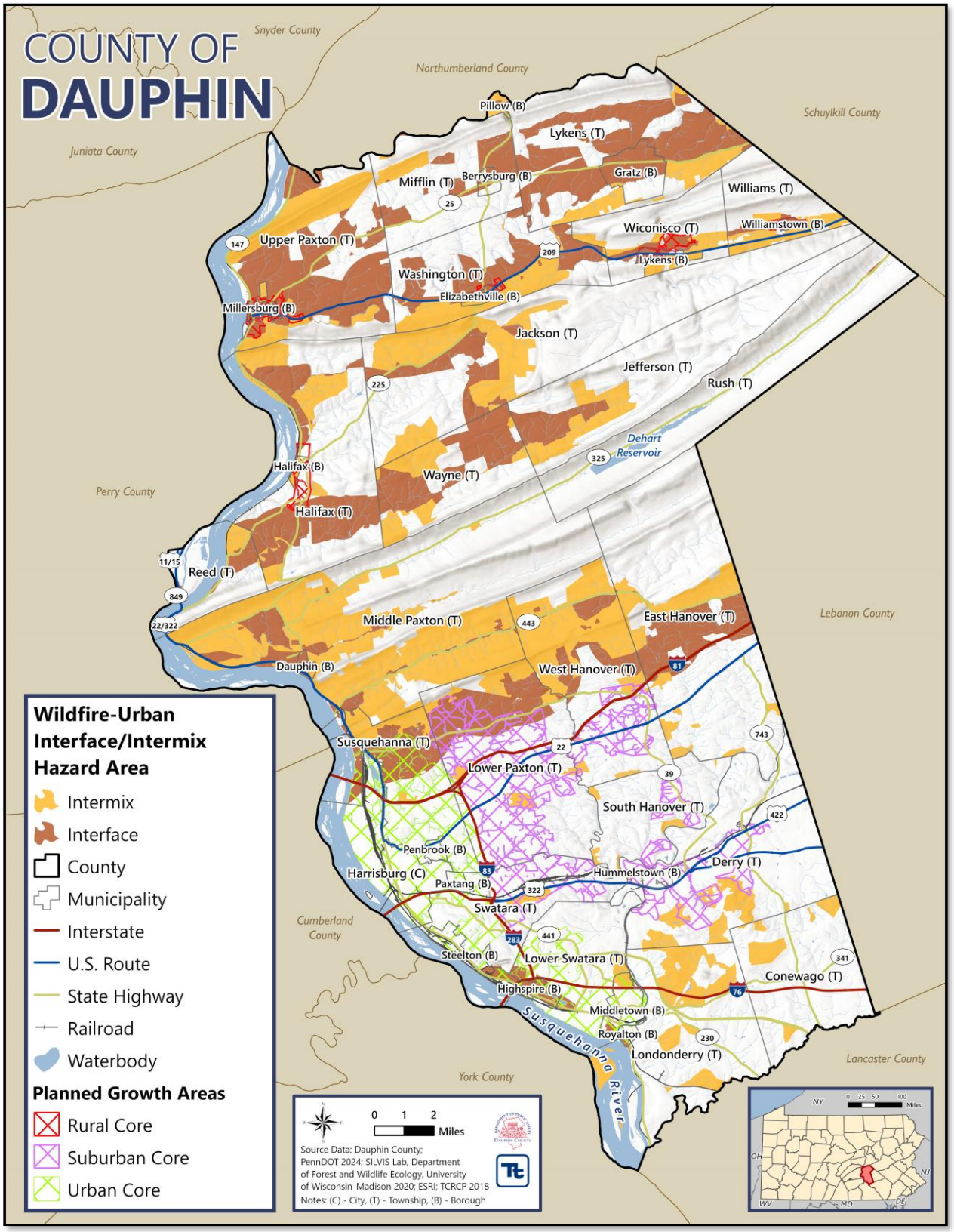


Figure 4.4.4-8. Dauphin County Growth Areas and Wildfire Hazard



SECTION 5 CAPABILITY ASSESSMENT

The capability assessment evaluates the community's capabilities and resources already in place at the municipal, county, state, and federal levels to reduce hazard risks. The assessment also identifies where improvements can be made to increase disaster resistance in the community.

The first step in organizing hazard mitigation capabilities or resources is to describe the basic approaches available to reduce hazard risks. According to the 2020 Pennsylvania Emergency Management Agency (PEMA) All-Hazard Mitigation Planning Standard Operating Guide (SOG), the following four general approaches may reduce hazard risks: (1) local plans and regulations, (2) structure and infrastructure, (3) natural systems protection, and (4) education and awareness. A brief description of each (according to the PEMA All-Hazard Mitigation Planning SOG) is provided below:

- **Local Plans and Regulations** – These actions include government authorities, policies, or codes that influence the ways land and buildings are developed and built.
- **Structure and Infrastructure** – These actions involve modifying existing structures and infrastructure or constructing new structures to reduce hazard vulnerability.
- **Natural Systems Protection** – These actions minimize damage and losses and preserve or restore the functions of natural systems.
- **Education and Awareness** – These actions inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate these hazards, including participation in national programs.

Capability assessments document the existing resources available to local communities to reduce hazard risks. Resources can be divided into five categories: human, physical, technical, informational, and financial. For each basic capability or approach, one or more of the five resources may be available. A brief description of each resource (PEMA 2020) is provided below:

- **Human resources** include local police, fire, ambulance, and emergency management and response personnel; local government services; and electric, gas, and other utility providers that are critical during disasters.
- **Physical resources** include the equipment and vehicles (such as emergency response and recovery equipment and vehicles), public lands, facilities, and buildings available to the community.
- **Technical/technological resources** include early warning systems, weather alert radios, stream-level monitoring gauges, and 911 communications systems. Technical/technological resources also include technical requirements established by law, regulation, or ordinance.
- **Informational resources** include materials about disasters and hazard mitigation and planning; these resources are available from a wide variety of sources, such as applicable websites, libraries, and state and federal agencies.
- **Financial resources** identify the sources of funding available for hazard mitigation. Most state and federal grant programs require local communities to provide at least part of the necessary project funding in real dollars or through in-kind services. Local communities need to assess their financial capability and resources to implement hazard mitigation action plans.

This section describes and summarizes the federal, state, county, and local capabilities to address hazard risk in Dauphin County.

5.1 UPDATE PROCESS SUMMARY

During the plan update process, Dauphin County and all participating municipalities were asked to provide an updated assessment of their mitigation planning capabilities. Each municipality was provided with a Capability Assessment Survey based on Appendix 3 of the October 2020 edition of the PEMA All-Hazard Mitigation Planning SOG (PEMA 2020). The survey was provided to each of the municipal planning points of contact at the Planning Team Kickoff Meeting. Completed Capability Assessment Surveys, whether completed by hand, electronically, or filled in working alongside the Dauphin County Department of Public Safety (DPS) staff or planning consultant, are provided in Appendix D.

Dauphin County has several resources available 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. These resources enable community resiliency through actions taken before, during, and after a hazard event. Emergency services, manpower, equipment, and fiscal resources are important tools in addressing hazard potential and mitigation in Dauphin County communities.

This section describes and summarizes the federal, state, county, and local capabilities to address hazard risks in Dauphin County.

5.2 CAPABILITY ASSESSMENT FINDINGS

A jurisdiction's ability to effectively manage natural hazard risk is directly related to its level of hazard mitigation capabilities. As such, mitigation strategies developed in coordination with Dauphin County's municipalities have a direct effect on establishing new capability functions in the community or strengthening existing capabilities.

Dauphin County and most of its municipalities updated and completed the Capability Assessment Survey (Appendix D: Municipal Participation Documentation). If municipalities did not update or partially update their capabilities information, the same information provided by those municipalities for the 2021 Hazard Mitigation Plan (HMP) was carried forward into this plan update.

The following sections further detail the capability assessment findings.

5.2.1 Planning and Regulatory Capability

While municipalities in Pennsylvania must comply with the minimum regulatory requirements established under the Pennsylvania Municipal Planning Code, they otherwise have considerable latitude in adopting ordinances, policies, and programs that can be used to manage natural and non-natural hazard risks. Specifically, municipalities can manage these risks through comprehensive land use planning, hazard-specific ordinances (for example, flood damage prevention, sinkholes, and steep slopes), zoning, site-plan approval, and building code enforcement. When effectively prepared and administered, these regulations can lead to hazard mitigation. Guiding documents, known as the "Planning Series" can assist municipalities develop regulations and best management practices. These *Series* can be found in the Pennsylvania Department of Community and Economic Development Library, https://dced.pa.gov/library/ under Local Government – Handbooks and Guides – Community Planning.

For example, the adoption of the National Flood Insurance Program (NFIP) and the Pennsylvania Flood Plain Management Act (Act 166 of 1978) established minimum floodplain management criteria. A municipality must adopt and enforce these minimum criteria to be eligible for participation in the NFIP. Municipalities have the option of adopting a single-purpose ordinance or incorporating these provisions into their zoning and/or subdivision and land development ordinances or building codes, thereby mitigating the potential impacts of local flooding.

Federal Planning Capabilities

Several national programs incentivize or support mitigation activities, including the NFIP and Community Rating System (CRS). These programs are a key component of hazard mitigation capabilities. The following summarizes the planning and regulatory capabilities available to Dauphin County at the state level.

Biggert-Waters National Flood Insurance Reform Act of 2012

Under the Biggert-Waters National Flood Insurance Reform Act of 2012, long-term changes to the NFIP have been adopted that have increased rates overall to reflect the flood risk more accurately to buildings in flood hazard areas. This has significantly influenced construction and reconstruction within flood hazard areas.

Property owners are encouraged to consider long-term insurance costs when undertaking reconstruction or elevation of damaged buildings. An investment to reconstruct the lowest floor of a building an additional foot or two higher today may translate into significant future flood insurance savings.

Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004

The Flood Insurance Reform Act of 2004 amended the National Flood Insurance Reform Act of 1968 to reduce losses to properties for which repetitive flood insurance claim payments have been made. This Act established a program for the mitigation of severe repetitive loss (SRL) properties and gave FEMA the authority to fund mitigation activities for individual repetitive loss (RL) claims properties. The Act provides additional coverage for compliance with land-use and control measures.

PEMA is the lead coordinator of the Commonwealth's NFIP efforts. PEMA's Mitigation Insurance and Resilient Communities (MIRC) Office is the agency working with Commonwealth communities with SRL properties. This Statute helps Commonwealth residents with affordable flood insurance and gives additional tools to the states and communities to mitigate SRL properties.

Code of Federal Regulations, Standard State Mitigation Plans (44 CFR PART 201.4)

The Code of Federal Regulations, Standard State Mitigation Plans (44 CFR PART 201.4) provides actions based on risk assessments and capabilities of the State to achieve and fund mitigation activities based on those actions. Both the law and regulations have encouraged the counties to prepare plans. FEMA has prepared policies and procedures for FEMA's review and approval of state and local emergency all-hazard mitigation plans.

Disaster Mitigation Act of 2000

The Disaster Mitigation Act of 2000 (DMA) is the current federal legislation addressing hazard mitigation planning. It encourages states, tribes, and local governments to undertake mitigation planning. DMA 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the Stafford Act) with mitigation plan requirements that emphasize the need for state, tribal, and local entities to closely coordinate mitigation planning and implementation efforts. It emphasizes planning for disasters before they occur.

DMA 2000 requires plans to be in place before Hazard Mitigation Assistance (HMA) grant funds are available to communities. Applicants with an approved HMP are eligible to apply for federal funds for mitigation of hazards. The rules provide detailed guidance on what applicants should include in a plan. The PEMA MIRC Office is the lead agency to promote mitigation planning in Pennsylvania.

Disaster Recovery Reform Act

This bill permits the use of technical and financial assistance to implement codes, specifications, and standards that incorporate the latest hazard-resistant designs; establishes a National Public Infrastructure Pre-disaster

Mitigation Fund; and authorizes the president's contribution to the cost of hazard mitigation measures to be used to increase resilience in any area affected by a major disaster.

PEMA's MIRC Office is the lead agency that reviews, submits and administers federal funding through this Act to programs that mitigate hazards in Pennsylvania. These programs help find cost-beneficial projects to help reduce damage from hazards.

Emergency Support Function #14 Long-Term Recovery Planning

Emergency Support Function (ESF) #14 Long-Term Recovery Planning coordinates federal support to state, tribal, regional, and local governments, nongovernmental organizations, and the private sector to enable community recovery from the long-term consequences of disasters. It identifies sources of recovery funding and provides technical assistance (such as impact analyses) for community recovery.

ESF #14 may be activated for incidents that require a coordinated federal response to foster sustainable recovery from significant long-term impacts (e.g., impacts on housing, government operations, agriculture, businesses, employment, community infrastructure, the environment, human health, and social services). Actions coordinated under ESF #14 include pre-incident planning and coordination, measures immediately prior to an incident, post-event planning, and operations.

Homeowner's Flood Insurance Affordability Act

This 2014 law repeals and modifies certain provisions of the Biggert-Waters Flood Insurance Reform Act, which was enacted in 2012, and makes additional program changes to other aspects of the program not covered by that Act. The new law lowers the recent rate increases on some policies, prevents some future rate increases, and implements a surcharge on all policyholders. The Act also repeals certain rate increases that have already gone into effect and provides for refunds to those policyholders. The Act also authorizes additional resources for the National Academy of Sciences (NAS) to complete the affordability study.

FEMA, Congress, the private Write-Your-Own insurance companies, and other stakeholders work together to implement these Congressionally mandated reforms and to work toward shared goals of helping families maintain affordable flood insurance, ensuring the financial stability of the NFIP, and reducing the risks and consequences of flooding nationwide.

National Flood Insurance Program

The U.S. Congress established the NFIP with the passage of the National Flood Insurance Act of 1968, enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for State and community floodplain management regulations that reduce future flood damages. The flood hazard profile provides further information on the NFIP as implemented in Dauphin County.

There are three components to the NFIP: flood insurance, floodplain management, and flood hazard mapping. Communities participate in the NFIP by adopting and enforcing floodplain management ordinances to reduce future flood damage. In exchange, the NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in these communities. Community participation in the NFIP is voluntary. Flood insurance is designed to provide an alternative to disaster assistance to reduce the escalating costs of repairing damage to buildings and their contents caused by floods. Flood damage in the U.S. is reduced by nearly $1 billion each year through communities implementing sound floodplain management requirements and property owners purchasing flood insurance.

The state and municipalities within it may adopt higher regulatory standards when implementing the provisions of the NFIP. The following list summarizes elements of these standards that may be altered to strengthen floodplain regulations:

- **Base Flood Elevation (BFE)**: The elevation of surface water due to flooding that has a 1 percent chance of being equaled or exceeded in any given year.
- **Freeboard:** By law, Pennsylvania requires Base Flood Elevation plus 1.5 feet (BFE+1.5) for all construction. When there is a base flood elevation available, the lowest floor, including any basement, must be at or above the base flood elevation. Elevations may be using properly compacted fill, a solid slab foundation, or a "crawl space" foundation, which contains permanent openings to let flood waters in and out. Non-residential structures may be flood-proofed in lieu of elevation. Where a local floodplain administrator has information to estimate a base flood elevation, such as historical flood records or a hydraulic study, that elevation must be used. Communities may go beyond this requirement, providing for additional freeboard (Commonwealth of Pennsylvania 2016).
- **Cumulative Substantial Improvements/Damages:** The NFIP allows improvements valued at up to 50 percent of the building's pre-improvement value to be permitted without meeting the flood protection requirements. Over the years, a community may issue a succession of permits for different repairs or improvements to the same structures. This can greatly increase the overall flood damage potential for structures within a community. The community may wish to deem "substantial improvement" cumulatively so that once a threshold of improvement within a certain length of time is reached, the structure is considered to be substantially improved and must meet flood protection requirements.

Implementation in Pennsylvania

The Pennsylvania Department of Community and Economic Development (PA DCED) is the legislated Commonwealth coordinating agency for the NFIP, and PEMA is the Commonwealth agency that carries out floodplain coordination in practice. These agencies support municipalities by providing suggested text for floodplain management ordinances.

The Pennsylvania Floodplain Management Act (Act 166) mandates municipal participation in and compliance with the NFIP. It also prohibits new or substantially improved structures in the floodway that are used for the production or storage of dangerous materials. Act 166 requires a special permit for the construction or expansion of any manufactured home park, hospital, nursing home, jail, or prison within a special flood hazard area.

As new Digital Flood Insurance Rate Maps (DFIRMs) are published, the Pennsylvania State NFIP Coordinator, who sits in PA 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) (FEMA 2011).

The DCED provides a suggested ordinance to assist municipalities in meeting the minimum requirements of the NFIP. It also presents provisions that are more restrictive than state and federal requirements. Suggested provisions include the following:

- Prohibiting manufactured homes in the floodway
- Prohibiting manufactured homes within the area 50 feet landward from the top of the bank of any watercourse in a special flood hazard area
- Prohibiting new construction and development within the area 50 feet landward from the top of the bank of any watercourse in a special flood hazard area
- Establishing special requirements for recreational vehicles within the special flood hazard area
- Establishing special requirements for accessory structures

Participation in the National Flood Insurance Program

Participation in the NFIP is based on an agreement between communities and the federal government. If a community adopts and enforces a floodplain management ordinance to reduce future flood risk to new construction and substantial improvements in floodplains, the federal government will make flood insurance available within the community as a financial protection against flood losses. This insurance is designed to

provide an alternative to disaster assistance and reduce the escalating costs of repairing damage to buildings and their contents caused by floods (FEMA 2024).

NFIP-participating communities in Dauphin County are required to adopt a flood damage prevention ordinance (also sometimes called a "floodplain" or "floodplain management ordinance") and update this ordinance when the regulatory NFIP Flood Insurance Rate Maps (FIRMs) are officially updated. The Pennsylvania Department of Community and Economic Development (PA DCED) (the legislated Commonwealth coordinating agency for the NFIP) and PEMA (the Commonwealth agency that carries out floodplain coordination in practice) provide support to municipalities by providing suggested text for floodplain management ordinances.

All the county's municipalities, except Berrysburg Borough, participate in the NFIP. Berrysburg Borough has no delineated special flood hazard area (SFHA). Penbrook Borough also does not have any delineated special flood hazard area but does participate in the NFIP. Dauphin County's municipalities' FIRMs were made effective in August 2012. All participating municipalities have adopted a floodplain ordinance, and many have adopted a stormwater management ordinance.

The municipalities' floodplain administrators, who are often either the code enforcement officer or zoning officer for the municipality, enforce the floodplain ordinances locally. Throughout Dauphin County, all municipalities enforce the Uniform Construction Code, and most enforce zoning regulations. Rather than using a specific Floodplain Development Permit, the county's municipalities include on zoning and/or building permit applications a space for applicants to state whether the proposed development is in the floodplain. The permit application reviewer confirms whether the property in question is in the floodplain. If it is, the municipal floodplain administrator reviews the proposed development against the municipality's floodplain management ordinance. The floodplain administrator conducts similar reviews of any revisions to the permit application until all requirements are met. As the proposed activity is conducted, the floodplain administrator works with the code enforcement officer and/or zoning officer to conduct inspections and ensure that the proposed activity is carried out as it was permitted.

NFIP-participating communities in Dauphin County are required to make current NFIP FIRMs available to their residents for review, and mapping assistance may be provided through their floodplain administrators. Typically, this mapping is available at the municipal offices in each community. Floodplain administrators provide information about mapping to their residents using established outreach methods such as municipal websites, newsletters, and mailings. At the time of this plan update, the Dauphin County FEMA Digitized Flood Insurance Rate Maps (DFIRMs) (dated August 2012) were used to evaluate exposure and determine potential future losses.

Floodplain administrators also use established outreach methods to provide information about flood insurance to residents and business owners. They can provide information on the availability of flood insurance, how to get a flood insurance policy, and determine the appropriate level of coverage.

Municipal participation in and compliance with the NFIP is supported at the federal level by FEMA Region III and the Insurance Services Organization (ISO) and the state level by the PA DEP, PA DCED, and PEMA. The county's Planning Commission and Conservation District both support flood mitigation efforts, associated training, and public education and awareness programs.

Additional information on the NFIP program and its implementation within the county can be found in the flood hazard profile in Section 4.3.7.

Community Rating System

In the 1990s, the Flood Insurance Administration (FIA) established the CRS to encourage local governments to increase their standards for floodplain development. The goal of the program is to encourage communities, through flood insurance rate adjustments, to implement standards beyond the minimum required to:

- Reduce losses from floods.
- Facilitate accurate insurance ratings.
- Promote public awareness of the availability of flood insurance.

CRS is a voluntary program designed to reward participating jurisdictions for their efforts to create more disaster-resistant communities using the principles of sustainable development and management. By enrolling in CRS, municipalities can leverage greater flood protection while receiving flood insurance discounts.

10 CRS classes determine the amount of reduction in insurance premiums. Class 1 requires the most credit points and gives the largest premium reduction; Class 10 receives no premium reduction. CRS premium discounts on flood insurance range from 5 percent for Class 9 communities up to 45 percent for Class 1 communities. The CRS recognizes 18 creditable activities that are organized under four categories: Public Information, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness. Currently, two jurisdictions participate in the CRS Program in Dauphin County.

Currently, the City of Harrisburg and the Borough of Royalton are the only Dauphin County municipalities that participate in the CRS Program. The county, municipalities, and PEMA's NFIP Program Manager continue to coordinate with FEMA Region III on additional municipality participation.

Presidential Policy Directive 8

Presidential Policy Directive 8 (PPD-8) requires states to develop a threat hazard identification and risk assessment (THIRA) to remain eligible for Homeland Security Grant Program (HSGP) and Emergency Management Program Grant (EMPG) funding. PEMA is the lead agency in preparing Pennsylvania's THIRA.

Risk Mapping, Assessment, and Planning

FEMA works with federal, state, tribal, and local partners across the nation to identify flood risk and promote informed planning and development practices to help reduce that risk through the Risk Mapping, Assessment, and Planning (Risk MAP) program. Risk MAP provides high-quality flood maps and information, tools to better assess the risk from flooding, and planning and outreach support to communities to help them take action to reduce (or mitigate) flood risk. Each Risk MAP flood risk project is tailored to the needs of each community and may involve different products and services.

Risk Rating 2.0: Equity in Action

FEMA introduced Risk Rating 2.0: Equity in Action to consider specific characteristics of a building to provide more modern, individualized, and equitable flood insurance rates. The new rating methodology considers the frequency of flooding, multiple flood types, proximity to flood sources, and building characteristics such as first-floor heights and costs to rebuild. Homeowners who elect to drop NFIP insurance policies will no longer have access to FMA funding for future mitigation efforts.

Robert T. Stafford Disaster Relief and Emergency Assistance Act

The Stafford Act provides an orderly and continuing means of assistance by the federal government to state and local governments in carrying out their responsibilities to alleviate the suffering and damage that results from disasters. The provisions of the Act include the following objectives:

- Revising and broadening the scope of existing disaster relief programs
- Encouraging the development of comprehensive disaster preparedness and assistance plans, programs, capabilities, and organizations by state and local governments
- Achieving greater coordination and responsiveness of disaster preparedness and relief programs
- Encouraging individuals, and state and local governments to protect themselves by obtaining insurance coverage to supplement or replace governmental assistance
- Encouraging hazard mitigation measures to reduce losses from disasters, including development of land-use and construction regulations
- Providing federal assistance programs for both public and private losses sustained in disasters

From a mitigation perspective of the Stafford Act, the PEMA MIRC Office is the lead agency that reviews, submits and administers federal funding to programs that mitigate hazards. These programs help find cost-beneficial projects to help reduce damages from hazards.

Clean Water Act Section 404(e)

Under Section 404(e) of the Clean Water Act, the U.S. Army Corps of Engineers (USACE) can issue general permits to authorize activities that have only minimal individual and cumulative adverse environmental effects. There are three types of USACE permits: standard, nationwide, and regional. Standard permits are individual permits that involve a full public interest review of an individual permit application and include the issuance of a public notice for any project that does not meet the terms and conditions of a Nationwide Permit (NWP) or a Letter of Permission (LOP). Regional general permits are for small, specialized projects.

An NWP is a general permit that authorizes activities across the country unless a district or division commander revokes the nationwide permit in a state or other geographic region. There are 54 nationwide permits, and they authorize a wide variety of activities, including linear transportation projects, bank stabilization activities, residential development, commercial and industrial developments, aids to navigation, and certain maintenance activities. (USACE 2017).

Commonwealth Planning Capabilities

The following summarizes the planning and regulatory capabilities available to Dauphin County at the commonwealth level.

Counterterrorism Planning, Preparedness and Response Act

Act 227 (i.e. the Counterterrorism Planning, Preparedness and Response Act of December 16, 2002, P.L. 1967, No. 227 35) provides for counterterrorism planning, preparedness, and response; imposing powers and duties on PEMA, Department of Health (DOH), counties, and municipalities; and providing for the organization of various response teams. Act 227 states the responsibilities of regional counter-terrorism task force groups, the urban search and rescue task force, and specialized response teams, and provides immunity from liability.

Marcellus Shale Drilling Regulations

Oil and gas exploration in Pennsylvania is regulated through the Oil and Gas Act, the Coal and Gas Resource Coordination Act, the Oil and Gas Conservation Law, the Clean Streams Law, the Dam Safety and Encroachments Act, the Solid Waste Management Act, and the Water Resources Planning Act. The Oil and Gas Act (Act 13 of 2012) presented major changes to the oil and gas industry in Pennsylvania, including the authorization for local governments to adopt an impact fee and the provision of stronger environmental protections.

The Bureau of Oil and Gas Management in the Pennsylvania Department of Environmental Protection (PADEP) along with county conservation districts and the Susquehanna River Basin Commission or the Delaware River Basin Commission, if applicable geographically, have the authority to regulate the oil and gas industry in Pennsylvania to protect the environment and citizens of the Commonwealth.

Nutrient Management Law

Act 38 was signed into law on July 6, 2005, replacing Act 6 which was Pennsylvania's first nutrient management law. This act deals with local regulation of agricultural operations. It requires concentrated animal operations to develop and maintain a nutrient management plan, which includes best management practices to minimize the environmental impact of nutrients on a farm. Act 38 Nutrient Management Plans are required to receive permits for concentrated animal feeding operations that can be populated with livestock.

Pennsylvania Construction Code Act

The Pennsylvania Construction Code Act (Act 45) of 1999 (as amended) establishes the basic requirements for the Uniform Construction Code (UCC), which applies to the construction, alteration, repair, demolition, or change of occupancy of buildings. Enforcement of the UCC began in April 2004. Utilization of the UCC provides for the protection of life, health, property, and the environment daily as well as during disasters by establishing construction standards. Pennsylvania is protected by the guidelines outlined in the UCC, with over 90 percent of Pennsylvania's 2,562 municipalities administering compliance locally either through their staff or third-party agencies (PA General Assembly n.d.). The Department of Labor & Industry has limited code enforcement authority, primarily ensuring municipalities have a certified "Accessibility Inspector/Plans Examiner."

Recent changes to the act include Acts 35 and 36 of 2017. Act 35 provided exclusions for certain agricultural buildings. Act 36 resulted in a lot of changes, including requiring a re-review of the 2015 International Code Council, changing the makeup of the UCC Review and Advisory Council, permitting Philadelphia to pass an ordinance adopting the 2018 commercial ICC codes, changes to permitting fees, creating a local board of appeals, and establishing a six-month statute of limitations for permit submissions after updated building codes go into effect (PA General Assembly n.d.). On October 26, 2022, the Commonwealth Court ruled that all enforcement of the 2021 accessibility standards must cease and revert to 2018 requirements.

Pennsylvania Emergency Management Service Code, Title 35

Pennsylvania's Emergency Management Service Code, Title 35, covers PEMA's overall legal responsibilities for emergency management. PA CS Title 35 Section 7102 defines emergency management as "the judicious planning, assignment, and coordination of all available resources in an integrated program of prevention, mitigation, preparedness, response and recovery for emergencies of any kind, whether from attack, Human-caused or natural sources." Section 7311 establishes that PEMA was created "to assure prompt, proper and effective discharge of basic Commonwealth responsibilities relating to civil defense and disaster preparedness, operations and recovery." Title 35 addresses PEMA's responsibilities before, during, and after a disaster.

Pennsylvania Flood Plain Management Act

The Pennsylvania Flood Plain Management Act (Act 166) encourages sound land use practices within the floodplain. The Act requires municipalities with Special Flood Hazard Areas (SFHA) to participate in the NFIP meeting the minimum standards. The Act establishes higher regulatory standards for hazardous materials and high-risk land uses and designates the state agency responsible for NFIP coordination and oversight. Previously held by the Department of Community and Economic Development (DCED), the Flood Plain Management Act was amended in July 2022 to designate PEMA as the State NFIP Coordinator.

In addition to the work PEMA does, there are local floodplain managers who have the training and authority to help enforce regulations. Managers are encouraged to enroll in FEMA training courses and even obtain their Certified Floodplain Manager (CFM) certification. PEMA's Orientation Guide describes the job as having four main roles: Coordinator, Regulator, Educator, and Planner. They work continuously with federal, state, and local stakeholders to ensure development in the floodplain is done properly.

Pennsylvania Hazardous Material Emergency Planning and Response Act

The federal requirements associated with the Superfund Amendments and Reauthorization Act 165 are implemented at the state level through Act 165 (i.e. Pennsylvania Hazardous Material Emergency Planning and Response Act, 1990-165). Act 165 creates a strong working relationship between business and industry, the Commonwealth, counties, and local municipalities to protect citizens from the dangers of hazardous materials.

The Superfund Amendments and Reauthorization Act 165 (SARA) has several provisions, including requirements for reporting releases of chemicals and requirements for the protection of responders. However, SARA Title III (i.e. the Federal Emergency Planning and Community Right-to-Know Act), relating to emergency planning and community right-to-know, has the greatest impact on local governments.

Pennsylvania Municipalities Planning Code Act

Per the Pennsylvania Municipalities Planning Code Act, P.L. 805, No. 247 (Act 247) of 1968, boroughs, townships, and counties have the authority to prepare zoning, subdivision, land development, floodplain management, and other ordinances, as well as official zoning maps, all of which can be used individually or jointly as tools to guide growth and minimize development in hazard-prone areas. Act 247 also requires counties to create and adopt a comprehensive plan and encourages municipalities to adopt municipal or joint municipal comprehensive plans generally consistent with the county comprehensive plan.

Pennsylvania Radiation Protection Act

Act 147 (i.e. Pennsylvania Radiation Protection Act, 1984-147) deals specifically with radiation, control of radioactive sources, and accidental releases of radiation from any of the nuclear-powered electric generating facilities in Pennsylvania. The act was most recently amended in 2007 with Act 31. This law empowers the PADEP to implement a comprehensive statewide radiation protection program and enables PEMA to develop a radiological emergency response program with plans for each fixed nuclear power generating facility. In implementing the radiological emergency response program, PEMA has planned for the evacuation or protection of persons in the area immediately surrounding a given facility within a 10-mile radius. Each of the affected municipalities has a plan that addresses accidental releases of radiation at the facility. The law requires periodic exercise of these plans; every 2 years there is a full-scale exercise involving several hundred people to test the plan and response capabilities.

Act 147 also created a Radiation Emergency Response Fund and a Radiation Transportation Emergency Response Fund, which receives money from nuclear facility operators, spent fuel storage facilities, and spent nuclear fuel shippers. PEMA then distributes this money to affected counties where it is then distributed to municipalities. Funds are distributed based on grant applications submitted by counties to reimburse expenses involved in preparing plans, providing equipment, and involved in training and exercising the radiological emergency response program.

Public Safety Emergency Telephone Act

Act 78 (i.e. the Public Safety Emergency Telephone Act, 1990-78), as amended, is designed to provide a toll-free standard number (911) accessible from both land and cellular phones for any individual in the Commonwealth to gain rapid, direct access to emergency services. The act was amended in 1998 with Act 17.

The act places responsibility for developing a 911 system on county government. The act also allows for end-user contributions based on the number of lines of telephone service. Act 78 establishes technical, training, and certification guidelines and minimum standards to be met in developing the county 911 system. Additionally, the act encourages the development of enhanced 911 systems and constant improvement of existing systems.

County and Municipal Planning Capabilities

Municipalities in Pennsylvania must comply with the minimum regulatory requirements established under the Pennsylvania Municipal Planning Code. They otherwise have considerable latitude in adopting ordinances, policies, and programs that can be used to manage natural and non-natural hazard risks. Municipalities can manage these risks through comprehensive land use planning, hazard-specific ordinances (e.g., flood damage prevention, sinkholes, and steep slopes), zoning, site-plan approval, and building code enforcement.

For example, the NFIP and the Pennsylvania Flood Plain Management Act establish minimum floodplain management criteria. A municipality must adopt and enforce these minimum criteria to be eligible for participation in the NFIP. Municipalities can adopt a single-purpose ordinance or incorporate these provisions into their zoning and/or subdivision and land development ordinances or building codes, thereby mitigating the potential impacts of local flooding.

When effectively prepared and administered, these regulations can mitigate potential hazards. Guiding documents to assist municipalities in developing regulations and best management practices can be found in the Pennsylvania Department of Community and Economic Development Library under Local Government – Handbooks and Guides – Community Planning.

Dauphin County Comprehensive Plan

A comprehensive plan is a policy document that states objectives and guides the future growth and physical development of a municipality. The comprehensive plan is a blueprint for housing, transportation, community facilities, utilities, and land use. It examines how the past led to the present and charts the community's future path. The Pennsylvania Municipalities Planning Code (MPC) Act 247 of 1968, as reauthorized and amended, requires counties to prepare and maintain a comprehensive plan. In addition, the MPC requires counties to update the comprehensive plan every 10 years.

Section 301a.(2) of the MPC requires comprehensive plans to include a plan for land use, which, among other provisions, suggests that the plan should consider floodplains and other areas of special hazards and other similar uses. The MPC also requires comprehensive plans to include a plan for community facilities and services and recommends considering storm drainage and floodplain management.

The county's comprehensive plan, "Growing Together," is slated to guide Dauphin County through 2027. The "Growing Together" comprehensive plan is composed of three components: "Growing Our Communities", "Growing Within Our Environment", and "Growing Our Economy" (Tri-County Regional Planning Commission [TCRPC] 2017). Each category subsection ends with primary goals and key action items. The purpose of this Comprehensive Plan is to have planning efforts use this document as a process document rather than a static document. It contains findings from community surveys, goals for each topic, and associated projects.

"Enhancing Our Communities" contains the vision and goals of the community by preserving each communities' unique identity while creating sustainable development through housing, public facilities and services. The comprehensive plan goals in this section include the following taken directly from the Dauphin County Comprehensive Plan of 2017 (Tri-County Regional Planning Commission 2017):

- *Manage growth toward areas with existing or planned public facilities and services;*
- *Promote the use of planning and stormwater best management practices (BMPs);*
- *Promote the creation of livable, sustainable communities;*

- *Promote economic development in conjunction with regional needs;*
- *Integrate land use with transportation and other public infrastructure;*
- *Expand fair housing choice and access to opportunity;*
- *Help build cooperative relationships between new housing developers, local municipal governments, and other key stakeholders;*
- *Evaluate and improve regulations & zoning ordinances to address key housing challenges;*
- *Conduct research and educate residents, officials, and developers on key housing issues;*
- *Maintain or improve the level of emergency services (police, fire, and ambulance) and enhance hazard protection for all Dauphin County residents;*
- *Provide appropriate parks & recreation facilities and services that are readily accessible to all residents;*
- *Strengthen access and strive to have the highest quality healthcare services possible for all residents;*
- *Educate the public and provide opportunities for healthy living for all residents;*
- *Enhance educational resources and strengthen our communities through the library system and other similar facilities;*
- *Enhance educational and skill development opportunities for students and residents.*

"Growing Within Our Environment" focuses on growth within the current environment's natural resources while focusing on the preservation of these same resources. Resources identified within the plan include water through water quality, stormwater management, floodplain, and riparian areas, agriculture, forest land, and limestone (karst) geology. Taken directly from the Dauphin County Comprehensive Plan of 2017 (Tri-County Regional Planning Commission 2017), below lists goals for the environment section of the plan:

- *Enhance the quality of ground and surface water resources;*
- *Reduce development-related impacts on water quality and increased runoff through improved regulatory and policy tools;*
- *Support the efforts of municipalities and others to address MS4 stormwater requirements;*
- *Reduce the impacts of flooding on homeowners and businesses;*
- *Seek to minimize the cost to property owners for hazard mitigation and flood insurance;*
- *Coordinate preservation/protection efforts with the identification of natural hazard potential to minimize future damage due to flooding by the Susquehanna River and its tributaries;*
- *Preserve and/or protect our agricultural, historic, and cultural resources along with other important environmental features.*

The final section, "Growing Our Economy", supports the diverse economic development activities currently occurring while encouraging economic growth for the future. To encourage economic development, this section focuses on programs, policies, transportation networks, water infrastructure, and wastewater infrastructure. The goals listed under each of these subsections were taken directly from the Dauphin County Comprehensive Plan and are as follows:

- *Focus future economic growth across Dauphin County near existing development areas, including downtowns and office/commercial/industrial centers;*
- *The downtowns of smaller boroughs and townships should be maintained and promoted as local economic centers and/or reinvented to meet current business opportunities;*
- *Maintain Harrisburg as the region's cultural center to boost economic development;*
- *Strengthen and enhance the relationships between businesses and local municipalities;*
- *Prioritize general economic development efforts for: 1) retaining businesses; 2) expanding businesses; 3) starting new businesses; 4) redeveloping sites; and 5) attracting businesses;*
- *Help build cooperative relations between transportation providers, employers, commercial facilities, governmental agencies & local municipalities;*
- *Enhance safety for all transportation system users;*
- *Maintain a focus on all modes for moving people and goods efficiently;*
- *Provide effective transportation for persons with disabilities;*

- *Encourage coordination between the provision of public utilities with the Regional Growth Management Plan (RGMP) and municipal plans;*
- *Identify and address limitations in public infrastructure relating to economic development that are consistent with the RGMP and municipal plans.*

Although the MPC requires that municipal plans be in accord with the county plan, the code provides no measures for ensuring this occurs.

Stormwater Management Planning

In 1978, the Pennsylvania General Assembly passed the Stormwater Management Act (Act 167) of 1978 (Pennsylvania State Data Center 1978). Act 167 requires counties to prepare stormwater management plans on a watershed-by-watershed basis. The plans must be developed in consultation with the affected municipalities. Each new plan is required to provide standards for control of runoff from new development, based on a detailed hydrologic assessment. A key objective of each plan is to coordinate the stormwater management decisions of the watershed municipalities. Implementation of each plan is through mandatory municipal adoption of ordinance provisions consistent with the plan.

Plans prepared under Act 167 will not resolve all drainage issues. A key goal of the planning process is to maintain existing peak runoff rates throughout a watershed as land development continues to take place. While the planning process does not solve existing flooding problems, it aims to prevent these problems from getting worse. Each municipality is responsible for correcting existing flooding problems.

The Dauphin County Act 167 Stormwater Management Plan's last update was in April 2010. This plan promotes county-wide planning efforts while breaking out into watershed planning regions. The plan incorporates Best Management Practices. The plan also includes model ordinances for municipalities to adopt. Dauphin County Conservation District worked with municipalities to adopt both the Stormwater Management Plan and Ordinance (Dauphin County Conservation District 2010).

Under the National Pollutant Discharge Elimination System (NPDES) and for small Municipal Separate Storm Sewer Systems (MS4), Dauphin County is a regulated entity. NPDES MS4s program purpose is to limit the amount of pollutants that enter into waterways and water bodies through separate storm sewer systems. These systems include, but are not limited to, inlets, pipes, outlets, and gutters. The MS4s Program has six minimum control standards that include public education, public participation, illicit discharge detection and elimination, construction site stormwater management, post-construction stormwater management, pollution prevention, and good housekeeping at municipal facilities. Dauphin County has an NPDES Phase II Regulations for Small MS4s Implementation Plan for the period of July 1, 2024 to June 30, 2025 (Dauphin County Conservation District 2025).

Natural Resource Planning

Dauphin County Parks and Recreation Plan, also titled the Dauphin County Parks, Recreation, Open Space, and Greenways Study, was developed to enhance land conservation efforts in the county by creating a unified greenway system. This plan includes agricultural easements, conservancy lands, environmentally sensitive and natural areas like floodplains and wetlands, conservation greenways, multi-use greenways, and recreational/cultural greenways (TCRPC 2009).

Capital Region Water, a company that operates the greater Harrisburg area’s water infrastructure systems, has the Green Infrastructure Plan for the Harrisburg regional water system to help reduce stormwater runoff and pollution through different projects, including community tree plantings (Capital Region Water 2009). Capital Region Water also has the Source Water Protection Plan guided by the Source Water Assessment and Protection Program (SWAP) that was established under the US EPA’s 1996 Safe Drinking Water Act, Section 1453. This

plan includes the identification of potential water source contaminates, mitigation of these contaminates, and the potential risk level to the water sources (Capital Region Water 2024).

Informational Resources

Dauphin County has a variety of informational resources available, and many of the publications discussed previously are available for review by the public on the Dauphin County Department of Community and Economic Development website: https://www.dauphincounty.gov/government/support-services/community-and-economic-development. Information is also posted on municipal websites, and hard copies of informational materials are available in municipal offices.

Dauphin County Department of Public Safety

The Dauphin County DPS maintains a strong emergency management capability that supports Dauphin County. The county operates an emergency 911 call center and activates its own emergency operations center (EOC) during emergencies. In addition, the county provides or supports emergency service programs and measures, including emergency response, public alert and warning systems, emergency communications systems, hazard event monitoring systems, and public information and outreach programs. Capabilities include the 911 center, EOC, emergency service measures, emergency response planning, public information programs, and geographic information systems, which are described in the sections below.

911 Center

911 is the telephone number used to report emergencies. Citizens use the service in the event of the presence or potential for an immediate threat to life or property and to request a response from police, fire, or emergency medical services (EMS) agencies. Examples include reporting a crime that has just occurred or is in progress; describing an odor such as gas or reporting a fire; or calling for assistance with a sick or injured person who requires treatment and possibly transportation to a hospital emergency department. The 911 system is capable of accepting calls from hearing or speech-impaired callers using a Telecommunications Device for the Deaf (TDD), and text messages. Several counties in Pennsylvania operate a 911 Public Safety Answering Point (PSAP). Personnel at these PSAPs would need to coordinate their efforts in a regional hazard event. Computerized mapping of streets with address information is critical for emergency response purposes. The 911 center is also used to alert citizens during an emergency.

Emergency Operations Center

In the event of an impending emergency or disaster that cannot be managed by the county 911 staff, Dauphin County would activate its EOC. The purpose of the EOC is to manage an emergency response and coordinate the distribution of resources to a disaster incident. When the EOC is activated and becomes operational, it is staffed with highly trained, experienced personnel who have the authority, flexibility, imagination, and initiative needed to take command and make coordinated decisions relative to their field of expertise. EOC staffing includes personnel with skills from the disciplines below, in accordance with the National Response Framework (NRF) and the Commonwealth Emergency Operations Plan (EOP). Each discipline is assigned a coordinating agency and at least one primary agency and one support agency. In cases where more than one agency has primary jurisdiction over a discipline, a coordinating agency is designated from among them. Where there is only one agency with primary jurisdiction, that agency is also the coordinating agency. EOC disciplines are listed below:

- Transportation
- Communications and Warning
- Public Works and Engineering
- Firefighting

- Emergency Management
- Mass Care, Evacuation and Human Services
- Logistics Management and Resource Support
- Public Health and Medical Services
- Search and Rescue
- Oil and Hazardous Materials /Radiation
- Agriculture and Natural Resources
- Energy and Utilities
- Public Safety and Security
- Long-Term Community Recovery
- Public Information Officer (PIO) External Affairs

When activated, the EOC is in constant communication with the 911 center to ensure coordination of activities. The DPS/911 capabilities fall under two categories: emergency service measures and emergency response planning. These capabilities are described below.

Emergency Service Measures

Emergency service measures protect people during and immediately following a disaster. The county monitors several systems that will disseminate emergency information and warnings. These monitoring systems include: PA-STARNet, Radio Amateur Civil Emergency Services (RACES), National Oceanic and Atmospheric Administration (NOAA) radios, PA-STARNet, and EMNet, which are described below.

- PA-STARNet is the Commonwealth's wireless voice and data network for public safety and emergency response communications. Initiated by Act 148 of 1996, it replaced multiple incompatible radio systems used by various state government agencies. It is also used by 22 Commonwealth agencies, both houses of the Legislature, business partners, and other external organizations including county and municipal agencies serving dispatch and mobile voice and data communications for public safety and emergency response.
- RACES is a group of amateur radio operators who donate their services in times of natural disaster or emergency. They provide communication to fire, police, and other agencies that need assistance.
- NOAA Weather Radio All-Hazards (NWR) is a nationwide network of radio stations broadcasting continuous weather information directly from a nearby National Weather System (NWS) office. NWR broadcasts NWS warnings, watches, forecasts, and other hazard information 24 hours a day. NWR also broadcasts warning and post-event information for all types of hazards, including natural, human-caused (such as chemical releases or oil spills), and public safety (such as AMBER alerts or 911 telephone outages). Dauphin County provided radios to all public schools in the county in 2005 and purchased another 100 radios in early 2021 to distribute to schools, hospitals, and long-term care facilities.
- EMNet is a fast, reliable alert and warning system, with 362 terminals across Pennsylvania over 214 broadcast stations, and 62 cable networks. It provides an avenue for text-based messages to be sent among system users.

Emergency Planning

Emergency Operations Plan (EOP)

The Dauphin County EOP documents the county's emergency preparedness planning. The EOP includes county-specific emergency response procedures during significant emergency events. Dauphin County's EOP complies with the National Incident Management System (NIMS) and is updated every 2 years. The updated risk assessment information from this HMP will be incorporated into subsequent updates to the EOP. The county's EOP was last adopted in December 2025.

Mutual Aid Agreements

Dauphin County has mutual aid agreements (formal agreements) with the contiguous Pennsylvania counties as a result of the Pennsylvania Intrastate Mutual Assistance Program. Every county participates in this program. Dauphin County is also part of a larger county consortium, the South Central Task Force (SCTF), which works together and shares resources during times of emergency. Originally formed in response to the increasing threat of weapons of mass destruction (WMD) and other terroristic activity, the SCTF also provides all-hazards preparedness, mitigation, prevention, response, and recovery services to citizens in its purview (SCTFPA 2025). This intergovernmental agreement is between the following counties:

- Adams
- Cumberland
- Dauphin
- Franklin
- Lancaster
- Lebanon
- Perry
- Schuylkill
- York

Regional Planning Initiatives

Dauphin County also assists in county or regional planning and preparation for the following:

- Local (Municipal) EOPs
- Medical facilities
- Dams
- Airports
- Pandemic
- Mass casualty/fatality incidents
- Counterterrorism preparedness
- Special events, such as concerts, parades, etc.
- School emergency planning
- Daycare, group home, and special needs facilities
- Evacuation and Detour Plan
- Superfund Amendments and Reauthorization Act of 1986 (SARA) – The Local Emergency Planning Committee program is based on the SARA of 1986, Title III. This legislation requires local planning by businesses and response agencies (such as fire departments and hazardous materials teams) whenever hazardous materials are involved. SARA also requires the establishment of a system in each community that informs the citizens of chemicals used, manufactured, and stored locally.
- In cooperation with the American Red Cross (ARC), the county has designated shelters that may be used during emergencies and disasters.

Local Emergency Management Capabilities

According to Pennsylvania Title 35 (Emergency Management Services Code), Chapter 7500, the following stipulations apply:

- Each political subdivision of this Commonwealth is directed and authorized to establish a local emergency management organization in accordance with the plan and program of PEMA. Each local organization shall have responsibility for emergency response and recovery within the territorial limits of the political subdivision within which it is organized and, in addition, shall conduct such services outside of its jurisdictional limits as may be required under this part.

- The governing body of a political subdivision may declare a local disaster emergency upon finding a disaster has occurred or is imminent. The effect of a declaration of a local disaster emergency is to activate the response and recovery aspects of any and all applicable local emergency management plans and to authorize the furnishing of aid and assistance.
- Each local organization of emergency management shall have a coordinator who shall be responsible for the planning, administration, and operation of the local organization.
- Each political subdivision shall adopt an Intergovernmental Cooperation agreement with other political subdivisions to accomplish the following:
    - Prepare, maintain, and keep current a disaster emergency management plan for (1) the prevention and minimization of injury and damage caused by a disaster, (2) prompt and effective response to disaster, and (3) disaster emergency relief and recovery consistent with the Pennsylvania Emergency Management Plan.
    - Establish, equip, and staff an EOC (integrated with warning and communication systems) to support government operations in emergencies and provide other essential facilities and equipment for agencies and activities assigned to emergency functions.
    - Provide individual and organizational training programs to ensure prompt, efficient, and effective disaster emergency services.
    - Organize, prepare, and coordinate all locally available manpower, materials, supplies, equipment, facilities, and services necessary for disaster emergency readiness, response, and recovery.
    - Adopt and implement precautionary measures to mitigate the anticipated effects of a disaster. Execute and enforce such rules and orders as the agency shall adopt and promulgate under the authority of this part.
    - Cooperate and coordinate with any public and private agency or entity in achieving any purpose of this part.
    - Have available for inspection at its EOC all emergency management plans, rules, and orders of the Governor and PEMA.
    - Provide prompt and accurate information regarding local disaster emergencies to appropriate Commonwealth and local officials and agencies and the general public.
    - Participate in all tests, drills, and exercises—including remedial drills and exercises—scheduled by the agency or by the federal government.
    - Participate in the program of integrated flood warning systems under Section 7313 (6) (relating to powers and duties).
- Direction of disaster emergency management services is first the responsibility of the lowest level of government affected. When two or more political subdivisions within a county are affected, the county organization shall exercise responsibility for coordination and support to the area of operations. When two or more counties are involved, coordination shall be provided by PEMA or by area organizations established by PEMA.
- When all appropriate locally available forces and resources are fully committed by the affected political subdivision, assistance from a higher level of government shall be provided.
- Local coordinators of emergency management shall develop mutual aid agreements with adjacent political subdivisions for reciprocal emergency assistance. The agreements shall be consistent with the plans and programs of PEMA.

Mutual Aid Agreements

Dauphin County has formal mutual aid agreements in place with its municipalities.

Emergency Operations Centers

In the event of an impending emergency or disaster, the local EOC may be activated. The purpose of the EOC is to manage the emergency response and coordinate the distribution of resources to a disaster incident at the local level.

Emergency Response

Each municipality is responsible for providing emergency response to their municipality consisting of EMS, fire, and police. If a municipality does not have one of these providers in their community, they should have mutual aid agreements with an adjacent political subdivision or the Commonwealth (e.g., law enforcement coverage by the Pennsylvania State Police [PSP]) to respond.

Monitoring Systems

The municipalities may also be equipped with several systems to monitor emergency information and warnings, including the Radio Amateur Civil Emergency Service (RACES) and the National Weather Service (NWS), which have been described previously.

Emergency Response Planning

The municipalities may also assist with planning for:

1. Municipal EOPs
2. Medical Facilities
3. Dams
4. Counterterrorism Preparedness
5. Special Events
6. School Emergency Planning
7. Daycare, Group Homes, and Special Needs Facilities
8. Evacuation

A summary of existing federal, state, regional, and county programs (regulatory and otherwise) to manage specific hazard risks may be found in the hazard profiles in Section 4 of this plan update. While the risk of certain hazards can be addressed at least partially through mitigation, the risks of other hazards (particularly certain non-natural hazards) are primarily managed through the preparedness and response elements of emergency management or other regulatory programs at the federal and state levels.

Municipal Capabilities

Participating municipalities in this planning effort were provided a Capability Assessment Survey. Table 5-1 summarizes the responses of the municipalities based on planning and regulatory capability, supplemented by information received from the county regarding municipal capabilities. Detailed information regarding Dauphin County municipalities' planning and regulatory capabilities can be found in the municipal survey responses provided in Appendix D.

Table 5-1. Planning and Regulatory Capability

Municipality	Hazard Mitigation Plan	EOP	Disaster Recovery Plan	Evacuation Plan	COOP Plan	NFIP	NFIP – CRS	Floodplain Regulations	Floodplain Mgmt. Plan	Zoning Regulations	Subdivision Regulations	Comprehensive Land Use Plan (or General, Master, or Growth Mgmt. Plan)	Open Space Mgmt. Plan	Stormwater Mgmt. Plan/Ordinance	Natural Resource Protection Plan	Capital Improvements Plan	Economic Dev. Plan	Historic Preservation Plan	Farmland Preservation	Building Code	Fire Code	Other
Dauphin County	X	X	X	-	X	N/A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-
Berrysburg Borough																						
Conewago Township	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	-	X	-	X	X	-
Dauphin Borough																						
Derry Township	X	X	-	-	X	X	-	X	-	X	X	X	-	X	X	-	-	-	-	X	X	X
East Hanover Township	X	X	-	+	-	X	-	-	X	X	X	X	X	X	-	-	-	-	X	X	X	X
Elizabethville Borough	X	X	-	-	-	-	-	X	X	-	X	-	-	X	-	-	-	-	-	X	X	-
Gratz Borough																						
Halifax Borough																						
Halifax Township																						
Harrisburg City	X	X	-	-	-	X	X	X	X	X	X	-	-	X	-	X	-	X	-	X	X	-
Highspire Borough	X	X	X	X	X	X	-	X	X	X	X	X	-	X	X	X	X	-	-	X	X	X
Hummelstown Borough	X	X	X	X	X	-	-	X	X	X	X	X	X	X	-	-	X	-	-	X	X	-
Jackson Township	-	-	-	-	-	-	-	-	-	X	X	-	-	X	-	-	-	-	-	X	-	-
Jefferson Township																						
Londonderry Township	X	X	X	-	-	X	-	X	X	X	X	+	+	X	-	-	-	-	X	X	X	-
Lower Paxton Township	X	X	X	X	X	X	+	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X
Lower Swatara Township	-	-	-	-	-	-	-	X	-	X	X	X	X	X	-	-	-	-	-	X	X	-
Lykens Borough	X	X	X	N/A	N/A	N/A	N/A	X	X	X	X	X	N/A	X	N/A	X	N/A	N/A	N/A	X	X	-
Lykens Township																						
Middle Paxton Township																						
Middletown Borough	-	X	-	X	-	X	-	X	-	X	X	-	-	X	-	-	-	-	-	X	-	-

Municipality	Hazard Mitigation Plan	EOP	Disaster Recovery Plan	Evacuation Plan	COOP Plan	NFIP	NFIP – CRS	Floodplain Regulations	Floodplain Mgmt. Plan	Zoning Regulations	Subdivision Regulations	Comprehensive Land Use Plan (or General, Master, or Growth Mgmt. Plan)	Open Space Mgmt. Plan	Stormwater Mgmt. Plan/Ordinance	Natural Resource Protection Plan	Capital Improvements Plan	Economic Dev. Plan	Historic Preservation Plan	Farmland Preservation	Building Code	Fire Code	Other
Mifflin Township	-	X	-	-	-	-	-	-	-	X	X	-	-	X	-	-	-	-	-	-	-	-
Millersburg Borough																						
Paxtang Borough	X	X	X	X	X	X	-	X	X	X	X	X	X	X	-	-	-	-	-	X	X	-
Penbrook Borough																						
Pillow Borough	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-
Reed Township	X	X	-	-	-	-	-	X	X	-	X	X	-	X	-	-	-	-	-	X	-	-
Royalton Borough	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	X	X	-
Rush Township																						
South Hanover Township	X	X	-	-	-	-	-	-	-	X	X	-	-	X	-	-	-	-	-	X	-	-
Steelton Borough	X	X	X	-	-	X	-	X	X	X	X	-	-	X	-	X	-	X	-	X	X	-
Susquehanna Township	X	X	-	-	-	X	+	X	X	X	X	X	X	X	-	X	-	-	-	X	X	-
Swatara Township	X	X	-	-	-	-	-	X	X	X	X	X	X	X	X	X	-	-	-	X	X	-
Upper Paxton Township	X	X	-	X	-	-	-	X	X	X	X	X	-	X	-	-	-	-	X	X	X	-
Washington Township	X	X	-	-	-	-	-	X	X	X	X	X	-	X	-	-	-	-	-	X	-	-
Wayne Township	X	X	-	-	-	-	-	X	-	-	X	-	-	X	-	-	-	-	X	X	-	-
West Hanover Township																						
Wiconisco Township																						
Williams Township	X	X	X	-	X	X	-	X	X	-	N/A	N/A	X	X	N/A	-	-	-	-	X	X	-
Williamstown Borough																						

Notes:
"X" indicates that the municipality currently has this capability in place; "N/A": Not applicable; "-" indicates no capability is currently in place; Blank space indicates no response was received from the municipality;"+" indicates that the capability is under development.
Other: Derry Township: Street Tree Ordinance; East Hanover Twp: Fire Prevention Ordinance; Highspire: Pollutant Reduction Plan-Chesapeake Bay; Lower Paxton Twp: Property Maintenance Code

5.2.2 Administrative and Technical Capability

Administrative capability is described as the adequacy of departmental and personnel resources for the implementation of mitigation-related activities. Technical capability relates to the adequacy of knowledge and technical expertise of local government employees or the ability to contract outside resources for this expertise to effectively execute mitigation activities. Common examples of skillsets 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.

Municipalities are further supported by county, regional, state, and federal administrative and technical capabilities. For this HMP, most support agencies and resources have been identified and referenced throughout this plan update.

It is noted that the county and many of its municipalities have identified specific mitigation initiatives described in this plan update, which will help build and enhance mitigation-related administrative and technical capabilities in Dauphin County.

Federal and Commonwealth Capabilities

Federal agencies that can provide technical assistance for mitigation activities include, but are not limited to:

- U.S. Army Corp of Engineers
- Department of Housing and Urban Development
- Department of Agriculture
- Economic Development Administration
- Emergency Management Institute
- Environmental Protection Agency
- FEMA
- Small Business Administration

Commonwealth agencies that 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 Emergency Management Agency
- Pennsylvania Department of Environmental Protection
- Pennsylvania Silver Jackets

Municipal Capabilities

Participating municipalities in this planning effort were provided with a capabilities survey. Table 5-2 summarizes the responses of the municipalities based on administrative and technical capability. Copies of the individual municipal responses are found in Appendix D.

Table 5-2. Administrative and Technical Capability

Municipality	Planners (with land use/land development knowledge)	Planners or Engineers (with natural and/or human-caused hazards knowledge)	Engineers or Professionals trained in building and/or infrastructure construction practices	Emergency Manager	NFIP Floodplain Administrator	Land Surveyors	Scientists or Staff familiar with the hazards of the community	Personnel skilled in GIS and/or the FEMA HAZUS program	Grant Writers or Fiscal Staff to handle large/complex grants	Other
Dauphin County	X	X	X	X	X	X	X	X	X	-
Berrysburg Borough										
Conewago Township	X	X	X	X	-	X	-	-	-	-
Dauphin Borough										
Derry Township	X	X	X	X	X	-	X	X	X	-
East Hanover Township	X	X	X	X	X	X	X	X	X	-
Elizabethville Borough	-	-	X	X	X	-	X	-	X	-
Gratz Borough										
Halifax Borough										
Halifax Township										
Harrisburg City	X	X	X	X	X	-	-	X	X	-
Highspire Borough	X	X	X	X	X	X	X	X	X	X
Hummelstown Borough	-	-	-	X	X	-	-	-	-	-
Jackson Township										
Jefferson Township										
Londonderry Township	X	X	X	X	X	-	X	X	X	-
Lower Paxton Township	X	X	X	X	X	-	-	X	X	-
Lower Swatara Township	X	X	X	X	X	X	X	X	X	-
Lykens Borough	X	X	X	X	X	X	-	X	X	-
Lykens Township										
Middle Paxton Township										
Middletown Borough	-	-	X	X	X	-	-	-	-	-
Mifflin Township										
Millersburg Borough										
Paxtang Borough	-	-	-	X	-	-	-	X	-	-
Penbrook Borough										
Pillow Borough	-	-	X	-	-	-	-	-	-	-
Reed Township	X	-	X	X	X	-	X	X	-	-
Royalton Borough	X	X	X	X	X	X	X	X	X	-
Rush Township										
South Hanover Township										
Steelton Borough	X	X	X	X	X	X	X	X	X	-
Susquehanna Township	X	X	X	X	X	X	X	X	-	

Municipality	Planners (with land use/land development knowledge)	Planners or Engineers (with natural and/or human-caused hazards knowledge)	Engineers or Professionals trained in building and/or infrastructure construction practices	Emergency Manager	NFIP Floodplain Administrator	Land Surveyors	Scientists or Staff familiar with the hazards of the community	Personnel skilled in GIS and/or the FEMA HAZUS program	Grant Writers or Fiscal Staff to handle large/complex grants	Other
Swatara Township	X	X	X	X	X	-	X	-	X	-
Upper Paxton Township	X	-	X	X	X	X	X	-	-	-
Washington Township	X	X	X	X	X	-	-	-	-	-
Wayne Township	-	X	X	X	X	-	X	X	-	-
West Hanover Township										
Wiconisco Township										
Williams Township	X	X	X	X	X	X	X	X	X	-
Williamstown Borough										

Notes:
"X" indicates that the municipality currently has this capability in place;"-" indicates no capability is currently in place;"+" indicates that the capability is under development; Blank space indicates no response was received from the municipality.
Other: Highspire: Wastewater Treatment/Stormwater/MS4

5.2.3 Financial Capability

Mitigation projects and initiatives are largely or entirely dependent on available funding. As such, it is critical to identify all available sources of funding at the local, county, regional, state, and federal levels to support the implementation of the mitigation strategies identified in this plan update.

Jurisdictions fund mitigation projects through existing local budgets, local appropriations (including referendums and bonding), and through myriad federal and state loan and grant programs.

Federal mitigation grant funding (Stafford Act 404 and 406) (FEMA 2000) is available to all communities with a current HMP (this plan); however, most of these grants require a "local share" in the range of 10 to 25 percent of the total grant amount.

Federal Hazard Mitigation Funding Opportunities

The Hazard Mitigation Grant Program

The Hazard Mitigation Grant Program (HMGP) (Stafford Act 404 and 406) is a post-disaster mitigation program made available to states by FEMA after each federal disaster declaration. The HMGP can provide up to 75 percent funding for hazard mitigation measures and can be used to fund cost-effective projects to protect public or private property in an area covered by a federal disaster declaration or projects to reduce the likely damage from future disasters. Examples of projects include the acquisition and demolition of structures in hazard-prone areas, floodproofing, or elevation to reduce future damage, minor structural improvements, and development of state or local standards.

Projects must fit into an overall mitigation strategy for the area identified as part of a local planning effort. All applicants must have a FEMA-approved HMP. Applicants who are eligible for the HMGP include state and local governments, certain nonprofit organizations or institutions that perform essential government services, and Indian tribes and authorized tribal organizations. Individuals or homeowners cannot apply directly for the

HMGP; a local government must apply on their behalf. Applications are submitted to PEMA and ranked order for available funding and submitted to FEMA for final approval. Eligible projects not selected for funding are placed in an inactive status and may be considered as additional HMGP funding becomes available.

Sections 404 and 406 hazard mitigation funding are two distinct criteria associated with mitigation funding. Participation in FEMA 404 HMGP may cover mitigation activities including raising, removing, relocating, or replacing structures within flood hazard areas. FEMA 406 HMGP is applied to parts of a facility that were damaged by a disaster, and the mitigation measures that protect from subsequent events.

Flood Mitigation Assistance Program

Flood Mitigation Assistance (FMA) provides funding to assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the NFIP. FMA is funded annually; no federal disaster declaration is required. Only NFIP-insured homes and businesses are eligible for mitigation in this program. Funding for FMA is limited, and, as with the HMGP, individuals cannot apply directly. Applications must come from local governments or other eligible organizations.

The federal government cost share for an FMA project is 75 percent. At least 25 percent of the total eligible costs must be provided by a non-federal source, and of this 25 percent, no more than half can be provided as in-kind contributions from third parties. At a minimum, a FEMA-approved local HMP is required before a project can be approved. FMA funds are distributed from FEMA to the Commonwealth. PEMA serves as the grantee and program administrator for FMA.

As of fiscal year 2013, the Severe Repetitive Loss and Repetitive Flood Claims Programs were dismantled and incorporated into the FMA Program. As a result, residential and non-residential properties currently insured with NFIP are eligible to receive FMA funds as long as they meet either the Repetitive Loss Properties (RLP) or Severe Repetitive Loss (SRL) property definitions as described in Section 4.3.6 of this plan.

Pre-Disaster Mitigation Program

Until 2020, the Pre-Disaster Mitigation (PDM) Program was an annually funded, nationwide, competitive grant program. No disaster declaration was required. Federal funds cover 75 percent of a project's cost of up to $3 million. As with the HMGP and FMA, a FEMA-approved local HMP was required to be approved for funding under the PDM program.

Building Resilient Infrastructure and Communities Program

The Building Resilient Infrastructure and Communities Program was first implemented in 2020 to replace and expand upon the PDM Program. For FY20, FEMA provided $500 million through the Building Resilient Infrastructure and Communities (BRIC) Program (FEMA 2020). States and territories were allocated $33.6 million. $20 million was set aside for tribal governments. The remaining $446.4 million was included in the competitive portion of the funding program. Like the PDM Program, no disaster declaration is required. Federal funds will cover 75 percent of a project's cost up to $50 million per subapplication, a substantial increase from the $3 million cap under the PDM Program. As with the HMGP, FMA, and (former) PDM Program, a FEMA-approved local HMP is required to be approved for funding under the BRIC program.

Federal Disaster Assistance Programs

Following a disaster, various types of assistance may be made available by local, state, and federal governments. The types and levels of disaster assistance depend on the severity of the damage and the declarations that result from the disaster event. General types of assistance that may be provided, should the President of the United States declare the event a major disaster, include the following:

- Individual Assistance – Provides help for homeowners, renters, businesses, and some nonprofit entities after disasters occur. This program is largely funded by the U.S. Small Business Administration. For homeowners and renters, those who suffered uninsured or underinsured losses may be eligible for a Home Disaster Loan to repair or replace damaged real estate or personal property. Renters are eligible for loans to cover personal property losses. Individuals may borrow up to $200,000 to repair or replace real estate, $40,000 to cover losses to personal property, and an additional 20 percent for mitigation. For businesses, loans may be made to repair or replace disaster damages to property owned by the business, including real estate, machinery and equipment, inventory, and supplies. Businesses of any size are eligible. Nonprofit organizations such as charities, churches, private universities, etc., are also eligible. An Economic Injury Disaster Loan provides necessary working capital until normal operations resume after a physical disaster. These loans are restricted, by law, to small businesses only.
- Public Assistance – Provides cost reimbursement aid to local governments (state, county, local, municipal authorities, and school districts) and certain nonprofit agencies that were involved in disaster response and recovery programs or that suffered loss or damage to facilities or property used to deliver government-like services.

U.S. Department of Housing and Urban Development Community Development Block Grants

The U.S. Department of Housing and Urban Development (HUD) Community Development Block Grants (CDBG) are federal funds intended to provide low- and moderate-income citizens with decent housing, a suitable living environment, and expanded economic opportunities. Eligible activities include community facilities and improvements, roads and infrastructure, housing rehabilitation and preservation, development activities, public services, economic development, planning, and administration. Public improvements may include flood and drainage improvements. In limited instances, and during times of "urgent need" (for example, post-disaster) as defined by the CDBG National Objectives, CDBG funding may be used to acquire a property located in a floodplain that was severely damaged by a recent flood, demolish a structure severely damaged by an earthquake, or repair a public facility severely damaged by a hazard event. All municipalities in the county are eligible for CDBG funds through the county, except for the City of Harrisburg, which receives CDBG funding directly from U.S. HUD.

High Hazard Potential Dam (HHPD) Program

To reduce DeHart Dam's vulnerability, Dauphin County could apply for the FEMA Rehabilitation of HHPD grant program. "The main objective of the HHPD grant program is to provide technical, planning, design, and construction assistance in the form of grants to non-federal sponsors for rehabilitation of eligible high-hazard potential dams." (FEMA 2024). New guidance for the HHPD grant program was provided in July 2020.

To receive the HHPD funding, the following are basic outline program eligibility requirements:

1. The applicant must be a non-federal government entity or a nonprofit and work with the State Administrative Agency (SSA) designee which will serve as the applicant and/or pass-through entity for a subrecipient.
    a. It is recommended that applicants pursue this grant in coordination with the State Dam Safety Officer and the State Hazard Mitigation Officer (SHMO). For Pennsylvania, Roger Adams is the PA DEP Dam Safety Division Chief, and Tom Hughes is the PA SHMO.
2. The subrecipient must:
    a. Act in accordance with the state dam safety program, and the project must be regulated by the same program.
    b. Must be a full participant in the NFIP and not suspended.
    c. Must commit to operation and maintenance (O&M) for 50 years in addition to providing an O&M plan and assure that the plan will be carried out.

d. Must have a floodplain management plan in place.
e. Must comply with the Stafford Act, Davis-Bacon Act, Copeland Anti-Kickback Act, and the Brook Architect-Engineers Act.

3. Eligibility Requirements as identified on pages 2-7 of the HHPD guidance document:
    a. Be located in a state with a state dam safety program.
    b. Be classified as "high hazard potential" by the state dam safety program.
    c. Have an emergency action plan (EAP) approved by the state dam safety program/
    d. Fail to meet minimum state dam safety standards and pose an unacceptable risk to the public/
    e. Eligible project must meet non-federal cost-share requirements of 35% of entire project costs.
    f. Phased projects are allowable in the program/
4. Grant Fund Requirements:
    a. Environmental and Historic Preservation Compliance
    b. Non-Discrimination compliance
    c. Conflicts of Interest compliance
    d. Procurement compliance
    e. Duplication of Programs
    f. Duplication of Benefits

Additional Federal Resources

Weatherization Assistance Program: Minimizes the adverse effects of high-energy costs on low-income, elderly, and handicapped citizens through client education activities and weatherization services like heating system modifications and insulation (US DOE 2011).

Section 108 Loan Guarantee Programs: Provides loan guarantees as security for federal loans for acquisition, rehabilitation, relocation, clearance, site preparation, special economic development activities, and construction of certain public facilities and housing (HUD 2011).

U.S. Department of Agriculture: Provides disaster assistance through the following:

- The Emergency Conservation Program provides emergency funding for farmers to rehabilitate farmland damaged by natural disasters and for carrying out emergency water conservation measures during periods of severe drought.
- The Non-Insured Crop Disaster Assistance Program provides financial assistance for non-insurable crop losses and planting prevented by disasters.

Emergency Watershed Protection Program: Undertakes emergency measures including the purchase of floodplain easements for runoff retardation and soil erosion prevention to safeguard lives and property from floods, drought, and the products of erosion on any watershed whenever fire, flood, or any other natural occurrence is causing or has caused a sudden impairment of the watershed (NRCS 2011). An emergency doesn't need to be declared by the President for an area to be eligible for assistance. The program objective is to assist sponsors and individuals in implementing emergency measures to relieve imminent hazards to life and property created by a natural disaster. Activities include providing financial and technical assistance to remove debris from streams, protecting destabilized stream banks, establishing cover on critically eroding lands, repairing conservation practices, and purchasing floodplain easements. The program is designed for the installation of recovery measures.

Commonwealth Hazard Mitigation Funding Opportunities

Marcellus Shale Legacy Fund - Act 13 of 2012

Watershed Restoration and Protection Program (WRPP): Act 13 of 2012 establishes the Marcellus Legacy Fund and allocates funds to the Commonwealth Financing Authority for watershed restoration and protection projects.

The overall goal of this program is to restore and maintain restored stream reaches impaired by the uncontrolled discharge of non-point source polluted runoff, and ultimately to remove these streams from the PA DEP's Impaired Waters list.

Greenways, Trails and Recreation Program (GTRP): In addition, Act 13 of 2012 allocates funds to the Commonwealth Financing Authority (the "Authority") for planning, acquisition, development, rehabilitation, and repair of greenways, recreational trails, open space, parks, and beautification projects. Projects can involve the development, rehabilitation, and improvements of public parks, recreation areas, greenways, trails, and river conservation.

Flood Mitigation Projects: Finally, Act 13 of 2012 allocates funds to the Commonwealth Financing Authority (the "Authority") for funding statewide initiatives to assist with flood mitigation projects.

While most of the identified fiscal capabilities are available to all of the municipalities in Dauphin County, the extent to which communities have leveraged these funding sources varies widely. It is expected that communities familiar with accessing grant programs will continue to pursue those grant sources, as appropriate.

Other Commonwealth Hazard Mitigation Funding Opportunities

Commonwealth programs that may provide financial support for mitigation activities include, but are not limited to:

- Community Conservation Partnerships Program
- Community Revitalization Program
- Floodplain Land Use Assistance Program
- Growing Greener Program
- Keystone Grant Program
- Local Government Capital Projects Loan Program
- Land Use Planning and Technical Assistance Program
- Pennsylvania Heritage Areas Program
- Pennsylvania Recreational Trails Program
- Shared Municipal Services
- Technical Assistance Program

Dauphin County Capabilities

Dauphin County Land Bank Authority

The Dauphin County Land Bank Authority (Land Bank) was created by Ordinance 2013-4 and enabled by Act 153 of 2012, 68 Pa. S.S.A. at Section 2107, Creation of Land Banks for the Conversion of Vacant or Tax-Delinquent Properties into Productive Use. The Land Bank was established to use available resources to facilitate the return of vacant, blighted, abandoned, and tax-delinquent properties to productive use, thereby combating community deterioration, creating economic growth, and stabilizing the housing and job market. Governed by a seven-member board, the Land Bank acquires, holds, and transfers interest in real property throughout Dauphin County as approved by the Board of Directors for the following purposes consistent with the goals established by the Dauphin County Land Bank Ordinance, local government partners, and other community stakeholders:

- To deter the spread of blight
- To promote redevelopment and reuse of vacant, abandoned, and tax-delinquent properties
- To support targeted efforts to stabilize neighborhoods

Local taxing bodies, including the county, municipalities, and local school districts, enter into an Intergovernmental Cooperation Agreement and Memorandum of Understanding (MOU) with the Land Bank.

Properties are referred to the Land Bank with a focus on revitalization to improve a property's condition, ultimately increasing the municipal tax base.

Dauphin County Local Share Gaming Fund

The Pennsylvania Race Horse Development and Gaming Act, as amended, established a coordinated system for ensuring that local governments receive a share of the revenues generated by gaming. This "Local Share" system distributes approximately 4 percent of the gross revenues of certain licensed gaming facilities to support community and economic well-being and mitigate the impact of gaming and related activities. Those funds are distributed to the licensed facility's host municipality and host county. Dauphin County is a host county. Under the Local Share system, Dauphin County uses a portion of the Local Share monies it receives for awarding municipal grants. Grants may be awarded from two grant pools: (1) a pool for projects with a clear connection to the operations or impacts of the licensed gaming facility; and (2) a pool where a project's connection to the licensed facility may be considered, but is not required, to receive a grant. The Dauphin County Gaming Advisory Board determines whether an application will be considered for funding from one or both grant pools. Eligible uses for funds from Grant Pool 2 include:

- Health: Projects that facilitate, enhance, or otherwise further the health of the residents and communities of the grantee.
- Safety: Projects that facilitate, enhance, or otherwise further the safety of the residents and communities of the grantee.
- Transportation: Projects that address transportation needs or improve transportation systems in the grantee communities.
- Public Interest: Projects that improve the quality of life in the grantee communities.

Dauphin County Infrastructure Bank

Starting in 2013, the Dauphin County Infrastructure Bank (DCIB) provides low-interest loan financing to support surface transportation projects county-wide and is intended to leverage other private, local, state, and federal funding resources. The county is working with the Pennsylvania Department of Transportation (PennDOT) on the DCIB and will provide a maximum of $30 million for low-interest loans for qualifying transportation projects. Program funds are run through PennDOT's Pennsylvania Infrastructure Bank (PIB) Program. Public road and bridge repair, improvement, or construction of culverts and drainage structures are some of the eligible uses of DCIB Program funding. The program was a 2014 Achievement Award Winner from the National Association of Counties (NACO).

Additional financial resources can be generated from local fees and taxes. Municipalities may exercise their taxing authority to raise funds for projects as they see fit. This includes special taxes to fund mitigation measures such as, but not limited to, EMS, firefighting, fire equipment, fire hydrants, and infrastructure improvements.

Intergovernmental Cooperation

Intergovernmental cooperation is one manner of accomplishing common goals, solving mutual problems, and reducing expenditures. Dauphin County municipalities have many types of partnering arrangements in place. For instance, the Capital Region Council of Governments (CapCOG) includes 43 municipal members from Dauphin, Cumberland, Lebanon, Perry, and York counties. A total of 20 Dauphin County municipalities participate in the CapCOG including Conewago Township, Dauphin Borough, Derry Township, East Hanover Township, Harrisburg City, Highspire Borough, Hummelstown Borough, Londonderry Township, Lower Paxton Township, Lower Swatara Township, Middle Paxton Township, Middletown Borough, Paxtang Borough, Penbrook Borough, Royalton Borough, South Hanover Township, Steelton Borough, Susquehanna Township, Swatara Township, and West Hanover Township.

Municipal Capabilities

The implementation of mitigation actions requires time and fiscal resources. While some mitigation actions are less costly than others, funds must be available locally to implement policies and projects. Financial resources are particularly important if jurisdictions are trying to take advantage of Commonwealth or federal mitigation grant funding opportunities that require local-match contributions.

Capital Improvement Planning

Capital improvement plans are often recommended by counties to their municipalities because these plans help identify specific capital projects to be funded and completed according to a defined schedule. Some of these projects involve improvements to facilities and infrastructure that provide hazard mitigation benefits. As such, during this update process, the county and its municipalities have been encouraged to consider the mitigation benefits associated with their known or anticipated capital projects as a way to help prioritize their execution and to develop awareness that mitigation grants may be available to help fund such projects.

Special Purpose Taxes

Communities may exercise their taxing authority to raise funds for any project they see fit. This includes special taxes to fund mitigation measures. Spreading the cost of a community project among the community's taxpayers helps provide the greatest public good for relatively little individual cost.

Gas/Electric Utility Fees

In the same way that special taxes can be levied to fund mitigation projects, another avenue for financing a project that a community may utilize is to dedicate a portion of homeowners' gas and electric utilities' fees to upgrade and maintain the related infrastructure. Burying transmission lines, thereby mitigating the effects of winds and ice storms, is expensive. These fees help to offset that cost.

Water/Sewer Fees

Water Authorities and Fees

Water authorities are multipurpose authorities with water projects, many of which operate both water and sewer systems. The financing of water systems for lease back to the municipality is among the principal activities of the local government facilities' financing authorities. An operating water authority issues bonds to purchase existing facilities or to construct, extend, or improve a system. The primary source of revenue is user fees based on metered usage.

The cost of constructing or extending water supply lines can be funded by special assessments against abutting property owners. Tapping fees also help fund water system capital costs. Water utilities are directly operated by municipal governments and by privately owned public utilities regulated by the Pennsylvania Public Utility Commission. The PA DEP has a program to assist with the consolidation of small individual water systems to make system upgrades more cost-effective.

Sewer Authorities and Fees

Sewer authorities include multipurpose authorities with sewer projects. The authorities issue bonds to finance the acquisition of existing systems or to finance construction, extension, and improvements. Sewer authority operating revenues originate from user fees. The fee frequently is based on the amount of water consumed, and payment is enforced by the ability to terminate service or the imposition of liens against real estate. In areas with no public water supply, flat rate charges are calculated on average use per dwelling unit.

Stormwater Utility Fees

Stormwater utility fees are assessed and collected to offset the cost of maintaining and upgrading stormwater management structures such as drains, retention ponds, and culverts.

Development Impact Fees

Development impact fees are one-time fees assessed to offset the cost of providing public services to a new development. They may be dedicated to providing the related new water or sewer infrastructure, roads, parks and recreational areas, libraries, schools, etc. The new infrastructure may be less vulnerable to hazard impacts.

General Obligation, Revenue, and/or Special Tax Bonds

Jurisdictions may simply decide to dedicate general funds or similar financing to implement hazard mitigation projects.

Partnering Arrangements or Intergovernmental Agreements

Intergovernmental cooperation is one manner of accomplishing common goals, solving mutual problems, and reducing expenditures. There are 40 municipalities within Dauphin County. Each of these municipalities conducts its daily operations and provides various community services according to local needs and limitations. Each municipality varies in staff size, resource availability, fiscal status, service provision, constituent population, overall size, and vulnerability to the identified hazards.

Circuit Rider Program (Engineer)

The Circuit Rider Program is an example of intergovernmental cooperation. This program offers municipalities the ability to join together to accomplish a common goal. The Circuit Rider is a municipal engineer who serves several small municipalities simultaneously. These are municipalities that may be too small to hire a professional engineer for their operations yet need the skills and expertise the engineer can offer. Municipalities can jointly obtain what no single municipality could obtain on its own.

Municipalities participating in this planning effort were provided with a capabilities survey. Table 5-3 summarizes the responses of the municipalities based on financial capabilities. Copies of the individual municipal responses are found in Appendix D.

Table 5-3. Fiscal Capability

Municipality	Capital Improvements Program	Community Development Block Grants (CDBG)	Special Purpose Taxes	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation, Revenue, and/or Special Tax Bonds	Partnering Arrangements or Intergovernmental Agreements	Other
Dauphin County	X	X	X	-	-	X	-	-	X	-
Berrysburg Borough										
Conewago Township	-	-	-	-	-	-	-	-	-	-
Dauphin Borough										
Derry Township	X	-	X	-	X	X	-	X	X	-
East Hanover Township	-	-	-	X	X	X	-	-	-	-
Elizabethville Borough	-	X	-	-	X	-	-	-	X	-

Municipality	Capital Improvements Program	Community Development Block Grants (CDBG)	Special Purpose Taxes	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation, Revenue, and/or Special Tax Bonds	Partnering Arrangements or Intergovernmental Agreements	Other
Gratz Borough										
Halifax Borough										
Halifax Township										
Harrisburg City	X	X	X	-	-	-	X	X	X	-
Highspire Borough	-	X	-	-	X	-	-	X	X	-
Hummelstown Borough	X	X	-	X	X	-	X	-	-	-
Jackson Township										
Jefferson Township										
Londonderry Township	X	X	X	-	-	-	X	X	X	-
Lower Paxton Township	-	-	-	-	X	X	-	X	X	X
Lower Swatara Township	X	X	-	-	X	X	X	X	-	-
Lykens Borough	X	X	-	-	X	-	-	X	-	-
Lykens Township										
Middle Paxton Township										
Middletown Borough	-	-	-	-	-	-	-	-	-	-
Mifflin Township										
Millersburg Borough										
Paxtang Borough	-	-	-	-	-	-	-	-	X	-
Penbrook Borough										
Pillow Borough	-	X	-	-	X	-	-	-	-	-
Reed Township	-	-	X	-	-	X	-	-	X	-
Royalton Borough	X	X	X	X	X	X	X	X	X	-
Rush Township										
South Hanover Township										
Steelton Borough	X	X	-	-	-	X	X	X	X	-
Susquehanna Township	X	X	X	-	X	X	-	X	X	-
Swatara Township	X	X	X	-	X	X	-	X	X	-
Upper Paxton Township	-	X	X	-	X	-	-	-	X	-
Washington Township	-	-	-	-	-	-	-	-	-	-
Wayne Township	-	-	-	-	-	-	-	-	X	-
West Hanover Township										
Wiconisco Township										
Williams Township	N/A	X	-	-	X	-	-	-	X	-
Williamstown Borough										

Notes:
"X" indicates that the municipality currently has this capability in place;"-" indicates no capability is currently in place; Blank space indicates no response was received from the municipality; "+" indicates that the capability is under development

Other: Lower Paxton Twp: Parks and Recreation Fee

5.2.4 Education and Outreach

Education and outreach programs and methods are used to implement mitigation activities and communicate hazard-related information. Examples include obtaining certification in programs such as Firewise and StormReady and developing and communicating hazard awareness and safety information to residents.

At the municipal level, education and outreach capabilities vary. Some municipalities can handle outreach initiatives while others rely on county resources. Several municipal websites post local plans and ordinances, and many municipalities post information regarding hazard-related topics. The local fire departments and emergency managers are active in the schools participating in programs such as fire safety in the fall and attending other community activities to conduct outreach. Appendix D details the outreach and education conducted at the municipal level.

Public Information Programs

Flood Maps

Flood maps and flood data, including new digital maps for Dauphin County, are available at the municipal offices. County and municipality maps, tax maps, and property assessment records are available at the Property Assessment and GIS Services offices, and deeds are available at the Recorder of Deeds Office.

Library Education Tools

Libraries have educational materials, available upon request, which are used at public speaking events or county meetings, when appropriate. The following educational materials are available but are not limited to:

- Various types of training videos
- Pennsylvania emergency preparedness guides
- American Red Cross packets for flash flooding, hurricane, thunder and lightning, tornado, and winter storms
- Family disaster planning guides
- Homeland security information for businesses, families, individuals, neighborhoods, and schools
- Pandemic brochures

Outreach Projects

Several organizations (both public and private sector) have developed outreach projects, educational tools, and training programs. The county promotes both online and traditional in-person programs to appeal to as wide an audience as possible.

Are You Ready?: This is an in-depth program for citizen preparedness (individual, family, and community) that provides a step-by-step approach to disaster preparedness by walking the participant through steps to become informed about local emergency plans, identify hazards that affect their area, and develop and maintain an emergency communications plan and disaster supply kit. Other topics include evacuation, emergency public shelters, animal handling during disasters, and information specific to people with disabilities. The program includes actions that can be taken before, during, and after each hazard type and provides in-depth information on specific hazards such as the following:

  - Floods
  - Tornadoes
  - Hurricanes
  - Thunderstorms and lightning
  - Winter storms and extreme cold

- Extreme heat
- Earthquakes
- Volcanoes
- Landslide and debris flows (mudslide)
- Tsunamis
- Fires and wildfires
- Hazardous materials incidents
- Household chemical emergencies
- Nuclear power plants
- Terrorism (explosion, biological, chemical, nuclear, and radiological hazards)

ReadyPA Campaign: Established by the Commonwealth of Pennsylvania, www.readypa.org is a website that aims to prepare the public for times of disaster by providing education on the risks within Pennsylvania, template emergency plans and kits, and information on ways to get involved with community organizations to help others.

Emergency management courses are provided through the county DPS to local coordinators and elected officials, including Duties and Responsibilities of the Local Emergency Management Coordinator (LEMC), Damage Assessment, and Basic Orientation.

Local Emergency Planning Committee

The Local Emergency Planning Committee (LEPC) works closely with the business industry community to form a safety net around the chemical industry to protect the general population from the possible outcome of hazardous material incidents. The following features of the LEPC demonstrate the capability of the LEPC to support county emergency management and preparedness initiatives.

The LEPC shall have a minimum of seven members, with at least one representative from each of the following groups:

- Group 1 – Elected official representing local government within the county
- Group 2 – Local law enforcement, first aid, health, environmental, hospital, and transportation personnel
- Group 3 – Firefighting personnel
- Group 4 – Civil defense and emergency management personnel
- Group 5 – Broadcast and print media personnel
- Group 6 – Community groups not affiliated with emergency service groups
- Group 7 – Owners and operators of facilities subject to the requirements of SARA Title III

Reporting Facilities: The minimum reporting threshold for which facilities are required to have or prepare a Material Safety Data Sheet is 10,000 pounds of hazardous chemicals. This document provides workers and emergency personnel with procedures for handling or working with hazardous materials safely. It includes information on the chemicals' physical properties, toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill-handling procedures.

Planning Facilities: The reporting threshold for Extremely Hazardous Substances (as designated under Section 302 of Title III) is 500 pounds or the threshold planning quantity, whichever is lower. Qualifying facilities are subject to additional reports and accident prevention regulations.

Technical Assistance

The county DPS can support local, public, and private entities as needed through coordination and provision of information and equipment resources. These include both existing county capabilities and predetermined private and public resources.

Municipalities participating in this planning effort were provided with a Capability Assessment Survey. Table 5-4 summarizes the responses of the municipalities based on education and outreach capabilities. Copies of the individual municipal responses are found in Appendix D.

Table 5-4. Education and Outreach Capability

Municipality	Firewise Communities Certification	StormReady Certification	Natural Disaster or Safety-Related School Programs	Ongoing public education or information programs (e.g. responsible water use, fire safety, household preparedness, environmental education)	Public-private partnership initiatives addressing disaster-related issues	Local citizen groups or nonprofit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Other
Dauphin County	-	X	X	X	X	X	X
Berrysburg Borough							
Conewago Township	-	-	-	-	-	-	-
Dauphin Borough							
Derry Township	-	-	-	-	-	X	-
East Hanover Township	-	-	-	X	-	X	-
Elizabethville Borough	-	-	-	X	-	-	-
Gratz Borough							
Halifax Borough							
Halifax Township							
Harrisburg City	-	-	X	X	-	-	-
Highspire Borough	-	-	-	-	-	-	-
Hummelstown Borough	-	-	-	X	-	-	-
Jackson Township							
Jefferson Township							
Londonderry Township	-	-	X	X	-	X	-
Lower Paxton Township	-	-	-	X	-	X	-
Lower Swatara Township	-	-	-	X	-	-	-
Lykens Borough	-	-	-	-	-	-	-
Lykens Township							
Middle Paxton Township							
Middletown Borough	-	-	-	-	-	-	-
Mifflin Township							
Millersburg Borough							
Paxtang Borough	-	-	X	X	-	-	-
Penbrook Borough							
Pillow Borough	-	-	-	X	-	-	-
Reed Township	-	-	-	-	-	-	-
Royalton Borough	-	-	-	X	-	X	-
Rush Township							

Municipality	Firewise Communities Certification	StormReady Certification	Natural Disaster or Safety-Related School Programs	Ongoing public education or information programs (e.g. responsible water use, fire safety, household preparedness, environmental education)	Public-private partnership initiatives addressing disaster-related issues	Local citizen groups or nonprofit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Other
South Hanover Township							
Steelton Borough	-	X	X	X	X	X	-
Susquehanna Township	-	-	-	X	-	-	-
Swatara Township	-	-	-	X	-	-	-
Upper Paxton Township	-	X	-	X	-	-	-
Washington Township	-	-	-	-	-	-	-
Wayne Township	-	-	-	-	-	-	-
West Hanover Township							
Wiconisco Township							
Williams Township	-	X	X	X	-	X	-
Williamstown Borough							

Notes:
"X" indicates that the municipality currently has this capability in place;"-" indicates no capability is currently in place; Blank space indicates no response was received from the municipality.
Other: Dauphin County- PPL does safety training for first responders. Drug and Alcohol services recently did a survey that will help guide prevention, education, treatment opportunities, and outreach initiatives.

5.2.5 Self-Assessment

Municipality	Capability Category			
	Planning and Regulatory Capability	Administrative and Technical Capability	Financial Capability	Education and Outreach Capability
Dauphin County	L	M	M	M
Berrysburg Borough				
Conewago Township	L	L	L	L
Dauphin Borough				
Derry Township	H	H	H	M
East Hanover Township	L	M	L	L
Elizabethville Borough	L	L	M	L
Gratz Borough				
Halifax Borough				
Halifax Township				
Harrisburg City	H	M	M	M
Highspire Borough	H	H	H	H
Hummelstown Borough	-	-	-	-
Jackson Township				

Municipality	Capability Category			
	Planning and Regulatory Capability	Administrative and Technical Capability	Financial Capability	Education and Outreach Capability
Jefferson Township				
Londonderry Township	L	M	L	L
Lower Paxton Township	H	H	H	M
Lower Swatara Township	L	L	L	L
Lykens Borough	L	L	L	L
Lykens Township				
Middle Paxton Township				
Middletown Borough	-	-	-	-
Mifflin Township				
Millersburg Borough				
Paxtang Borough	L	L	L	L
Penbrook Borough				
Pillow Borough	L	L	L	L
Reed Township	L	L	L	L
Royalton Borough	H	H	L	H
Rush Township				
South Hanover Township				
Steelton Borough	M	M	L	L
Susquehanna Township	L	L	L	L
Swatara Township	L	L	L	L
Upper Paxton Township	M	L	L	M
Washington Township	L	L	L	L
Wayne Township	L	L	L	L
West Hanover Township				
Wiconisco Township				
Williams Township	M	M	M	M
Williamstown Borough				

5.2.6 Plan Integration

According to FEMA, plan integration is a process where communities look critically at their existing planning framework and align their efforts. Integration of hazard mitigation principles into other local planning mechanisms (comprehensive plans, transportation plans, floodplain ordinances, etc.) and vice versa is vital to building a safer, more resilient community. This two-way exchange of information supports community-wide risk reduction, both before and after disasters occur. Not only will the community's planning efforts be better integrated, but by going through this process, `there is a higher level of interagency coordination, which is just as important as the planning mechanisms themselves.

Within Dauphin County, many existing plans and programs support hazard risk management; thus, it is critical that this HMP integrate, coordinate with, and complement, those mechanisms.

The intention of the Planning Team and participating jurisdictions is to incorporate mitigation planning as an integral component of daily government operations. Planning Team members will work with local government

officials to integrate the newly adopted hazard mitigation goals and actions into the general operations of government and partner organizations. Further, the sample adoption resolution (located in Section 8 of this HMP) includes a resolution item stating the intent of the local governing body to incorporate mitigation planning as an integral component of government and partner operations. By doing so, the Planning Team anticipates the following:

1) Hazard mitigation planning will be formally recognized as an integral part of overall emergency management efforts.
2) Hazard mitigation planning will be formally recognized as an integral part of land use policies and mechanisms.
3) The HMP, the county and municipal comprehensive plans, and the county and municipal EOPs will become mutually supportive documents that work in concert to meet the goals and needs of county residents.
4) Duplication of effort can be minimized.

As noted in Section 6 of this plan, Dauphin County has made a concerted effort to reduce its vulnerability to natural and non-natural hazards in its planning and daily operations since the Dauphin County HMP was last updated in 2021. The county and its jurisdictions have implemented various programs and projects to reduce the impacts of hazards. These projects, programs, and regulations have reduced the risk caused by natural and non-natural hazards and support the goals and objectives of this HMP. It is the intent of the county and its participating municipalities to strengthen this focus on mitigation by continuing existing policies and by further implementing the mitigation policies contained in this HMP.

Implementation actions will include incorporating the goals of the HMP into ongoing planning, zoning, building, and engineering activities. Specifically, the county will urge municipalities to take the following actions:

- Fund hazard mitigation projects or actions in operating budgets to the extent possible.
- Notify other municipalities about grants and other funding opportunities as they arise.
- Use data and maps from this HMP as supporting documentation in grant applications.
- Review mitigation actions when allocating funding for the municipal budgets.
- Include hazard mitigation when updating municipal ordinances.
- Identify hazard areas in updates of comprehensive plans to identify land use issues.
- Review the HMP before land use or zoning changes and permitting or development decisions.

The information on hazards, risk, vulnerability, and mitigation contained in this HMP is based on the best science and technology available at the time of the plan's preparation. Additionally, plans were incorporated directly into this HMP update. All participating jurisdictions recognize that this information can be invaluable in making decisions under other planning programs, such as comprehensive, capital improvement, and emergency management plans. Figure 5-1 illustrates the interrelationships between the HMP, the Dauphin County comprehensive plan, the county EOP, and other community planning mechanisms. Existing processes and programs through which the HMP should be implemented are described below.

Plan participants will make every effort to implement the relevant sections and or data contained in the HMP utilizing administrative, budgetary, and regulatory processes as well as partnerships to the maximum extent, as described below.

Administrative

Administrative processes include departmental or organizational work plans, policies, or procedural changes that can be addressed by the following departments:

- Facility Maintenance
- Housing Authority
- Human Services

- Solid Waste Management and Recycling
- Public Safety
- Sheriff's Department

Additional administrative measures may include the creation of paid or unpaid internships to assist in HMP maintenance.

The Dauphin County DPS is responsible for preparing and maintaining the county EOP, including a minimum biennial review. Whenever portions of the plan are implemented in an emergency event or training exercise, a review is performed, and changes are made where necessary. Municipalities are notified of changes to the county EOP, which most of Dauphin County's municipalities have adopted as their own EOP. The risk assessment information presented in the 2021 HMP was used to update the Hazard Vulnerability Assessment section of the county EOP. The updated risk assessment information will affect subsequent updates to the EOP. Recommended changes to the HMP, based on changes to the EOP, will then be coordinated with the Planning Team.

The Dauphin County Planning Commission, which is administered by the TCRPC, is responsible for maintaining and updating the county comprehensive plan, which covers all 40 municipalities. The Planning Commission meets monthly to review, discuss, and comment on municipal subdivision and land development plans, municipal floodplain ordinances, municipal stormwater management plans and ordinances, and other community planning and development matters. Since the adoption of the original Dauphin County HMP, these reviews have included informal cross-referencing of the planned development or regulatory activity with the provisions of the HMP. It uses this information to identify necessary revisions and to amend the county's comprehensive plan. The Planning Commission's meetings are open to the public and are advertised according to the Pennsylvania Sunshine Act (65 PA C.S.A.).

The administrative practices described above will continue through the development of subsequent Dauphin County comprehensive plan updates using the information in this updated HMP. In return, the Dauphin County comprehensive plan, located on the TCRPC website, was incorporated into multiple aspects of this HMP. Information from the comprehensive plan and other documents was used to formulate the county profile, identify the history of individual hazards, and detail the population projections in Dauphin County.

Budgetary Process

In terms of budgetary processes, the county will review capital budgets and, if funding is available, include a line item for mitigation actions. In addition, the county will maximize the mitigation aspects of proposed projects and will encourage municipalities to do likewise.

Regulatory Measures

Regulatory measures—such as the creation of executive orders, ordinances, and other directives—will be considered to support hazard mitigation in the following areas:

- Comprehensive Planning – Institutionalize hazard mitigation for new construction and land use.
- Zoning and Ordinances
- Building Codes – Enforce codes or higher standards in hazard areas.
- Capital Improvements Plan – Ensure that the person responsible for projects under this plan evaluates whether new construction is in a high-hazard area (such as a flood plain) so the construction is designed to mitigate the risk. Revise requirements for this plan to include hazard mitigation in the design of new construction.
- NFIP – Continue participation in this program and explore participation in the CRS Program.
- Stormwater Management – Continue to implement stormwater management plans.

- HMP Plan Coordination – Prior to formal changes (amendments) to master plans, zoning, ordinances, capital improvement plans, or other mechanisms that control development, all above-mentioned plans must be reviewed to ensure they are consistent with the HMP.

Funding

The county and its jurisdictions will consider multiple grant sources to fund eligible projects. These opportunities may include, but are not limited to:

- Federal
    - FEMA Building Resilient Infrastructure and Communities Program (BRIC)
    - FEMA Flood Mitigation Assistance Program (FMA)
    - FEMA Hazard Mitigation Grant Program (HMGP) – Stafford Act, Section 404
    - U.S. Department of Housing and Urban Development (HUD) – Community Development Block Grant (CDBG)
    - U.S. Department of Agriculture (USDA) – USDA Community Facilities
    - U.S. Economic Development Administration (EDA) Public Works Program
- Commonwealth
    - PennDOT Pennsylvania Infrastructure Bank
    - Act 13 Marcellus Shale Legacy Funds – Flood Mitigation Program
- Nonprofit organizations, foundations, and private sources

Other potential federal funding sources include:

- Stafford Act, Section 406 – Public Assistance Program Mitigation Grants
- Federal Highway Administration
- Catalog of Federal Domestic Assistance
- U.S. Fire Administration – Assistance to Firefighter Grants
- U.S. Small Business Administration Pre- and Post-Disaster Mitigation Loans
- U.S. Department of Economic Development Administration Grants
- U.S. Army Corps of Engineers
- U.S. Department of Interior, Bureau of Land Management
- Other sources as yet to be defined

Partnerships

The following opportunities for partnerships will be encouraged to provide broader support and understanding of hazard mitigation:

Existing Committees and Councils

- Dauphin County Agricultural Preservation Board (http://www.dauphincd.org/ag/alp.html)
- Dauphin County Conservation District (http://www.dauphincd.org/)
- Dauphin County Economic Development Corporation (https://www.dauphincounty.gov/government/support-services/community-and-economic-development/economic-development-corporation)
- Dauphin County Redevelopment Authority (https://www.dauphincounty.gov/government/support-services/community-and-economic-development/redevelopment-authority)

- Dauphin County Land Bank (https://www.dauphincounty.gov/government/support-services/community-and-economic-development/land-bank-authority)
- Dauphin County Local Emergency Planning Committee (https://www.dauphincounty.gov/government/support-services/public-safety/hazardous-materials)
- Dauphin County Hospital Authority (https://www.dauphincounty.gov/government/support-services/community-and-economic-development/hospital-authority)

Creative Partnerships for Funding and Incentives

- Public-private partnerships, including utilities and businesses
- State cooperation
- In-kind resources

Working with Other Federal and Commonwealth Agencies

- U.S. Army Corps of Engineers (USACE)
- Department of Homeland Security (DHS)
- Federal Emergency Management Agency (FEMA)
- National Oceanic and Atmosphere Administration (NOAA)
- National Weather Service (NWS)
- Pennsylvania Department of Transportation (PennDOT)
- Pennsylvania Department of Environmental Protection (PADEP)
- Pennsylvania State Police (PSP)
- United States Department of Agriculture (USDA)
- United States Department of Transportation (USDOT)
- United States Geological Service (USGS)

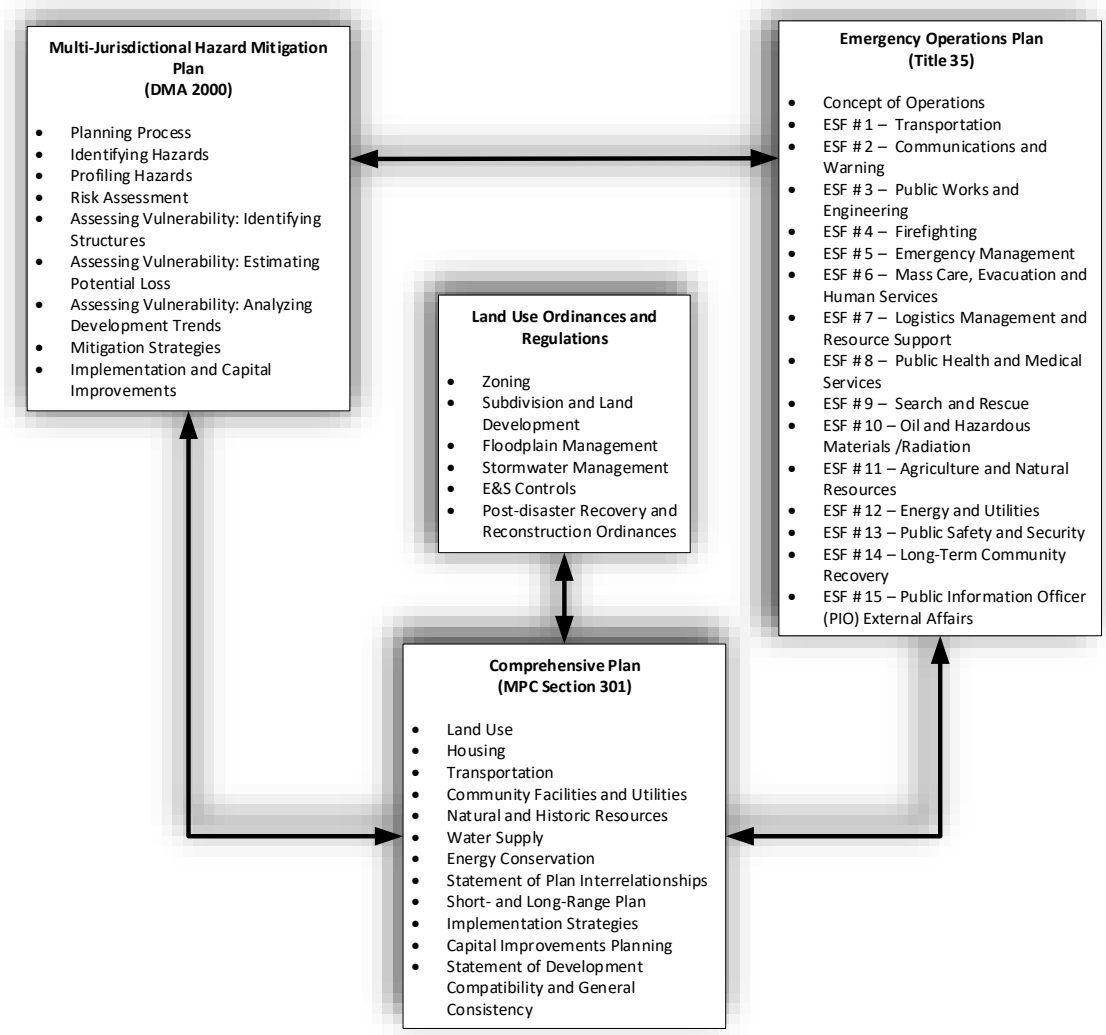
American Red Cross

Watershed Associations

- Twin Valley Conservation Association (uphere@pa.net)
- Clarks Creek Watershed Preservation Association (www.ccwpa.org)
- Tri-County Conewago Creek Association (http://www.conewagocreek.net/)
- Tri-Valley Watershed Association (hgtwpaut@epix.net)
- Paxton Creek Watershed & Education Association (www.paxtoncreek.org)
- Swatara Creek Watershed Association (www.mbcomp.com/swatara)
- Wiconisco Creek Restoration Association

During the plan evaluation process, the Planning Team will identify additional policies, programs, practices, and procedures that could be modified to accommodate hazard mitigation actions and will include these findings and recommendations in the HMP Progress Report.

Figure 5-1. Plan Interrelationships



Notes:
E&S *Erosion and Sedimentation*
ESF *Emergency support function*
MPC *Municipal Planning Code*

SECTION 6 MITIGATION STRATEGY

This section describes the process by which the Dauphin County Planning Team will reduce or eliminate potential losses from the natural and non-natural hazards identified in Section 4.2 of this Hazard Mitigation Plan (HMP). The mitigation strategy focuses on existing and potential future mitigation actions to alleviate the effects of hazards on Dauphin County's population, economy, and general building stock.

This section summarizes the 2025 HMP update process, outlines the mitigation goals and objectives set forth in the 2025 HMP update, describes the process for identifying and analyzing mitigation techniques, and provides the mitigation action plan.

6.1 UPDATE PROCESS SUMMARY

The goals and objectives listed in the Dauphin County HMP were first examined through the dispersal of the Mitigation Strategy 5-Year Plan Review Worksheet (Mitigation Review Worksheet). During the 5-year review, the Planning Team members were afforded the opportunity to comment on the goals, objectives, and actions that were listed in the existing HMP.

The general mitigation planning approach used to develop this plan is based on (1) the Federal Emergency Management Agency (FEMA) publication, "Local Mitigation Planning Handbook" (FEMA 2013), and (2) the Pennsylvania All-Hazard Mitigation Planning Standard Operating Guide (SOG) (PEMA 2020):

1. **Review of Existing Mitigation Plan Goals, Objectives, and Mitigation Action Plan:** Existing mitigation goals and objectives, and the 2021 HMP mitigation actions were first examined at the Planning Team Kick-Off Meeting and revisited during the Mitigation Strategy Workshop. Both meetings were open to members of the Planning Team and stakeholders. The Steering Committee thoroughly reviewed and updated the mitigation goals and objectives utilizing the latest information gathered through the hazard profiles, vulnerability assessments, and risk assessment; the mitigation goals and objectives were also compared to the State HMP goals and objectives. The updated goals and objectives were then presented at the Mitigation Strategies Workshop for final review and approval. Plan participants continued to review and provide progress on the 2021 mitigation actions throughout the planning process.
2. **Develop and Update Mitigation Strategies:** Mitigation actions were identified based on the risk assessment, mitigation goals and objectives, existing policies, and input from the Planning Team, Steering Committee, and planning partners.
3. **Mitigation Strategy Prioritization and Implementation:** The potential mitigation actions were qualitatively evaluated and are described in more detail in Section 6.4 of this HMP. Mitigation actions were prioritized into three categories: high, medium, and low. High-priority and medium-priority mitigation actions are recommended for implementation before low-priority actions; however, based on county and municipal-specific needs, cost estimation, and available funding, some low-priority mitigation actions may be addressed first.
4. **Document the Mitigation Planning Process:** The entire mitigation planning process is documented throughout this HMP, particularly in Section 3.

This section summarizes past mitigation goals and past mitigation action status and provides an update on mitigation strategies and additional past mitigation accomplishments.

6.1.1 Review of the Past Mitigation Goals

The mitigation goals identified in the 2021 version of the HMP are listed below:

- **Goal 1:** Prevent injury/death, physical damage, and other impacts from hazards in Dauphin County.

- **Goal 2**: Protect the citizens of Dauphin County as well as public and private property from the impacts of natural and human-caused hazards.
- **Goal 3**: Protect and restore existing natural resources.
- **Goal 4**: Educate officials and the public on the potential impacts of natural and non-natural hazards, and actions to reduce those impacts.
- **Goal 5**: Plan for improved infrastructure to protect citizens and public and private property from natural and human-made hazards.

Table 6.1.1-1 shows the results of the Steering Committee and Planning Team review of the 2021 goals and objectives.

Table 6.1.1-1. Steering and Planning Team Evaluation of 2021 Goals and Objectives

2021 Dauphin County HMP Goals and Objectives		Evaluation
Goal 1: Prevent injury/death, physical damage, and other impacts from hazards in Dauphin County.		*Rephrased as 2025* ***Goal 1***
Objective 1.1	Encourage awareness of the County's hazards so that residents and business owners are prepared for future hazard events.	*Rephrased and integrated into 2025* ***Objectives 2.1***
Objective 1.2	Ensure that property owners and buyers are aware of the availability and benefits of obtaining federal flood insurance.	*Rephrased and integrated into 2025* ***Objectives 1.7***
Objective 1.3	Ensure that local officials and EMA staff are well-trained regarding natural hazards and appropriate prevention and mitigation activities.	*Integrated into 2025* ***Objective 2.1***
Objective 1.4	Increase Dauphin County's municipal participation in FEMA's Community Rating System.	*Integrated into 2025* ***Objective 2.3***
Objective 1.5	Improve problem intersections and transportation corridors to reduce the likelihood of transportation accidents.	*Regrouped under 2025* ***Goal 5***
Goal 2: Protect the citizens of Dauphin County as well as public and private property from the impacts of natural and human-caused hazards.		*Rephrased and carried over as the 2025* ***Goal 1***
Objective 2.1	Protect existing structures, including critical facilities, historic and cultural resources, and infrastructure, from damage that can be caused by hazards.	*No longer a stand-alone Objective, but instead is captured by 2025* ***Goal 1***
Objective 2.2	Acquire, relocate, elevate, and/or retrofit existing structures, including repetitive loss properties, located in hazard areas.	*Integrated into 2025* ***Objective 1.5***
Objective 2.3	Improve and maintain stormwater management systems to reduce flooding.	*Integrated into 2025* ***Objective 1.6***
Objective 2.4	Encourage homeowners, renters, and businesses to insure their properties against all hazards, including flood coverage under the National Flood Insurance Program (NFIP).	*Integrated into 2025* ***Objective 1.7***
Objective 2.5	Develop connections and agreements among water systems and operators.	*Integrated into 2025* ***Objective 1.8***

2021 Dauphin County HMP Goals and Objectives		Evaluation
Goal 3: Protect and restore existing natural resources.		*Expanded some and carried over as the 2025* ***Goal 3***
Objective 3.1	Restore degraded natural resources and open space to reduce vulnerability to hazards.	*No change – carried over as 2025* ***Objective 3.1***
Objective 3.2	Provide appropriate safeguards for the preservation of the quality of water resources, stream corridors, watershed areas, and floodplains.	*No change – carried over as 2025* ***Objective 3.2***
Objective 3.3	Preserve areas where natural hazard potential is high.	*No change – carried over as 2025* ***Objective 3.3***
Goal 4: Educate officials and the public on the potential impacts of natural and non-natural hazards, and actions to reduce those impacts.		*Integrate and rephrased to make Goal 2 in the 2025 HMP Update*
Objective 4.1	Educate local officials regarding their municipalities' risks and the precautions they can take.	*Unchanged, but carried over as 2025* ***Objective 2.1***
Objective 4.2	Educate property owners and residents in hazard-risk areas regarding their risks and the precautions they can take.	*Unchanged, but carried over as 2025* ***Objective 2.2***
Objective 4.3	Encourage local participation in the Community Rating System (CRS) Program.	*Unchanged, but carried over as 2025* ***Objective 2.3***
Objective 4.4	Develop and enforce a requirement for property sellers to disclose hazards that exist on the property to potential buyers.	*Unchanged, but carried over as 2025* ***Objective 2.4***
Objective 4.5	Educate the public about cyber security and how to reduce their vulnerability to cybercrime and attack.	*Unchanged, but carried over as 2025* ***Objective 2.5***
Objective 4.6	Educate the public about invasive species and the precautions and response measures they can take to reduce the impacts of these species.	*Unchanged, but carried over as 2025* ***Objective 2.6***
Objective 4.7	Encourage residents and business owners to install and maintain radon fans in below-grade levels of structures.	*Unchanged, but carried over as 2025* ***Objective 2.7***
Goal 5: Plan for improved infrastructure to protect citizens and public and private property from natural and human-made hazards.		*Rephrased and carried over as the 2025* ***Goal 5***
Objective 5.1	Provide residents and businesses with adequate warning of natural and human-made hazard events.	*Unchanged. Carried over as 2025* ***Objective 5.1***
Objective 5.2	Provide adequate shelters during hazard events.	*Unchanged. Carried over as 2025* ***Objective 5.2***
Objective 5.3	Provide adequate communication systems for emergency management agencies and emergency response units.	*Unchanged. Carried over as 2025* ***Objective 5.3***

In addition to these changes, the 2025 HMP Update incorporates a new mitigation goal that captures the importance of reducing the risks and impacts in socially vulnerable and/or underserved communities across the County.

Table 6.2.2-1 shows this new addition as Goal 4.

6.1.2 Past Mitigation Action Status and Update of Mitigation Strategies

In the 2021 HMP, Dauphin County identified 344 actions and initiatives to support an improved understanding of hazard risk and vulnerability, enhance mitigation capabilities, and/or reduce the vulnerability of infrastructure. Progress on the 2021 mitigation actions was evaluated during the 2025 update process.

Dauphin County, via various representatives on the Steering Committee and Planning Team, was provided with a Mitigation Review Worksheet identifying all of the county and municipal actions and initiatives from the 2021 HMP. The respondents were asked to indicate the status of each action ("No Progress/Unknown," "In Progress/Not Yet Complete," "Continuous," "Completed," or "Discontinued") and provide review comments on each.

The completed Mitigation Action Plan Review Worksheet is provided in Table 6.1.2-1. Projects and initiatives identified as "Complete" and "Discontinued" have been removed from this plan update. The actions that the county has identified as "No Progress/Unknown" or "In Progress/Not Yet Complete" have been carried forward in the updated mitigation strategies identified in Table 6.4.1-2 (unless otherwise determined by the county to be a discontinued project). Actions from the 2021 HMP that reflect continuously maintaining capabilities have also been removed. The language in some actions being carried over has been adjusted to reflect changes to county needs and capabilities. Some actions were also merged to reduce redundant efforts on behalf of the county and its municipalities.

Table 6.1.2-1. Past Mitigation Action Status

Action Number	Description	Jurisdiction*	Status	Review Comments*
DauphinC-01	Provide public outreach about hazards and protective measures people, including renters and tourists, can take to protect themselves (e.g., receiving emergency alerts through South Central Alert) and their property.	Countywide	In Progress / Not Yet Complete	• Conservation District granted $5,000 to partner with municipalities to host stormwater management for homeowners workshops on reducing non-point source pollution. • Friends of Wildwood Lake granted $5,000 to provide state standards-based wetlands education programs to students in grades 4-12. • Dauphin County's EMC regularly conducts press and social media interviews to educate the public on hazards and protective measures they can take to protect themselves and their property. *Municipality Status* **East Hanover (T**): Continuous **Hummelstown (B**): Continuous **Londonderry (T):** Continuous – NNO, Fire Protection Week, flooding outreach, MS4 **Lower Paxton (T):** Continuous **Lower Swatara (T):** Continuous **Middletown (B):** In Progress / Not Yet Completed **Millersburg (B):** No Response **Paxtang (B):** Continuous **Royalton (B):** Continuous **South Hanover (T):** Continuous – set up an alert system **Steelton (B):** Continuous **Swatara (T):** Continuous **Upper Paxton (T):** Continuous **Washington (T):** No Progress / Unknown **Williams (T):** Continuous
DauphinC-02	Improve telecommunications infrastructure, including accessibility of high-speed Internet connectivity, throughout the county	Countywide	In Progress / Not Yet Complete	*Municipality Status* **East Hanover (T):** Continuous **Hummelstown (B):** Continuous **Londonderry (T):** No Progress / Unknown **Lower Paxton (T):** Completed **Lower Swatara (T):** Continuous **Millersburg (B):** No Response **Paxtang (B):** No Progress / Unknown **Royalton (B):** No Progress / Unknown **South Hanover (T):** Continuous **Steelton (B):** Continuous – Savvy citizen **Swatara (T):** Continuous **Upper Paxton (T):** Continuous

Action Number	Description	Jurisdiction*	Status	Review Comments*
				Washington (T): No Progress / Unknown **Williams (T):** Continuous
DauphinC-03	Simplify and improve the model stormwater management ordinance to enhance the enforcement and effectiveness of stormwater management practices	Countywide	No Progress/ Unknown	• No comments
DauphinC-04	Educate the public about resources available to combat opioid abuse/addiction.	Countywide	In Progress/ Not Yet Complete	• The county is conducting a survey of residents regarding drug and alcohol use, prevention tools, and local resources. Information gathered will guide prevention, education, treatment opportunities, and outreach initiatives through Drug and Alcohol Services. *Municipality Status* **Harrisburg (C)**: No Progress / Unknown **Hummelstown (B)**: Continuous **Londonderry (T):** No Progress / Unknown **Lower Paxton (T)**: Continuous **Middletown (B):** No Progress / Unknown **Millersburg (B):** No Response **Paxtang (B):** No Progress / Unknown **Royalton (B):** Continuous **South Hanover (T):** In Progress / Not Yet Completed **Steelton (B):** Continuous – outreach through PD; drop-off for old/unused medication **Swatara (T):** Continuous **Upper Paxton (T):** Continuous **Washington (T):** No Progress / Unknown **Williams (T):** Continuous – Healthcare
DauphinC-05	Inform the owners/operators of facilities storing hazardous materials of the risks they face and what they can do to protect their facilities and operations.	Countywide	In Progress / Not Yet Complete	• SCTF Counties worked with PaCiC to identify trends in cybersecurity breaches and potential response options. *Municipality Status* **Harrisburg (C)**: No Progress / Unknown **Hummelstown (B)**: Continuous **Londonderry (T):** Continuous – through code enforcement **Lower Paxton (T)**: Continuous **Lower Swatara (T):** Continuous **Middletown (B):** No Progress / Unknown **Millersburg (B):** No Response **Paxtang (B):** No Progress / Unknown **Royalton (B):** No Progress / Unknown – N/A **South Hanover (T):** Continuous

Action Number	Description	Jurisdiction*	Status	Review Comments*
				Steelton (B): Continuous **Swatara (T):** Continuous **Upper Paxton (T):** Continuous **Washington (T):** No Progress / Unknown **Williams (T):** Continuous – county SARA planning
DauphinC-06	Work with childcare facility operators to discuss hazards they face and ensure their emergency plans address those hazards.	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover (T)**: Continuous **Harrisburg (C)**: Continuous **Hummelstown (B)**: Continuous **Londonderry (T):** Continuous – through codes **Lower Paxton (T)**: Continuous **Lower Swatara (T):** Continuous **Middletown (B):** In Progress / Not et Completed **Millersburg (B):** No Response **Paxtang (B):** Continuous **Royalton (B):** No Progress / Unknown – N/A **South Hanover (T):** Continuous **Steelton (B):** Continuous **Swatara (T):** Continuous **Upper Paxton (T):** Continuous **Washington (T):** No Progress / Unknown **Williams (T):** Continuous
DauphinC-07	Assess the topography around the Lykens Tower Site, Mahantango Tower Site, Peters Mountain Tower Site, and Pillow Tower Site to determine if mitigation measures are necessary and to implement those measures if they are.	Countywide	No Progress/ Unknown	• No comments
DauphinC-08	Assess the following properties to determine the risk from wildfires and what vegetation needs to be cleared: Agriculture Building, Blue Mountain Tower Site, Conewago CWT Tower Site, Lower Swatara Tower Site, and Mahantango Tower Site	Countywide	No Progress/ Unknown	• No comments
DauphinC-09	Determine options for protecting the following facilities from the possible inundation due to a failure of the Raystown Lake Dam: Admin Building, Bar Association, County Offices – 100 Chestnut Street, Court House, Fort Hunter Park, Harrisburg Tower Site, Lykens Tower Site, Superior Court, Veterans Building Tower Site	Countywide	No Progress/ Unknown	• No comments

Action Number	Description	Jurisdiction*	Status	Review Comments*
DauphinC-10	Determine options for protecting Dauphin County Bridge No. 23 from inundation due to a failure of the DeHart Dam	Countywide	No Progress/ Unknown	• No comments
DauphinC-11	Assess the geology at the following sites and determine if mitigation measures are necessary, and to implement them if they are: 333 Market Street Tower Site, Administration Building, Adult Probation, Assistance Office, Bar Association, Children and Youth, Conewago CWT Tower Site, Coroner's Office, County Offices – 100 Chestnut Street, Court House, Dauphin ECC Tower Site, Department of Public Safety, Harrisburg Tower Site, Judicial Center, Lower Swatara Tower Site, Market Street Tower Site, Prison, Recycling Center, Reservoir Park Tower Site, Superior Court, Veteran's Building Tower Site, and Work Release.	Countywide	No Progress/ Unknown	• No comments
DauphinC-12	Identify and provide incentives to recruit and retain emergency services and/or public safety personnel in both paid and volunteer services, including but not limited to county department of emergency services, dispatch center employees, emergency medical personnel, law enforcement personnel, and fire personnel	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover (T)**: Continuous **Hummelstown (B)**: Continuous **Londonderry (T):** No Progress / Unknown **Lower Paxton (T)**: Continuous **Lower Swatara (T):** Continuous **Middletown (B):** Continuous **Millersburg (B):** Continuous – incentives exist but an investigation into further incentives ongoing **Paxtang (B):** Continuous **Royalton (B):** No Progress / Unknown – N/A **South Hanover (T):** Continuous **Steelton (B):** Continuous **Susquehanna (T):** Continuous **Swatara (T):** Continuous **Upper Paxton (T):** Continuous – incentives exist but an investigation into further incentives ongoing **Washington (T):** No Progress / Unknown **Williams (T):** Continuous – county
DauphinC-13	Provide information to PEMA on the risks faced by each Commonwealth-owned critical facility in Dauphin County, so that PEMA can work with the Department of General Services to protect the facilities.	Countywide	No Progress/ Unknown	• No comments

Action Number	Description	Jurisdiction*	Status	Review Comments*
DauphinC-14	Work with PennDOT to improve Interstates - 076 (PA Turnpike), -081, -083, and -283 to reduce accidents.	Countywide	In Progress / Not Yet Complete	*(Update provided by PennDOT Project Manager)* • Master Plan developed in 2003. Expected completion in 2034. Designed to address worsening roadway conditions; high traffic volumes, congestion, and safety. • **Section 1** - I-81 thru Union Deposit Interchange: Bridges replaced (Contract 1), and Widened/repaved (Contract 2). • **Section 2** - South of UD int. thru 29th St. (includes Eisenhower Int.) FHA approved Environmental Assessment. Demolition of acquired structures is ongoing. • **Section 3** - West Eisenhower Int. to Susquehanna River: Contract 1 awarded, construction began Fall 2023, expected to be complete 2027. • **South Bridge** - July 2022 - Legislature amended state P3 law to remove tolling as an option to fund the project • Transportation Improvement Plan work
DauphinC-15	Conduct a wildlands/forestry survey of forested areas, to identify strategies for mitigating the negative effects of invasive plant and insect species.	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover (T)**: Continuous **Hummelstown (B)**: Continuous **Londonderry (T):** No Progress / Unknown **Lower Paxton (T)**: In Progress / Not Yet Completed **Lower Swatara (T):** Continuous **Paxtang (B):** No Progress / Unknown **Royalton (B):** No Progress / Unknown **Steelton (B):** No Progress / Unknown – Discontinue **Swatara (T):** Continuous **Upper Paxton (T):** Continuous **Washington (T):** No Progress / Unknown **Williams (T):** Continuous – Dept. of Agriculture sprayed trees
DauphinC-16	Construct another ingress/egress route for the Dauphin County Department of Public Safety, Schaffner Youth Center, Adult Probation facility, and Work Release Center	Countywide	No Progress/ Unknown	• No comments
DauphinC-17	Install wet and dry hydrants to provide a water supply for fire suppression.	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover (T)**: Completed in 2011 **Hummelstown (B)**: No Progress / Unknown **Londonderry (T):** Continuous **Lower Paxton (T)**: In Progress / Not Yet Completed **Lower Swatara (T):** Continuous **Middletown (B):** Completed

Action Number	Description	Jurisdiction*	Status	Review Comments*
				Millersburg (B): In Progress / Not Yet Completed – the status of current dry hydrants needs to be updated. Location of future dry hydrants ongoing **Paxtang (B):** Completed **Royalton (B):** Continuous **South Hanover (T):** Continuous **Steelton (B):** Continuous **Susquehanna (T):** Continuous **Swatara (T):** Continuous **Upper Paxton (T):** In Progress / Not Yet Completed – The status of current dry hydrants needs to be updated. Location of future dry hydrants ongoing **Washington (T):** No Progress / Unknown **Williams (T):** Continuous – water authority
DauphinC-18	Work with the owners/operators of privately owned critical facilities in the special flood hazard area to discuss their risk of flooding and the protective measures they can take.	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover (T)**: Continuous **Harrisburg (C)**: Continuous **Hummelstown (B)**: Continuous **Londonderry (T):** Continuous – initial outreach by Ed, available as needed **Lower Paxton (T)**: In Progress / Not Yet Completed **Lower Swatara (T):** Continuous **Middletown (B):** In Progress / Not Yet Completed **Millersburg (B):** No Response **Paxtang (B):** Completed **Royalton (B):** No Progress / Unknown – N/A **South Hanover (T):** Continuous **Steelton (B):** Continuous – through codes/zoning **Susquehanna (T)** - Continuous **Swatara (T):** Continuous **Upper Paxton (T):** Continuous **Washington (T):** No Progress / Unknown **Williams (T):** N/A
DauphinC-19	Work with the owners/operators of privately owned critical facilities in the area subject to inundation due to a failure of the Raystown Lake Dam to discuss their risk of flooding and protective measures they can take.	Countywide	No Progress/ Unknown	• No comments
DauphinC-20	Work with privately-owned critical facilities to assess the geology at their sites to determine if	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover (T)**: Continuous **Harrisburg (C):** In Progress / Not Yet Completed

Action Number	Description	Jurisdiction*	Status	Review Comments*
	mitigation measures are necessary, and to implement them if they are.			**Hummelstown (B)**: Continuous **Londonderry (T):** No Progress / Unknown **Lower Paxton (T)**: In Progress / Not Yet Completed **Lower Swatara (T):** Continuous **Middletown (B):** Continuous **Millersburg (B):** No Response **Paxtang (B):** No Progress / Unknown **Royalton (B):** No Progress / Unknown – N/A **South Hanover (T):** Continuous **Steelton (B):** No Progress / Unknown – N/A **Swatara (T):** Continuous **Upper Paxton (T):** Continuous **Washington (T):** No Progress / Unknown **Williams (T):** N/A
DauphinC-21	Work with the owners/operators of the privately owned critical facilities to determine the risk from wildfires and what vegetation needs to be cleared.	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover (T)**: Continuous – Township newsletter **Hummelstown (B)**: Continuous **Londonderry (T):** No Progress / Unknown **Lower Paxton (T)**: In Progress / Not Yet Completed **Lower Swatara (T):** Continuous **Millersburg (B):** No Response **Paxtang (B):** Completed **Royalton (B):** No Progress / Unknown – N/A **South Hanover (T):** No Progress / Unknown **Steelton (B):** Continuous **Swatara (T):** Continuous **Upper Paxton (T):** Continuous **Washington (T):** No Progress / Unknown **Williams (T):** N/A
DauphinC-22	Assess the Dauphin County Bridge No. 23 historic site to determine the risk from wildfires and what vegetation needs to be cleared.	Countywide	In Progress/ Not Yet Complete	• PA Silver Jackets and SHPO conducted a survey of historic resources throughout Dauphin County. Identified 782 historic properties most at risk of future flooding. Identified 44 additional properties and two historic districts as potentially eligible for National Historic Register.
DauphinC-23	Protect the Dauphin County Bridge No. 23 historic site to at least the 0.2 percent chance flood level.	Countywide	In Progress/ Not Yet Complete	• PA Silver Jackets and SHPO conducted a survey of historic resources throughout Dauphin County. Identified 782 historic properties most at risk of future flooding. Identified 44 additional properties and two historic districts as potentially eligible for National Historic Register.
DauphinC-24	Work with the owners/operators of privately owned critical facilities on steep slopes to study the topography of the property to determine if	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover (T):** No Progress / Unknown **Harrisburg (C)**: No Progress / Unknown **Hummelstown (B)**: Continuous

Action Number	Description	Jurisdiction*	Status	Review Comments*
	mitigation measures are necessary, and to implement those measures.			**Londonderry (T):** No Progress / Unknown **Lower Paxton (T)**: In Progress / Not Yet Completed **Lower Swatara (T):** Continuous **Millersburg (B):** No Response **Paxtang (B):** Completed **Royalton (B):** No Progress / Unknown – N/A **South Hanover (T):** No Progress / Unknown **Steelton (B):** N/A **Swatara (T):** Continuous **Upper Paxton (T):** Continuous **Washington (T):** No Progress / Unknown **Williams (T):** N/A
DauphinC-25	The county will assess their bridges to determine what measures can be taken to protect them to the 0.2 percent annual chance of flood level	Countywide	In Progress/ Not Yet Complete	• In October of 2022, all county-owned bridges were determined to be in good condition. The county is working with municipalities to repair locally owned bridges in poor condition.
DauphinC-26	Assess the geology at the Area Agency on Aging property to determine if mitigation measures are necessary, and to implement them if they are.	Countywide	No Progress/ Unknown	• No comments
DauphinC-27	Encourage homeowners, renters, and businesses to insure their properties against all hazards, including flood coverage under the National Flood Insurance Program (NFIP)	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover (T)**: Completed **Harrisburg (C)**: Continuous **Hummelstown (B)**: Continuous **Londonderry (T):** Continuous **Lower Paxton (T)**: Continuous **Lower Swatara (T):** Continuous **Middletown (B):** Continuous **Millersburg (B):** No Response **Paxtang (B):** Continuous **Royalton (B):** Continuous **South Hanover (T):** Continuous **Steelton (B):** Continuous **Susquehanna (T):** Continuous **Swatara (T):** Continuous **Upper Paxton (T):** Continuous **Washington (T):** No Progress / Unknown **Williams (T):** Continuous – permitting process
DauphinC-28	Clean debris from pillars at Grubb Street and Canal Street bridges	Countywide	In Progress/ Not Yet Complete	• In October of 2022, all County-owned bridges were determined to be in good condition. The County is working with municipalities to repair locally owned bridges in poor condition.

Action Number	Description	Jurisdiction*	Status	Review Comments*
DauphinC-29	Install backup preventers in wastewater pipes to prevent basement flooding.	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover (T)**: No Progress / Unknown **Harrisburg (C)**: No Progress / Unknown **Hummelstown (B)**: Continuous **Londonderry (T):** No Progress / Unknown **Lower Paxton (T)**: Continuous **Lower Swatara (T):** Continuous **Millersburg (B):** No Response **Paxtang (B):** No Progress / Unknown **Royalton (B):** Continuous **South Hanover (T):** Continuous **Steelton (B):** Continuous – outreach from the Borough advised homeowners to install as needed **Swatara (T):** Continuous **Upper Paxton (T):** Continuous **Washington (T):** No Progress / Unknown **Williams (T):** N/A
DauphinC-30	Elevate, acquire, or demolish and rebuild properties, including repetitive loss and severe repetitive loss properties, in flood-prone areas.	Countywide	In Progress/ Not Yet Complete	*Municipality Status* **East Hanover (T)**: Continuous **Harrisburg (C):** In Progress / Not Yet Completed **Hummelstown (B)**: Continuous **Lower Paxton (T)**: Continuous **Lower Swatara (T):** Continuous – acquired/demolished RL and SRL properties in the Jednota Flats area to reduce impacts of repeated flooding; applied for and received FEMA mitigation funds (project costs are 90/10% share); following a survey of residents regarding the Wedgewood Hills Swim Club, Susquehanna (T) will be re-naturalizing the property in 5 phases. The result will be a park-like setting with trees, trails, and pavilions. **Middle Paxton (T)**: 2015 FMA funds to elevate residences along the Susquehanna River; October 3, 2022, project out for bid on PennBid; Pre-bid meeting scheduled for 10/13; Bid opening scheduled for 10/27; February 2023, project on hold until BCA of 1.0 or higher is reached (currently at .67); began initial phases of rerouting Potato Valley Road in October 2019; anticipate completion in summer 2020; Red Hill Rd. project on hold pending completion of Potato Valley Rd. project. **Middletown (B):** No Progress / Unknown – stormwater runoff from PSU Capital Campus housing impacting South Wood Street at the railroad underpass. PSU Engineering students assisting Borough with Potential solutions. **Millersburg (B):** No Response

Action Number	Description	Jurisdiction*	Status	Review Comments*
				Paxtang (B) (2022): No Progress / Unknown – seeking funding to acquire and demo/elevate SRL properties along Derry St. **Royalton (B):** Continuous **South Hanover (T):** Continuous **Steelton (B):** Continuous – currently putting together a blight management plan **Swatara (T):** Continuous **Upper Paxton (T):** No Progress / Unknown **Washington (T):** No Progress / Unknown **Williams (T):** N/A
DauphinC-31	Floodproof structures in flood prone areas.	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover:** Continuous **Harrisburg:** In Progress / Not Yet Completed **Hummelstown (B)**: Continuous **Lower Paxton (T)**: Continuous **Middletown (B):** Continuous **Millersburg (B):** No Response **Paxtang (B):** No Progress / Unknown **Royalton (B):** Continuous **Steelton (B):** Continuous – outreach conducted through zoning; new development are required **Susquehanna (T):** Continuous **Swatara (T):** Continuous **Upper Paxton (T):** No Progress / Unknown **Washington (T):** No Progress / Unknown **Williams (T):** N/A
DauphinC-32	Conduct a study for the Susquehanna River to determine the best option to address snakeheads, flathead catfish, and other invasive species	Countywide	No Progress/ Unknown	• No comments
DauphinC-33	Develop a new Comprehensive Plan or amend an existing Comprehensive Plan to include an assessment and associated mapping of the municipality's vulnerability to location-specific hazards and appropriate recommendations for the use of these hazard areas.	Countywide	In Progress/ Not Yet Complete	• Detweiler Park Master Plan • 9/2022 - Funds awarded for construction of connector Trail between new accessible public entrance, restroom, event lawn and pavilion. • Funding = Commonwealth Greenways, Trails, and Recreation Program *Municipality Status* **East Hanover (T)**: Completed **Harrisburg (C):** In Progress / Not Yet Completed – funds awarded for stormwater mgmt. improvements in Reservoir Park; funds awarded to rehab Reservoir Park playground to include "tot play structures" and adult fitness equipment; funds awarded to convert Reservoir Drive into

Action Number	Description	Jurisdiction*	Status	Review Comments*
				pedestrian walkway; Reservoir Park Master Plan updates. (funding from CWOPA Greenways, Trails and Recreation Program) **Hummelstown (B)**: Continuous **Londonderry (T):** Continuous – ongoing **Lower Paxton (T)**: Continuous **Lower Swatara (T):** Completed – adopted 2017 **Lykens (B):** Completed – TCRPC staff reported that this action was completed **Middletown (B):** In Progress / Not Yet Completed **Millersburg (B):** No Response **Paxtang (B):** No Progress / Unknown **Royalton (B):** Completed **South Hanover (T):** Completed in 2019 **Steelton (B):** In Progress / Not Yet Completed – 2025/2026 **Swatara (T):** No Response **Upper Paxton (T):** Completed **Washington (T):** No Progress / Unknown **Williams (T):** N/A
DauphinC-34	Develop a new Zoning Ordinance or revise an existing Zoning Ordinance to include separate zones or districts with appropriate development criteria for known hazard areas.	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover**: Completed in 2003 **Harrisburg**: Completed **Hummelstown (B)**: No Progress / Unknown **Londonderry (T):** No Progress / Unknown **Lower Swatara (T):** Completed **Middletown (B):** Continuous **Millersburg (B):** No Response **Paxtang (B):** No Progress / Unknown **Royalton (B):** Continuous **South Hanover (T):** Continuous **Steelton (B):** Completed **Susquehanna (T):** Continuous **Swatara (T):** No Response **Upper Paxton (T):** Completed **Washington (T):** No Progress / Unknown
DauphinC-35	Develop a new Subdivision and Land Development Ordinance or revise an existing Subdivision and Land Development Ordinance to include municipal-specific, hazard mitigation-related development criteria and/or provisions for the mandatory use of conservation subdivision design principles to regulate the	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover**: No Progress / Unknown **Harrisburg**: Completed **Hummelstown (B)**: No Progress / Unknown **Londonderry (T):** No Progress / Unknown **Lower Swatara (T):** Completed **Lykens (B):** Completed

Action Number	Description	Jurisdiction*	Status	Review Comments*
	location and construction of buildings and other infrastructure in known hazard areas.			**Middletown (B):** Continuous **Millersburg (B):** No Response **Paxtang (B):** No Progress / Unknown **Royalton (B):** Continuous **South Hanover (T):** Continuous **Steelton (B):** Completed **Swatara (T):** No Response **Upper Paxton (T):** Completed **Washington (T):** No Progress / Unknown **Williams (T):** N/A
DauphinC-36	Revise existing zoning and/or subdivision and land development ordinances or adopt a separate, standalone ordinance to require the completion of subsurface investigations (i.e., borings, geophysical surveys, and/or studies by a registered Professional Geologist) for all new subdivision and land development projects in known land subsidence hazard areas.	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover**: No Progress / Unknown **Harrisburg**: No Progress / Unknown **Hummelstown (B)**: No Progress / Unknown **Londonderry (T):** No Progress / Unknown **Lower Swatara (T):** Completed **Middletown (B):** Continuous **Millersburg (B):** No Response **Paxtang (B):** No Progress / Unknown **Royalton (B):** No Progress / Unknown **South Hanover (T):** Continuous **Steelton (B):** Completed – included in SALDO – specifications & processing procedures **Swatara (T):** No Response **Upper Paxton (T):** No Progress / Unknown **Washington (T):** No Progress / Unknown **Williams (T):** N/A
DauphinC-37	Update and implement a comprehensive water resources management plan that analyzes the County's existing water resources supply and evaluates the County's anticipated water use demand to identify suspected water supply shortages and potential new water supply sources.	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover**: No Progress / Unknown **Harrisburg**: No Progress / Unknown **Hummelstown (B)**: No Progress / Unknown **Londonderry (T):** No Progress / Unknown – potable water supply and distribution through PA American Water or individual household wells **Lower Swatara (T):** No Progress / Unknown **Middletown (B):** Continuous **Millersburg (B):** No Response **Paxtang (B):** No Progress / Unknown **Royalton (B):** No Progress / Unknown **South Hanover (T):** No Progress / Unknown **Steelton (B):** N/A, water is from private entity -- PA American Water **Swatara (T):** No Progress / Unknown

Action Number	Description	Jurisdiction*	Status	Review Comments*
				Upper Paxton (T): No Progress / Unknown **Washington (T):** No Progress / Unknown **Williams (T):** Continuous – water authority
DauphinC-38	Coordinate with the USGS, local watershed organizations, and/or the DCCD to increase the number of USGS and Integrated Flood Observing and Warning System (IFLOWS) rain and stream gauges in the County as a potential enhancement to the existing Susquehanna Flood Forecast and Warning System.	Countywide	No Progress/ Unknown	• No comments
DauphinC-39	Work with municipalities to evaluate participation in the CRS and facilitate the preparation and submission of CRS applications.	Countywide	No Progress/ Unknown	• No comments
DauphinC-40	Develop a technical proficiency at the municipal level for conducting post-disaster damage assessments and continue to regulate through local planning and zoning reconstruction activities to ensure compliance with NFIP substantial damage/substantial improvement requirements.	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover**: No Progress / Unknown **Harrisburg**: Continuous **Hummelstown (B)**: Continuous **Londonderry (T):** Continuous – EMC and Public Works trained **Lower Swatara (T):** Continuous **Middletown (B):** Continuous **Millersburg (B):** No Response **Paxtang (B):** No Progress / Unknown **Royalton (B):** Continuous **South Hanover (T):** Continuous **Steelton (B):** Completed – zoning & EM collaborate depending upon structure damage cause **Susquehanna (T):** Continuous **Swatara (T):** Continuous **Upper Paxton (T):** Continuous **Washington (T):** No Progress / Unknown **Williams (T):** Continuous
DauphinC-41	Develop technical proficiency at the municipal level for assisting residents and business owners in applying for hazard mitigation and assistance funds and identifying cost-beneficial hazard mitigation measures to be incorporated into reconstruction activities.	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover**: No Progress / Unknown **Harrisburg**: In Progress / Not Yet Completed **Hummelstown (B)**: No Progress / Unknown **Londonderry (T):** Continuous – Ed, Conewago Creek initiative **Lower Paxton (T)**: Continuous **Lower Swatara (T):** In Progress / Not Yet Completed **Middletown (B):** Continuous **Millersburg (B):** No Response **Paxtang (B):** No Progress / Unknown

Action Number	Description	Jurisdiction*	Status	Review Comments*
				Royalton (B): Continuous **South Hanover (T):** Continuous **Steelton (B):** In Progress / Not Yet Complete – The EM coordinator is working on this & has reached back to County EM **Swatara (T):** No Response **Upper Paxton (T):** No Progress / Unknown **Washington (T):** No Progress / Unknown **Williams (T):** Continuous
DauphinC-42	Investigate the feasibility of constructing a levee/floodwall system along Swatara Creek between East Main Street and the Pennsylvania Turnpike to minimize Middletown Borough's flood hazard potential.	Countywide	No Progress/ Unknown	• No comments
DauphinC-43	Municipalities should continue to seek solutions to problem areas and obstructions identified in the April 2010 Countywide Act 167 Stormwater Management Plan.	Countywide	In Progress/ Not Yet Complete	*Municipality Status* **Conewago (T)**: Valley Road/Hoffer Creek Stream bank stabilization; backfilling and placing stone along the creek to manage stormwater flow and future erosion of roadway. **East Hanover (T):** No Progress / Unknown **Harrisburg (C):** Continuous – funds awarded for stormwater mgmt. Improvements in Reservoir Park; funds awarded to rehab. Reservoir Park playground to include "tot play structures" and adult fitness equipment; funds awarded to convert Reservoir Drive into a pedestrian walkway; Reservoir Park Master Plan updates; funding from CWOPA Greenways, Trails, and Recreation Program **Hummelstown (B)**: No Progress / Unknown **Londonderry (T):** Continuous – Conewago Creek **Lower Swatara (T):** Continuous **Upper Paxton (T): --** FEMA funded Snyder Mill Road streambank stabilization through HMGP along Mahantango Creek **Lykens (B):** Completed **Middletown (B):** Continuous **Millersburg (B):** No Response **Paxtang (B):** No Progress / Unknown **Royalton (B):** Continuous **South Hanover (T):** Continuous **Steelton (B):** In Progress / Not Yet Complete – ongoing, SW authority exists; just replaced 16 inlets **Susquehanna (T):** Continuous **Swatara (T):** Continuous **Upper Paxton (T):** No Progress / Unknown **Washington (T):** Continuous

Action Number	Description	Jurisdiction*	Status	Review Comments*
				Williams (T): Continuous
DauphinC-44	Enroll in the Pennsylvania Firewise Communities Program through the DCNR Fire Forester for Dauphin County.	Countywide	No Progress/ Unknown	• No comments
DauphinC-45	Encourage homeowners and renters to test for radon and install radon mitigation systems, if needed.	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover**: No Progress / Unknown **Harrisburg**: No Progress / Unknown **Hummelstown (B)**: In Progress / Not Yet Completed **Londonderry (T):** In Progress / Not Yet Completed – encouraged **Lower Paxton (T)**: Continuous **Lower Swatara (T):** radon requirements not adopted by PA Codes **Middletown (B):** Continuous **Millersburg (B):** No Response **Paxtang (B):** No Progress / Unknown **Royalton (B):** Continuous **South Hanover (T):** Continuous **Steelton (B):** In Progress / Not Yet Complete – outreach materials available through realtor **Susquehanna (T):** Continuous **Swatara (T):** No Response **Upper Paxton (T):** No Progress / Unknown **Washington (T):** No Progress / Unknown **Williams (T):** N/A
DauphinC-46	Adopt the Radon Control Methods Appendix of the current, adopted edition of the International Residential Code to address radon in new construction.	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover**: No Progress / Unknown **Harrisburg**: No Progress / Unknown **Hummelstown (B)**: In Progress / Not Yet Completed **Londonderry (T):** No Progress / Unknown **Lower Swatara (T):** radon requirements not adopted by PA Codes **Millersburg (B):** No Response **Paxtang (B):** No Progress / Unknown **Royalton (B):** Continuous **South Hanover (T):** No Progress / Unknown **Steelton (B):** In Progress / Not Yet Complete **Swatara (T):** No Response **Upper Paxton (T):** No Progress / Unknown **Washington (T):** No Progress / Unknown **Williams (T):** N/A

Action Number	Description	Jurisdiction*	Status	Review Comments*
DauphinC-47	Encourage municipalities to enter into an Intergovernmental Cooperation Agreement and Memorandum of Understanding with the Dauphin County Land Bank Authority as a way to address structures at risk from the impacts of natural and human-made hazards.	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover**: No Progress / Unknown **Harrisburg**: No Progress / Unknown **Hummelstown (B)**: No Progress / Unknown **Londonderry (T):** Completed **Lower Swatara (T):** Continuous **Middletown (B):** Continuous **Millersburg (B):** No Response **Paxtang (B):** No Progress / Unknown **Royalton (B):** Continuous **South Hanover (T):** Continuous **Steelton (B):** Completed **Swatara (T):** Continuous **Upper Paxton (T):** No Progress / Unknown **Washington (T):** No Progress / Unknown **Williams (T):** N/A
DauphinC-48	Increase the number of NOAA Weather Alert radios in public places across the County that currently do not have them (such as personal care homes) above and beyond what is required of the County by the NWS's Storm Ready Program.	Countywide	In Progress/ Not Yet Complete	• Dauphin County OEM purchases and distributes NOAA weather alert radios to vulnerable facilities within the County.
DauphinC-49	Establish an alternate EOC location in the event the primary EOC must be evacuated. This facility should also be located outside of the Special Flood Hazard Area.	Countywide	No Progress/ Unknown	*Municipality Status* **East Hanover**: Completed – currently have two alternative sites in the event a relocation is required. **Harrisburg**: In Progress / Not Yet Completed **Hummelstown (B)**: Completed **Londonderry (T):** No Progress / Unknown – township building, alternate firehouse **Lower Paxton (T)**: Continuous **Lower Swatara (T):** Continuous **Middletown (B):** Completed **Millersburg (B):** In Progress / Not Yet Complete – existing alternate EOC will be unavailable in the next 5 years. Efforts have begun to transition to a new location. **Paxtang (B):** Completed **Royalton (B):** Completed **South Hanover (T):** Completed – 2020 **Steelton (B):** Continuous – working to identify alternates **Swatara (T):** Continuous

Action Number	Description	Jurisdiction*	Status	Review Comments*
				Upper Paxton (T): In Progress / Not Yet Complete – existing alternate EOC will be unavailable in the next 5 years. Efforts have begun to transition to a new location. **Washington (T):** No Progress / Unknown **Williams (T):** Completed
DauphinC-50	The Dauphin County Department of Information Technology will make natural and human-made hazard data available for municipal use.	Countywide	No Progress/ Unknown	• No comments
DauphinC-51	Assess the Station 12 property to determine the risk from wildfires and what vegetation needs to be cleared.	Countywide	No Progress/ Unknown	• Remove EMS and update station to Station 77

6.2 MITIGATION GOALS AND OBJECTIVES

This section describes the mitigation goals and objectives set forth in the 2025 HMP update.

6.2.1 2025 Mitigation Goals

The Steering Committee reviewed the 2021 HMP goals to determine their continuing applicability to county mitigation needs and decided to update them. The updated goals and objectives were distributed to the Planning Team at the Mitigation Strategies Workshop conducted on January 7, 2025. The Planning Team and stakeholders reviewed and approved the updated goals for the 2025 HMP, which are in line with State mitigation goals. They also embody the overarching needs and concerns of the county and participating municipalities and address both natural and non-natural hazard risk reduction.

6.2.2 2025 Mitigation Objectives

The goals listed below were used to develop relevant mitigation objectives. These objectives address the results of the vulnerability assessment in more specific terms and reflect the possible effects that can be mitigated for the identified hazards, as well as existing limitations in available data and information. The objectives that were originally identified during the 2021 HMP update process were reviewed by the Steering Committee and Planning Team and were updated to reflect changes in county priorities and capabilities since the HMP was written in 2021.

The 2025 Dauphin County HMP goals and objectives are listed in Table 6.2.2-1 below. Objectives related to each of the goals are listed below, while Table 6.1.1-1 summarizes the evaluation of all goals and objectives from the 2021 HMP.

Table 6.2.2-1. Mitigation Goals for the 2025 Dauphin County HMP Update

2025 Dauphin County Hazard Mitigation Plan Goals and Objectives	
Goal 1: Protect life, property, the environment, and critical infrastructure from natural and human-made hazards, preventing injury, death, and damage.	
Objective 1.1	Support FEMA's efforts to prepare detailed floodplain mapping in the Lower Susquehanna-Penns & Lower Susquehanna-Swatara Watersheds
Objective 1.2	Enhance regulations for development in hazard-prone areas.
Objective 1.3	Enhance stormwater management planning and regulations.
Objective 1.4	Upgrade infrastructure to reduce the likelihood of hazards and their impacts.
Objective 1.5	Acquire, relocate, elevate, and/or retrofit existing structures, including repetitive loss properties, located in the hazard areas.
Objective 1.6	Improve and maintain stormwater management systems to reduce flooding.
Objective 1.7	Encourage homeowners, renters, and businesses to insure their properties against all hazards, including flood coverage under the NFIP.
Objective 1.8	Develop connections and agreements among water systems and operators.
Goal 2: Increase public awareness and education on the impacts of natural hazards and promote activities to mitigate these risks.	
Objective 2.1	Educate local officials regarding their municipalities' risks and the precautions they can take.
Objective 2.2	Educate property owners and residents in hazard-risk areas regarding their risks and the precautions they can take.
Objective 2.3	Encourage local participation in the Community Rating System (CRS) Program.
Objective 2.4	Develop and enforce a requirement for property sellers to disclose hazards that exist on the property to potential buyers.
Objective 2.5	Educate the public about cyber security and how to reduce their vulnerability to cyber-crime and attack.
Objective 2.6	Educate the public about invasive species and the precautions and response measures they can take to reduce the impacts of these species.
Objective 2.7	Encourage residents and business owners to install and maintain radon fans in below-grade-level structures.

2025 Dauphin County Hazard Mitigation Plan Goals and Objectives	
Goal 3: Protect and restore natural resources to strengthen environmental resilience.	
Objective 3.1	Restore degraded natural resources and open space to reduce vulnerability to hazards.
Objective 3.2	Provide appropriate safeguards for the preservation of the quality of water resources, stream corridors, watershed areas, and floodplains.
Objective 3.3	Preserve areas where natural hazard potential is high.
Goal 4: Reduce the risk of natural hazards for socially vulnerable populations and underserved communities.	
Objective 4.1	Encourage the establishment of policies to help ensure the prioritization and implementation of mitigation actions and/or projects designed to benefit socially vulnerable populations and underserved communities.
Objective 4.2	Promote sustainable and equitable land development practices that direct future development away from vulnerable areas and, when that is not possible, encourage the use of more resilient design, construction, and materials.
Objective 4.3	Encourage and support multi-jurisdictional mitigation projects that leverage funding and support from multiple levels of government and community organizations.
Goal 5: Develop and improve infrastructure to better protect citizens and both public and private properties from hazards.	
Objective 5.1	Provide residents and businesses with adequate warning of natural and human-made hazard events.
Objective 5.2	Provide adequate shelters during hazard events.
Objective 5.3	Provide adequate communication systems for emergency management agencies and emergency response units.
Objective 5.4	Improve problem intersections and transportation corridors to reduce the likelihood of transportation accidents.
Objective 5.5	Provide clearing of strainers and debris from streams and creeks to help mitigate the effects of damming on the waterway.

6.3 IDENTIFICATION AND ANALYSIS OF MITIGATION TECHNIQUES

Concerted efforts were made to ensure the county and its municipalities developed updated mitigation strategies. Updated strategies included activities and initiatives covering the range of mitigation action types described in recent FEMA planning guidance, "Local Mitigation Planning Handbook" (FEMA 2023). Mitigation action types listed in the FEMA guidance include the following:

1. **Local Plans and Regulations:** These actions include government authorities, policies, or codes that influence the way land and buildings are being developed and built.
2. **Structure and Infrastructure Projects:** These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. These project types could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
3. **Natural Systems Protection:** These are actions that minimize damage and losses and also preserve or restore the functions of natural systems.
4. **Education and Awareness Programs:** These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as NFIP and CRS, StormReady (NOAA), and Firewise (National Fire Protection Association [NFPA]) Communities (FEMA 2013).

The participants of the Mitigation Strategy Workshop and the Planning Team identified actions that relate to the techniques listed above. Table 6.2.2-1 identifies which mitigation techniques are applicable for the hazards included in the 2025 HMP. In some cases, the mitigation techniques identified for a particular hazard reflect ongoing mitigation capabilities, not specific projects included in the updated HMP.

Table 6.2.2-1. Mitigation Technique Matrix

Hazard	Local Plans and Regulations	Structure and Infrastructure Projects	Natural Systems Protection	Education and Awareness Programs
Building and Structure Collapse	✓			✓
Cyber Attack	✓			✓
Dam Failure	✓			✓
Drought	✓			✓
Environmental Hazards – Gas & Liquid Pipelines				✓
Environmental Hazards – Hazardous Materials Release	✓			✓
Flood, Flash Flood, and Ice Jam	✓	✓	✓	✓
Hurricane, Tropical Storm, and Nor'easter	✓		✓	✓
Invasive Species	✓		✓	✓
Landslide	✓	✓	✓	✓
Opioid Addiction Response				✓
Pandemic and Infectious Diseases	✓			✓

Hazard	Local Plans and Regulations	Structure and Infrastructure Projects	Natural Systems Protection	Education and Awareness Programs
Radon Exposure	✓			✓
Subsidence, Sinkholes	✓	✓		✓
Tornado and Windstorm	✓			✓
Transportation Accident	✓	✓		✓
Utility Interruption	✓	✓		✓
Wildfire	✓		✓	✓
Winter Storm	✓			✓

6.4 MITIGATION ACTION PLAN

Representatives from the county and all participating municipalities selected mitigation strategies and initiatives to pursue until the next plan update. These actions also include some actions identified during the 2021 update that are still relevant or in progress. This section describes 2025 mitigation initiatives, mitigation strategy prioritization and implementation, and prioritization of mitigation actions.

6.4.1 2025 Mitigation Initiatives

Below is a summary of the updated mitigation strategies identified by the county and all municipalities, including the following information:

- Mitigation actions for individual and multiple hazards
- Mitigation action type
- Department or agency primarily responsible for project initiation and/or implementation
- Estimated cost for the mitigation action and identification of known or potential sources of funding
- Implementation schedule
- Implementation priority

The updated mitigation actions were documented using the Mitigation Action Worksheet distributed at the Mitigation Solution Workshop as well as through email correspondence and phone calls. Refer to Appendix G for a blank version of the Mitigation Action Worksheet and to Appendix H for completed worksheets. Specific mitigation actions were identified to prevent future losses; however, current funding is not identified for all of these actions at present, but potential funding sources (see Section 5) are indicated to support future implementation.

Likewise, limited information was available for addressing the long-term vulnerability of Dauphin County's residents to pandemic and infectious disease. Though many preparedness actions can be identified for addressing that hazard, Dauphin County's mitigation strategy includes few actions that specifically address pandemics and infectious diseases. The county will continue to research long-term solutions to the risk from pandemics and infectious diseases as part of the annual review process.

The county and municipalities have limited resources to take on new responsibilities or projects. The implementation of these mitigation actions is dependent on the approval of the local elected governing body and the ability of the jurisdiction to obtain funding from local or outside sources.

The Planning Team prioritized proposed mitigation actions during the Mitigation Action Worksheet documentation process. In general, mitigation actions ranked as the highest priorities should be addressed first within each jurisdiction, depending upon funding. However, medium- or low-priority mitigation actions will be considered for implementation as funding becomes available. Therefore, the ranking levels should be considered as a preliminary ranking, which will evolve based on prevailing priorities and discretion of local governments, the public, the Pennsylvania Emergency Management Agency (PEMA), and FEMA as the plan update is implemented.

A complete list of all hazard mitigation initiatives is provided in the following pages, beginning first with Dauphin County. While the 2021 HMP combined all mitigation initiatives into a single table, the 2025 HMP Update breaks them down based on the jurisdictions. For ease of access, Table 6.4.1-1 contains a list of all 40 municipalities, and each is cross-referenced to allow quicker access to those specific initiatives.

Table 6.4.1-1. Cross-References for Municipal Hazard Mitigation Strategies

Berrysburg Borough	Highspire Borough	Middletown Borough	Steelton Borough
Conewago Township	Hummelstown Borough	Mifflin Township	Susquehanna Township
Dauphin Borough	Jackson Township	Millersburg Borough	Swatara Township
Derry Township	Jefferson Township	Paxtang Borough	Upper Paxton Township
East Hanover Township	Londonderry Township	Penbrook Borough	Washington Township
Elizabethville Borough	Lower Paxton Township	Pillow Borough	Wayne Township
Gratz Borough	Lower Swatara Township	Reed Township	West Hanover Township
Halifax Borough	Lykens Borough	Royalton Borough	Wiconisco Township
Halifax Township	Lykens Township	Rush Township	Williams Township
Harrisburg City	Middle Paxton Township	South Hanover Township	Williamstown Borough

Note: Some of the identified mitigation initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in county or municipal priorities. Actions that have been carried over from the 2021 version of the HMP may have been reworded and given a new initiative designation to conform to current needs and procedures. The countywide actions apply to the county as an entity and participating municipalities. For most countywide actions, the action applies to all participating municipalities. See Appendix H for action worksheets that specify to which municipalities other countywide actions apply.

Table 6.4.1-2. 2025 Mitigation Initiatives

Dauphin County

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DauphinC-01	Provide public outreach about hazards and protective measures people, including renters and tourists, can take to protect themselves (e.g., receiving emergency alerts through South Central Alert) and their property.	Existing	All Hazards	2	DPS	EMCs	Medium	Low	Operating Budget	Short	Medium
DauphinC-02	Improve telecommunications infrastructure, including the accessibility of high-speed Internet connectivity, throughout the county.	Existing	Pandemic and Infectious Disease; Utility Interruption	1, 2	DC DCED		High	High	FEMA BRIC; PA DCED; Operating Budget; Gaming grant	Long	High
DauphinC-03	Simplify and improve the model stormwater management ordinance to enhance the enforcement and effectiveness of stormwater management practices.	Both	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1	Dauphin County Conservation District	Municipalities	High	Low	Operating Budget	Short	Medium
DauphinC-04	Educate the public about resources available to combat opioid abuse/addiction.	N/A	Opioid Addiction Response	2	Dauphin County Human Services		Medium	Low	Operating Budget; Gaming grant	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DauphinC-05	Inform the owners/operators of facilities storing hazardous materials of the risks they face and what they can do to protect their facilities and operations.	Existing	Cyber Attack; Dam Failure; Environmental Hazards: Hazardous Materials Releases; Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter; Landslide; Subsidence, Sinkholes; Tornado, Windstorm; Transportation Accidents; Utility Interruption; Wildfire; Winter Storm	2	DPS	LEPC; SCTF	High	Low	Operating Budget	Short	High
DauphinC-06	Work with childcare facility operators to discuss hazards they face and ensure their emergency plans address those hazards.	Existing	All Hazards	2, 4, 5	DPS	EMCs	High	High	Operating Budget	Short	Medium
DauphinC-07	Assess the topography around the Lykens Tower Site, Mahantango Tower Site, Peters Mountain Tower Site, and Pillow Tower Site to determine if mitigation measures are necessary, and to implement those measures if they are.	Existing	Landslide	1, 2	Engineer	DPS	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DauphinC-08	Assess the following properties to determine the risk from wildfires and what vegetation needs to be cleared: Agriculture Building, Blue Mountain Tower Site, Conewago CWT Tower Site, Lower Swatara Tower Site, and Mahantango Tower Site.	Existing	Wildfire	1, 3	DPS	All departments	High	Low	Operating Budget	Short	Medium
DauphinC-09	Determine options for protecting the following facilities from the possible inundation due to a failure of the Raystown Lake Dam: Admin Building, Bar Association, County Offices – 100 Chestnut Street, Court House, Fort Hunter Park, Harrisburg Tower Site, Lykens Tower Site, Superior Court, Veterans Building Tower Site.	Existing	Dam Failure; Floods, Flash Floods, and Ice Jams	1	Engineer		Medium	Medium	Operating Budget	Short	High
DauphinC-10	Determine options for protecting Dauphin County Bridge No. 23 from inundation due to a failure of the DeHart Dam.	Existing	Dam Failure; Floods, Flash Floods, and Ice Jams	1	Engineer	DPS; PHMC	Medium	Medium	Operating Budget	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DauphinC-11	Assess the geology at the following sites and determine if mitigation measures are necessary, and to implement them if they are: 333 Market Street Tower Site, Administration Building, Adult Probation, Assistance Office, Bar Association, Children and Youth, Conewago CWT Tower Site, Coroner's Office, County Offices – 100 Chestnut Street, Court House, Dauphin ECC Tower Site, Department of Public Safety, Harrisburg Tower Site, Judicial Center, Lower Swatara Tower Site, Market Street Tower Site, Prison, Recycling Center, Reservoir Park Tower Site, Superior Court, Veteran's Building Tower Site, and Work Release.	Existing	Subsidence and Sinkholes	1	Engineer	DPS	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
DauphinC-12	Identify and provide incentives to recruit and retain volunteer firefighters.	Existing	Building or Structure Collapse; Dam Failure; Drought; Environmental Hazards: Hazardous Materials Releases; Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter; Landslide; Subsidence, Sinkholes; Tornado, Windstorm; Transportation Accidents; Utility Interruption; Wildfire; Winter Storm	2	Municipalities	Fire Departments	High	Medium	Operating Budget	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DauphinC-13	Provide information to PEMA on the risks faced by each Commonwealth-owned critical facility in Dauphin County, so that PEMA can work with the Department of General Services to protect the facilities.	Existing	Dam Failure; Environmental Hazards: Hazardous Materials Releases; Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter; Subsidence, Sinkholes; Wildfire	1	DPS	PEMA; PA DGS	High	Low	Operating Budget	Short	Medium
DauphinC-14	Work with PennDOT to improve Interstates -076 (PA Turnpike), -081, -083, and -283 to reduce accidents.	Existing	Transportation Accidents	5	Dauphin County Planning Commission	PennDOT	High	High	PennDOT, Operating Budget	Long	Medium
DauphinC-15	Conduct a wildlands/forestry survey of forested areas, to identify strategies for mitigating the negative effects of invasive plant and insect species.	Existing	Invasive Species	3	DC Conservation District	DPS; PA DCNR	Medium	Medium	Operating Budget	Short	High
DauphinC-16	Construct another ingress/egress route for the Dauphin County Department of Public Safety, Schaffner Youth Center, Adult Probation facility, and Work Release Center.	Existing	Transportation Accidents	5	Swatara Township	County Engineer	Medium	Low	Operating Budget; Infrastructure Bank	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DauphinC-17	Install wet and dry hydrants to provide a water supply for fire suppression.	Existing	Drought	2	Municipal EMCs	Fire Departments; Water Utilities	High	Medium	Operating Budget; Gaming grant	Short	Medium
DauphinC-18	Work with the owners/operators of privately owned critical facilities in the special flood hazard area to discuss their risk of flooding and the protective measures they can take.	Existing	Floods, Flash Floods, and Ice Jams	1, 2	FPA	Engineers; USACE	High	Low	Operating Budget	Short	Low
DauphinC-19	Work with the owners/operators of privately owned critical facilities in the area subject to inundation due to a failure of the Raystown Lake Dam to discuss their risk of flooding and protective measures they can take.	Existing	Dam Failure; Floods, Flash Floods, and Ice Jams	2	FPA	Engineers; USACE	High	Low	Operating Budget	Short	Medium
DauphinC-20	Work with privately-owned critical facilities to assess the geology at their sites to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	2	Municipal EMC		High	Medium	Municipal Budget	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DauphinC-21	Work with the owners/operators of the privately owned critical facilities to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Municipalities	DC Conservation District, PA DCNR	Medium	Low	Operating Budget	Short	Medium
DauphinC-22	Assess the Dauphin County Bridge No. 23 historic site to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	DC Conservation District	PA DCNR; PHMC	Medium	Low	Operating Budget	Short	Medium
DauphinC-23	Protect the Dauphin County Bridge No. 23 historic site to at least the 0.2 percent chance flood level.	Existing	Floods, Flash Floods, and Ice Jams	1	Engineer	FPA	Medium	Medium	FEMA HMGP, BRIC; PA DCED FMP; PHMC; Gaming grant	Short	Medium
DauphinC-24	Work with the owners/operators of privately owned critical facilities on steep slopes to study the topography of the property to determine if mitigation measures are necessary, and to implement those measures.	Existing	Landslide	1, 2	DPS	EMCs	Medium	Low	Operating Budget	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DauphinC-25	The county will assess their bridges to determine what measures can be taken to protect them from the 0.2 percent annual chance flood level.	Existing	Floods, Flash Floods, and Ice Jams	1	Engineer	Municipal FPAs	High	Medium	Operating Budget; Infrastructure Bank	Short	High
DauphinC-26	Assess the geology at the Area Agency on Aging property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	--	Medium	Medium	Operating Budget	Short	High
DauphinC-27	Encourage homeowners, renters, and businesses to insure their properties against all hazards, including flood coverage under the National Flood Insurance Program (NFIP).	Existing	Building or Structure Collapse; Cyber Attack; Dam Failure; Drought; Environmental Hazards: Hazardous Materials Releases; Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter; Invasive Species; Landslide; Pandemic and Infectious Disease; Radon Exposure; Subsidence, Sinkholes; Tornado, Windstorm; Transportation Accidents; Utility Interruption; Wildfire; Winter Storm	1	Municipalities	DPS; LEPC	High	Low	Operating Budget	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DauphinC-28	Clean debris from pillars at the Grubb Street and Canal Street bridges.	N/A	Floods, Flash Floods, and Ice Jams	1, 3	Royalton Borough	Middletown Borough; Dauphin County	Medium	Medium	PA DCNR; Operating Budget	Short	High
DauphinC-29	Install backup preventers in wastewater pipes to prevent basement flooding.	Existing	Floods, Flash Floods, and Ice Jams; Utility Interruption	1	Municipalities		High	High	PA DCED Small Water and Sewer Grant; Operating Budget; Gaming grant	Short	Medium
DauphinC-30	Elevate, acquire, or demolish and rebuild properties, including repetitive loss and severe repetitive loss properties, in flood-prone areas.	Existing	Floods, Flash Floods, and Ice Jams	1, 3	FPA		High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget	Short	Medium
DauphinC-31	Floodproof structures in flood-prone areas.	Existing	Floods, Flash Floods, and Ice Jams	1	FPA		High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DauphinC-32	Conduct a study for the Susquehanna River to determine the best option to address snakeheads, flathead catfish, and other invasive species.	N/A	Invasive Species	2	DC Conservation District	Susquehanna River Basin Commission; PA Fish and Boat Commission	Medium	Medium	Operating Budget	Short	High
DauphinC-33	Develop a new Comprehensive Plan or amend an existing Comprehensive Plan to include an assessment and associated mapping of the municipality's vulnerability to location-specific hazards and appropriate recommendations for the use of these hazard areas.	Both	Building or Structure Collapse; Cyber Attack; Dam Failure; Drought; Environmental Hazards: Hazardous Materials Releases; Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter; Invasive Species; Landslide; Pandemic and Infectious Disease; Radon Exposure; Subsidence, Sinkholes; Tornado, Windstorm; Transportation Accidents; Utility Interruption; Wildfire; Winter Storm	2, 4	Municipalities	Tri-County Regional Planning Commission	High	$80,000	Municipal budget	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DauphinC-34	Develop a new Zoning Ordinance or revise an existing Zoning Ordinance to include separate zones or districts with appropriate development criteria for known hazard areas.	Both	Building or Structure Collapse; Cyber Attack; Dam Failure; Drought; Environmental Hazards: Hazardous Materials Releases; Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter; Invasive Species; Landslide; Pandemic and Infectious Disease; Radon Exposure; Subsidence, Sinkholes; Tornado, Windstorm; Transportation Accidents; Utility Interruption; Wildfire; Winter Storm	2	Municipalities	Tri-County Regional Planning Commission	High	50,000	Municipal Budget	Short	High
DauphinC-35	Develop a new Subdivision and Land Development Ordinance or revise an existing Subdivision and Land Development Ordinance to include municipal-specific, hazard mitigation-related development criteria and/or provisions for the mandatory use of conservation subdivision design principles in order to regulate the location and construction of buildings and other infrastructure in known hazard areas.	Both	Building or Structure Collapse; Cyber Attack; Dam Failure; Drought; Environmental Hazards: Hazardous Materials Releases; Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter; Invasive Species; Landslide; Pandemic and Infectious Disease; Radon Exposure; Subsidence, Sinkholes; Tornado, Windstorm; Transportation Accidents; Utility Interruption; Wildfire; Winter Storm	2	Municipalities	Tri-County Regional Planning Commission	High	50000	Municipal budget	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DauphinC-36	Revise existing zoning and/or subdivision and land development ordinances or adopt a separate, standalone ordinance to require the completion of subsurface investigations (i.e., borings, geophysical surveys, and/or studies by a registered Professional Geologist) for all new subdivision and land development projects in known land subsidence hazard areas.	Both	Subsidence and Sinkholes	2	Municipalities	Tri-County Regional Planning Commission	High	5000	Municipal budget	Short	High
DauphinC-37	Update and implement a comprehensive water resources management plan that analyzes the County's existing water resources supply and evaluates the County's anticipated water use demand in an effort to identify suspected water supply shortages and potential new water supply sources.	Both	Drought; Utility Interruption; Wildfire	2	DCCD	Susquehanna River Basin Commission; PA DEP	Medium	Medium	Municipal budget; Gaming grants	Long	Medium
DauphinC-38	Coordinate with the USGS, local watershed organizations, and/or the DCCD to increase the number of USGS and Integrated Flood Observing and Warning System (IFLOWS) rain and stream gauges in the County as a potential enhancement to the existing Susquehanna Flood Forecast and Warning System.	New	Floods, Flash Floods, and Ice Jams	2, 5	DPS	Susquehanna River Basin Commission; watershed associations; DC Conservation District; USGS	Medium	Medium	Municipal budget; Gaming grants	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DauphinC-39	Work with municipalities to evaluate participation in the CRS and facilitate the preparation and submission of CRS applications.	Both	Dam Failure; Floods, Flash Floods, and Ice Jams	2	DC DCED	DPS; PEMA; FEMA Region III	High	Low	CDBG	Short	High
DauphinC-40	Sustain a technical proficiency at the municipal level for conducting post-disaster damage assessments and continue to regulate through local planning and zoning reconstruction activities to ensure compliance with NFIP substantial damage/substantial improvement requirements.	Both	Building or Structure Collapse; Dam Failure; Environmental Hazards: Hazardous Materials Releases; Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter; Landslide; Subsidence, Sinkholes; Tornado, Windstorm; Transportation Accidents; Utility Interruption; Wildfire; Winter Storm	2	DPS	County IT; County Tax Assessment; Municipal EMCs	Medium	Low	Operating Budget; Gaming grant	Short	Medium
DauphinC-41	Develop technical proficiency at the municipal level for assisting residents and business owners in applying for hazard mitigation and assistance funds and identifying cost-beneficial hazard mitigation measures to be incorporated into reconstruction activities.	Both	Building or Structure Collapse; Dam Failure; Environmental Hazards: Hazardous Materials Releases; Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter; Landslide; Subsidence, Sinkholes; Tornado, Windstorm; Transportation Accidents; Utility Interruption; Wildfire; Winter Storm	2, 5	Municipal EMC	DPS	High	Low	Operating Budget; Gaming grant	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DauphinC-42	Investigate the feasibility of constructing a levee/floodwall system along Swatara Creek between East Main Street and the Pennsylvania Turnpike to minimize Middletown Borough's flood hazard potential.	New	Floods, Flash Floods, and Ice Jams	1	FPA	Engineer; SRBC	High	High	FEMA HMA; USACE	Long	Medium
DauphinC-43	Municipalities should continue to seek solutions to problem areas and obstructions identified in the April 2010 Countywide Act 167 Stormwater Management Plan.	Existing	Floods, Flash Floods, and Ice jams; Hurricanes, Tropical Storms, and Nor'easters	1	Municipalities	FPA	High	High	FEMA HMA; PA DCED FMP; Gaming grant	Short	Medium
DauphinC-44	Enroll in the Pennsylvania Firewise Communities Program through the DCNR Fire Forester for Dauphin County.	N/A	Wildfire	2, 3, 5	Municipalities	Fire Departments; PA DCNR	Medium	Low	Operating Budget	Short	Medium
DauphinC-45	Encourage homeowners and renters to test for radon and install radon mitigation systems, if needed.	Existing	Radon Exposure	2	Municipalities	PA DEP	Medium	Low	Operating Budget	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DauphinC-46	Adopt the Radon Control Methods Appendix of the current, adopted edition of the International Residential Code to address radon in new construction.	Both	Radon Exposure	2	Municipalities	PA DEP	Medium	Low	Operating Budget	Short	High
DauphinC-47	Encourage municipalities to enter into an Intergovernmental Cooperation Agreement and Memorandum of Understanding with the Dauphin County Land Bank Authority as a way to address structures at risk from the impacts of natural and human-made hazards.	Both	Building or Structure Collapse; Dam Failure; Drought; Environmental Hazards: Hazardous Materials Releases; Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter; Invasive Species; Landslide; Radon Exposure; Subsidence, Sinkholes; Tornado, Windstorm; Transportation Accidents; Utility Interruption; Wildfire; Winter Storm	2	DC DCED	DPS	Medium	Low	Operating Budget	Short	High
DauphinC-48	Increase the number of NOAA Weather Alert radios in public places across the County that currently do not have them (such as personal care homes) above and beyond what is required of the County by the NWS's Storm Ready Program.	Both	Dam Failure; Environmental Hazards: Hazardous Materials Releases; Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter; Tornado, Windstorm; Wildfire; Winter Storm	2	DPS		Medium	Low	Operating Budget; EMPG; Gaming grant	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DauphinC-49	Enhance alternate EOC location in the event the primary EOC must be evacuated. This facility should also be located outside of the Special Flood Hazard Area.	Existing	Building or Structure Collapse; Cyber Attack; Dam Failure; Drought; Environmental Hazards: Hazardous Materials Releases; Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter; Invasive Species; Landslide; Pandemic and Infectious Disease; Radon Exposure; Subsidence, Sinkholes; Tornado, Windstorm; Transportation Accidents; Utility Interruption; Wildfire; Winter Storm	5	DPS	DC Conservation District; Facilities; Engineer	Low	Low	Operating Budget	Short	High
DauphinC-50	The Dauphin County Department of Information Technology will make natural and human-made hazard data available for municipal use.	N/A	Building or Structure Collapse; Cyber Attack; Dam Failure; Drought; Environmental Hazards: Hazardous Materials Releases; Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter; Invasive Species; Landslide; Pandemic and Infectious Disease; Radon Exposure; Subsidence, Sinkholes; Tornado, Windstorm; Transportation Accidents; Utility Interruption; Wildfire; Winter Storm	2	DC IT	DPS	Low	Low	Operating Budget	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DauphinC-51	Assess the Station 77 property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1	Facilities	DPS; Fire Department; PA DCNR	High	Low	Operating Budget	Short	Medium
DauphinC-52	Implement the Wildwood Lake Restoration Feasibility Study, the Joint Pollutant Reduction Plan (for Paxton Creek Watershed, Chesapeake Bay, Wildwood Lake, and UNT Spring Creek), and the Paxton Creek Restoration Master Plan, to restore the Paxton Creek watershed and Wildwood Lake. Restoration efforts will provide an increase in water quality and flood protection while maintaining optimal recreation areas and diverse wildlife habitats.	New	Flood, Flash Floods, Ice Jam	2, 3		DC Conservation District, TCRCP	High	Low	Operating Budget	Short	Medium
DauphinC-53	Conduct and build upon a study of Emergency Medical Services to establish a plan of action to stabilize and enhance emergency medical services coverage in the Upper Dauphin County Region.	Existing	All	2	Dauphin County DPS	Fire and EMS	High	Medium	Operation Budget	Short	High

Berrysburg Borough

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
BerrysburgB-01	Install a backup power generator at the Berrysburg Borough municipal building.	Existing	Utility Interruption	2	Borough		High	High	FEMA HMGP, BRIC; Operating Budget; Gaming grant	Short	Medium
BerrysburgB-02	Install a backup power generator at the Berrysburg & Community Fire Company station.	Existing	Utility Interruption	1, 2	Borough	Fire Department	High	High	FEMA HMGP, BRIC; Operating Budget; Gaming grant	Short	High
BerrysburgB-03	Discuss with the owner/operator of critical facilities vulnerable to hazardous materials release the risk and possible protective measures.	Existing	Environmental Hazards - Hazardous Material Releases	2	EMC	DPS, LEPC	Medium	Low	Operating Budget	Short	Medium

Conewago Township

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
ConewagoT-01	Protect Laurel Drive from the current and future sinkholes.	Existing	Subsidence and Sinkholes	1	Engineer		High	Medium			Medium
ConewagoT-02	Work with PennDOT to improve Deodate Road to mitigate traffic accidents.	Existing	Transportation Accidents	5	Conewago Township	PennDOT	High	High			Medium
ConewagoT-03	Work with PennDOT to improve Colebrook Road to mitigate traffic accidents.	Existing	Transportation Accidents	5	Conewago Township	PennDOT	High	High			Medium

Dauphin Borough

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DauphinB-01	Assess conditions at the confluence of Stony Creek and the Susquehanna River to identify potential mitigation actions for nearby structures.	Existing	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 3	FPA	Susquehanna River Basin Commission	Medium	Medium	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	Medium
DauphinB-02	Assess the borough to identify potential mitigation actions to take to ensure access to/from the borough during floods of the Susquehanna River.	Existing	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1	Borough	Susquehanna River Basin Commission	Medium	Medium	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget	Short	Medium
DauphinB-03	Install a generator at the Borough Building.	Existing	Utility Interruption	1, 2	Borough		High	High	FEMA HMGP, BRIC; Operating Budget; Gaming grant	Short	Low
DauphinB-04	Determine what other critical facilities in the borough need generators and purchase/install them.	Existing	Utility Interruption	1, 2	EMC	Public Works	High	High	FEMA HMGP, BRIC; Operating Budget	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DauphinB-05	Develop and implement a stream maintenance program to clear debris from Stony Creek.	Existing	Floods, Flash Floods, and Ice Jams	3	Borough	FPA	Medium	Medium	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget	Short	High
DauphinB-06	Assess critical facilities in the wildland-urban interface area to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Borough	Fire Department; PA DCNR	Medium	Low	Operating Budget	Short	Medium
DauphinB-07	Assess Hillside properties to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Borough	Fire Department; PA DCNR	High	Low	Operating Budget	Short	High
DauphinB-08	Work with PennDOT to improve Claster Boulevard to reduce traffic accidents.	Existing	Transportation Accidents	5	Dauphin Borough	PennDOT	High	High	Operating Budget; Infrastructure Bank	Long	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DauphinB-09	Work with PennDOT to improve US-22/322 to mitigate traffic accidents.	Existing	Transportation Accidents	5	Dauphin Borough	PennDOT	High	High	Municipal Budget	Long	Medium

Derry Township

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DerryT-01	Assess stormwater management infrastructure in the township to determine what improvements need to be made, then implement the improvements.	Existing	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 2	Engineer	FPA	High	High	FEMA HMGP, BRIC; PA DCED FMP; Gaming grant	Short	Low
DerryT-02	Work with PennDOT to assess the bridges over Swatara Creek on PA-39 and PA-0743 to improve the ability to pass floodwaters under the bridges.	Existing	Floods, Flash Floods, and Ice Jams	1, 3	Engineer	FPA	Medium	Medium	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget	Long	High
DerryT-03	Work with PennDOT to upgrade stormwater infrastructure on Hershey Park Drive.	Existing	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1	Public Works	PennDOT	High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DerryT-04	Upgrade stormwater infrastructure on Mae Street.	Existing	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1	Public Works		High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	High
DerryT-05	Upgrade stormwater infrastructure on Bull Frog Valley Road.	Existing	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1	Public Works		High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	Medium
DerryT-07	Install a generator at the Derry Township Public Works building	Existing	Utility Interruption	1	Public Works		High	High	FEMA HMGP, BRIC; Operating Budget; Gaming grant	Short	Medium
DerryT-08	Assess the topography around the following structures to determine if mitigation measures are necessary, and to implement those measures if they are: Quarries of the Hummelstown Brownstone Company historic site and Derry Township LDFL Wastewater facility.	Existing	Landslide	1, 2	Engineer		Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Low

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DerryT-09	Work with PennDOT to protect US-322 near PA-0743 from current and future sinkholes.	N/A	Subsidence and Sinkholes	1, 2, 5	Public Works	EMC; PennDOT	High	Medium	Municipal Budget	Long	Medium
DerryT-10	Assess the geology at the Derry Township municipal offices to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	5	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
DerryT-11	Work with Sheetz #351 to determine options for protecting the facility from the possible inundation from dam failure from the Hershey Dam.	Existing	Dam Failure; Floods, Flash Floods, and Ice Jams	1	EMC	FPA; Engineer	High	Medium	Operating Budget	Short	Medium
DerryT-12	Work with PennDOT to improve Elizabethtown Road to mitigate traffic accidents.	N/A	Transportation Accidents	1, 3, 4	Derry Township	PennDOT	High	High	Municipal Budget	Long	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DerryT-13	Work with PennDOT to improve Governor Road to mitigate traffic accidents.	N/A	Transportation Accidents	5	Derry Township	PennDOT	High	High	Municipal Budget	Long	Medium
DerryT-14	Work with PennDOT to improve Middletown Road to mitigate traffic accidents.	N/A	Transportation Accidents	5	Derry Township	PennDOT	High	High	Municipal Budget	Long	Medium
DerryT-15	Work with PennDOT to improve Waltonville Road to mitigate traffic accidents.	N/A	Transportation Accidents	5	Derry Township	PennDOT	High	High	Operating Budget; Infrastructure Bank	Long	High
DerryT-16	Assess the drainage and stormwater management infrastructure in the area of Hersheypark Drive and Walton Avenue to determine appropriate mitigation measures to reduce the risk of flooding, and implement them.	Existing	Floods, Flash Floods, and Ice Jams	5	Engineer	PennDOT; TCRPC; FPA	High	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
DerryT-17	Work with FEMA and the PA Department of Environmental Protection to obtain certification for the levee in Palmdale.	Existing	Dam Failure; Floods, Flash Floods	1, 2	Town Administration	FEMA, PA Dept. of Environmental Protection	High	Medium	County Operating Budget	Short	Medium

East Hanover Township

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
EastHanoverT-01	Work with PennDOT to improve drainage to reduce flooding along the 1100 block of Manada Bottom Road.	Existing	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 2	Public Works	PennDOT	Medium	Medium	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	High
EastHanoverT-02	Work with PennDOT to eliminate highway flooding at the intersection of PA-443 and Firehouse Road during heavy rainfalls.	N/A	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 2	Township Public Works	PennDOT	High	Medium	PennDOT	Long	Low
EastHanoverT-03	Work with PennDOT to improve Mountain Road to mitigate traffic accidents.	N/A	Transportation Accidents	5	East Hanover Township	PennDOT	High	High	Municipal Budget	Long	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
EastHanoverT-04	Work with PennDOT to improve Laudermilch Road to mitigate traffic accidents.	N/A	Transportation Accidents	5	East Hanover Township	PennDOT	High	High	Municipal Budget	Long	Medium
EastHanoverT-06	Obtain a warning system for residents from outside contractors to alert residents, including renters and tourists, to hazardous materials incidents or other hazards.	N/A	Environmental Hazards: Hazardous Materials Releases; Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter; Subsidence, Sinkholes; Tornado, Windstorm; Transportation Accidents; Utility Interruption; Wildfire; Winter Storm	5	EMC	Township Manager	Medium	Low	Operating Budget; Gaming grant; SCTF	Short	Medium

Elizabethville Borough

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
ElizabethvilleB-01	Assess stormwater management infrastructure in the borough to determine what improvements need to be made to control runoff and reduce flooding.	Existing	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 2	Engineer	FPA	High	High	FEMA HMGP, BRIC; PA DCED FMP; Gaming grant	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
ElizabethvilleB-02	Protect the Upper Dauphin County EMS station from the 0.2 percent annual chance flood level.	Existing	Floods, Flash Floods, and Ice Jams	1	Engineer	FPA	High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	High
ElizabethvilleB-03	Install a backup power generator at the Elizabethville Borough building.	Existing	Utility Interruption	1, 2	Borough	EMC	High	30,000	FEMA HMGP, BRIC; Operating Budget; Gaming grant	Short	Medium

Gratz Borough

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
GratzB-01	Assess the property of the Gratz Borough Building to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Borough	Fire Department	Medium	Low	Operating Budget	Short	High
GratzB-02	Assess the Gratz Fire Department station to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Borough	Fire Department	Medium	Low	Operating Budget	Short	Medium

Halifax Borough

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
HalifaxB-01	Ensure that the borough has plans in place to continue operations if a hazardous materials release causes an evacuation of the Halifax Borough Office.	Existing	Environmental Hazards - Hazardous Material Releases	2	EMC	DPS, LEPC	High	Low	Operating Budget	Short	Medium
HalifaxB-02	Discuss with the US Postal Service that the Halifax Post Office is vulnerable to a hazardous materials release and possible protective measures.	Existing	Environmental Hazards - Hazardous Material Releases	2	EMC	DPS, LEPC	Medium	Low	Operating Budget	Short	Medium

Halifax Township

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
HalifaxT-01	Protect the Halifax Area Water Authority Well #1 to the 0.2 percent annual chance of flood event.	Existing	Floods, Flash Floods, and Ice Jams; Utility Interruption	1	Water Authority		High	High	FEMA HMGP, BRIC; PA DCED H2O, Small Water, and Sewer Project Grant; Operating Budget; Gaming grant	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
HalifaxT-02	Work with the property owner to protect the Legislative Route 1 Sycamore Allee historic site from flooding.	Existing	Floods, Flash Floods, and Ice Jams	1	Engineer	FPA; PHMC	Medium	Medium	FEMA HMGP, BRIC, FMA; PA DCED FMP; PHMC; Operating Budget	Short	Medium
HalifaxT-03	Assess the topography around the Halifax Area Water Authority Well #1 to determine if mitigation measures are necessary, and to implement those measures if they are.	Existing	Landslide	1, 2	Engineer		Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
HalifaxT-04	Assess the following properties to determine the risk from wildfires and what vegetation needs to be cleared: Halifax Area Authority Sewer Plant, Halifax Area Water Authority Well #1, Halifax Area Authority Sewer Plant, and Halifax Township Municipal Building.	Existing	Wildfire	1, 3	Township	Fire Department; PA DCNR	High	Low	Operating Budget	Short	High
HalifaxT-05	Work with PennDOT to improve Peters Mountain Road to mitigate traffic accidents.	N/A	Transportation Accidents	5	Halifax Township	PennDOT	High	High	Municipal Budget	Long	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
HalifaxT-06	Work with PennDOT to improve Powells Valley Road to mitigate traffic accidents.	N/A	Transportation Accidents	5	Halifax Township	PennDOT	High	High	Municipal Budget	Long	High
HalifaxT-07	Work with PennDOT to improve South River Road to mitigate traffic accidents.	N/A	Transportation Accidents	5	Halifax Township	PennDOT	High	High	Municipal Budget	Long	Medium

Harrisburg City

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
HarrisburgC-01	Renovate or demolish vacant structures that are at risk of collapse.	Existing	Building or Structure Collapse	1	City of Harrisburg	DC DCED	High	Medium	CDBG; Operating Budget	Short	Medium
HarrisburgC-02	Protect the Downey Elementary School from at least the 0.2 percent chance flood level.	Existing	Floods, Flash Floods, and Ice Jams	1	FPA		High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
HarrisburgC-03	Protect the Edgewater Psychiatric Center to at least the 0.2 percent chance flood level.	Existing	Floods, Flash Floods, and Ice Jams	1	FPA		High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	Medium
HarrisburgC-04	Protect the Station 1 EMS facility to at least the 0.2 percent chance of flood level.	Existing	Floods, Flash Floods, and Ice Jams	1	Engineer	FPA	High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	Low
HarrisburgC-05	Assess the geology at the Ben Franklin School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	School District Facilities	City Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
HarrisburgC-06	Assess the geology at the Camp Curtin Fire Station historic site property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
HarrisburgC-07	Assess the geology at the Camp Curtin Junior High School historic property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Facilities Management	Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
HarrisburgC-08	Assess the geology at the Downey Elementary School historic site property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	District Facilities Management	City Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
HarrisburgC-09	Assess the geology at the Edgewater Psychiatric Center property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Facility Engineer	City Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
HarrisburgC-10	Assess the geology at the Foose Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	District Facilities Management	City Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
HarrisburgC-11	Assess the geology at the Hamilton School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	District Facilities Management	City Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High
HarrisburgC-12	Assess the geology at the Steele School District property to determine if mitigation measures are necessary, and to implement them if they are.	New	Subsidence and Sinkholes	1	District Facilities Management	City Engineer	Medium	Medium	FEMA HMGP, BRIC, Operating Budget	Short	High
HarrisburgC-13	Assess the geology at the Harrisburg City Government Center and Police Department property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High
HarrisburgC-14	Assess the geology at the Harrisburg City Public Works property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
HarrisburgC-15	Assess the geology at the Harrisburg City Fire Station 1 property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
HarrisburgC-16	Assess the geology at the Harrisburg City Fire Station 2 property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High
HarrisburgC-17	Assess the geology at the Harrisburg City Fire Station 8 property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High
HarrisburgC-18	Assess the geology at the Harrisburg Technical High School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	School Facilities Management	City Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
HarrisburgC-19	Assess the geology at the John Harris High School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Facilities Management	Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High
HarrisburgC-20	Assess the geology at the Harrisburg School District Administration Building property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Facilities Management	Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High
HarrisburgC-21	Assess the geology at the Marshall School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	School Facilities Management	City Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High
HarrisburgC-22	Assess the geology at the Melrose School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	School Facilities Management	City Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Low

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
HarrisburgC-23	Assess the geology at the Paxton Fire Station historic property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	City Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
HarrisburgC-24	Assess the geology at the Riverside Fire Station historic property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
HarrisburgC-25	Assess the geology at the Rowland Middle School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	School Facilities Management	City Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High
HarrisburgC-26	Assess the geology at the Scott Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	School Facilities Management	City Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
HarrisburgC-28	Determine options for protecting the following facilities from possible inundation due to a failure of the Raystown Lake Dam: Downey Elementary School, Edgewater Psychiatric Center, Harrisburg City Government Center, Harrisburg City Police Station, and Station 1 EMS.	Existing	Dam Failure; Floods, Flash Floods, and Ice Jams	1	Engineer		Medium	Low	Operating Budget	Short	High
HarrisburgC-29	Work with PennDOT to assess and improve the stormwater management infrastructure at Cameron and Maclay Streets, near the Maclay Street entrance to the Farm Show Complex.	Existing	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 2	Engineer	Capital Region Water; PennDOT	High	High	FEMA HMGP, BRIC; PA DCED FMP; Gaming grant	Short	High
HarrisburgC-30	Work with PennDOT to assess and improve the stormwater management infrastructure on the 1800 block of Derry Street.	Existing	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 2	Engineer	Capital Region Water; PennDOT	High	High	FEMA HMGP, BRIC; PA DCED FMP; Gaming grant	Short	Medium
HarrisburgC-31	Work with PennDOT to assess and improve the stormwater management infrastructure along the 1400 block of Market Street.	Existing	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 2	Engineer	Capital Region Water; PennDOT	High	High	FEMA HMGP, BRIC; PA DCED FMP; Gaming grant	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
HarrisburgC-32	Assess and improve the stormwater management infrastructure at the intersection of 2nd and Geiger Streets.	Existing	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 2	Engineer	Capital Region Water; PennDOT	High	High	FEMA HMGP, BRIC; PA DCED FMP; Gaming grant	Short	High
HarrisburgC-33	Assess and improve the stormwater management infrastructure at the intersection of Herr and Plum Streets.	Existing	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 2	Engineer	Capital Region Water	High	High	FEMA HMGP, BRIC; PA DCED FMP; Gaming grant	Short	Medium
HarrisburgC-34	Work with PennDOT to study Cameron Street to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	City Engineer	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	Medium
HarrisburgC-35	Work with PennDOT to study Mulberry Street to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	City Engineer	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
HarrisburgC-36	Work with PennDOT to study State Street to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	City Engineer	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	Medium
HarrisburgC-37	Support Capital Region Water's Wastewater Arsenal Boulevard Sewer Improvements - Rehabilitation/replacement of approximately 2,500 LF of sewer collector pipe.	Existing	Utility Interruption	1, 2	City Engineer	Capital Region Water; PennDOT	High	$3 million	PENNVEST	Short	High
HarrisburgC-38	Support Capital Region Water's Stormwater SW Pond Retrofit – Bellevue Park Design - Employing green stormwater infrastructure (GSI) to manage stormwater runoff and prevent flows from entering the combined sewer system, thereby reducing combined sewer overflow (CSO) activity.	New	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 2, 3	City Engineer	Capital Region Water; Jacobs	High	$1,150,000	PA DCED H2O	2021-2022	Medium
HarrisburgC-39	Support Capital Region Water's Stormwater Camp Curtin YMCA GSI - Develop visible GSI improvements as part of the community center rehabilitation and beautification.	New	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 2, 3	City Engineer	Capital Region Water; AKRF	High	$1,857,000	PENNVEST	2021-2022	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
HarrisburgC-40	Support Capital Region Water's Stormwater COH East-West Multimodal Connector - GSI - Capture and manage stormwater in green stormwater elements designed to also serve as traffic calming elements.	New	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter; Transportation Accidents	1, 2, 3	City Engineer	Capital Region Water	High	$900,000	PA DCED Multimodal Transportation Funding (MTF) grant; PENNVEST	2021-2022	Medium
HarrisburgC-41	Support Capital Region Water's Wastewater (Combined, Sanitary & Storm) Collection System Rehabilitation - Rehabilitate priority defects to avoid failures using a variety of methods including conventional replacement and "trenchless" structural pipe lining procedures.	Existing	Utility Interruption	1, 2	City Engineer	Capital Region Water; HRG; Rogele & Abel Recon	High	$4,300,000	Municipal Bonds; Operating Budget	Short	Low
HarrisburgC-42	Support Capital Region Water's Stormwater South Allison Hill GSI - Capture and manage stormwater in green stormwater elements designed to also serve as traffic calming elements.	New	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter; Transportation Accidents	1, 2, 3	City Engineer	Capital Region Water; PennDOT; Tri-County Community Action; Impact Harrisburg; AKRF	High	$1,700,000	PENNVEST	2020-2021	Medium
HarrisburgC-43	Work with PennDOT to study 19th Street to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Engineer	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
HarrisburgC-44	Work with PennDOT to study 25th Street to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Engineer	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	High
HarrisburgC-45	Work with PennDOT to study the intersection of 2nd and Geiger Streets to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Engineer	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	Medium
HarrisburgC-46	Work with PennDOT to study the intersection of Front and Forster Streets to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Engineer	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	Medium
HarrisburgC-47	Work with PennDOT to study the intersection of Susquehanna and Riley Streets to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Engineer	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
HarrisburgC-48	Implement the recommendations of the Harrisburg Authority's ongoing combined sewer overflow impact study.	Existing	Utility Interruption	1, 3	Engineer		High	High	Capital Improvement Budget	Long	Medium
HarrisburgC-49	Identify, assess, and, as necessary, implement solutions to reduce impacts to human life from the Dock Street Dam.	Existing	Flood, Flash Floods; Dam Failure	1, 3, 5	Engineer		High	Medium	County Operating Budget	Long	Medium
HarrisburgC-50	Study options to restore Paxton Creek within City limits and collaborate with Whole Community Partners to implement findings of the study to re-establish the historic floodplain of the creek.	Existing	Flood, Flash Flood	1, 3, 4	Engineer		High	Medium	County Operating Budget	Long	Medium

Highspire Borough

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
HighspireB-01	Protect the wastewater treatment plant from the 0.2 percent annual chance flood level.	Existing	Floods, Flash Floods, and Ice Jams; Utility Interruption	1	Engineer	FPA	High	High	FEMA HMGP, BRIC; PA DCED H2O, Small Water, and Sewer Project Grant; Operating Budget; Gaming grant	Short	Medium
HighspireB-02	Protect the Highspire Fire Department station from the 0.2 percent annual chance flood level.	Existing	Floods, Flash Floods, and Ice Jams	1	Engineer	FPA	High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	Medium
HighspireB-03	Assess the Highspire Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Borough	Fire Department; PA DCNR	Medium	Low	Operating Budget	Short	Medium
HighspireB-05	Proceed with the culvert replacement efforts at Penn Street as well as Lumber Street, plus the culvert replacement and canal modifications on Ann Street to improve drainage.	Existing	Flood, Flash Flood, Ice Jam	1	Borough	Public Works	High	Penn St $1.303M Lumber St $700k Ann St $2.25M	Operating Budget	Short	High

Hummelstown Borough

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
HummelstownB-01	Assess the geology at the Lower Dauphin School District campuses to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	District Facilities Management	Borough Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
HummelstownB-02	Assess the geology at the Hummelstown Borough Office to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High
HummelstownB-03	Assess the geology at the Hummelstown Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
HummelstownB-04	Assess the geology at the Nye Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	District Facilities Management	Borough Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium

Jefferson Township

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
JeffersonT-01	Assess the Carsonville Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Township	Fire Department; PA DCNR	High	Low	Operating Budget	Short	Medium
JeffersonT-02	Assess the Jefferson Township Municipal Office property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Township	Fire Department; PA DCNR	Medium	Low	Operating Budget	Short	Medium

Londonderry Township

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
LondonderryT-01	Assess the Londonderry Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Township	Fire Department	Medium	Low	Operating Budget	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
LondonderryT-02	Assess the Londonderry Township Building property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Township	Fire Department	Medium	Low	Operating Budget	Short	High
LondonderryT-03	Assess the geology at the Derry Township Municipal Authority Southwest property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Municipal Authority	Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Low
LondonderryT-04	Replant Ash Trees that were lost to the Ash Borer and determine the best actions to prevent invasive species in the future.	N/A	Invasive Species	2, 4	Londonderry Township		Medium	Medium	Operating budget	Short	High
LondonderryT-05	Assess the geology at the Londonderry Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	District Facilities Management	Township Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
LondonderryT-06	Install a backup power generator at the public works building.	Existing	Utility Interruption	1, 2	Township		High	High	FEMA HMGP, BRIC; Operating Budget; Gaming grant	Short	Medium
LondonderryT-07	Work with PennDOT to study Colebrook Road to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Township	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	Medium
LondonderryT-08	Work with PennDOT to study Harrisburg Pike to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Township	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	Medium
LondonderryT-09	Work with PennDOT to study Roundtop Road to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Township	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
LondonderryT-10	Assess the geology at the Londonderry Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
LondonderryT-11	Conewago Creek Stream Restoration - restore 1 mile of stream, remove approximately 125,000 cubic yards of sediment, and re-establish the historic floodplain of the creek.	N/A	Floods, Flash Floods, and Ice Jams	1, 3	MS4 Environmental Specialist	TCRPC; SRBC; EMC; Engineer	High	$4,000,000	FEMA HMGP, BRIC; CDBG-DR; PA DCED	Long	Medium

Lower Paxton Township

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
LowerPaxtonT-01	Assess the Linglestown Middle School property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	2, 3	Township	Fire Department; School Staff; PA DCNR	Medium	Low	Operating Budget	Short	High
LowerPaxtonT-02	Assess the geology at the Linglestown Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	2	Facilities Management	Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
LowerPaxtonT-03	Work with PennDOT to study Colonial Road to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	1	Public Works	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	High
LowerPaxtonT-04	Work with PennDOT to study Jonestown Road to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Public Works	TCRPC; PennDOT	Medium	Medium	PennDOT	Short	Medium
LowerPaxtonT-05	Work with PennDOT to study Linglestown Road to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Public Works	TCRPC; PennDOT	Medium	Medium	PennDOT	Short	Medium
LowerPaxtonT-06	Work with PennDOT to study Nyes Road to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Public Works	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
LowerPaxtonT-07	Work with PennDOT to study Rutherford Road to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Public Works	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	High
LowerPaxtonT-08	Work with PennDOT to study Union Deposit Road to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	1	Public Works	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	High
Lower PaxtonT-09	Assess the options for the identification and creation of community “comfort centers”	New	All Hazards	1	Town Administration	TCRPC	Medium	Low	Operating Budget	Short	High

Lower Swatara Township

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
LowerSwataraT-01	Assess the geology at the Kunkel Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Facilities Management	Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
LowerSwataraT-02	Assess the cause(s) of flooding of "The Flats" to identify feasible mitigation actions, and implement them.	Existing	Floods, Flash Floods, and Ice Jams	1	Engineer	Public Works; FPA	High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	High
LowerSwataraT-03	Assess the geology at the Lower Swatara Township Building property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	Township Staff	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High
LowerSwataraT-04	Assess the geology at the Lower Swatara Township Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	Township Staff	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High
LowerSwataraT-05	Assess the geology at the Middletown Area High School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	District Facilities Management	Township Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
LowerSwataraT-06	Assess the geology at the Reid Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	District Facilities Management	Township Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
LowerSwataraT-07	Protect the Farr Pump Station to at least the 0.2 percent annual chance flood level.	Existing	Floods, Flash Floods, and Ice Jams; Utility Interruption	1	Public Works	Township Municipal Authority	High	High	FEMA HMGP, BRIC; PA DCED H2O, Small Water, and Sewer Project Grant; Operating Budget; Gaming grant	Short	Medium
LowerSwataraT-08	Install a backup power generator at the Farr Pump Station.	Existing	Utility Interruption	1, 2	Public Works	EMC; Township Municipal Authority	High	High	FEMA HMGP, BRIC; Operating Budget; Gaming grant	Short	Medium
LowerSwataraT-09	Install a backup power generator at the Jamesway Pump Station.	Existing	Utility Interruption	1, 2	Public Works	EMC; Township Municipal Authority	High	High	FEMA HMGP, BRIC; Operating Budget; Gaming grant	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
LowerSwataraT-10	Install a backup power generator at the North Union Street Pump Station.	Existing	Utility Interruption	1, 2	Public Works	EMC; Township Municipal Authority	High	High	FEMA HMGP, BRIC; Operating Budget; Gaming grant	Short	Medium

Lykens Borough

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
LykensB-01	Protect the Lykens Borough Office to at least the 0.2 percent chance of flood level.	Existing	Floods, Flash Floods, and Ice Jams	1	Engineer	FPA	High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	High
LykensB-02	Protect the Lykens Borough Authority WWTP to at least the 0.2 percent chance of flood level.	Existing	Floods, Flash Floods, and Ice Jams; Utility Interruption	1	Borough Authority		High	High	FEMA HMGP, BRIC; PA DCED H2O, Small Water, and Sewer Project Grant; Operating Budget; Gaming grant	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
LykensB-03	Assess the Lykens Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Borough	Fire Department; PA DCNR	Medium	Low	Operating Budget	Short	High
LykensB-04	Assess the Lykens Borough Office property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Borough	Fire Department; PA DCNR	Medium	Low	Operating Budget	Short	High
LykensB-05	Assess the Lykens Borough Authority WWTP property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Borough	Fire Department; Borough Authority; PA DCNR	Medium	Low	Operating Budget	Short	High
LykensB-06	Identify sections of banks of waterways that need to be stabilized, and design and implement the stabilization.	N/A	Floods, Flash Floods, and Ice Jams; Landslide	3	FPA		Medium	Medium	FEMA HMGP, BRIC; PA DCNR	Short	Medium

Lykens Township

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
LykensT-01	Assess the Bridge in Lykens Township No. 1 historic site to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Township	Fire Department; PA DCNR	Medium	Low	Operating Budget	Short	High
LykensT-02	Work with PennDOT to study North Crossroads Road to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Township	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	Medium

Middle Paxton Township

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
MiddlePaxtonT-01	Work with PennDOT to study Peters Mountain Road to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Township	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
MiddlePaxtonT-02	Assess the Dauphin-Middle Paxton Municipal Office property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Township	Fire Department; PA DCNR	High	Low	Operating Budget	Short	Medium
MiddlePaxtonT-03	Assess the Middle Paxton Elementary School property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Township	Fire Department; School Staff; PA DCNR	Medium	Low	Operating Budget	Short	High
MiddlePaxtonT-04	Work with the owners/operators of privately owned critical facilities in the area subject to inundation due to a failure of the DeHart Dam to discuss their risk of flooding and protective measures they can take.	Existing	Dam Failure; Floods, Flash Floods, and Ice Jams	2	Engineer	FPA; Capital Region Water	High	Low	Operating Budget	Short	Medium

Middletown Borough

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
MiddletownB-02	Assess the geology at the Fink Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Facilities Management	Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High
MiddletownB-03	Work with PennDOT to study Main Street/Harrisburg Pike to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Public Works	TCRPC	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	Medium
MiddletownB-04	Protect the Mill Street electrical substation from the 0.2 percent annual chance flood level.	Existing	Floods, Flash Floods, and Ice Jams; Utility Interruption	1, 3	Middletown Borough		High	High	FEMA HMGP, BRIC; Operating Budget; Gaming grant	Short	Medium
MiddletownB-05	Work with Veolia Wastewater Plant property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Engineer	Suez; EMC; Fire Department; Public Works; PA DCNR	Medium	Low	Operating Budget	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
MiddletownB-06	Assess the geology at the Middletown Borough Building property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
MiddletownB-07	Assess the geology at the Middletown Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High
MiddletownB-08	Assess the geology at the Middletown Police Department property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High
MiddletownB-09	Work with Veolia to assess the geology at the Veolia Wastewater Plant property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	Suez; Public Works	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium

Millersburg Borough

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
MillersburgB-01	Identify sections of banks of waterways that need to be stabilized, and design and implement the stabilization.	N/A	Floods, Flash Floods, and Ice Jams; Landslide	3	FPA		Medium	Medium	FEMA HMGP, BRIC; PA DCNR	Short	Medium
MillersburgB-04	Floodproof the Welcome Center along the Susquehanna River.	Existing	Floods, Flash Floods, and Ice Jams	1	Borough		High	8500	Capital Improvement Budget; Gaming grant	Short	High
MillersburgB-05	Use the repair estimate provided by National Gunite to repair the storm sewer and install a concrete pipe to alleviate sinkhole issues located on State Street.	Existing	Flood, Flash Floods, and Ice Jams; Subsidence, Sinkhole	1	Millersburg Borough / Upper Paxton Township	National Gunite	High	Unknown	FEMA HMGP, Operating Budget	Short	High

Paxtang Borough

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
PaxtangB-01	Protect the Paxtang Borough Office/Fire Station to at least the 0.2 percent annual chance flood level.	Existing	Floods, Flash Floods, and Ice Jams	1	Engineer	FPA; Fire Department	High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	High
PaxtangB-02	Assess the geology at the Paxtang Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Facilities Management	Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
PaxtangB-03	Assess the geology at the Paxtang Borough Office property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium

Penbrook Borough

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
PenbrookB-01	Assess the geology at the Penbrook Borough Office property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High
PenbrookB-02	Assess the geology at the Penbrook Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
PenbrookB-03	Install a backup power generator at the public works building.	Existing	Utility Interruption	1, 2	Engineer	Borough Staff	High	High	FEMA HMGP, BRIC; Operating Budget; Gaming grant	Short	High
PenbrookB-04	Install a backup power generator at the Citizen's Fire Company #1 station.	Existing	Utility Interruption	1, 2	Borough Engineer	EMC; Borough Staff; Fire Department	High	High	FEMA HMGP, BRIC; Operating Budget; Gaming grant	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
PenbrookB-05	Assess the stormwater management infrastructure throughout the borough and determine what upgrades need to be made.	Existing	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 2	Engineer	Borough Staff	Medium	Medium	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget	Short	Medium

Pillow Borough

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
PillowB-01	Install a backup power generator at the Pillow Borough municipal building.	Existing	Utility Interruption	1, 2	Engineer	Borough Staff	High	High	FEMA HMGP, BRIC; Operating Budget; Gaming grant	Short	Medium
PillowB-02	Determine appropriate measures for preventing injuries at blighted properties.	Existing	Building or Structure Collapse	2, 4	Mayor		High	High	CDBG	Short	Low
PillowB-03	Install a backup power generator at Well 5.	Existing	Utility Interruption	1, 2	Water Authority	Borough Staff	High	High	FEMA HMGP, BRIC; Operating Budget; Gaming grant	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
PillowB-04	Install a backup power generator at Well 6.	Existing	Utility Interruption	1, 2	Water Authority	Borough Staff	High	High	FEMA HMGP, BRIC; Operating Budget; Gaming grant	Short	High
PillowB-05	Upgrade fire department radios to be interoperable between Dauphin and Northumberland Counties.	N/A	Building or Structure Collapse; Dam Failure; Environmental Hazards: Hazardous Materials Releases; Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter; Landslide; Tornado, Windstorm; Transportation Accidents; Utility Interruption; Wildfire; Winter Storm	1, 2, 4	Fire Department	DPS	Medium	Medium	Operating Budget	Short	Medium
PillowB-06	Work with the Pillow Historical Society and PPL to determine options to prevent power outages and damage to the water treatment building, and implement the most appropriate one.	Existing	Utility Interruption	1, 2	Engineer	Borough Staff; PPL; Pillow Historical Society	Medium	Medium	CDBG, Gaming grants, PA DCED H2O, or Small Water and Sewers Grant	Short	Medium
PillowB-07	Work with PennDOT to improve drainage on PA-225 to prevent ponding water.	N/A	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 2	Borough Staff	PennDOT; TCRPC	High	Medium	PennDOT	Long	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
PillowB-08	Map the borough's water infrastructure.	Existing	Utility Interruption	1, 2	Borough Staff	Engineer; Water Authority	Medium	Low	CDBG, Gaming grants	Short	Medium
PillowB-09	Analyze the intersection develop solutions to reduce speeding on PA-225, and implement the most appropriate one.	N/A	Transportation Accidents	1	Engineer	Borough Staff; PennDOT; TCRPC	Medium	Medium	PennDOT	Short	Medium
PillowB-10	Develop an evacuation and sheltering plan for Pillow Borough.	N/A	Environmental Hazards: Hazardous Materials Releases; Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter; Landslide; Tornado, Windstorm; Utility Interruption; Wildfire; Winter Storm	5	EMC		Medium	Low	CDBG, Gaming grants	Short	High
PillowB-11	Installation of new water lines and improve the water infrastructure.	Existing	Utility Interruption	1, 2	Water Authority		High	High	CDBG, Gaming grants, PA DCED H20	Long	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
PillowB-12	Enclose Well 5 infrastructure in a shelter.	Existing	Utility Interruption	2	Water Authority		Medium	Medium	CDBG, Gaming grants, PA DCED Small Water and Sewer Grant	Short	Medium

Reed Township

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
ReedT-01	Work with PennDOT to study South River Road to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Township	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	Medium

Royalton Borough

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
RoyaltonB-01	Protect the Edgewater Pump Station to at least the 0.2 percent annual chance flood level.	Existing	Floods, Flash Floods, and Ice Jams; Utility Interruption	1, 5	Royalton Borough Authority	FPA; Engineer	High	High	FEMA HMGP, BRIC; PA DCED H2O, Small Water, and Sewer Project Grant; Operating	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
									Budget; Gaming grant		
RoyaltonB-02	Develop a plan with emergency services to assist the borough if chemical containers from Univar float downstream.	N/A	Environmental Hazards - Hazardous Material Releases; Floods, Flash Floods, and Ice Jams	1, 5	EMC	DPS, LEPC	Medium	Low	Operating Budget	Short	High
RoyaltonB-04	Provide assistance to remove built-up debris from around bridge pillars.	Existing	Floods, Flash Floods, and Ice Jams	1	FPA	Public Works	High	Low	Operating Budget	Short	Medium
RoyaltonB-05	Phase 2 Royalton Canal Improvement Project to mitigate localized flooding.	N/A	Floods, Flash Floods, and Ice Jams	1	Royalton Borough	FPA; Engineer	High	High	FEMA HMGP, BRIC; USACE; CDBG; Dauphin County Regional Stormwater Program; Gaming grant	DOF	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
RoyaltonB06	Structural assessment and reinforcement of Edgewater Development retaining wall.	Existing	Building or Structure Collapse	1	Engineer	Edgewater Development Homeowner Association, Cameron Woods Development Homeowner Association	High	High	CDBG; Operating Budget	DOF	Low

Rush Township

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
RushT-01	Assess the Rush Township Municipal Office property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1	Township	Fire Department; PA DCNR	Medium	Low	Operating Budget	Short	Short
RushT-02	Work with PennDOT to study Gold Mine Road to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Township Staff	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
RushT-03	Coordinate with the DCNR Fire Forester for Dauphin County on the potential construction of a fire break at the appropriate location on the south side of Peters Mountain along Route 325.	N/A	Wildfire	1, 3	Township	Fire Departments; PA DCNR	Medium	Medium	Operating Budget; PA DCNR	Short	High

South Hanover Township

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
SouthHanoverT-01	Work with PennDOT to study Grandview Drive to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Public Works	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	Low
SouthHanoverT-02	Work with PennDOT to study Union Deposit Road to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Public Works	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	Medium

Steelton Borough

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
SteeltonB-01	Assess the geology at the Steelton Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High
SteeltonB-02	Work with PA American Water to protect the Steelton Water Filtration Plant to at least the 0.2 percent annual chance flood level.	Existing	Floods, Flash Floods, and Ice Jams; Utility Interruption	1	Engineer	Public Works; PA American Water; FPA	High	High	FEMA HMGP, BRIC; PA DCED H2O, Small Water, and Sewer Project Grant; Operating Budget; Gaming grant	Short	Medium
SteeltonB-03	Install a backup power generator at the Steelton Highway Garage.	Existing	Utility Interruption	1, 2	Public Works		High	High	FEMA HMGP, BRIC; Operating Budget; Gaming grant	Short	High
SteeltonB-04	Work with PA American Water to install a backup power generator at the sewer pump stations.	Existing	Utility Interruption	1, 2	Engineer	Public Works; PA American Water	High	High	FEMA HMGP, BRIC; Operating Budget; Gaming grant	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
SteeltonB-05	Install a backup power generator at the Steelton Borough Building.	Existing	Utility Interruption	1, 2	Public Works		High	High	FEMA HMGP, BRIC; Operating Budget; Gaming grant	Short	High
SteeltonB-06	Renovate or demolish vacant structures that were damaged by fire and are at risk of collapse.	Existing	Building or Structure Collapse	1	Steelton Borough	DC DCED	High	Medium	CDBG; Operating Budget	Short	Medium
SteeltonB-07	Assess the flooding problem along South Front Street near the quarry to identify feasible mitigation actions, and implement them.	Existing	Floods, Flash Floods, and Ice Jams	1	Engineer	Borough Staff; FPA	Medium	Medium	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	Medium
SteeltonB-08	Assess the geology at the Steelton Borough office property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC; Borough Staff	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Low

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
SteeltonB-09	Work with PA American Water to assess the geology at the Steelton Water Filtration Plant property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	PA American Water; Public Works	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
SteeltonB-10	Assess the type and number of vacant/abandoned buildings in the Borough and determine if mitigation measures are necessary.	Existing	Building or Structure Collapse	2, 5	Borough Administration	Borough Tax Office, Borough Fire Department, and Borough Emergency Management	Medium	Low	Borough Operating Budget	Medium	High
SteeltonB-11	Borough Storm Sewer Management System to conduct an assessment on storm sewer system inlets being old and need to be replaced as well as cleaned up.	Existing	Floods, Flash Floods	2, 5	Storm Water Authority	Borough Administration	High	High	Penn Vest Grant/Loan, Operating Budget	Short	High
SteeltonB-12	Conduct an assessment of the Borough's information technology system and determine potential updates or software needed to prevent intrusions into the system.	Existing	Cyber Attack	2	Borough Manager	IT Consultants	High	Medium	Operating Budget	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
SteeltonB-13	Install a backup power generator at the Steelton Highway Garage and the Steelton Borough Building.	New	Floods, Flash Floods, & Ice Jams, Hurricane, Tropical Storm, Nor'easter, Tornado, Windstorm, Utility Interruption, Wildfire, Winter Storm	2, 5	Borough Manager	Borough Emergency Management	High	Medium	Operating Budget, HMGP	Short	High

Susquehanna Township

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
SusquehannaT-01	Assess the Susquehanna Township Administration Building property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1	Township	Fire Department; PA DCNR	Medium	Low	Operating Budget	Short	Medium
SusquehannaT-02	Assess the Thomas Holtzman Elementary School property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1	Township	Fire Department; School District; PA DCNR	Medium	Low	Operating Budget	Short	Low
SusquehannaT-03	Assess the geology at the Susquehanna Township Administration Building property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Low

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
SusquehannaT-04	Assess the geology at the Susquehanna Township High School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Facilities Management	Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
SusquehannaT-05	Assess the geology at the Thomas Holtzman Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Facilities Management	Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
SusquehannaT-06	Work with PennDOT to study Progress Avenue to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Engineer	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	High
SusquehannaT-07	Assess the flooding problem along the canal bed to identify feasible mitigation actions, and implement them.	Existing	Floods, Flash Floods, and Ice Jams	1, 2, 3	Public Works		Medium	Medium	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
SusquehannaT-08	Work with PennDOT to assess the flooding problem along Front Street to identify feasible mitigation actions, and implement them.	Existing	Floods, Flash Floods, and Ice Jams	1, 5	Engineer	PennDOT	High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	Medium
SusquehannaT-09	Work with PennDOT to assess the flooding problem along the 3600 block of Elmerton Avenue to identify feasible mitigation actions, and implement them.	Existing	Floods, Flash Floods, and Ice Jams	5	Engineer	PennDOT	High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	High
SusquehannaT-10	Work with PennDOT to improve drainage to reduce flooding at Penn Street and Estherton Avenue.	Existing	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 2	Engineer	FPA; PennDOT	Medium	Medium	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	High
SusquehannaT-11	Work with PennDOT to assess the flooding problem along Paxton Church Road to identify feasible mitigation actions, and implement them.	Existing	Floods, Flash Floods, and Ice Jams	1, 5	Engineer	FPA; PennDOT	Medium	Medium	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
SusquehannaT-12	Assess and improve drainage near the Latshmere Swim Club.	N/A	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 2	Engineer	Swim Club Staff	Medium	Medium	FEMA HMGP, BRIC; PA DCED FMP; Gaming grant	Short	Medium
SusquehannaT-13	Assess and improve drainage of the mountain to reduce flooding on Red Road and Roberts Valley Road.	N/A	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 2	Engineer		Medium	Medium	FEMA HMGP, BRIC; PA DCED FMP; Gaming grant	Short	High
SusquehannaT-14	Assess the geology at the Londonderry School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Facilities Management	Engineer	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
SusquehannaT-15	Assess the geology at the Progress Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
SusquehannaT-16	Separate stormwater and sanitary sewer in Ward 1 (Front Street corridor).	Existing	Floods, Flash Floods, and Ice Jams; Utility Interruption	1, 2	Engineer	Township Authority	High	High	FEMA HMGP, BRIC; PA DCED H2O, Small Water, and Sewer Project Grant; Operating Budget; Gaming grant	Short	Medium
SusquehannaT-17	Work with PennDOT to upgrade stormwater infrastructure on Paxton Church Road and Elmwood Drive.	Existing	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 2	Engineer	Township Authority; PennDOT	High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	High
SusquehannaT-18	Upgrade stormwater infrastructure on Maple Lane.	Existing	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 2	Engineer	Township Authority	High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	High
SusquehannaT-19	Upgrade stormwater infrastructure on 36th Street in the area of Morton Drive.	Existing	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 2	Engineer	Township Authority	High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
SusquehannaT-20	Work with PennDOT to upgrade stormwater infrastructure along State Farm Road where it meets Carter and Locust.	Existing	Floods, Flash Floods, and Ice Jams; Hurricane, Tropical Storm, Nor'easter	1, 2	Engineer	Township Authority; PennDOT	High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	High
SusquehannaT-21	Assess the geology at the Sara Lindemuth Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Township Engineer	Facilities Management	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
SusquehannaT-22	Assess the geology at the Susquehanna Middle School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Township Engineer	Facilities Management	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Low
SusquehannaT-23	Assess the geology at the Susquehanna Township EMS station property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
SusquehannaT-24	Assess the property of the Rescue Fire Department Station 1 to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1	Township	Fire Department; PA DCNR	Medium	Low	Operating Budget	Short	High

Swatara Township

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
SwataraT-01	Protect the Swatara Township Authority WPCF to at least the 0.2 percent annual chance flood level.	Existing	Floods, Flash Floods, and Ice Jams; Utility Interruption	1	Authority		High	High	FEMA HMGP, BRIC; PA DCED H2O, Small Water, and Sewer Project Grant; Operating Budget; Gaming grant	Short	Medium
SwataraT-02	Work with Capital Region Water to protect the Harrisburg Advanced Wastewater facility to at least the 0.2 percent annual chance flood level.	Existing	Floods, Flash Floods, and Ice Jams; Utility Interruption	1	Engineer	Capital Region Water	High	High	FEMA HMGP, BRIC; PA DCED H2O, Small Water, and Sewer Project Grant; Operating Budget; Gaming grant	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
SwataraT-03	Work with PennDOT to study Derry Street to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	1	Public Works	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	High
SwataraT-04	Work with PennDOT to study Eisenhower Boulevard to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	1	Public Works	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	High
SwataraT-05	Work with PennDOT to study Harrisburg Street to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Public Works	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	Medium
SwataraT-06	Work with PennDOT to study Paxton Street to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	1, 2, 3	Public Works	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
SwataraT-07	Assess the geology at the Station 1-2 property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1, 5	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High
SwataraT-08	Assess the geology at the Steelton-Highspire Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1, 2	Township Engineer	Facilities Management	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Low
SwataraT-09	Assess the geology at the Steelton-Highspire High School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1, 2	Township Engineer	Facilities Management	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
SwataraT-10	Assess the geology at the Swatara Middle School property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Township Engineer	Facilities Management	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
SwataraT-11	Assess the geology at the Swatara Township Building property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1, 2	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
SwataraT-12	Assess the geology at the Swatara Township Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1, 2	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
SwataraT-13	Develop a plan for replacing the Derry Street Bridge over Spring Creek.	Existing	Floods, Flash Floods, and Ice Jams	1, 2	Public Works		High	High	FEMA HMA; PennDOT; Capital Improvement Budget; Infrastructure Bank	Short	Medium

Upper Paxton Township

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
UpperPaxtonT-01	Assess the Lenkerville Elementary School property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 2	Township	Fire Department; School Staff; PA DCNR	Medium	Low	Operating Budget	Short	Medium
UpperPaxtonT-02	Assess the Millersburg Area Authority - Water Plant property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 2	Township	Fire Department; Authority; PA DCNR	Medium	Low	Operating Budget	Short	High
UpperPaxtonT-03	Assess the Millersburg Area Senior Center property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 2	Township	Fire Department; PA DCNR	Medium	Low	Operating Budget	Short	Medium
UpperPaxtonT-05	Assess the Millersburg Area Ambulance Association property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 2	Township	Fire Department; PA DCNR	Medium	Low	Operating Budget	Short	High

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
UpperPaxtonT-06	Assess the Upper Paxton Township Building property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 2	Township	Fire Department; PA DCNR	Medium	Low	Operating Budget	Short	High
UpperPaxtonT-09	Assess the flooding problem in Lenkerville along the Wiconisco Creek to identify feasible mitigation actions, and implement them.	Existing	Floods, Flash Floods, and Ice Jams	1	Engineer	Township Staff	High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	High
UpperPaxtonT-10	Assess the flooding problem on River Street to identify feasible mitigation actions, and implement them.	Existing	Floods, Flash Floods, and Ice Jams	1	Engineer	Township Staff	High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	Medium
UpperPaxtonT-11	Work with PennDOT to protect PA-147 north of Millersburg Borough from landslides.	N/A	Landslide	1, 2	Township Staff	PennDOT	High	High	FEMA HMGP, BRIC; PennDOT; HATS; Operating Budget	Long	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
UpperPaxtonT-12	Use the repair estimate provided by National Gunite to repair the storm sewer and install a concrete pipe to alleviate sinkhole issues located on State Street.	Existing	Flood, Flash Floods, and Ice Jams; Subsidence, Sinkhole	1	Millersburg Borough / Upper Paxton Township	National Gunite	High	Unknown	FEMA HMGP, Operating Budget	Short	High

Washington Township

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
WashingtonT-01	Work with the Dauphin Meadows Landfill to assess the property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Township	Fire Department	Medium	Low	Operating Budget	Short	Medium
WashingtonT-02	Assess the Upper Dauphin High School property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Township	Fire Department; PA DCNR; School Staff	Medium	Low	Operating Budget	Short	High
WashingtonT-03	Assess the Upper Dauphin Middle School property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Township	Fire Department; PA DCNR; School Staff	Medium	Low	Operating Budget	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
WashingtonT-04	Assess the Washington Township Building property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Township	Fire Department; PA DCNR	Medium	Low	Operating Budget	Short	Medium

West Hanover Township

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
WestHanoverT-01	Assess the West Hanover Township Public Works Building on Walnut Ave property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Township	Fire Department; PA DCNR	Medium	Low	Operating Budget	Short	Medium
WestHanoverT-02	Assess the West Hanover Township Fire Department Station 3 property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Township	Fire Department; PA DCNR	Medium	Low	Operating Budget	Short	Medium
WestHanoverT-03	Assess the geology at the West Hanover Township Water and Sewer property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	Public Works	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
WestHanoverT-04	Work with PennDOT to study Hershey Road to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Public Works	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	Medium
WestHanoverT-05	Work with PennDOT to study Linglestown Road to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Township	TCRPC; PennDOT	Medium	Medium	PennDOT	Short	Medium

Wiconisco Township

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
WiconiscoT-01	Assess the geology at the Wiconisco Township Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
WiconiscoT-02	Assess the topography around the Wiconisco Township WWTP to determine if mitigation measures are necessary, and to implement those measures if they are.	Existing	Landslide	1, 2	Engineer		Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
WiconiscoT-03	Protect the Wiconisco Township Municipal Office at 305 Walnut Street to at least the 0.2 percent annual chance flood level.	Existing	Floods, Flash Floods, and Ice Jams	1	Engineer	FPA	High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	High
WiconiscoT-04	Assess the geology at the Wiconisco Township building property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
WiconiscoT-05	Assess the Wiconisco Township Office property on Arch Street to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Township	Fire Department; PA DCNR	Medium	Low	Operating Budget	Short	Medium

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
WiconiscoT-06	Assess the Wiconisco Township Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Township	Fire Department; PA DCNR	Medium	Low	Operating Budget	Short	Medium
WiconiscoT-07	Assess the Wiconisco Township Municipal Building property on Walnut Street to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Township	Fire Department; PA DCNR	Medium	Low	Operating Budget	Short	High
WiconiscoT-08	Assess the geology at the Wiconisco Township Police Department property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	EMC	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	Medium
WiconiscoT-09	Assess the geology at the Wiconisco Township WWTP property to determine if mitigation measures are necessary, and to implement them if they are.	Existing	Subsidence and Sinkholes	1	Engineer	Township Staff	Medium	Medium	FEMA HMGP, BRIC; Operating Budget	Short	High

Williams Township

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
WilliamsT-01	Assess the Williams Township Office property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Township	Fire Department; PA DCNR	Medium	Low	Operating Budget	Short	High
WilliamsT-02	Assess the Williams Valley High School property on Walnut Street to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Township	Fire Department; School Staff; PA DCNR	Medium	Low	Operating Budget	Short	High
WilliamsT-03	Work with PennDOT to study Market Street to identify measures to reduce transportation accidents.	N/A	Transportation Accidents	5	Township	TCRPC; PennDOT	Medium	Medium	Operating Budget; HATS; Infrastructure Bank	Short	Medium

Williamstown Borough

Action #	Action Description	Applies to new or existing assets	Hazard(s) Addressed	Goals Met	Lead Agency	Support Agencies	Benefits	Costs	Sources of Funding	Timeline	Priority
WilliamstownB-01	Assess the Williamstown Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	Existing	Wildfire	1, 3	Borough	Fire Department; PA DCNR	Medium	Low	Operating Budget	Short	Medium
WilliamstownB-02	Protect the Williamstown EMS Station to at least the 0.2 percent annual chance flood level.	Existing	Floods, Flash Floods, and Ice Jams	1	Engineer	FPA	High	High	FEMA HMGP, BRIC, FMA; PA DCED FMP; Operating Budget; Gaming grant	Short	Medium

6.4.2 Mitigation Strategy Prioritization and Implementation

Section 201.6(c) (3) (iii) of Title 44 Code of Federal Regulations (44 CFR) requires the prioritization of the action plan to emphasize the extent to which benefits are maximized according to a cost-benefit review of the proposed projects and their associated costs. This allows the jurisdictions to select the most cost-effective actions for implementation first, not only to use resources efficiently but also to make a realistic start toward mitigating risks.

Mitigation benefits are defined as future damages and losses that would be eliminated and/or reduced by implementing the proposed mitigation project and include physical damage to structures and infrastructure, loss of service or function, and emergency management costs. Particularly for physical ("shovel-in-the-ground") mitigation projects, jurisdictions were encouraged to estimate project costs as well as to identify the anticipated benefits. Where exact project costs and potential benefits were not available, ranges were identified (high, medium, low) for each, allowing a qualitative evaluation of project cost-effectiveness.

PEMA has developed a mitigation actions evaluation and prioritization process to provide a consistent, uniform approach for counties and jurisdictions to use to consider, systematically, the best mitigation strategies for their communities (PEMA 2020). Jurisdictions first evaluate the feasibility of mitigation actions by using the following ten evaluation criteria:

- **Life Safety:** The Planning Team assesses to what extent a mitigation action will protect individuals from being injured or killed by a hazard.
- **Property Protection:** The Planning Team assesses to what extent the action will protect property, including homes, businesses, and critical infrastructure.
- **Technical:** It is important to determine whether the proposed action is technically feasible, will help to reduce losses in the long term, and has minimal secondary impacts. Here, the Planning Team determines whether the alternative action is a whole or partial solution or not a solution at all.
- **Political:** Understanding current opinions of community and state political leadership regarding issues related to the environment, economic development, safety, and emergency management will provide valuable insight into the level of political support offered for mitigation activities and programs. Proposed mitigation objectives sometimes fail because of a lack of political acceptability.
- **Legal:** Without the appropriate legal authority, the action cannot lawfully be undertaken. When considering this criterion, the Planning Team determines whether a jurisdiction has the legal authority at the state, tribal, or local level to implement the action, or whether the jurisdiction must pass new laws or regulations. Each level of government operates under a specific source of delegated authority. As a general rule, most local governments operate under enabling legislation that gives them the power to engage in different activities. Jurisdictions should identify the unit of government undertaking the mitigation action, and include an analysis of the inter-relationships between local, regional, state, and federal governments. Legal authority is likely to have a significant role later in the process when the state, tribe, or community determines how mitigation activities can best be carried out, and the extent to which mitigation policies and programs can be enforced.
- **Environmental:** Impact on the environment is an important consideration because of the public desire for sustainable and environmentally healthy communities. In addition, many statutory considerations, such as the National Environmental Policy Act (NEPA), should be counted when using federal funds. Jurisdictions need to evaluate whether, when implementing mitigation actions, the potential negative consequences to environmental assets such as threatened and endangered species, wetlands, and other protected natural resources.
- **Social:** The public must support the overall implementation strategy and specific mitigation actions. Therefore, the projects have to be evaluated in terms of community acceptance. Likewise, the Planning Team should determine if implementing a mitigation action will have a beneficial or negative effect on a particular segment of the population.

- **Administrative:** Under this part of the evaluation criteria, the Planning Team examines the anticipated staffing, funding, and maintenance requirements for the mitigation action to determine whether the jurisdiction has the personnel and administrative capabilities necessary to implement the action or whether outside help will be necessary.
- **Local Champion:** Having an individual who will lead the implementation of a project, particularly a complex project, is essential for implementing it.
- **Other Community Objectives:** The Planning Team evaluates to what extent implementing the mitigation action supports other community objectives, such as increasing parks and recreation, quality of life, and economic development.

Table 6.4.2-1 shows the feasibility evaluation for each identified mitigation action. For each criterion, how feasible or effective the action is in the above criteria was indicated with a "+" (highly effective or feasible), "N" (neutral or not applicable), or a "-" (ineffective or not feasible). All actions were deemed feasible.

Table 6.4.2-1. Evaluation of Mitigation Actions

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
DauphinC-01	Provide public outreach about hazards and protective measures people, including renters and tourists, can take to protect themselves (e.g., receiving emergency alerts through South Central Alert) and their property.	+	+	+	+	+	+	+	N	+	+	9 (+) 1 (N) 0 (-)
DauphinC-02	Improve telecommunications infrastructure, including the accessibility of high-speed Internet connectivity, throughout the county.	+	+	+	+	+	+	+	N	+	+	9 (+) 1 (N) 0 (-)
DauphinC-03	Simplify and improve the model stormwater management ordinance to enhance the enforcement and effectiveness of stormwater management practices.	+	+	+	+	+	+	N	+	N	N	7 (+) 3 (N) 0 (-)
DauphinC-04	Educate the public about resources available to combat opioid abuse/addiction.	+	+	+	+	+	+	+	N	+	+	9 (+) 1 (N) 0 (-)
DauphinC-05	Inform the owners/operators of facilities storing hazardous materials of the risks they face and what they can do to protect their facilities and operations.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
DauphinC-06	Work with childcare facility operators to discuss hazards they face and ensure their emergency plans address those hazards.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
DauphinC-07	Assess the topography around the Lykens Tower Site, Mahantango Tower Site, Peters Mountain Tower Site, and Pillow Tower Site to determine if mitigation measures are necessary, and to implement those measures if they are.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
DauphinC-08	Assess the following properties to determine the risk from wildfires and what vegetation needs to be cleared: Agriculture Building, Blue Mountain Tower Site, Conewago CWT Tower Site, Lower Swatara Tower Site, and Mahantango Tower Site.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
DauphinC-09	Determine options for protecting the following facilities from the possible inundation due to a failure of the Raystown Lake Dam: Admin Building, Bar Association, County Offices – 100 Chestnut Street, Court House, Fort Hunter Park, Harrisburg Tower Site, Lykens Tower Site, Superior Court, Veterans Building Tower Site.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
DauphinC-10	Determine options for protecting Dauphin County Bridge No. 23 from inundation due to a failure of the DeHart Dam.	+	+	+	+	+	+	N	N	+	+	8 (+) 2 (N) 0 (-)
DauphinC-11	Assess the geology at the following sites and determine if mitigation measures are necessary, and to implement them if they are: 333 Market Street Tower Site, Administration Building, Adult Probation, Assistance Office, Bar Association, Children and Youth, Conewago CWT Tower Site, Coroner's Office, County Offices – 100 Chestnut Street, Court House, Dauphin ECC Tower Site, Department of Public Safety, Harrisburg Tower Site, Judicial Center, Lower Swatara Tower Site, Market Street Tower Site, Prison, Recycling Center, Reservoir Park Tower Site, Superior Court, Veteran's Building Tower Site, and Work Release.	+	+	+	+	+	+	N	N	N	N	6 (+) 4 (N) 0 (-)
DauphinC-12	Identify and provide incentives to recruit and retain volunteer firefighters.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
DauphinC-13	Provide information to PEMA on the risks faced by each Commonwealth-owned critical facility in Dauphin County, so that PEMA can work with the Department of General Services to protect the facilities.	+	+	+	+	+	+	N	+	N	N	7 (+) 3 (N) 0 (-)
DauphinC-14	Work with PennDOT to improve Interstates -076 (PA Turnpike), -081, -083, and -283 to reduce accidents.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
DauphinC-15	Conduct a wildlands/forestry survey of forested areas, to identify strategies for mitigating the negative effects of invasive plant and insect species.	+	+	+	+	+	+	N	+	+	+	9 (+) 1 (N) 0 (-)
DauphinC-16	Construct another ingress/egress route for the Dauphin County Department of Public Safety, Schaffner Youth Center, Adult Probation facility, and Work Release Center.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
DauphinC-17	Install wet and dry hydrants to provide a water supply for fire suppression.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
DauphinC-18	Work with the owners/operators of privately owned critical facilities in the special flood hazard area to discuss their risk of flooding and the protective measures they can take.	N	+	+	+	+	N	+	N	N	+	6 (+) 4 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
DauphinC-19	Work with the owners/operators of privately owned critical facilities in the area subject to inundation due to a failure of the Raystown Lake Dam to discuss their risk of flooding and protective measures they can take.	N	+	+	+	+	N	+	N	N	+	6 (+) 4 (N) 0 (-)
DauphinC-20	Work with privately-owned critical facilities to assess the geology at their sites to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	+	+	7 (+) 3 (N) 0 (-)
DauphinC-21	Work with the owners/operators of the privately owned critical facilities to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	N	+	N	+	+	8 (+) 2 (N) 0 (-)
DauphinC-22	Assess the Dauphin County Bridge No. 23 historic site to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
DauphinC-23	Protect the Dauphin County Bridge No. 23 historic site to at least the 0.2 percent chance flood level.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
DauphinC-24	Work with the owners/operators of privately owned critical facilities on steep slopes to study the topography of the property to determine if mitigation measures are necessary, and to implement those measures.	+	+	+	+	+	N	+	N	+	+	8 (+) 2 (N) 0 (-)
DauphinC-25	The county will assess their bridges to determine what measures can be taken to protect them from the 0.2 percent annual chance flood level.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
DauphinC-26	Assess the geology at the Area Agency on Aging property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
DauphinC-27	Encourage homeowners, renters, and businesses to insure their properties against all hazards, including flood coverage under the National Flood Insurance Program (NFIP)	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
DauphinC-28	Clean debris from pillars at the Grubb Street and Canal Street bridges.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
DauphinC-29	Install backup preventers in wastewater pipes to prevent basement flooding.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
DauphinC-30	Elevate, acquire, or demolish and rebuild properties, including repetitive loss and severe repetitive loss properties, in flood-prone areas.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
DauphinC-31	Floodproof structures in flood-prone areas.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
DauphinC-32	Conduct a study for the Susquehanna River to determine the best option to address snakeheads, flathead catfish, and other invasive species.	N	N	+	+	+	+	N	N	+	+	6 (+) 4 (N) 0 (-)
DauphinC-33	Develop a new Comprehensive Plan or amend an existing Comprehensive Plan to include an assessment and associated mapping of the municipality's vulnerability to location-specific hazards and appropriate recommendations for the use of these hazard areas.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
DauphinC-34	Develop a new Zoning Ordinance or revise an existing Zoning Ordinance to include separate zones or districts with appropriate development criteria for known hazard areas.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
DauphinC-35	Develop a new Subdivision and Land Development Ordinance or revise an existing Subdivision and Land Development Ordinance to include municipal-specific, hazard mitigation-related development criteria and/or provisions for the mandatory use of conservation subdivision design principles to regulate the location and construction of buildings and other infrastructure in known hazard areas.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
DauphinC-36	Revise existing zoning and/or subdivision and land development ordinances or adopt a separate, standalone ordinance to require the completion of subsurface investigations (i.e., borings, geophysical surveys, and/or studies by a registered Professional Geologist) for all new subdivision and land development projects in known land subsidence hazard areas.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
DauphinC-37	Update and implement a comprehensive water resources management plan that analyzes the County's existing water resources supply and evaluates the County's anticipated water use demand to identify suspected water supply shortages and potential new water supply sources.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
DauphinC-38	Coordinate with the USGS, local watershed organizations, and/or the DCCD to increase the number of USGS and Integrated Flood Observing and Warning System (IFLOWS) rain and stream gauges in the County as a potential enhancement to the existing Susquehanna Flood Forecast and Warning System.	+	+	+	+	+	+	N	N	N	N	6 (+) 4 (N) 0 (-)
DauphinC-39	Work with municipalities to evaluate participation in the CRS and facilitate the preparation and submission of CRS applications.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
DauphinC-40	Develop a technical proficiency at the municipal level for conducting post-disaster damage assessments and continue to regulate through local planning and zoning reconstruction activities to ensure compliance with NFIP substantial damage/substantial improvement requirements.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
DauphinC-41	Develop technical proficiency at the municipal level for assisting residents and business owners in applying for hazard mitigation and assistance funds and identifying cost-beneficial hazard mitigation measures to be incorporated into reconstruction activities.	+	+	+	+	+	+	+	N	+	+	9 (+) 1 (N) 0 (-)
DauphinC-42	Investigate the feasibility of constructing a levee/floodwall system along Swatara Creek between East Main Street and the Pennsylvania Turnpike to minimize Middletown Borough's flood hazard potential.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
DauphinC-43	Municipalities should continue to seek solutions to problem areas and obstructions identified in the April 2010 Countywide Act 167 Stormwater Management Plan.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
DauphinC-44	Enroll in the Pennsylvania Firewise Communities Program through the DCNR Fire Forester for Dauphin County.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
DauphinC-45	Encourage homeowners and renters to test for radon and install radon mitigation systems, if needed.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
DauphinC-46	Adopt the Radon Control Methods Appendix of the current, adopted edition of the International Residential Code to address radon in new construction.	N	+	+	+	+	N	+	N	+	+	7 (+) 3 (N) 0 (-)
DauphinC-47	Encourage municipalities to enter into an Intergovernmental Cooperation Agreement and Memorandum of Understanding with the Dauphin County Land Bank Authority as a way to	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
	address structures at risk from the impacts of natural and human-made hazards.											
DauphinC-48	Increase the number of NOAA Weather Alert radios in public places across the County that currently do not have them (such as personal care homes) above and beyond what is required of the County by the NWS's Storm Ready Program.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
DauphinC-49	Establish an alternate EOC location in the event the primary EOC must be evacuated. This facility should also be located outside of the Special Flood Hazard Area.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
DauphinC-50	The Dauphin County Department of Information Technology will make natural and human-made hazard data available for municipal use.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
DauphinC-51	Assess the Station 77 property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
DauphinC-52	Implement the Wildwood Lake Restoration Feasibility Study, the Joint Pollutant Reduction Plan (for Paxton Creek Watershed, Chesapeake Bay, Wildwood Lake, and UNT Spring Creek), and the Paxton Creek Restoration Master Plan, to restore the Paxton Creek watershed and Wildwood Lake. Restoration efforts will provide an increase in water quality and flood protection while maintaining optimal recreation areas and diverse wildlife habitats.	+	+	+	+	+	+	+	N	+	N	8 (+) 2 (N) 0 (-)
DauphinC-53	Conduct a study of Emergency Medical Services to establish a plan of action to stabilize and enhance emergency medical services coverage in the Upper Dauphin County Region.	+	+	+	+	+	N	+	+	+	N	8 (+) 2 (N) 0 (-)
BerrysburgB-01	Install a backup power generator at the Berrysburg Borough municipal building.	+	+	+	+	+	+	N	N	N	N	6 (+) 4 (N) 0 (-)
BerrysburgB-02	Install a backup power generator at the Berrysburg & Community Fire Company station.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
BerrysburgB-03	Discuss with the owner/operator of critical facilities vulnerable to hazardous materials release the risk and possible protective measures.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
ConewagoT-01	Protect Laurel Drive from the current and future sinkholes.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
ConewagoT-02	Work with PennDOT to improve Deodate Road to mitigate traffic accidents.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
ConewagoT-03	Work with PennDOT to improve Colebrook Road to mitigate traffic accidents.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
DauphinB-01	Assess conditions at the confluence of Stony Creek and the Susquehanna River to identify potential mitigation actions for nearby structures.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
DauphinB-02	Assess the borough to identify potential mitigation actions to take to ensure access to/from the borough during floods of the Susquehanna River.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
DauphinB-03	Install a generator at the Borough Building.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
DauphinB-04	Determine what other critical facilities in the borough need generators and purchase/install them.	+	+	+	+	+	+	N	N	+	+	8 (+) 2 (N) 0 (-)
DauphinB-05	Develop and implement a stream maintenance program to clear debris from Stony Creek.	+	+	+	+	+	+	+	N	+	+	9 (+) 1 (N) 0 (-)
DauphinB-06	Assess critical facilities in the wildland-urban interface area to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
DauphinB-07	Assess Hillside properties to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	+	+	9 (+) 1 (N) 0 (-)
DauphinB-08	Work with PennDOT to improve Claster Boulevard to reduce traffic accidents.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
DauphinB-09	Work with PennDOT to improve US-22/322 to mitigate traffic accidents.	N	+	+	+	+	N	+	N	N	+	6 (+) 4 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
DerryT-01	Assess stormwater management infrastructure in the township to determine what improvements need to be made, then implement the improvements.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
DerryT-02	Work with PennDOT to assess the bridges over Swatara Creek on PA-39 and PA-0743 to improve the ability to pass floodwaters under the bridges.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
DerryT-03	Work with PennDOT to upgrade stormwater infrastructure on Hershey Park Drive.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
DerryT-04	Upgrade stormwater infrastructure on Mae Street.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
DerryT-05	Upgrade stormwater infrastructure on Bull Frog Valley Road.	+	+	+	+	+	+	+	N	+	+	9 (+) 1 (N) 0 (-)
DerryT-07	Install a generator at the Derry Township Public Works building.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
DerryT-08	Assess the topography around the following structures to determine if mitigation measures are necessary, and to implement those measures if they are: Quarries of the Hummelstown Brownstone Company historic site and Derry Township LDFL Wastewater facility.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
DerryT-09	Work with PennDOT to protect US-322 near PA-0743 from current and future sinkholes.	+	+	+	+	+	+	N	+	N	N	7 (+) 3 (N) 0 (-)
DerryT-10	Assess the geology at the Derry Township municipal offices to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
DerryT-11	Work with Sheetz #351 to determine options for protecting the facility from the possible inundation from dam failure from the Hershey Dam.	+	+	+	+	+	+	N	+	N	N	7 (+) 3 (N) 0 (-)
DerryT-12	Work with PennDOT to improve Elizabethtown Road to mitigate traffic accidents.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
DerryT-13	Work with PennDOT to improve Governor Road to mitigate traffic accidents.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
DerryT-14	Work with PennDOT to improve Middletown Road to mitigate traffic accidents.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
DerryT-15	Work with PennDOT to improve Waltonville Road to mitigate traffic accidents.	+	+	+	+	+	+	+	N	+	+	9 (+) 1 (N) 0 (-)
DerryT-16	Assess the drainage and stormwater management infrastructure in the area of Hersheypark Drive and Walton Avenue to determine appropriate mitigation measures to reduce the risk of flooding, and implement them.	+	+	+	+	+	+	+	+	N	+	9 (+) 1 (N) 0 (-)
DerryT-17	Work with FEMA and the PA Department of Environmental Protection to obtain certification for the levee in Palmdale.	+	+	+	+	+	+	+	+	N	+	9 (+) 1 (N) 0 (-)
EastHanoverT-01	Work with PennDOT to improve drainage to reduce flooding along the 1100 block of Manada Bottom Road.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
EastHanoverT-02	Work with PennDOT to eliminate highway flooding at the intersection of PA-443 and Firehouse Road during heavy rainfalls.	N	+	+	+	+	N	+	N	N	+	6 (+) 4 (N) 0 (-)
EastHanoverT-03	Work with PennDOT to improve Mountain Road to mitigate traffic accidents.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
EastHanoverT-04	Work with PennDOT to improve Laudermilch Road to mitigate traffic accidents.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
EastHanoverT-06	Obtain a warning system for residents from outside contractors to alert residents, including renters and tourists, to hazardous materials incidents or other hazards.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
ElizabethvilleB-01	Assess stormwater management infrastructure in the borough to determine what improvements need to be made to control runoff and reduce flooding.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
ElizabethvilleB-02	Protect the Upper Dauphin County EMS station from the 0.2 percent annual chance flood level.	+	+	+	+	+	+	+	N	+	+	9 (+) 1 (N) 0 (-)
ElizabethvilleB-03	Install a backup power generator at the Elizabethville Borough building.	+	+	+	+	+	+	N	N	N	N	6 (+) 4 (N) 0 (-)
GratzB-01	Assess the property of the Gratz Borough Building to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
GratzB-02	Assess the Gratz Fire Department station to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
HalifaxB-01	Ensure that the borough has plans in place to continue operations if a hazardous materials release causes an evacuation of the Halifax Borough Office.	N	N	+	+	+	+	N	N	N	N	4 (+) 6 (N) 0 (-)
HalifaxB-02	Discuss with the US Postal Service that the Halifax Post Office is vulnerable to a hazardous materials release and possible protective measures.	+	+	+	+	+	+	N	+	N	N	7 (+) 3 (N) 0 (-)
HalifaxT-01	Protect the Halifax Area Water Authority Well #1 to the 0.2 percent annual chance of flood event.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
HalifaxT-02	Work with the property owner to protect the Legislative Route 1 Sycamore Allee historic site from flooding.	+	+	+	+	+	+	N	+	N	N	7 (+) 3 (N) 0 (-)
HalifaxT-03	Assess the topography around the Halifax Area Water Authority Well #1 to determine if mitigation measures are necessary, and to implement those measures if they are.	+	+	+	+	+	+	N	N	+	+	8 (+) 2 (N) 0 (-)
HalifaxT-04	Assess the following properties to determine the risk from wildfires and what vegetation needs to be cleared: Halifax Area Authority Sewer Plant, Halifax Area Water Authority Well #1, Halifax Area Authority Sewer Plant, and Halifax Township Municipal Building.	+	+	+	+	+	+	+	N	+	+	9 (+) 1 (N) 0 (-)
HalifaxT-05	Work with PennDOT to improve Peters Mountain Road to mitigate traffic accidents.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
HalifaxT-06	Work with PennDOT to improve Powells Valley Road to mitigate traffic accidents.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
HalifaxT-07	Work with PennDOT to improve South River Road to mitigate traffic accidents.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
HarrisburgC-01	Renovate or demolish vacant structures that are at risk of collapse.	+	+	+	N	+	+	N	N	+	+	7 (+) 3 (N) 0 (-)
HarrisburgC-02	Protect the Downey Elementary School to at least the 0.2 percent chance flood level.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
HarrisburgC-03	Protect the Edgewater Psychiatric Center to at least the 0.2 percent chance flood level.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
HarrisburgC-04	Protect the Station 1 EMS facility to at least the 0.2 percent chance of flood level.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
HarrisburgC-05	Assess the geology at the Ben Franklin School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	N	+	+	8 (+) 2 (N) 0 (-)
HarrisburgC-06	Assess the geology at the Camp Curtin Fire Station historic site property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	+	+	7 (+) 3 (N) 0 (-)
HarrisburgC-07	Assess the geology at the Camp Curtin Junior High School historic property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	+	+	7 (+) 3 (N) 0 (-)
HarrisburgC-08	Assess the geology at the Downey Elementary School historic site property to determine if mitigation measures are necessary, and to implement them if they are.	N	+	+	+	+	N	N	N	N	+	5 (+) 5 (N) 0 (-)
HarrisburgC-09	Assess the geology at the Edgewater Psychiatric Center property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	N	+	+	8 (+) 2 (N) 0 (-)
HarrisburgC-10	Assess the geology at the Foose Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)

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HarrisburgC-11	Assess the geology at the Hamilton School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	N	+	+	8 (+) 2 (N) 0 (-)
HarrisburgC-12	Assess the geology at the Harrisburg City Government Center and Police Department property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	N	+	+	8 (+) 2 (N) 0 (-)
HarrisburgC-13	Assess the geology at the Harrisburg City Public Works property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	N	+	+	N	N	+	N	6 (+) 4 (N) 0 (-)
HarrisburgC-14	Assess the geology at the Harrisburg City Fire Station 1 property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
HarrisburgC-15	Assess the geology at the Harrisburg City Fire Station 2 property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	N	+	+	8 (+) 2 (N) 0 (-)
HarrisburgC-16	Assess the geology at the Harrisburg City Fire Station 8 property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	N	N	+	7 (+) 3 (N) 0 (-)
HarrisburgC-17	Assess the geology at the Harrisburg Technical High School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	N	+	+	N	N	+	N	6 (+) 4 (N) 0 (-)
HarrisburgC-18	Assess the geology at the John Harris High School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	+	+	+	9 (+) 1 (N) 0 (-)
HarrisburgC-19	Assess the geology at the Harrisburg School District Administration Building property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	N	+	+	N	N	N	+	6 (+) 4 (N) 0 (-)
HarrisburgC-20	Assess the geology at the Marshall School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	N	+	N	7 (+) 3 (N) 0 (-)
HarrisburgC-21	Assess the geology at the Melrose School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
HarrisburgC-22	Assess the geology at the Paxton Fire Station historic property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	N	N	N	6 (+) 4 (N) 0 (-)

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HarrisburgC-24	Assess the geology at the Riverside Fire Station historic property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
HarrisburgC-25	Assess the geology at the Rowland Middle School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
HarrisburgC-26	Assess the geology at the Scott Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
HarrisburgC-28	Determine options for protecting the following facilities from possible inundation due to a failure of the Raystown Lake Dam: Downey Elementary School, Edgewater Psychiatric Center, Harrisburg City Government Center, Harrisburg City Police Station, and Station 1 EMS.	+	+	+	+	+	+	N	N	+	+	8 (+) 2 (N) 0 (-)
HarrisburgC-29	Work with PennDOT to assess and improve the stormwater management infrastructure at Cameron and Maclay Streets, near the Maclay Street entrance to the Farm Show Complex.	+	N	+	+	+	N	+	N	+	+	7 (+) 3 (N) 0 (-)
HarrisburgC-30	Work with PennDOT to assess and improve the stormwater management infrastructure on the 1800 block of Derry Street.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
HarrisburgC-31	Work with PennDOT to assess and improve the stormwater management infrastructure along the 1400 block of Market Street.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
HarrisburgC-32	Assess and improve the stormwater management infrastructure at the intersection of 2nd and Geiger Streets.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
HarrisburgC-33	Assess and improve the stormwater management infrastructure at the intersection of Herr and Plum Streets.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
HarrisburgC-34	Work with PennDOT to study Cameron Street to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
HarrisburgC-35	Work with PennDOT to study Mulberry Street to identify measures to reduce transportation accidents.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
HarrisburgC-36	Work with PennDOT to study State Street to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
HarrisburgC-37	Support Capital Region Water's Wastewater Arsenal Boulevard Sewer Improvements - Rehabilitation/replacement of approximately 2,500 LF of sewer collector pipe.	+	+	+	+	+	+	+	N	+	+	9 (+) 1 (N) 0 (-)
HarrisburgC-38	Support Capital Region Water's Stormwater SW Pond Retrofit – Bellevue Park Design - Employing green stormwater infrastructure (GSI) to manage stormwater runoff and prevent flows from entering the combined sewer system, thereby reducing combined sewer overflow (CSO) activity.	+	+	+	+	+	+	N	N	N	N	6 (+) 4 (N) 0 (-)
HarrisburgC-39	Support Capital Region Water's Stormwater Camp Curtin YMCA GSI - Develop visible GSI improvements as part of the community center rehabilitation and beautification.	+	+	+	+	+	+	N	+	N	N	7 (+) 3 (N) 0 (-)
HarrisburgC-40	Support Capital Region Water's Stormwater COH East-West Multimodal Connector - GSI - Capture and manage stormwater in green stormwater elements designed to also serve as traffic calming elements.	+	+	+	+	+	+	N	+	N	N	7 (+) 3 (N) 0 (-)
HarrisburgC-41	Support Capital Region Water's Wastewater (Combined, Sanitary & Storm) Collection System Rehabilitation - Rehabilitate priority defects to avoid failures using a variety of methods including conventional replacement and "trenchless" structural pipe lining procedures.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
HarrisburgC-42	Support Capital Region Water's Stormwater South Allison Hill GSI - Capture and manage stormwater in green stormwater elements designed to also serve as traffic calming elements.	+	+	+	+	+	+	N	N	N	N	6 (+) 4 (N) 0 (-)
HarrisburgC-43	Work with PennDOT to study 19th Street to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
HarrisburgC-44	Work with PennDOT to study 25th Street to identify measures to reduce transportation accidents.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
HarrisburgC-45	Work with PennDOT to study the intersection of 2nd and Geiger Streets to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
HarrisburgC-46	Work with PennDOT to study the intersection of Front and Forster Streets to identify measures to reduce transportation accidents.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)

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HarrisburgC-47	Work with PennDOT to study the intersection of Susquehanna and Riley Streets to identify measures to reduce transportation accidents.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
HarrisburgC-48	Implement the recommendations of the Harrisburg Authority's ongoing combined sewer overflow impact study.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
HarrisburgC-49	Identify, assess, and, as necessary, implement solutions to reduce impacts to human life from the Dock Street Dam.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
HarrisburgC-50	Study options to restore Paxton Creek within City limits and collaborate with Whole Community Partners to implement findings of the study to re-establish the historic floodplain of the creek.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
HighspireB-01	Protect the wastewater treatment plant from the 0.2 percent annual chance flood level.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
HighspireB-02	Protect the Highspire Fire Department station from the 0.2 percent annual chance flood level.	+	+	+	+	+	N	+	N	+	+	8 (+) 2 (N) 0 (-)
HighspireB-03	Assess the Highspire Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
HummelstownB-01	Assess the geology at the Lower Dauphin School District campuses to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	N	+	N	N	N	N	+	5 (+) 5 (N) 0 (-)
HummelstownB-02	Assess the geology at the Hummelstown Borough Office to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	+	+	+	9 (+) 1 (N) 0 (-)
HummelstownB-03	Assess the geology at the Hummelstown Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	N	N	+	7 (+) 3 (N) 0 (-)
HummelstownB-04	Assess the geology at the Nye Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	+	N	N	7 (+) 3 (N) 0 (-)

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JeffersonT-01	Assess the Carsonville Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	N	+	N	+	+	8 (+) 2 (N) 0 (-)
JeffersonT-02	Assess the Jefferson Township Municipal Office property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
LondonderryT-01	Assess the Londonderry Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
LondonderryT-02	Assess the Londonderry Township Building property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
LondonderryT-03	Assess the geology at the Derry Township Municipal Authority Southwest property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	N	N	N	6 (+) 4 (N) 0 (-)
LondonderryT-04	Replant Ash Trees that were lost to the Ash Borer and determine the best actions to prevent invasive species in the future	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
LondonderryT-05	Assess the geology at the Londonderry Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	N	+	N	7 (+) 3 (N) 0 (-)
LondonderryT-06	Install a backup power generator at the public works building.	+	+	+	+	+	+	N	N	N	N	6 (+) 4 (N) 0 (-)
LondonderryT-07	Work with PennDOT to study Colebrook Road to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
LondonderryT-08	Work with PennDOT to study Harrisburg Pike to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
LondonderryT-09	Work with PennDOT to study Roundtop Road to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
LondonderryT-10	Assess the geology at the Londonderry Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	N	+	+	8 (+) 2 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
LondonderryT-11	Conewago Creek Stream Restoration - restore 1 mile of stream, remove approximately 125,000 cubic yards of sediment, and re-establish the historic floodplain of the creek.	N	+	+	+	+	+	+	N	+	+	8 (+) 2 (N) 0 (-)
LowerPaxtonT-01	Assess the Linglestown Middle School property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
LowerPaxtonT-02	Assess the geology at the Linglestown Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	N	+	+	N	N	N	+	6 (+) 4 (N) 0 (-)
LowerPaxtonT-03	Install a backup power generator at the Central Dauphin School District transportation facility.	+	+	+	+	+	+	N	N	N	N	6 (+) 4 (N) 0 (-)
LowerPaxtonT-04	Work with the owner/operator of the Colonial Park Care Center to upgrade its backup power capabilities.	+	+	+	+	+	N	+	N	+	+	8 (+) 2 (N) 0 (-)
LowerPaxtonT-05	Work with PennDOT to study Colonial Road to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
LowerPaxtonT-06	Work with PennDOT to study Jonestown Road to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
LowerPaxtonT-07	Work with PennDOT to study Linglestown Road to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
LowerPaxtonT-08	Work with PennDOT to study Nyes Road to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
LowerPaxtonT-09	Work with PennDOT to study Rutherford Road to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
LowerPaxtonT-10	Work with PennDOT to study Union Deposit Road to identify measures to reduce transportation accidents.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
LowerSwataraT-01	Assess the geology at the Kunkel Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	N	+	+	8 (+) 2 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
LowerSwataraT-02	Assess the cause(s) of flooding of "The Flats" to identify feasible mitigation actions, and implement them.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
LowerSwataraT-03	Assess the geology at the Lower Swatara Township Building property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	+	+	+	8 (+) 2 (N) 0 (-)
LowerSwataraT-04	Assess the geology at the Lower Swatara Township Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	+	+	+	9 (+) 1 (N) 0 (-)
LowerSwataraT-05	Assess the geology at the Middletown Area High School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	N	N	N	6 (+) 4 (N) 0 (-)
LowerSwataraT-06	Assess the geology at the Reid Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	N	+	+	+	+	N	N	N	N	+	5 (+) 5 (N) 0 (-)
LowerSwataraT-07	Protect the Farr Pump Station to at least the 0.2 percent annual chance flood level.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
LowerSwataraT-08	Install a backup power generator at the Farr Pump Station.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
LowerSwataraT-09	Install a backup power generator at the Jamesway Pump Station.	+	+	+	+	+	+	N	+	N	N	7 (+) 3 (N) 0 (-)
LowerSwataraT-10	Install a backup power generator at the North Union Street Pump Station.	+	+	+	+	+	+	N	N	N	N	6 (+) 4 (N) 0 (-)
LykensB-01	Protect the Lykens Borough Office to at least the 0.2 percent chance of flood level.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
LykensB-02	Protect the Lykens Borough Authority WWTP to at least the 0.2 percent chance of flood level.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
LykensB-03	Assess the Lykens Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
LykensB-04	Assess the Lykens Borough Office property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
LykensB-05	Assess the Lykens Borough Authority WWTP property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
LykensB-06	Identify sections of banks of waterways that need to be stabilized, and design and implement the stabilization.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
LykensT-01	Assess the Bridge in Lykens Township No. 1 historic site to determine the risk from wildfires and what vegetation needs to be cleared.	+	N	+	+	+	N	+	N	+	+	7 (+) 3 (N) 0 (-)
LykensT-02	Work with PennDOT to study North Crossroads Road to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
MiddlePaxtonT-01	Work with PennDOT to study Peters Mountain Road to identify measures to reduce transportation accidents.	+	+	+	+	+	N	+	N	+	+	8 (+) 2 (N) 0 (-)
MiddlePaxtonT-02	Assess the Dauphin-Middle Paxton Municipal Office property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
MiddlePaxtonT-03	Assess the Middle Paxton Elementary School property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
MiddlePaxtonT-04	Work with the owners/operators of privately owned critical facilities in the area subject to inundation due to a failure of the DeHart Dam to discuss their risk of flooding and protective measures they can take.	+	+	+	+	+	N	+	N	+	+	8 (+) 2 (N) 0 (-)
MiddletownB-02	Assess the geology at the Fink Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
MiddletownB-03	Work with PennDOT to study Main Street/Harrisburg Pike to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
MiddletownB-04	Protect the Mill Street electrical substation from the 0.2 percent annual chance flood level.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
MiddletownB-05	Work with Suez to assess the Veolia Wastewater Plant property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
MiddletownB-06	Assess the geology at the Middletown Borough Building property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	N	N	N	6 (+) 4 (N) 0 (-)
MiddletownB-07	Assess the geology at the Middletown Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
MiddletownB-08	Assess the geology at the Middletown Police Department property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
MiddletownB-09	Work with Suez to assess the geology at the Veolia Wastewater Plant property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	N	N	N	6 (+) 4 (N) 0 (-)
MillersburgB-01	Identify sections of banks of waterways that need to be stabilized, and design and implement the stabilization.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
MillersburgB-04	Floodproof the Welcome Center along the Susquehanna River	+	N	+	+	+	N	N	N	N	+	5 (+) 5 (N) 0 (-)
PaxtangB-01	Protect the Paxtang Borough Office/Fire Station to at least the 0.2 percent annual chance flood level.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
PaxtangB-02	Assess the geology at the Paxtang Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	+	+	7 (+) 3 (N) 0 (-)
PaxtangB-03	Assess the geology at the Paxtang Borough Office property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	+	N	N	7 (+) 3 (N) 0 (-)
PenbrookB-01	Assess the geology at the Penbrook Borough Office property to determine if mitigation measures are necessary, and to implement them if they are.	N	N	+	+	+	+	N	N	+	+	6 (+) 4 (N) 0 (-)
PenbrookB-02	Assess the geology at the Penbrook Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
PenbrookB-03	Install a backup power generator at the public works building.	+	+	+	+	+	N	N	N	+	+	7 (+) 3 (N) 0 (-)
PenbrookB-04	Install a backup power generator at the Citizen's Fire Company #1 station.	+	+	+	+	+	N	N	N	+	+	7 (+) 3 (N) 0 (-)
PenbrookB-05	Assess the stormwater management infrastructure throughout the borough and determine what upgrades need to be made.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
PillowB-01	Assess the Pillow Borough Building property to determine the risk from wildfires and what vegetation needs to be cleared.	N	+	+	+	+	N	+	N	N	+	6 (+) 4 (N) 0 (-)
PillowB-02	Assess the Pillow Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
PillowB-03	Install a backup power generator at the Pillow Borough municipal building.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
PillowB-04	Install a backup power generator at the Pillow Fire Department station.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
PillowB-05	Determine appropriate measures for preventing injuries at blighted properties.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
PillowB-06	Install a backup power generator at Well 5.	+	N	+	+	+	N	N	N	N	+	5 (+) 5 (N) 0 (-)
PillowB-07	Install a backup power generator at Well 6.	+	+	+	+	+	+	N	N	N	+	7 (+) 3 (N) 0 (-)
PillowB-08	Upgrade fire department radios to be interoperable between Dauphin and Northumberland Counties.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
PillowB-09	Work with the Pillow Historical Society and PPL to determine options to prevent power outages and damage to the water treatment building, and implement the most appropriate one.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
PillowB-10	Work with PennDOT to improve drainage on PA-225 to prevent ponding water.	+	+	+	+	+	N	+	N	+	+	8 (+) 2 (N) 0 (-)
PillowB-11	Map the borough's water infrastructure.	+	+	+	+	+	+	N	+	N	N	7 (+) 3 (N) 0 (-)
PillowB-12	Analyze the intersection and develop solutions to reduce speeding on PA-225, and implement the most appropriate one.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
PillowB-13	Develop an evacuation and sheltering plan for Pillow Borough.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
PillowB-14	Installation of new water lines and improve the water infrastructure.	+	+	+	+	+	+	N	+	N	N	7 (+) 3 (N) 0 (-)
PillowB-15	Enclose Well 5 infrastructure in a shelter.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
ReedT-01	Work with PennDOT to study South River Road to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
RoyaltonB-01	Protect the Edgewater Pump Station to at least the 0.2 percent annual chance flood level.	+	+	+	+	+	+	+	N	+	+	9 (+) 1 (N) 0 (-)
RoyaltonB-02	Develop a plan with emergency services to assist the borough if chemical containers from Univar float downstream.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
RoyaltonB-04	Provide assistance to remove built-up debris from around bridge pillars.	+	+	+	+	+	+	N	N	+	+	8 (+) 2 (N) 0 (-)
RoyaltonB-05	Phase 2 Royalton Canal Improvement Project to mitigate localized flooding.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
RoyaltonB-06	Structural assessment and reinforcement of Edgewater Development retaining wall.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
RushT-01	Assess the Rush Township Municipal Office property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
RushT-02	Work with PennDOT to study Gold Mine Road to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
RushT-03	Coordinate with the DCNR Fire Forester for Dauphin County on the potential construction of a fire break at the appropriate location on the south side of Peters Mountain along Route 325.	+	+	+	+	+	+	N	N	N	N	6 (+) 4 (N) 0 (-)
SouthHanoverT-01	Work with PennDOT to study Grandview Drive to identify measures to reduce transportation accidents.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
SouthHanoverT-02	Work with PennDOT to study Union Deposit Road to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	N	+	+	9 (+) 1 (N) 0 (-)
SteeltonB-01	Assess the geology at the Steelton Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
SteeltonB-02	Work with PA American Water to protect the Steelton Water Filtration Plant to at least the 0.2 percent annual chance flood level.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
SteeltonB-03	Install a backup power generator at the Steelton Highway Garage.	+	N	+	+	+	N	N	N	N	+	5 (+) 5 (N) 0 (-)
SteeltonB-04	Work with PA American Water to install a backup power generator at the sewer pump stations.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
SteeltonB-05	Install a backup power generator at the Steelton Borough Building.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
SteeltonB-06	Renovate or demolish vacant structures that were damaged by fire and are at risk of collapse.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
SteeltonB-07	Assess the flooding problem along South Front Street near the quarry to identify feasible mitigation actions, and implement them.	+	+	+	+	+	N	+	N	+	+	8 (+) 2 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
SteeltonB-08	Assess the geology at the Steelton Borough office property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
SteeltonB-09	Work with PA American Water to assess the geology at the Steelton Water Filtration Plant property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	+	N	N	7 (+) 3 (N) 0 (-)
SteeltonB-10	Assess the type and number of vacant/abandoned buildings in the Borough and determine if mitigation measures are necessary.	+	+	+	+	+	+	N	N	N	+	7 (+) 3 (N) 0 (-)
SteeltonB-11	Borough Storm Sewer Management System to conduct an assessment on storm sewer system inlets being old and need to be replaced as well as cleaned up.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
SteeltonB-12	Conduct an assessment of the Borough's information technology system and determine potential updates or software needed to prevent intrusions into the system.	+	+	+	+	+	N	+	N	N	N	6 (+) 4 (N) 0 (-)
SteeltonB-13	Install a backup power generator at the Steelton Highway Garage and the Steelton Borough Building.	+	+	+	+	+	N	+	+	+	N	8 (+) 2 (N) 0 (-)
SusquehannaT-01	Assess the Susquehanna Township Administration Building property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	N	N	6 (+) 4 (N) 0 (-)
SusquehannaT-02	Assess the Thomas Holtzman Elementary School property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
SusquehannaT-03	Assess the geology at the Susquehanna Township Administration Building property to determine if mitigation measures are necessary, and to implement them if they are.	N	+	+	+	+	N	N	N	N	+	7 (+) 3 (N) 0 (-)
SusquehannaT-04	Assess the geology at the Susquehanna Township High School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	+	N	N	8 (+) 2 (N) 0 (-)
SusquehannaT-05	Assess the geology at the Thomas Holtzman Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	N	N	N	9 (+) 1 (N) 0 (-)
SusquehannaT-06	Work with PennDOT to study Progress Avenue to identify measures to reduce transportation accidents.	+	+	+	+	+	N	+	N	N	+	8 (+) 2 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
SusquehannaT-07	Assess the flooding problem along the canal bed to identify feasible mitigation actions, and implement them.	+	+	+	+	+	+	+	N	N	N	8 (+) 2 (N) 0 (-)
SusquehannaT-08	Work with PennDOT to assess the flooding problem along Front Street to identify feasible mitigation actions, and implement them.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
SusquehannaT-09	Work with PennDOT to assess the flooding problem along the 3600 block of Elmerton Avenue to identify feasible mitigation actions, and implement them.	+	+	+	+	+	+	+	N	+	+	9 (+) 1 (N) 0 (-)
SusquehannaT-10	Work with PennDOT to improve drainage to reduce flooding at Penn Street and Estherton Avenue.	+	+	+	+	+	N	+	N	+	+	8 (+) 2 (N) 0 (-)
SusquehannaT-11	Work with PennDOT to assess the flooding problem along Paxton Church Road to identify feasible mitigation actions, and implement them.	+	+	+	+	+	N	+	N	+	+	6 (+) 4 (N) 0 (-)
SusquehannaT-12	Assess and improve drainage near the Latshmere Swim Club.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
SusquehannaT-13	Assess and improve drainage off the mountain to reduce flooding on Red Road and Roberts Valley Road.	+	+	+	+	+	+	+	N	+	+	9 (+) 1 (N) 0 (-)
SusquehannaT-14	Assess the geology at the Londonderry School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	N	+	+	9 (+) 1 (N) 0 (-)
SusquehannaT-15	Assess the geology at the Progress Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	7 (+) 3 (N) 0 (-)
SusquehannaT-16	Separate stormwater and sanitary sewer in Ward 1 (Front Street corridor).	+	+	+	+	+	+	+	+	N	N	7 (+) 3 (N) 0 (-)
SusquehannaT-17	Work with PennDOT to upgrade stormwater infrastructure on Paxton Church Road and Elmwood Drive.	+	+	+	+	+	+	+	N	+	+	7 (+) 3 (N) 0 (-)
SusquehannaT-18	Upgrade stormwater infrastructure on Maple Lane.	+	+	+	+	+	+	+	N	+	+	6 (+) 4 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
SusquehannaT-19	Upgrade stormwater infrastructure on 36th Street in the area of Morton Drive.	+	+	+	+	+	+	+	N	N	N	6 (+) 4 (N) 0 (-)
SusquehannaT-20	Work with PennDOT to upgrade stormwater infrastructure along State Farm Road where it meets Carter and Locust.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
SusquehannaT-21	Assess the geology at the Sara Lindemuth Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	+	+	8 (+) 2 (N) 0 (-)
SusquehannaT-22	Assess the geology at the Susquehanna Middle School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
SusquehannaT-23	Assess the geology at the Susquehanna Township EMS station property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	7 (+) 3 (N) 0 (-)
SusquehannaT-24	Assess the property of the Rescue Fire Department Station 1 to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
SwataraT-01	Protect the Swatara Township Authority WPCF to at least the 0.2 percent annual chance flood level.	+	+	+	+	+	+	+	+	N	N	7 (+) 3 (N) 0 (-)
SwataraT-02	Work with Capital Region Water to protect the Harrisburg Advanced Wastewater facility to at least the 0.2 percent annual chance flood level.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
SwataraT-03	Work with PennDOT to study Derry Street to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	N	N	N	6 (+) 4 (N) 0 (-)
SwataraT-04	Work with PennDOT to study Eisenhower Boulevard to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	N	N	N	9 (+) 1 (N) 0 (-)
SwataraT-05	Work with PennDOT to study Harrisburg Street to identify measures to reduce transportation accidents.	+	+	+	+	+	N	+	N	N	+	8 (+) 2 (N) 0 (-)
SwataraT-06	Work with PennDOT to study Paxton Street to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	N	N	N	6 (+) 4 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
SwataraT-07	Assess the geology at the Station 1-2 property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	7 (+) 3 (N) 0 (-)
SwataraT-08	Assess the geology at the Steelton-Highspire Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)
SwataraT-09	Assess the geology at the Steelton-Highspire High School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	+	N	N	7 (+) 3 (N) 0 (-)
SwataraT-10	Assess the geology at the Swatara Middle School property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	+	N	N	7 (+) 3 (N) 0 (-)
SwataraT-11	Assess the geology at the Swatara Township Building property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	7 (+) 3 (N) 0 (-)
SwataraT-12	Assess the geology at the Swatara Township Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	+	N	N	7 (+) 3 (N) 0 (-)
SwataraT-13	Develop a plan for replacing the Derry Street Bridge over Spring Creek.	+	+	+	+	+	+	N	+	N	N	7 (+) 3 (N) 0 (-)
UpperPaxtonT-01	Assess the Lenkerville Elementary School property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
UpperPaxtonT-02	Assess the Millersburg Area Authority - Water Plant property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
UpperPaxtonT-03	Assess the Millersburg Area Senior Center property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	N	+	N	N	+	9 (+) 1 (N) 0 (-)
UpperPaxtonT-05	Assess the Millersburg Area Ambulance Association property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
UpperPaxtonT-06	Assess the Upper Paxton Township Building property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	N	+	N	N	+	8 (+) 2 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
UpperPaxtonT-09	Assess the flooding problem in Lenkerville along the Wiconisco Creek to identify feasible mitigation actions, and implement them.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
UpperPaxtonT-10	Assess the flooding problem on River Street to identify feasible mitigation actions, and implement them.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
UpperPaxtonT-11	Work with PennDOT to protect PA-147 north of Millersburg Borough from landslides.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
UpperPaxtonT-12	Use the repair estimate provided by National Gunite to repair the storm sewer and install concrete pipe to alleviate sinkhole issues located on State Street	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
WashingtonT-01	Work with the Dauphin Meadows Landfill to assess the property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
WashingtonT-02	Assess the Upper Dauphin High School property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
WashingtonT-03	Assess the Upper Dauphin Middle School property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	N	+	N	+	N	7 (+) 3 (N) 0 (-)
WashingtonT-04	Assess the Washington Township Building property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
WestHanoverT-01	Assess the West Hanover Township Public Works Building on Walnut Ave property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
WestHanoverT-02	Assess the West Hanover Township Fire Department Station 3 property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
WestHanoverT-03	Assess the geology at the West Hanover Township Water and Sewer property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	N	+	6 (+) 4 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
WestHanoverT-04	Work with PennDOT to study Hershey Road to identify measures to reduce transportation accidents.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
WestHanoverT-05	Work with PennDOT to study Linglestown Road to identify measures to reduce transportation accidents.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
WiconiscoT-01	Assess the geology at the Wiconisco Township Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	N	N	N	+	+	7 (+) 3 (N) 0 (-)
WiconiscoT-02	Assess the topography around the Wiconisco Township WWTP to determine if mitigation measures are necessary, and to implement those measures if they are.	+	+	+	+	+	+	N	N	N	N	6 (+) 4 (N) 0 (-)
WiconiscoT-03	Protect the Wiconisco Township Municipal Office at 305 Walnut Street to at least the 0.2 percent annual chance flood level.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
WiconiscoT-04	Assess the geology at the Wiconisco Township building property to determine if mitigation measures are necessary, and to implement them if they are.	+	N	+	+	+	+	N	N	+	+	7 (+) 3 (N) 0 (-)
WiconiscoT-05	Assess the Wiconisco Township Office property on Arch Street to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	N	N	N	7 (+) 3 (N) 0 (-)
WiconiscoT-06	Assess the Wiconisco Township Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	N	+	+	+	+	N	+	N	+	+	7 (+) 3 (N) 0 (-)
WiconiscoT-07	Assess the Wiconisco Township Municipal Building property on Walnut Street to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
WiconiscoT-08	Assess the geology at the Wiconisco Township Police Department property to determine if mitigation measures are necessary, and to implement them if they are.	N	+	+	+	+	N	N	N	N	+	5 (+) 5 (N) 0 (-)
WiconiscoT-09	Assess the geology at the Wiconisco Township WWTP property to determine if mitigation measures are necessary, and to implement them if they are.	+	+	+	+	+	+	N	N	N	N	6 (+) 4 (N) 0 (-)
WilliamsT-01	Assess the Williams Township Office property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)

Initiative*	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
WilliamsT-02	Assess the Williams Valley High School property on Walnut Street to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	N	N	+	+	N	N	+	6 (+) 4 (N) 0 (-)
WilliamsT-03	Work with PennDOT to study Market Street to identify measures to reduce transportation accidents.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)
WilliamstownB-01	Assess the Williamstown Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	+	+	+	+	+	+	+	+	N	N	8 (+) 2 (N) 0 (-)
WilliamstownB-02	Protect the Williamstown EMS Station to at least the 0.2 percent annual chance flood level.	+	+	+	+	+	N	+	N	N	+	7 (+) 3 (N) 0 (-)

6.4.3 Prioritization of Mitigation Actions

Actions that are deemed feasible (i.e., receive a positive evaluation score) were then compared and prioritized using another set of criteria (PEMA 2020):

- Effectiveness (20% of score) – The extent to which an action reduces the vulnerability of people and property.
- Efficiency (30% of score) – The extent to which time, effort, and cost are well used as a means of reducing vulnerability. This criterion assesses the benefits of an action versus the cost of the action's implementation.
- Multi-Hazard Mitigation (20% of score) – The action reduces vulnerability for more than one hazard.
- Addresses High-Risk Hazard (15% of score) – The action reduces vulnerability for people and property from a hazard(s) identified as high-risk.
- Addresses Critical Communications/Critical Infrastructure (15% of score) – The action pertains to the maintenance of critical functions and structures such as transportation, supply chain management, data circuits, etc.

Scores in each criterion range from 0 to 3. The action's priority is determined by using a formula based on the criteria values and weights. Priority values range from 0 to 3 as well. An action's priority is then determined using the following scale (PEMA 2020):

- Low priority = 0 – 1.8
- Medium priority = 1.9 – 2.4
- High priority = 2.5 – 3

Table 6.4.3-1 shows the prioritization scores for the identified, feasible mitigation actions. Municipal officials reviewed and updated the prioritization values based on local needs.

Table 6.4.3-1. Prioritization Scoring of Mitigation Actions

Initiative	Mitigation Action	Effectiveness	Efficiency	Multi-Hazard	Address High Risk	Address Crit Communications/ Infrastructure	Priority
DauphinC-01	Provide public outreach about hazards and protective measures people, including renters and tourists, can take to protect themselves (e.g., receiving emergency alerts through South Central Alert) and their property.	2	2	3	2	1	2.05
DauphinC-02	Improve telecommunications infrastructure, including the accessibility of high-speed Internet connectivity, throughout the county.	2	3	2	3	3	2.60
DauphinC-03	Simplify and improve the model stormwater management ordinance in an effort to enhance the enforcement and effectiveness of stormwater management practices.	2	3	1	3	2	2.25
DauphinC-04	Educate the public about resources available to combat opioid abuse/addiction.	2	2	2	3	3	2.30
DauphinC-05	Inform the owners/operators of facilities storing hazardous materials of the risks they face and what they can do to protect their facilities and operations.	3	3	1	3	3	2.60
DauphinC-06	Work with childcare facility operators to discuss hazards they face and ensure their emergency plans address those hazards.	2	3	1	3	2	2.25
DauphinC-07	Assess the topography around the Lykens Tower Site, Mahantango Tower Site, Peters Mountain Tower Site, and Pillow Tower Site to determine if mitigation measures are necessary, and to implement those measures if they are.	3	3	1	3	3	2.60
DauphinC-08	Assess the following properties to determine the risk from wildfires and what vegetation needs to be cleared: Agriculture Building, Blue Mountain Tower Site, Conewago CWT Tower Site, Lower Swatara Tower Site, and Mahantango Tower Site.	2	2	1	2	3	1.95
DauphinC-09	Determine options for protecting the following facilities from the possible inundation due to a failure of the Raystown Lake Dam: Admin Building, Bar Association, County Offices – 100 Chestnut Street, Court House, Fort Hunter Park, Harrisburg Tower Site, Lykens Tower Site, Superior Court, Veterans Building Tower Site	3	3	1	3	3	2.60
DauphinC-10	Determine options for protecting Dauphin County Bridge No. 23 from inundation due to a failure of the DeHart Dam.	2	3	2	3	3	2.60
DauphinC-11	Assess the geology at the following sites and determine if mitigation measures are necessary, and to implement them if they are: 333 Market Street Tower Site, Administration Building, Adult Probation, Assistance Office, Bar Association, Children and Youth, Conewago CWT Tower Site, Coroner's Office, County Offices – 100 Chestnut Street, Court House, Dauphin ECC Tower Site, Department of Public Safety, Harrisburg Tower Site, Judicial Center, Lower Swatara Tower Site, Market Street Tower Site, Prison, Recycling Center, Reservoir Park Tower Site, Superior Court, Veteran's Building Tower Site, and Work Release.	2	2	1	3	3	2.10
DauphinC-12	Identify and provide incentives to recruit and retain volunteer firefighters.	3	2	1	3	1	2.00
DauphinC-13	Provide information to PEMA on the risks faced by each Commonwealth-owned critical facility in Dauphin County, so that PEMA can work with the Department of General Services to protect the facilities.	2	3	1	3	2	2.25

Initiative	Mitigation Action	Effectiveness	Efficiency	Multi-Hazard	Address High Risk	Address Crit Communications/ Infrastructure	Priority
DauphinC-14	Work with PennDOT to improve Interstates -076 (PA Turnpike), -081, -083, and -283 to reduce accidents.	2	3	1	3	2	2.25
DauphinC-15	Conduct a wildlands/forestry survey of forested areas, to identify strategies for mitigating the negative effects of invasive plant and insect species.	2	3	3	3	3	2.80
DauphinC-16	Construct another ingress/egress route for the Dauphin County Department of Public Safety, Schaffner Youth Center, Adult Probation facility, and Work Release Center	3	3	1	3	3	2.60
DauphinC-17	Install wet and dry hydrants to provide a water supply for fire suppression.	2	3	1	3	3	2.40
DauphinC-18	Work with the owners/operators of privately owned critical facilities in the special flood hazard area to discuss their risk of flooding and the protective measures they can take.	2	2	1	3	1	1.80
DauphinC-19	Work with the owners/operators of privately owned critical facilities in the area subject to inundation due to a failure of the Raystown Lake Dam to discuss their risk of flooding and protective measures they can take.	2	2	2	3	1	2.00
DauphinC-20	Work with privately-owned critical facilities to assess the geology at their sites to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	1	2.30
DauphinC-21	Work with the owners/operators of the privately owned critical facilities to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	1	2.30
DauphinC-22	Assess the Dauphin County Bridge No. 23 historic site to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	1	2.30
DauphinC-23	Protect the Dauphin County Bridge No. 23 historic site to at least the 0.2 percent chance flood level.	3	3	1	3	1	2.30
DauphinC-24	Work with the owners/operators of privately owned critical facilities on steep slopes to study the topography of the property to determine if mitigation measures are necessary, and to implement those measures.	3	3	1	3	1	2.30
DauphinC-25	The county will assess their bridges to determine what measures can be taken to protect them to the 0.2 percent annual chance flood level.	3	3	1	3	3	2.60
DauphinC-26	Assess the geology at the Area Agency on Aging property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	3	2.60
DauphinC-27	Encourage homeowners, renters, and businesses to insure their properties against all hazards, including flood coverage under the National Flood Insurance Program (NFIP).	3	3	1	3	3	2.60
DauphinC-28	Clean debris from pillars at the Grubb Street and Canal Street bridges.	3	3	1	3	3	2.60
DauphinC-29	Install backup preventers in wastewater pipes to prevent basement flooding.	2	3	1	3	2	2.25
DauphinC-30	Elevate, acquire, or demolish and rebuild properties, including repetitive loss and severe repetitive loss properties, in flood-prone areas.	3	3	1	3	1	2.30
DauphinC-31	Floodproof structures in flood-prone areas.	3	3	1	3	3	2.60

Initiative	Mitigation Action	Effectiveness	Efficiency	Multi-Hazard	Address High Risk	Address Crit Communications/ Infrastructure	Priority
DauphinC-32	Conduct a study for the Susquehanna River to determine the best option to address snakeheads, flathead catfish, and other invasive species.	2	3	2	3	3	2.60
DauphinC-33	Develop a new Comprehensive Plan or amend an existing Comprehensive Plan to include an assessment and associated mapping of the municipality's vulnerability to location-specific hazards and appropriate recommendations for the use of these hazard areas.	2	2	1	3	3	2.10
DauphinC-34	Develop a new Zoning Ordinance or revise an existing Zoning Ordinance to include separate zones or districts with appropriate development criteria for known hazard areas.	3	3	1	3	3	2.60
DauphinC-35	Develop a new Subdivision and Land Development Ordinance or revise an existing Subdivision and Land Development Ordinance to include municipal-specific, hazard mitigation-related development criteria and/or provisions for the mandatory use of conservation subdivision design principles in order to regulate the location and construction of buildings and other infrastructure in known hazard areas.	2	2	1	3	3	2.10
DauphinC-36	Revise existing zoning and/or subdivision and land development ordinances or adopt a separate, standalone ordinance to require the completion of subsurface investigations (i.e., borings, geo-physical surveys, and/or studies by a registered Professional Geologist) for all new subdivision and land development projects in known land subsidence hazard areas.	3	3	1	3	3	2.60
DauphinC-37	Update and implement a comprehensive water resources management plan that analyzes the County's existing water resources supply and evaluates the County's anticipated water use demand in an effort to identify suspected water supply shortages and potential new water supply sources.	2	2	1	3	3	2.10
DauphinC-38	Coordinate with the USGS, local watershed organizations, and/or the DCCD to increase the number of USGS and Integrated Flood Observing and Warning System (IFLOWS) rain and stream gauges in the County as a potential enhancement to the existing Susquehanna Flood Forecast and Warning System.	3	3	1	3	3	2.60
DauphinC-39	Work with municipalities to evaluate participation in the CRS and facilitate the preparation and submission of CRS applications.	3	3	1	3	3	2.60
DauphinC-40	Develop a technical proficiency at the municipal level for conducting post-disaster damage assessments and continue to regulate through local planning and zoning reconstruction activities to ensure compliance with NFIP substantial damage/substantial improvement requirements.	2	2	1	3	3	2.10
DauphinC-41	Develop technical proficiency at the municipal level for assisting residents and business owners in applying for hazard mitigation and assistance funds and identifying cost-beneficial hazard mitigation measures to be incorporated into reconstruction activities.	2	2	1	3	3	2.10
DauphinC-42	Investigate the feasibility of constructing a levee/floodwall system along Swatara Creek between East Main Street and the Pennsylvania Turnpike to minimize Middletown Borough's flood hazard potential.	3	2	1	3	1	2.00
DauphinC-43	Municipalities should continue to seek solutions to problem areas and obstructions identified in the April 2010 Countywide Act 167 Stormwater Management Plan.	2	3	1	3	2	2.25
DauphinC-44	Enroll in the Pennsylvania Firewise Communities Program through the DCNR Fire Forester for Dauphin County.	2	3	1	3	3	2.40
DauphinC-45	Encourage homeowners and renters to test for radon and install radon mitigation systems, if needed.	3	3	1	3	1	2.30

Initiative	Mitigation Action	Effectiveness	Efficiency	Multi-Hazard	Address High Risk	Address Crit Communications/ Infrastructure	Priority
DauphinC-46	Adopt the Radon Control Methods Appendix of the current, adopted edition of the International Residential Code to address radon in new construction.	3	3	1	3	3	2.60
DauphinC-47	Encourage municipalities to enter into an Intergovernmental Cooperation Agreement and Memorandum of Understanding with the Dauphin County Land Bank Authority as a way to address structures at risk from the impacts of natural and human-made hazards.	3	3	1	3	3	2.60
DauphinC-48	Increase the number of NOAA Weather Alert radios in public places across the County that currently do not have them (such as personal care homes) above and beyond what is required of the County by the NWS's Storm Ready Program.	2	2	1	3	3	2.10
DauphinC-49	Establish an alternate EOC location in the event the primary EOC must be evacuated. This facility should also be located outside of the Special Flood Hazard Area.	3	3	1	3	3	2.60
DauphinC-50	The Dauphin County Department of Information Technology will make natural and human-made hazard data available for municipal use.	2	2	1	3	3	2.10
DauphinC-51	Assess the Station 77 property to determine the risk from wildfires and what vegetation needs to be cleared.	2	2	1	3	3	2.10
DauphinC-52	Implement the Wildwood Lake Restoration Feasibility Study, the Joint Pollutant Reduction Plan (for Paxton Creek Watershed, Chesapeake Bay, Wildwood Lake, and UNT Spring Creek), and the Paxton Creek Restoration Master Plan, to restore the Paxton Creek watershed and Wildwood Lake. Restoration efforts will provide an increase in water quality and flood protection while maintaining optimal recreation areas and diverse wildlife habitats.	2	2	1	3	3	2.10
DauphinC-53	Conduct a study of Emergency Medical Services to establish a plan of action to stabilize and enhance emergency medical services coverage in the Upper Dauphin County Region.	2	2	1	3	3	2.10
BerrysburgB-01	Install a backup power generator at the Berrysburg Borough municipal building.	2	2	1	3	3	2.10
BerrysburgB-02	Install a backup power generator at the Berrysburg & Community Fire Company station.	3	3	1	3	3	2.60
BerrysburgB-03	Discuss with the owner/operator of critical facilities vulnerable to hazardous materials release the risk and possible protective measures.	2	2	1	3	3	2.10
ConewagoT-01	Protect Laurel Drive from the current and future sinkholes.	3	3	1	3	1	2.30
ConewagoT-02	Work with PennDOT to improve Deodate Road to mitigate traffic accidents.	2	3	1	3	3	2.40
ConewagoT-03	Work with PennDOT to improve Colebrook Road to mitigate traffic accidents.	2	3	1	3	3	2.40
DauphinB-01	Assess conditions at the confluence of Stony Creek and the Susquehanna River to identify potential mitigation actions for nearby structures.	2	3	1	3	3	2.40
DauphinB-02	Assess the borough to identify potential mitigation actions to take to ensure access to/from the borough during floods of the Susquehanna River.	2	3	1	3	2	2.25
DauphinB-03	Install a generator at the Borough Building.	2	2	1	3	1	1.80
DauphinB-04	Determine what other critical facilities in the borough need generators and purchase/install them.	2	3	2	3	3	2.60
DauphinB-05	Develop and implement a stream maintenance program to clear debris from Stony Creek.	2	3	2	3	3	2.60

Initiative	Mitigation Action	Effectiveness	Efficiency	Multi-Hazard	Address High Risk	Address Crit Communications/ Infrastructure	Priority
DauphinB-06	Assess critical facilities in the wildland-urban interface area to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	1	2.30
DauphinB-07	Assess Hillside properties to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	2	3	3	2.80
DauphinB-08	Work with PennDOT to improve Claster Boulevard to reduce traffic accidents.	2	3	1	3	3	2.40
DauphinB-09	Work with PennDOT to improve US-22/322 to mitigate traffic accidents.	2	2	2	3	1	2.00
DerryT-01	Assess stormwater management infrastructure in the township to determine what improvements need to be made, then implement the improvements.	2	2	1	3	1	1.80
DerryT-02	Work with PennDOT to assess the bridges over Swatara Creek on PA-39 and PA-0743 to improve the ability to pass floodwaters under the bridges.	3	3	1	3	3	2.60
DerryT-03	Work with PennDOT to upgrade stormwater infrastructure on Hershey Park Drive.	3	3	2	3	3	2.80
DerryT-04	Upgrade stormwater infrastructure on Mae Street.	3	3	2	3	3	2.80
DerryT-05	Upgrade stormwater infrastructure on Bull Frog Valley Road.	2	2	2	3	3	2.30
DerryT-07	Install a generator at the Derry Township Public Works building.	2	2	1	3	3	2.10
DerryT-08	Assess the topography around the following structures to determine if mitigation measures are necessary, and to implement those measures if they are: Quarries of the Hummelstown Brownstone Company historic site and Derry Township LDFL Wastewater facility.	1	1	1	3	1	1.30
DerryT-09	Work with PennDOT to protect US-322 near PA-0743 from current and future sinkholes.	2	3	1	3	3	2.40
DerryT-10	Assess the geology at the Derry Township municipal offices to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	1	2.30
DerryT-11	Work with Sheetz #351 to determine options for protecting the facility from the possible inundation from dam failure from the Hershey Dam.	2	3	1	3	2	2.25
DerryT-12	Work with PennDOT to improve Elizabethtown Road to mitigate traffic accidents.	2	2	1	3	3	2.10
DerryT-13	Work with PennDOT to improve Governor Road to mitigate traffic accidents.	2	3	1	3	3	2.40
DerryT-14	Work with PennDOT to improve Middletown Road to mitigate traffic accidents.	2	3	1	3	2	2.25
DerryT-15	Work with PennDOT to improve Waltonville Road to mitigate traffic accidents.	2	3	2	3	3	2.60
DerryT-16	Assess the drainage and stormwater management infrastructure in the area of Hersheypark Drive and Walton Avenue to determine appropriate mitigation measures to reduce the risk of flooding, and implement them.	2	2	2	3	2	2.15
DerryT-17	Work with FEMA and PA Department of Environmental Protection to obtain certification for the levee in Palmdale.	2	2	2	3	2	2.15
EastHanoverT-01	Work with PennDOT to improve drainage to reduce flooding along the 1100 block of Manada Bottom Road.	3	3	1	3	3	2.60
EastHanoverT-02	Work with PennDOT to eliminate highway flooding at the intersection of PA-443 and Firehouse Road during heavy rainfalls.	2	2	1	3	1	1.80

Initiative	Mitigation Action	Effectiveness	Efficiency	Multi-Hazard	Address High Risk	Address Crit Communications/ Infrastructure	Priority
EastHanoverT-03	Work with PennDOT to improve Mountain Road to mitigate traffic accidents.	3	3	1	3	1	2.30
EastHanoverT-04	Work with PennDOT to improve Laudermilch Road to mitigate traffic accidents.	2	3	1	3	2	2.25
EastHanoverT-06	Obtain a warning system for residents from outside contractors to alert residents, including renters and tourists, to hazardous materials incidents or other hazards.	2	3	1	3	1	2.10
ElizabethvilleB-01	Assess stormwater management infrastructure in the borough to determine what improvements need to be made to control runoff and reduce flooding.	2	2	1	3	3	2.10
ElizabethvilleB-02	Protect the Upper Dauphin County EMS station from the 0.2 percent annual chance flood level.	3	3	2	3	3	2.80
ElizabethvilleB-03	Install a backup power generator at the Elizabethville Borough building.	2	2	1	3	3	2.10
GratzB-01	Assess the property of the Gratz Borough Building to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	3	2.60
GratzB-02	Assess the Gratz Fire Department station to determine the risk from wildfires and what vegetation needs to be cleared.	2	2	1	3	3	2.10
HalifaxB-01	Ensure that the borough has plans in place to continue operations if a hazardous materials release causes an evacuation of the Halifax Borough Office.	2	2	1	3	3	2.10
HalifaxB-02	Discuss with the US Postal Service that the Halifax Post Office is vulnerable to a hazardous materials release and possible protective measures.	2	3	1	3	1	2.10
HalifaxT-01	Protect the Halifax Area Water Authority Well #1 to the 0.2 percent annual chance of flood event.	2	3	1	3	2	2.25
HalifaxT-02	Work with the property owner to protect the Legislative Route 1 Sycamore Allee historic site from flooding.	2	3	1	3	3	2.40
HalifaxT-03	Assess the topography around the Halifax Area Water Authority Well #1 to determine if mitigation measures are necessary, and to implement those measures if they are.	2	2	1	3	3	2.10
HalifaxT-04	Assess the following properties to determine the risk from wildfires and what vegetation needs to be cleared: Halifax Area Authority Sewer Plant, Halifax Area Water Authority Well #1, Halifax Area Authority Sewer Plant, and Halifax Township Municipal Building.	3	3	2	3	2	2.65
HalifaxT-05	Work with PennDOT to improve Peters Mountain Road to mitigate traffic accidents.	3	3	1	3	1	2.30
HalifaxT-06	Work with PennDOT to improve Powells Valley Road to mitigate traffic accidents.	3	3	1	3	3	2.60
HalifaxT-07	Work with PennDOT to improve South River Road to mitigate traffic accidents.	3	3	1	3	1	2.30
HarrisburgC-01	Renovate or demolish vacant structures that are at risk of collapse.	3	3	2	2	1	2.35
HarrisburgC-02	Protect the Downey Elementary School to at least the 0.2 percent chance flood level.	2	3	1	3	3	2.40
HarrisburgC-03	Protect the Edgewater Psychiatric Center to at least the 0.2 percent chance flood level.	2	3	1	3	3	2.40
HarrisburgC-04	Protect the Station 1 EMS facility to at least the 0.2 percent chance of flood level.	2	2	1	3	1	1.80
HarrisburgC-05	Assess the geology at the Ben Franklin School property to determine if mitigation measures are necessary, and to implement them if they are.	2	2	2	3	3	2.30

Initiative	Mitigation Action	Effectiveness	Efficiency	Multi-Hazard	Address High Risk	Address Crit Communications/ Infrastructure	Priority
HarrisburgC-06	Assess the geology at the Camp Curtin Fire Station historic site property to determine if mitigation measures are necessary, and to implement them if they are.	2	2	3	3	3	2.50
HarrisburgC-07	Assess the geology at the Camp Curtin Junior High School historic property to determine if mitigation measures are necessary, and to implement them if they are.	2	2	2	3	3	2.30
HarrisburgC-08	Assess the geology at the Downey Elementary School historic site property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	1	2.30
HarrisburgC-09	Assess the geology at the Edgewater Psychiatric Center property to determine if mitigation measures are necessary, and to implement them if they are.	2	2	2	3	3	2.30
HarrisburgC-10	Assess the geology at the Foose Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	3	2.60
HarrisburgC-11	Assess the geology at the Hamilton School property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	2	3	3	2.80
HarrisburgC-12	Assess the geology at the Harrisburg City Government Center and Police Department property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	2	3	3	2.80
HarrisburgC-13	Assess the geology at the Harrisburg City Public Works property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	3	3	2	2.85
HarrisburgC-14	Assess the geology at the Harrisburg City Fire Station 1 property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	1	2.30
HarrisburgC-15	Assess the geology at the Harrisburg City Fire Station 2 property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	2	3	3	2.80
HarrisburgC-16	Assess the geology at the Harrisburg City Fire Station 8 property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	3	2.60
HarrisburgC-17	Assess the geology at the Harrisburg Technical High School property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	3	3	2	2.85
HarrisburgC-18	Assess the geology at the John Harris High School property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	2	3	2	2.65
HarrisburgC-19	Assess the geology at the Harrisburg School District Administration Building property to determine if mitigation measures are necessary, and to implement them if they are.	2	3	3	3	3	2.80
HarrisburgC-20	Assess the geology at the Marshall School property to determine if mitigation measures are necessary, and to implement them if they are.	2	3	3	3	2	2.65
HarrisburgC-21	Assess the geology at the Melrose School property to determine if mitigation measures are necessary, and to implement them if they are.	2	2	1	3	1	1.80
HarrisburgC-22	Assess the geology at the Paxton Fire Station historic property to determine if mitigation measures are necessary, and to implement them if they are.	2	2	1	3	3	2.10
HarrisburgC-24	Assess the geology at the Riverside Fire Station historic property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	1	2.30
HarrisburgC-25	Assess the geology at the Rowland Middle School property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	3	2.60
HarrisburgC-26	Assess the geology at the Scott Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	1	2.30

Initiative	Mitigation Action	Effectiveness	Efficiency	Multi-Hazard	Address High Risk	Address Crit Communications/ Infrastructure	Priority
HarrisburgC-28	Determine options for protecting the following facilities from the possible inundation due to a failure of the Raystown Lake Dam: Downey Elementary School, Edgewater Psychiatric Center, Harrisburg City Government Center, Harrisburg City Police Station, Station 1 EMS.	2	3	2	3	3	2.60
HarrisburgC-29	Work with PennDOT to assess and improve the stormwater management infrastructure at Cameron and Maclay Streets, near the Maclay Street entrance to the Farm Show Complex.	3	3	2	3	3	2.80
HarrisburgC-30	Work with PennDOT to assess and improve the stormwater management infrastructure on the 1800 block of Derry Street.	2	2	3	3	1	2.20
HarrisburgC-31	Work with PennDOT to assess and improve the stormwater management infrastructure along the 1400 block of Market Street.	3	3	1	3	1	2.30
HarrisburgC-32	Assess and improve the stormwater management infrastructure at the intersection of 2nd and Geiger Streets.	3	3	1	3	3	2.60
HarrisburgC-33	Assess and improve the stormwater management infrastructure at the intersection of Herr and Plum Streets.	2	2	2	3	1	2.00
HarrisburgC-34	Work with PennDOT to study Cameron Street to identify measures to reduce transportation accidents.	2	3	1	3	2	2.25
HarrisburgC-35	Work with PennDOT to study Mulberry Street to identify measures to reduce transportation accidents.	3	3	1	3	3	2.60
HarrisburgC-36	Work with PennDOT to study State Street to identify measures to reduce transportation accidents.	2	2	1	3	3	2.10
HarrisburgC-37	Support Capital Region Water's Wastewater Arsenal Boulevard Sewer Improvements - Rehabilitation/replacement of approximately 2,500 LF of sewer collector pipe.	3	3	2	3	1	2.50
HarrisburgC-38	Support Capital Region Water's Stormwater SW Pond Retrofit – Bellevue Park Design - Employing green stormwater infrastructure (GSI) to manage stormwater runoff and prevent flows from entering the combined sewer system, thereby reducing combined sewer overflow (CSO) activity.	2	2	1	3	3	2.10
HarrisburgC-39	Support Capital Region Water's Stormwater Camp Curtin YMCA GSI - Develop visible GSI improvements as part of the community center rehabilitation and beautification.	2	3	1	3	2	2.25
HarrisburgC-40	Support Capital Region Water's Stormwater COH East-West Multimodal Connector - GSI - Capture and manage stormwater in green stormwater elements designed to also serve as traffic calming elements.	2	3	1	3	2	2.25
HarrisburgC-41	Support Capital Region Water's Wastewater (Combined, Sanitary & Storm) Collection System Rehabilitation - Rehabilitate priority defects to avoid failures using a variety of methods including conventional replacement and "trenchless" structural pipe lining procedures.	2	2	1	3	1	1.80
HarrisburgC-42	Support Capital Region Water's Stormwater South Allison Hill GSI - Capture and manage stormwater in green stormwater elements designed to also serve as traffic calming elements.	2	2	1	3	3	2.10
HarrisburgC-43	Work with PennDOT to study 19th Street to identify measures to reduce transportation accidents.	3	3	1	3	3	2.60
HarrisburgC-44	Work with PennDOT to study 25th Street to identify measures to reduce transportation accidents.	3	3	1	3	3	2.60
HarrisburgC-45	Work with PennDOT to study the intersection of 2nd and Geiger Streets to identify measures to reduce transportation accidents.	2	3	1	3	1	2.10
HarrisburgC-46	Work with PennDOT to study the intersection of Front and Forster Streets to identify measures to reduce transportation accidents.	3	3	1	3	1	2.30

Initiative	Mitigation Action	Effectiveness	Efficiency	Multi-Hazard	Address High Risk	Address Crit Communications/ Infrastructure	Priority
HarrisburgC-47	Work with PennDOT to study the intersection of Susquehanna and Riley Streets to identify measures to reduce transportation accidents.	3	3	1	3	1	2.30
HarrisburgC-48	Implement the recommendations of the Harrisburg Authority's ongoing combined sewer overflow impact study.	2	3	1	3	2	2.25
HarrisburgC-49	Identify, assess, and, as necessary, implement solutions to reduce impacts to human life from the Dock Street Dam.	2	3	1	3	1	2.10
HarrisburgC-50	Study options to restore Paxton Creek within City limits and collaborate with Whole Community Partners to implement findings of the study to re-establish the historic floodplain of the creek.	2	3	1	3	1	2.10
HighspireB-01	Protect the wastewater treatment plant from the 0.2 percent annual chance flood level.	2	2	1	3	3	2.10
HighspireB-02	Protect the Highspire Fire Department station from the 0.2 percent annual chance flood level.	2	2	2	3	3	2.30
HighspireB-03	Assess the Highspire Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	2	2	1	3	3	2.10
HummelstownB-01	Assess the geology at the Lower Dauphin School District campuses to determine if mitigation measures are necessary, and to implement them if they are.	2	3	2	2	1	2.15
HummelstownB-02	Assess the geology at the Hummelstown Borough Office to determine if mitigation measures are necessary, and to implement them if they are.	3	3	2	3	1	2.50
HummelstownB-03	Assess the geology at the Hummelstown Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	2	2	2	3	1	2.00
HummelstownB-04	Assess the geology at the Nye Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	2	3	1	3	3	2.40
JeffersonT-01	Assess the Carsonville Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	2	2	2	3	3	2.30
JeffersonT-02	Assess the Jefferson Township Municipal Office property to determine the risk from wildfires and what vegetation needs to be cleared.	2	2	1	3	3	2.10
LondonderryT-01	Assess the Londonderry Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	3	2.60
LondonderryT-02	Assess the Londonderry Township Building property to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	3	2.60
LondonderryT-03	Assess the geology at the Derry Township Municipal Authority Southwest property to determine if mitigation measures are necessary, and to implement them if they are.	2	2	1	3	1	1.80
LondonderryT-04	Replant Ash Trees that were lost to the Ash Borer and determine the best actions to prevent invasive species in the future.	3	3	1	3	3	2.60
LondonderryT-05	Assess the geology at the Londonderry Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	2	3	2	2	1	2.15
LondonderryT-06	Install a backup power generator at the public works building.	2	2	1	3	3	2.10
LondonderryT-07	Work with PennDOT to study Colebrook Road to identify measures to reduce transportation accidents.	2	3	1	3	2	2.25
LondonderryT-08	Work with PennDOT to study Harrisburg Pike to identify measures to reduce transportation accidents.	2	2	1	3	3	2.10

Initiative	Mitigation Action	Effectiveness	Efficiency	Multi-Hazard	Address High Risk	Address Crit Communications/ Infrastructure	Priority
LondonderryT-09	Work with PennDOT to study Roundtop Road to identify measures to reduce transportation accidents.	3	3	1	3	3	2.60
LondonderryT-10	Assess the geology at the Londonderry Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	2	2	1	2.35
LondonderryT-11	Conewago Creek Stream Restoration - restore 1 mile of stream, remove approximately 125,000 cubic yards of sediment, and re-establish the historic floodplain of the creek.	3	2	1	3	1	2.00
LowerPaxtonT-01	Assess the Linglestown Middle School property to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	3	2.60
LowerPaxtonT-02	Assess the geology at the Linglestown Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	2	3	2	3	3	2.60
LowerPaxtonT-03	Install a backup power generator at the Central Dauphin School District transportation facility.	2	2	1	3	3	2.10
LowerPaxtonT-04	Work with the owner/operator of the Colonial Park Care Center to upgrade its backup power capabilities.	3	3	1	3	1	2.30
LowerPaxtonT-05	Work with PennDOT to study Colonial Road to identify measures to reduce transportation accidents.	3	3	1	3	3	2.60
LowerPaxtonT-06	Work with PennDOT to study Jonestown Road to identify measures to reduce transportation accidents.	2	2	1	3	3	2.10
LowerPaxtonT-07	Work with PennDOT to study Linglestown Road to identify measures to reduce transportation accidents.	2	2	1	3	3	2.10
LowerPaxtonT-08	Work with PennDOT to study Nyes Road to identify measures to reduce transportation accidents.	2	2	1	3	3	2.10
LowerPaxtonT-09	Work with PennDOT to study Rutherford Road to identify measures to reduce transportation accidents.	3	3	3	3	3	3.00
LowerPaxtonT-10	Work with PennDOT to study Union Deposit Road to identify measures to reduce transportation accidents.	3	3	1	3	3	2.60
LowerSwataraT-01	Assess the geology at the Kunkel Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	2	3	3	3	1	2.50
LowerSwataraT-02	Assess the cause(s) of flooding of "The Flats" to identify feasible mitigation actions, and implement them.	3	3	1	3	3	2.60
LowerSwataraT-03	Assess the geology at the Lower Swatara Township Building property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	3	3	3	3.00
LowerSwataraT-04	Assess the geology at the Lower Swatara Township Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	2	3	3	3	3	2.80
LowerSwataraT-05	Assess the geology at the Middletown Area High School property to determine if mitigation measures are necessary, and to implement them if they are.	2	2	1	2	3	1.95
LowerSwataraT-06	Assess the geology at the Reid Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	2	2	1	2	3	1.95
LowerSwataraT-07	Protect the Farr Pump Station to at least the 0.2 percent annual chance flood level.	2	3	1	3	3	2.40
LowerSwataraT-08	Install a backup power generator at the Farr Pump Station.	3	3	1	3	1	2.30
LowerSwataraT-09	Install a backup power generator at the Jamesway Pump Station.	2	3	1	3	2	2.25

Initiative	Mitigation Action	Effectiveness	Efficiency	Multi-Hazard	Address High Risk	Address Crit Communications/ Infrastructure	Priority
LowerSwataraT-10	Install a backup power generator at the North Union Street Pump Station.	2	2	1	3	3	2.10
LykensB-01	Protect the Lykens Borough Office to at least the 0.2 percent chance of flood level.	3	3	1	3	3	2.60
LykensB-02	Protect the Lykens Borough Authority WWTP to at least the 0.2 percent chance of flood level.	2	2	1	2	3	1.95
LykensB-03	Assess the Lykens Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	3	2.60
LykensB-04	Assess the Lykens Borough Office property to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	3	2.60
LykensB-05	Assess the Lykens Borough Authority WWTP property to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	3	2.60
LykensB-06	Identify sections of banks of waterways that need to be stabilized, and design and implement the stabilization.	2	3	1	3	3	2.40
LykensT-01	Assess the Bridge in Lykens Township No. 1 historic site to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	3	2.60
LykensT-02	Work with PennDOT to study North Crossroads Road to identify measures to reduce transportation accidents.	2	2	1	2	3	1.95
MiddlePaxtonT-01	Work with PennDOT to study Peters Mountain Road to identify measures to reduce transportation accidents.	3	3	1	3	1	2.30
MiddlePaxtonT-02	Assess the Dauphin-Middle Paxton Municipal Office property to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	1	2.30
MiddlePaxtonT-03	Assess the Middle Paxton Elementary School property to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	3	2.60
MiddlePaxtonT-04	Work with the owners/operators of privately owned critical facilities in the area subject to inundation due to a failure of the DeHart Dam to discuss their risk of flooding and protective measures they can take.	3	3	1	3	1	2.30
MiddletownB-02	Assess the geology at the Fink Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	3	2.60
MiddletownB-03	Work with PennDOT to study Main Street/Harrisburg Pike to identify measures to reduce transportation accidents.	2	3	1	3	2	2.25
MiddletownB-04	Protect the Mill Street electrical substation from the 0.2 percent annual chance flood level.	2	2	1	3	3	2.10
MiddletownB-05	Work with Suez to assess the Veolia Wastewater Plant property to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	3	2.60
MiddletownB-06	Assess the geology at the Middletown Borough Building property to determine if mitigation measures are necessary, and to implement them if they are.	2	2	1	2	3	1.95
MiddletownB-07	Assess the geology at the Middletown Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	3	2.60
MiddletownB-08	Assess the geology at the Middletown Police Department property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	3	2.60
MiddletownB-09	Work with Suez to assess the geology at the Veolia Wastewater Plant property to determine if mitigation measures are necessary, and to implement them if they are.	2	2	1	2	3	1.95

Initiative	Mitigation Action	Effectiveness	Efficiency	Multi-Hazard	Address High Risk	Address Crit Communications/ Infrastructure	Priority
MillersburgB-01	Identify sections of banks of waterways that need to be stabilized, and design and implement the stabilization.	2	3	1	3	3	2.40
MillersburgB-04	Floodproof the Welcome Center along the Susquehanna River	3	3	1	3	3	2.60
MillersburgB-05	Use the repair estimate provided by National Gunite to repair the storm sewer and install concrete pipe to alleviate sinkhole issues located on State Street	2	3	1	3	3	2.40
PaxtangB-01	Protect the Paxtang Borough Office/Fire Station to at least the 0.2 percent annual chance flood level.	3	3	1	3	3	2.60
PaxtangB-02	Assess the geology at the Paxtang Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	2	2	2	3	3	2.30
PaxtangB-03	Assess the geology at the Paxtang Borough Office property to determine if mitigation measures are necessary, and to implement them if they are.	2	3	1	3	3	2.40
PenbrookB-01	Assess the geology at the Penbrook Borough Office property to determine if mitigation measures are necessary, and to implement them if they are.	2	3	2	3	3	2.60
PenbrookB-02	Assess the geology at the Penbrook Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	1	2.30
PenbrookB-03	Install a backup power generator at the public works building.	3	3	2	3	3	2.80
PenbrookB-04	Install a backup power generator at the Citizen's Fire Company #1 station.	3	2	2	3	3	2.50
PenbrookB-05	Assess the stormwater management infrastructure throughout the borough and determine what upgrades need to be made.	2	2	2	3	2	2.15
PillowB-01	Assess the Pillow Borough Building property to determine the risk from wildfires and what vegetation needs to be cleared.	2	2	1	3	1	1.80
PillowB-02	Assess the Pillow Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	1	2.30
PillowB-03	Install a backup power generator at the Pillow Borough municipal building.	3	3	1	3	1	2.30
PillowB-04	Install a backup power generator at the Pillow Fire Department station.	3	3	1	3	1	2.30
PillowB-05	Determine appropriate measures for preventing injuries at blighted properties	2	2	1	3	1	1.80
PillowB-06	Install a backup power generator at Well 5.	3	3	1	3	1	2.30
PillowB-07	Install a backup power generator at Well 6.	3	3	1	3	3	2.60
PillowB-08	Upgrade fire department radios to be interoperable between Dauphin and Northumberland Counties.	3	3	1	3	1	2.30
PillowB-09	Work with the Pillow Historical Society and PPL to determine options to prevent power outages and damage to the water treatment building, and implement the most appropriate one.	3	3	1	3	1	2.30
PillowB-10	Work with PennDOT to improve drainage on PA-225 to prevent ponding water.	2	2	2	3	3	2.30
PillowB-11	Map the borough’s water infrastructure.	2	3	1	3	2	2.25
PillowB-12	Analyze the intersection and develop solutions to reduce speeding on PA-225, and implement the most appropriate one.	2	3	1	3	3	2.40

Initiative	Mitigation Action	Effectiveness	Efficiency	Multi-Hazard	Address High Risk	Address Crit Communications/ Infrastructure	Priority
PillowB-13	Develop an evacuation and sheltering plan for Pillow Borough.	3	3	1	3	3	2.60
PillowB-14	Installation of new water lines and improve the water infrastructure.	2	3	1	3	2	2.25
PillowB-15	Enclose Well 5 infrastructure in a shelter.	3	3	1	3	1	2.30
ReedT-01	Work with PennDOT to study South River Road to identify measures to reduce transportation accidents.	2	3	1	3	3	2.40
RoyaltonB-01	Protect the Edgewater Pump Station to at least the 0.2 percent annual chance flood level.	3	3	2	3	3	2.80
RoyaltonB-02	Develop a plan with emergency services to assist the borough if chemical containers from Univar float downstream.	3	3	1	3	2	2.45
RoyaltonB-04	Provide assistance to remove built-up debris from around bridge pillars	2	2	2	3	2	2.15
RoyaltonB-05	Phase 2 Royalton Canal Improvement Project to mitigate localized flooding.	3	3	1	3	3	2.60
RoyaltonB-06	Structural assessment and reinforcement of Edgewater Development retaining wall.	2	2	1	3	1	1.80
RushT-01	Assess the Rush Township Municipal Office property to determine the risk from wildfires and what vegetation needs to be cleared.	2	2	1	3	3	2.10
RushT-02	Work with PennDOT to study Gold Mine Road to identify measures to reduce transportation accidents.	3	3	1	3	3	2.60
RushT-03	Coordinate with the DCNR Fire Forester for Dauphin County on the potential construction of a fire break at the appropriate location on the south side of Peters Mountain along Route 325.	3	3	1	3	3	2.60
SouthHanoverT-01	Work with PennDOT to study Grandview Drive to identify measures to reduce transportation accidents.	2	2	1	3	1	1.80
SouthHanoverT-02	Work with PennDOT to study Union Deposit Road to identify measures to reduce transportation accidents.	2	2	2	3	3	2.30
SteeltonB-01	Assess the geology at the Steelton Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	3	2.60
SteeltonB-02	Work with PA American Water to protect the Steelton Water Filtration Plant to at least the 0.2 percent annual chance flood level.	2	2	1	3	3	2.10
SteeltonB-03	Install a backup power generator at the Steelton Highway Garage.	3	3	1	3	3	2.60
SteeltonB-04	Work with PA American Water to install a backup power generator at the sewer pump stations.	3	3	1	3	3	2.60
SteeltonB-05	Install a backup power generator at the Steelton Borough Building.	3	3	2	3	1	2.50
SteeltonB-06	Renovate or demolish vacant structures that were damaged by fire and are at risk of collapse.	2	2	3	2	1	2.05
SteeltonB-07	Assess the flooding problem along South Front Street near the quarry to identify feasible mitigation actions, and implement them.	2	3	1	3	1	2.10
SteeltonB-08	Assess the geology at the Steelton Borough office property to determine if mitigation measures are necessary, and to implement them if they are.	2	2	1	3	1	1.80
SteeltonB-09	Work with PA American Water to assess the geology at the Steelton Water Filtration Plant property to determine if mitigation measures are necessary, and to implement them if they are.	2	3	1	3	3	2.40

Initiative	Mitigation Action	Effectiveness	Efficiency	Multi-Hazard	Address High Risk	Address Crit Communications/ Infrastructure	Priority
SteeltonB-10	Assess the type and number of vacant/abandoned buildings in the Borough and determine if mitigation measures are necessary.	2	2	1	3	1	1.80
SteeltonB-11	Borough Storm Sewer Management System to conduct an assessment on storm sewer system inlets being old and need to be replaced as well as cleaned up.	2	3	1	3	2	2.25
SteeltonB-12	Conduct an assessment of the Borough's information technology system and determine potential updates or software needed to prevent intrusions into the system.	3	3	2	3	1	2.50
SteeltonB-13	Install a backup power generator at the Steelton Highway Garage and the Steelton Borough Building.	3	3	2	3	1	2.50
SusquehannaT-01	Assess the Susquehanna Township Administration Building property to determine the risk from wildfires and what vegetation needs to be cleared.	2	2	1	3	3	2.10
SusquehannaT-02	Assess the Thomas Holtzman Elementary School property to determine the risk from wildfires and what vegetation needs to be cleared.	2	2	1	3	1	1.80
SusquehannaT-03	Assess the geology at the Susquehanna Township Administration Building property to determine if mitigation measures are necessary, and to implement them if they are.	2	2	1	3	1	1.80
SusquehannaT-04	Assess the geology at the Susquehanna Township High School property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	1	2.30
SusquehannaT-05	Assess the geology at the Thomas Holtzman Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	2	2	1	3	3	2.10
SusquehannaT-06	Work with PennDOT to study Progress Avenue to identify measures to reduce transportation accidents.	3	3	1	3	3	2.60
SusquehannaT-07	Assess the flooding problem along the canal bed to identify feasible mitigation actions, and implement them.	3	3	1	3	3	2.60
SusquehannaT-08	Work with PennDOT to assess the flooding problem along Front Street to identify feasible mitigation actions, and implement them.	2	3	1	3	2	2.25
SusquehannaT-09	Work with PennDOT to assess the flooding problem along the 3600 block of Elmerton Avenue to identify feasible mitigation actions, and implement them.	3	3	2	3	3	2.80
SusquehannaT-10	Work with PennDOT to improve drainage to reduce flooding at Penn Street and Estherton Avenue.	2	3	2	3	3	2.60
SusquehannaT-11	Work with PennDOT to assess the flooding problem along Paxton Church Road to identify feasible mitigation actions, and implement them.	2	2	3	3	1	2.20
SusquehannaT-12	Assess and improve drainage near the Latshmere Swim Club.	2	3	1	3	1	2.10
SusquehannaT-13	Assess and improve drainage of the mountain to reduce flooding on Red Road and Roberts Valley Road.	3	3	2	3	3	2.80
SusquehannaT-14	Assess the geology at the Londonderry School property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	2	2	1	2.35
SusquehannaT-15	Assess the geology at the Progress Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	1	2.30
SusquehannaT-16	Separate stormwater and sanitary sewer in Ward 1 (Front Street corridor).	2	3	1	3	2	2.25
SusquehannaT-17	Work with PennDOT to upgrade stormwater infrastructure on Paxton Church Road and Elmwood Drive	2	3	2	3	3	2.60
SusquehannaT-18	Upgrade stormwater infrastructure on Maple Lane	3	3	2	3	3	2.80

Initiative	Mitigation Action	Effectiveness	Efficiency	Multi-Hazard	Address High Risk	Address Crit Communications/ Infrastructure	Priority
SusquehannaT-19	Upgrade stormwater infrastructure on 36th Street in the area of Morton Drive.	3	2	2	3	3	2.50
SusquehannaT-20	Work with PennDOT to upgrade stormwater infrastructure along State Farm Road where it meets Carter and Locust.	3	3	1	3	3	2.60
SusquehannaT-21	Assess the geology at the Sara Lindemuth Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	2	2	2	3	3	2.30
SusquehannaT-22	Assess the geology at the Susquehanna Middle School property to determine if mitigation measures are necessary, and to implement them if they are.	1	1	1	3	1	1.30
SusquehannaT-23	Assess the geology at the Susquehanna Township EMS station property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	3	2.60
SusquehannaT-24	Assess the property of the Rescue Fire Department Station 1 to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	3	2.60
SwataraT-01	Protect the Swatara Township Authority WPCF to at least the 0.2 percent annual chance flood level.	2	3	1	3	3	2.40
SwataraT-02	Work with Capital Region Water to protect the Harrisburg Advanced Wastewater facility to at least the 0.2 percent annual chance flood level.	2	2	1	3	3	2.10
SwataraT-03	Work with PennDOT to study Derry Street to identify measures to reduce transportation accidents.	3	3	2	3	3	2.80
SwataraT-04	Work with PennDOT to study Eisenhower Boulevard to identify measures to reduce transportation accidents.	3	3	1	3	3	2.60
SwataraT-05	Work with PennDOT to study Harrisburg Street to identify measures to reduce transportation accidents.	3	3	1	3	1	2.30
SwataraT-06	Work with PennDOT to study Paxton Street to identify measures to reduce transportation accidents.	2	2	1	3	3	2.10
SwataraT-07	Assess the geology at the Station 1-2 property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	2	2.45
SwataraT-08	Assess the geology at the Steelton-Highspire Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	1	1	1	3	1	1.30
SwataraT-09	Assess the geology at the Steelton-Highspire High School property to determine if mitigation measures are necessary, and to implement them if they are.	2	3	1	3	3	2.40
SwataraT-10	Assess the geology at the Swatara Middle School property to determine if mitigation measures are necessary, and to implement them if they are.	2	3	1	3	3	2.40
SwataraT-11	Assess the geology at the Swatara Township Building property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	1	2.30
SwataraT-12	Assess the geology at the Swatara Township Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	2	3	1	3	2	2.25
SwataraT-13	Develop a plan for replacing the Derry Street Bridge over Spring Creek.	2	3	1	3	3	2.40
UpperPaxtonT-01	Assess the Lenkerville Elementary School property to determine the risk from wildfires and what vegetation needs to be cleared.	2	2	1	3	3	2.10
UpperPaxtonT-02	Assess the Millersburg Area Authority - Water Plant property to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	3	2.60
UpperPaxtonT-03	Assess the Millersburg Area Senior Center property to determine the risk from wildfires and what vegetation needs to be cleared.	2	2	1	3	3	2.10

Initiative	Mitigation Action	Effectiveness	Efficiency	Multi-Hazard	Address High Risk	Address Crit Communications/ Infrastructure	Priority
UpperPaxtonT-05	Assess the Millersburg Area Ambulance Association property to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	3	2.60
UpperPaxtonT-06	Assess the Upper Paxton Township Building property to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	3	2.60
UpperPaxtonT-09	Assess the flooding problem in Lenkerville along the Wiconisco Creek to identify feasible mitigation actions, and implement them.	3	3	1	3	3	2.60
UpperPaxtonT-10	Assess the flooding problem on River Street to identify feasible mitigation actions, and implement them.	2	3	1	3	2	2.25
UpperPaxtonT-11	Work with PennDOT to protect PA-147 north of Millersburg Borough from landslides.	2	3	1	3	3	2.40
UpperPaxtonT-12	Use the repair estimate provided by National Gunite to repair the storm sewer and install concrete pipe to alleviate sinkhole issues located on State Street	2	3	1	3	3	2.40
WashingtonT-01	Work with the Dauphin Meadows Landfill to assess the property to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	1	2.30
WashingtonT-02	Assess the Upper Dauphin High School property to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	3	2.60
WashingtonT-03	Assess the Upper Dauphin Middle School property to determine the risk from wildfires and what vegetation needs to be cleared.	2	2	2	3	1	2.00
WashingtonT-04	Assess the Washington Township Building property to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	1	2.30
WestHanoverT-01	Assess the West Hanover Township Public Works Building on Walnut Ave property to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	1	2.30
WestHanoverT-02	Assess the West Hanover Township Fire Department Station 3 property to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	1	2.30
WestHanoverT-03	Assess the geology at the West Hanover Township Water and Sewer property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	1	2.30
WestHanoverT-04	Work with PennDOT to study Hershey Road to identify measures to reduce transportation accidents.	2	2	1	3	3	2.10
WestHanoverT-05	Work with PennDOT to study Linglestown Road to identify measures to reduce transportation accidents.	3	3	1	3	1	2.30
WiconiscoT-01	Assess the geology at the Wiconisco Township Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	2	2	2	3	3	2.30
WiconiscoT-02	Assess the topography around the Wiconisco Township WWTP to determine if mitigation measures are necessary, and to implement those measures if they are.	2	2	1	3	3	2.10
WiconiscoT-03	Protect the Wiconisco Township Municipal Office at 305 Walnut Street to at least the 0.2 percent annual chance flood level.	3	3	1	3	3	2.60
WiconiscoT-04	Assess the geology at the Wiconisco Township building property to determine if mitigation measures are necessary, and to implement them if they are.	2	2	2	3	3	2.30
WiconiscoT-05	Assess the Wiconisco Township Office property on Arch Street to determine the risk from wildfires and what vegetation needs to be cleared.	2	2	1	3	3	2.10
WiconiscoT-06	Assess the Wiconisco Township Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	2	2	1	3	3	2.10

Initiative	Mitigation Action	Effectiveness	Efficiency	Multi-Hazard	Address High Risk	Address Crit Communications/ Infrastructure	Priority
WiconiscoT-07	Assess the Wiconisco Township Municipal Building property on Walnut Street to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	3	2.60
WiconiscoT-08	Assess the geology at the Wiconisco Township Police Department property to determine if mitigation measures are necessary, and to implement them if they are.	2	2	2	3	1	2.00
WiconiscoT-09	Assess the geology at the Wiconisco Township WWTP property to determine if mitigation measures are necessary, and to implement them if they are.	3	3	1	3	3	2.60
WilliamsT-01	Assess the Williams Township Office property to determine the risk from wildfires and what vegetation needs to be cleared.	3	3	1	3	3	2.60
WilliamsT-02	Assess the Williams Valley High School property on Walnut Street to determine the risk from wildfires and what vegetation needs to be cleared.	3	2	2	3	3	2.50
WilliamsT-03	Work with PennDOT to study Market Street to identify measures to reduce transportation accidents.	3	3	1	3	1	2.30
WilliamstownB-01	Assess the Williamstown Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	2	3	1	3	2	2.25
WilliamstownB-02	Protect the Williamstown EMS Station to at least the 0.2 percent annual chance flood level.	3	3	1	3	1	2.30

The actions in Table 6.4.3-2 are listed in order of priority, with the high-priority actions first. This list of actions is the result of the planning effort led by the Planning Team and represents what the county and municipalities consider most important. Any actions, including projects, to be implemented will have benefits outweighing their associated costs (i.e., the benefit-cost ratio would be greater than 1).

A blank Mitigation Action Worksheet template is included in Appendix G. The set of completed action worksheets and a table summarizing the worksheets by jurisdiction are presented in Appendix H.

Table 6.4.3-2. Prioritized Mitigation Actions

Mitigation Actions		Priority
High Priority		
LowerPaxtonT-09	Work with PennDOT to study Rutherford Road to identify measures to reduce transportation accidents.	3.00
LowerSwataraT-03	Assess the geology at the Lower Swatara Township Building property to determine if mitigation measures are necessary, and to implement them if they are.	3.00
HarrisburgC-13	Assess the geology at the Harrisburg City Public Works property to determine if mitigation measures are necessary, and to implement them if they are.	2.85
HarrisburgC-17	Assess the geology at the Harrisburg Technical High School property to determine if mitigation measures are necessary, and to implement them if they are.	2.85
DauphinC-15	Conduct a wildlands/forestry survey of forested areas, to identify strategies for mitigating the negative effects of invasive plant and insect species.	2.80
DauphinB-07	Assess Hillside properties to determine the risk from wildfires and what vegetation needs to be cleared	2.80
DerryT-03	Work with PennDOT to upgrade stormwater infrastructure on Hershey Park Drive	2.80

Mitigation Actions		Priority
DerryT-04	Upgrade stormwater infrastructure on Mae Street	2.80
HarrisburgC-11	Assess the geology at the Hamilton School property to determine if mitigation measures are necessary, and to implement them if they are.	2.80
HarrisburgC-12	Assess the geology at the Harrisburg City Government Center and Police Department property to determine if mitigation measures are necessary, and to implement them if they are.	2.80
HarrisburgC-15	Assess the geology at the Harrisburg City Fire Station 2 property to determine if mitigation measures are necessary, and to implement them if they are.	2.80
HarrisburgC-19	Assess the geology at the Harrisburg School District Administration Building property to determine if mitigation measures are necessary, and to implement them if they are.	2.80
HarrisburgC-29	Work with PennDOT to assess and improve the stormwater management infrastructure at Cameron and Maclay Streets, near the Maclay Street entrance to the Farm Show Complex.	2.80
LowerSwataraT-04	Assess the geology at the Lower Swatara Township Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	2.80
PenbrookB-03	Install a backup power generator at the public works building.	2.80
RoyaltonB-01	Protect the Edgewater Pump Station to at least the 0.2 percent annual chance flood level.	2.80
SusquehannaT-09	Work with PennDOT to assess the flooding problem along the 3600 block of Elmerton Avenue to identify feasible mitigation actions, and implement them.	2.80
SusquehannaT-13	Assess and improve drainage of the mountain to reduce flooding on Red Road and Roberts Valley Road.	2.80
SusquehannaT-18	Upgrade stormwater infrastructure on Maple Lane.	2.80
SwataraT-04	Work with PennDOT to study Derry Street to identify measures to reduce transportation accidents.	2.80
HalifaxT-04	Assess the following properties to determine the risk from wildfires and what vegetation needs to be cleared: Halifax Area Authority Sewer Plant, Halifax Area Water Authority Well #1, Halifax Area Authority Sewer Plant, and Halifax Township Municipal Building.	2.65
HarrisburgC-18	Assess the geology at the John Harris High School property to determine if mitigation measures are necessary, and to implement them if they are.	2.65
HarrisburgC-20	Assess the geology at the Marshall School property to determine if mitigation measures are necessary, and to implement them if they are.	2.65
DauphinC-02	Improve telecommunications infrastructure, including the accessibility of high-speed Internet connectivity, throughout the county.	2.60
DauphinC-05	Inform the owners/operators of facilities storing hazardous materials of the risks they face and what they can do to protect their facilities and operations.	2.60
DauphinC-07	Assess the topography around the Lykens Tower Site, Mahantango Tower Site, Peters Mountain Tower Site, and Pillow Tower Site to determine if mitigation measures are necessary, and to implement those measures if they are.	2.60
DauphinC-09	Determine options for protecting the following facilities from the possible inundation due to a failure of the Raystown Lake Dam: Admin Building, Bar Association, County Offices – 100 Chestnut Street, Court House, Fort Hunter Park, Harrisburg Tower Site, Lykens Tower Site, Superior Court, Veterans Building Tower Site.	2.60
DauphinC-10	Determine options for protecting Dauphin County Bridge No. 23 from inundation due to a failure of the DeHart Dam.	2.60
DauphinC-16	Construct another ingress/egress route for the Dauphin County Department of Public Safety, Schaffner Youth Center, Adult Probation facility, and Work Release Center.	2.60
DauphinC-25	The county will assess their bridges to determine what measures can be taken to protect them from the 0.2 percent annual chance of flood level.	2.60
DauphinC-26	Assess the geology at the Area Agency on Aging property to determine if mitigation measures are necessary, and to implement them if they are.	2.60
DauphinC-27	Encourage homeowners, renters, and businesses to insure their properties against all hazards, including flood coverage under the National Flood Insurance Program (NFIP).	2.60

Mitigation Actions		Priority
DauphinC-28	Clean debris from pillars at Grubb Street and Canal Street bridges	2.60
DauphinC-31	Floodproof structures in flood-prone areas.	2.60
DauphinC-32	Conduct a study for the Susquehanna River to determine the best option to address snakeheads, flathead catfish, and other invasive species.	2.60
DauphinC-34	Develop a new Zoning Ordinance or revise an existing Zoning Ordinance to include separate zones or districts with appropriate development criteria for known hazard areas.	2.60
DauphinC-36	Revise existing zoning and/or subdivision and land development ordinances or adopt a separate, standalone ordinance to require the completion of subsurface investigations (i.e., borings, geophysical surveys, and/or studies by a registered Professional Geologist) for all new subdivision and land development projects in known land subsidence hazard areas.	2.60
DauphinC-38	Coordinate with the USGS, local watershed organizations, and/or the DCCD to increase the number of USGS and Integrated Flood Observing and Warning System (IFLOWS) rain and stream gauges in the County as a potential enhancement to the existing Susquehanna Flood Forecast and Warning System.	2.60
DauphinC-39	Work with municipalities to evaluate participation in the CRS and facilitate the preparation and submission of CRS applications.	2.60
DauphinC-46	Adopt the Radon Control Methods Appendix of the current, adopted edition of the International Residential Code to address radon in new construction.	2.60
DauphinC-47	Encourage municipalities to enter into an Intergovernmental Cooperation Agreement and Memorandum of Understanding with the Dauphin County Land Bank Authority as a way to address structures at risk from the impacts of natural and human-made hazards.	2.60
DauphinC-49	Establish an alternate EOC location in the event the primary EOC must be evacuated. This facility should also be located outside of the Special Flood Hazard Area.	2.60
BerrysburgB-02	Install a backup power generator at the Berrysburg & Community Fire Company station	2.60
DauphinB-04	Determine what other critical facilities in the borough need generators and purchase/install them.	2.60
DauphinB-05	Develop and implement a stream maintenance program to clear debris from Stony Creek.	2.60
DerryT-02	Work with PennDOT to assess the bridges over Swatara Creek on PA-39 and PA-0743 to improve the ability to pass floodwaters under the bridges.	2.60
DerryT-15	Work with PennDOT to improve Waltonville Road to mitigate traffic accidents.	2.60
EastHanoverT-01	Work with PennDOT to improve drainage to reduce flooding along the 1100 block of Manada Bottom Road.	2.60
ElizabethvilleB-01	Determine the best option to prevent flooding of the borough building.	2.60
GratzB-01	Assess the property of the Gratz Borough Building to determine the risk from wildfires and what vegetation needs to be cleared.	2.60
HalifaxT-06	Work with PennDOT to improve Powells Valley Road to mitigate traffic accidents.	2.60
HarrisburgC-10	Assess the geology at the Foose Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	2.60
HarrisburgC-16	Assess the geology at the Harrisburg City Fire Station 8 property to determine if mitigation measures are necessary, and to implement them if they are.	2.60
HarrisburgC-25	Assess the geology at the Rowland Middle School property to determine if mitigation measures are necessary, and to implement them if they are.	2.60
HarrisburgC-28	Determine options for protecting the following facilities from possible inundation due to a failure of the Raystown Lake Dam: Downey Elementary School, Edgewater Psychiatric Center, Harrisburg City Government Center, Harrisburg City Police Station, and Station 1 EMS.	2.60
HarrisburgC-32	Assess and improve the stormwater management infrastructure at the intersection of 2nd and Geiger Streets.	2.60
HarrisburgC-35	Work with PennDOT to study Mulberry Street to identify measures to reduce transportation accidents.	2.60
HarrisburgC-43	Work with PennDOT to study 19th Street to identify measures to reduce transportation accidents.	2.60
HarrisburgC-44	Work with PennDOT to study 25th Street to identify measures to reduce transportation accidents.	2.60

Mitigation Actions		Priority
LondonderryT-01	Assess the Londonderry Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	2.60
LondonderryT-02	Assess the Londonderry Township Building property to determine the risk from wildfires and what vegetation needs to be cleared.	2.60
LondonderryT-04	Replant Ash Trees that were lost to the Ash Borer and determine the best actions to prevent invasive species in the future.	2.60
LondonderryT-09	Work with PennDOT to study Roundtop Road to identify measures to reduce transportation accidents.	2.60
LowerPaxtonT-01	Assess the Linglestown Middle School property to determine the risk from wildfires and what vegetation needs to be cleared.	2.60
LowerPaxtonT-02	Assess the geology at the Linglestown Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	2.60
LowerPaxtonT-05	Work with PennDOT to study Colonial Road to identify measures to reduce transportation accidents.	2.60
LowerPaxtonT-10	Work with PennDOT to study Union Deposit Road to identify measures to reduce transportation accidents.	2.60
LowerSwataraT-02	Assess the cause(s) of flooding of "The Flats" to identify feasible mitigation actions, and implement them.	2.60
LykensB-01	Protect the Lykens Borough Office to at least the 0.2 percent chance of flood level.	2.60
LykensB-03	Assess the Lykens Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	2.60
LykensB-04	Assess the Lykens Borough Office property to determine the risk from wildfires and what vegetation needs to be cleared.	2.60
LykensB-05	Assess the Lykens Borough Authority WWTP property to determine the risk from wildfires and what vegetation needs to be cleared.	2.60
LykensT-01	Assess the Bridge in Lykens Township No. 1 historic site to determine the risk from wildfires and what vegetation needs to be cleared.	2.60
MiddlePaxtonT-03	Assess the Middle Paxton Elementary School property to determine the risk from wildfires and what vegetation needs to be cleared.	2.60
MiddletownB-02	Assess the geology at the Fink Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	2.60
MiddletownB-05	Work with Suez to assess the Veolia Wastewater Plant property to determine the risk from wildfires and what vegetation needs to be cleared.	2.60
MiddletownB-07	Assess the geology at the Middletown Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	2.60
MiddletownB-08	Assess the geology at the Middletown Police Department property to determine if mitigation measures are necessary, and to implement them if they are.	2.60
MillersburgB-04	Floodproof the Welcome Center along the Susquehanna River.	2.60
PaxtangB-01	Protect the Paxtang Borough Office/Fire Station to at least the 0.2 percent annual chance flood level.	2.60
PenbrookB-01	Assess the geology at the Penbrook Borough Office property to determine if mitigation measures are necessary, and to implement them if they are.	2.60
PillowB-07	Install a backup power generator at Well 6.	2.60
PillowB-13	Develop an evacuation and sheltering plan for Pillow Borough.	2.60
RoyaltonB-05	Phase 2 Royalton Canal Improvement Project to mitigate localized flooding.	2.60
RushT-02	Work with PennDOT to study Gold Mine Road to identify measures to reduce transportation accidents.	2.60
RushT-03	Coordinate with the DCNR Fire Forester for Dauphin County on the potential construction of a fire break at the appropriate location on the south side of Peters Mountain along Route 325.	2.60
SteeltonB-01	Assess the geology at the Steelton Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	2.60
SteeltonB-03	Install a backup power generator at the Steelton Highway Garage.	2.60
SteeltonB-04	Work with PA American Water to install a backup power generator at the sewer pump stations.	2.60
SusquehannaT-06	Work with PennDOT to study Progress Avenue to identify measures to reduce transportation accidents.	2.60

Mitigation Actions		Priority
SusquehannaT-07	Assess the flooding problem along the canal bed to identify feasible mitigation actions, and implement them.	2.60
SusquehannaT-10	Work with PennDOT to improve drainage to reduce flooding at Penn Street and Estherton Avenue.	2.60
SusquehannaT-17	Work with PennDOT to upgrade stormwater infrastructure on Paxton Church Road and Elmwood Drive.	2.60
SusquehannaT-20	Work with PennDOT to upgrade stormwater infrastructure along State Farm Road where it meets Carter and Locust.	2.60
SusquehannaT-23	Assess the geology at the Susquehanna Township EMS station property to determine if mitigation measures are necessary, and to implement them if they are.	2.60
SusquehannaT-24	Assess the property of the Rescue Fire Department Station 1 to determine the risk from wildfires and what vegetation needs to be cleared.	2.60
SwataraT-05	Work with PennDOT to study Eisenhower Boulevard to identify measures to reduce transportation accidents.	2.60
UpperPaxtonT-02	Assess the Millersburg Area Authority - Water Plant property to determine the risk from wildfires and what vegetation needs to be cleared.	2.60
UpperPaxtonT-05	Assess the Millersburg Area Ambulance Association property to determine the risk from wildfires and what vegetation needs to be cleared.	2.60
UpperPaxtonT-06	Assess the Upper Paxton Township Building property to determine the risk from wildfires and what vegetation needs to be cleared.	2.60
UpperPaxtonT-09	Assess the flooding problem in Lenkerville along the Wiconisco Creek to identify feasible mitigation actions, and implement them.	2.60
WashingtonT-02	Assess the Upper Dauphin High School property to determine the risk from wildfires and what vegetation needs to be cleared.	2.60
ElizaWiconiscoT-03	Protect the Wiconisco Township Municipal Office at 305 Walnut Street to at least the 0.2 percent annual chance flood level.	2.60
WiconiscoT-07	Assess the Wiconisco Township Municipal Building property on Walnut Street to determine the risk from wildfires and what vegetation needs to be cleared.	2.60
WiconiscoT-09	Assess the geology at the Wiconisco Township WWTP property to determine if mitigation measures are necessary, and to implement them if they are.	2.60
WilliamsT-01	Assess the Williams Township Office property to determine the risk from wildfires and what vegetation needs to be cleared.	2.60
HarrisburgC-06	Assess the geology at the Camp Curtin Fire Station historic site property to determine if mitigation measures are necessary, and to implement them if they are.	2.50
HarrisburgC-37	Support Capital Region Water's Wastewater Arsenal Boulevard Sewer Improvements - Rehabilitation/replacement of approximately 2,500 LF of sewer collector pipe.	2.50
HummelstownB-02	Assess the geology at the Hummelstown Borough Office to determine if mitigation measures are necessary, and to implement them if they are.	2.50
LowerSwataraT-01	Assess the geology at the Kunkel Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	2.50
PenbrookB-04	Install a backup power generator at the Citizen's Fire Company #1 station.	2.50
SteeltonB-05	Install a backup power generator at the Steelton Borough Building.	2.50
SteeltonB-12	Conduct an assessment of the Borough's information technology system and determine potential updates or software needed to prevent intrusions into the system.	2.50
SteeltonB-13	Install a backup power generator at the Steelton Highway Garage and the Steelton Borough Building.	2.50
SusquehannaT-19	Upgrade stormwater infrastructure on 36th Street in the area of Morton Drive.	2.50
WilliamsT-02	Assess the Williams Valley High School property on Walnut Street to determine the risk from wildfires and what vegetation needs to be cleared.	2.50
Medium Priority		
RoyaltonB-02	Develop a plan with emergency services to assist the borough if chemical containers from Univar float downstream	2.45
SwataraT-11	Assess the geology at the Station 1-2 property to determine if mitigation measures are necessary, and to implement them if they are.	2.45
DauphinC-17	Install wet and dry hydrants to provide a water supply for fire suppression.	2.40

Mitigation Actions		Priority
DauphinC-44	Enroll in the Pennsylvania Firewise Communities Program through the DCNR Fire Forester for Dauphin County.	2.40
ConewagoT-02	Work with PennDOT to improve Deodate Road to mitigate traffic accidents.	2.40
ConewagoT-03	Work with PennDOT to improve Colebrook Road to mitigate traffic accidents	2.40
DauphinB-01	Assess conditions at the confluence of Stony Creek and the Susquehanna River to identify potential mitigation actions for nearby structures.	2.40
DauphinB-08	Work with PennDOT to improve Claster Boulevard to reduce traffic accidents	2.40
DerryT-09	Work with PennDOT to protect US-322 near PA-0743 from current and future sinkholes.	2.40
DerryT-13	Work with PennDOT to improve Governor Road to mitigate traffic accidents	2.40
HalifaxT-02	Work with the property owner to protect the Legislative Route 1 Sycamore Allee historic site from flooding	2.40
HarrisburgC-02	Protect the Downey Elementary School to at least the 0.2 percent chance flood level	2.40
HarrisburgC-03	Protect the Edgewater Psychiatric Center to at least the 0.2 percent chance flood level	2.40
HummelstownB-04	Assess the geology at the Nye Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	2.40
LowerSwataraT-07	Protect the Farr Pump Station to at least the 0.2 percent annual chance flood level.	2.40
LykensB-06	Identify sections of banks of waterways that need to be stabilized, and design and implement the stabilization.	2.40
MillersburgB-01	Identify sections of banks of waterways that need to be stabilized, and design and implement the stabilization.	2.40
MillersburgB-05	Use the repair estimate provided by National Gunite to repair the storm sewer and install concrete pipe to alleviate sinkhole issues located on State Street	2.40
PaxtangB-03	Assess the geology at the Paxtang Borough Office property to determine if mitigation measures are necessary, and to implement them if they are.	2.40
PillowB-12	Analyze the intersection and develop solutions to reduce speeding on PA-225, and implement the most appropriate one.	2.40
ReedT-01	Work with PennDOT to study South River Road to identify measures to reduce transportation accidents.	2.40
SteeltonB-09	Work with PA American Water to assess the geology at the Steelton Water Filtration Plant property to determine if mitigation measures are necessary, and to implement them if they are.	2.40
SwataraT-01	Protect the Swatara Township Authority WPCF to at least the 0.2 percent annual chance flood level.	2.40
SwataraT-13	Assess the geology at the Steelton-Highspire High School property to determine if mitigation measures are necessary, and to implement them if they are.	2.40
SwataraT-14	Assess the geology at the Swatara Middle School property to determine if mitigation measures are necessary, and to implement them if they are.	2.40
SwataraT-18	Develop a plan for replacing the Derry Street Bridge over Spring Creek.	2.40
UpperPaxtonT-11	Work with PennDOT to protect PA-147 north of Millersburg Borough from landslides.	2.40
UpperPaxtonT-12	Use the repair estimate provided by National Gunite to repair the storm sewer and install a concrete pipe to alleviate sinkhole issues located on State Street.	2.40
HarrisburgC-01	Renovate or demolish vacant structures that are at risk of collapse.	2.35
LondonderryT-10	Assess the geology at the Londonderry Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	2.35
SusquehannaT-14	Assess the geology at the Londonderry School property to determine if mitigation measures are necessary, and to implement them if they are.	2.35
DauphinC-04	Educate the public about resources available to combat opioid abuse/addiction.	2.30
DauphinC-20	Work with privately-owned critical facilities to assess the geology at their sites to determine if mitigation measures are necessary, and to implement them if they are.	2.30
DauphinC-21	Work with the owners/operators of the privately owned critical facilities to determine the risk from wildfires and what vegetation needs to be cleared.	2.30

Mitigation Actions		Priority
DauphinC-22	Assess the Dauphin County Bridge No. 23 historic site to determine the risk from wildfires and what vegetation needs to be cleared.	2.30
DauphinC-23	Protect the Dauphin County Bridge No. 23 historic site to at least the 0.2 percent chance flood level.	2.30
DauphinC-24	Work with the owners/operators of privately owned critical facilities on steep slopes to study the topography of the property to determine if mitigation measures are necessary, and to implement those measures.	2.30
DauphinC-30	Elevate, acquire, or demolish and rebuild properties, including repetitive loss and severe repetitive loss properties, in flood-prone areas.	2.30
DauphinC-45	Encourage homeowners and renters to test for radon and install radon mitigation systems, if needed.	2.30
DauphinC-52	Implement the Wildwood Lake Restoration Feasibility Study, the Joint Pollutant Reduction Plan (for Paxton Creek Watershed, Chesapeake Bay, Wildwood Lake, and UNT Spring Creek), and the Paxton Creek Restoration Master Plan, to restore the Paxton Creek watershed and Wildwood Lake. Restoration efforts will provide an increase in water quality and flood protection while maintaining optimal recreation areas and diverse wildlife habitats.	2.30
DauphinC-53	Conduct a study of Emergency Medical Services to establish a plan of action to stabilize and enhance emergency medical services coverage in the Upper Dauphin County Region.	2.30
ConewagoT-01	Protect Laurel Drive from the current and future sinkholes.	2.30
DauphinB-06	Assess critical facilities in the wildland-urban interface area to determine the risk from wildfires and what vegetation needs to be cleared.	2.30
DerryT-05	Upgrade stormwater infrastructure on Bull Frog Valley Road	2.30
DerryT-10	Assess the geology at the Derry Township municipal offices to determine if mitigation measures are necessary, and to implement them if they are.	2.30
EastHanoverT-03	Work with PennDOT to improve Mountain Road to mitigate traffic accidents	2.30
HalifaxT-05	Work with PennDOT to improve Peters Mountain Road to mitigate traffic accidents	2.30
HalifaxT-07	Work with PennDOT to improve South River Road to mitigate traffic accidents	2.30
HarrisburgC-05	Assess the geology at the Ben Franklin School property to determine if mitigation measures are necessary, and to implement them if they are.	2.30
HarrisburgC-07	Assess the geology at the Camp Curtin Junior High School historic property to determine if mitigation measures are necessary, and to implement them if they are.	2.30
HarrisburgC-08	Assess the geology at the Downey Elementary School historic site property to determine if mitigation measures are necessary, and to implement them if they are.	2.30
HarrisburgC-09	Assess the geology at the Edgewater Psychiatric Center property to determine if mitigation measures are necessary, and to implement them if they are.	2.30
HarrisburgC-14	Assess the geology at the Harrisburg City Fire Station 1 property to determine if mitigation measures are necessary, and to implement them if they are.	2.30
HarrisburgC-24	Assess the geology at the Riverside Fire Station historic property to determine if mitigation measures are necessary, and to implement them if they are.	2.30
HarrisburgC-26	Assess the geology at the Scott Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	2.30
HarrisburgC-31	Work with PennDOT to assess and improve the stormwater management infrastructure along the 1400 block of Market Street.	2.30
HarrisburgC-46	Work with PennDOT to study the intersection of Front and Forster Streets to identify measures to reduce transportation accidents.	2.30
HarrisburgC-47	Work with PennDOT to study the intersection of Susquehanna and Riley Streets to identify measures to reduce transportation accidents.	2.30
HighspireB-02	Protect the Highspire Fire Department station from the 0.2 percent annual chance flood level.	2.30
JeffersonT-01	Assess the Carsonville Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	2.30
LowerPaxtonT-04	Work with the owner/operator of the Colonial Park Care Center to upgrade its backup power capabilities.	2.30
LowerSwataraT-08	Install a backup power generator at the Farr Pump Station.	2.30

Mitigation Actions		Priority
MiddlePaxtonT-01	Work with PennDOT to study Peters Mountain Road to identify measures to reduce transportation accidents.	2.30
MiddlePaxtonT-02	Assess the Dauphin-Middle Paxton Municipal Office property to determine the risk from wildfires and what vegetation needs to be cleared.	2.30
MiddlePaxtonT-04	Work with the owners/operators of privately owned critical facilities in the area subject to inundation due to a failure of the DeHart Dam to discuss their risk of flooding and protective measures they can take.	2.30
PaxtangB-02	Assess the geology at the Paxtang Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	2.30
PenbrookB-02	Assess the geology at the Penbrook Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	2.30
PillowB-02	Assess the Pillow Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	2.30
PillowB-03	Install a backup power generator at the Pillow Borough municipal building.	2.30
PillowB-04	Install a backup power generator at the Pillow Fire Department station.	2.30
PillowB-06	Install a backup power generator at Well 5.	2.30
PillowB-08	Upgrade fire department radios to be interoperable between Dauphin and Northumberland Counties.	2.30
PillowB-09	Work with the Pillow Historical Society and PPL to determine options to prevent power outages and damage to the water treatment building, and implement the most appropriate one.	2.30
PillowB-10	Work with PennDOT to improve drainage on PA-225 to prevent ponding water.	2.30
PillowB-15	Enclose Well 5 infrastructure in a shelter.	2.30
SouthHanoverT-02	Work with PennDOT to study Union Deposit Road to identify measures to reduce transportation accidents.	2.30
SusquehannaT-04	Assess the geology at the Susquehanna Township High School property to determine if mitigation measures are necessary, and to implement them if they are.	2.30
SusquehannaT-15	Assess the geology at the Progress Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	2.30
SusquehannaT-21	Assess the geology at the Sara Lindemuth Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	2.30
SwataraT-06	Work with PennDOT to study Harrisburg Street to identify measures to reduce transportation accidents.	2.30
SwataraT-16	Assess the geology at the Swatara Township Building property to determine if mitigation measures are necessary, and to implement them if they are.	2.30
WashingtonT-01	Work with the Dauphin Meadows Landfill to assess the property to determine the risk from wildfires and what vegetation needs to be cleared.	2.30
WashingtonT-04	Assess the Washington Township Building property to determine the risk from wildfires and what vegetation needs to be cleared.	2.30
WestHanoverT-01	Assess the West Hanover Township Public Works Building on Walnut Ave property to determine the risk from wildfires and what vegetation needs to be cleared.	2.30
WestHanoverT-02	Assess the West Hanover Township Fire Department Station 3 property to determine the risk from wildfires and what vegetation needs to be cleared.	2.30
WestHanoverT-03	Assess the geology at the West Hanover Township Water and Sewer property to determine if mitigation measures are necessary, and to implement them if they are.	2.30
WestHanoverT-05	Work with PennDOT to study Linglestown Road to identify measures to reduce transportation accidents.	2.30
WiconiscoT-01	Assess the geology at the Wiconisco Township Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	2.30
WiconiscoT-04	Assess the geology at the Wiconisco Township building property to determine if mitigation measures are necessary, and to implement them if they are.	2.30
WilliamsT-03	Work with PennDOT to study Market Street to identify measures to reduce transportation accidents.	2.30
WilliamstownB-02	Protect the Williamstown EMS Station to at least the 0.2 percent annual chance flood level.	2.30

Mitigation Actions		Priority
DauphinC-03	Simplify and improve the model stormwater management ordinance to enhance the enforcement and effectiveness of stormwater management practices	2.25
DauphinC-06	Work with childcare facility operators to discuss hazards they face and ensure their emergency plans address those hazards.	2.25
DauphinC-13	Provide information to PEMA on the risks faced by each Commonwealth-owned critical facility in Dauphin County, so that PEMA can work with the Department of General Services to protect the facilities.	2.25
DauphinC-14	Work with PennDOT to improve Interstates -076 (PA Turnpike), -081, -083, and -283 to reduce accidents	2.25
DauphinC-29	Install backup preventers in wastewater pipes to prevent basement flooding.	2.25
DauphinC-43	Municipalities should continue to seek solutions to problem areas and obstructions identified in the April 2010 Countywide Act 167 Stormwater Management Plan.	2.25
DauphinB-02	Assess the borough to identify potential mitigation actions to take to ensure access to/from the borough during floods of the Susquehanna River.	2.25
DerryT-11	Work with Sheetz #351 to determine options for protecting the facility from the possible inundation from dam failure from the Hershey Dam	2.25
DerryT-14	Work with PennDOT to improve Middletown Road to mitigate traffic accidents	2.25
EastHanoverT-04	Work with PennDOT to improve Laudermilch Road to mitigate traffic accidents	2.25
HalifaxT-01	Protect the Halifax Area Water Authority Well #1 to the 0.2 percent annual chance of flood event.	2.25
HarrisburgC-34	Work with PennDOT to study Cameron Street to identify measures to reduce transportation accidents.	2.25
HarrisburgC-39	Support Capital Region Water's Stormwater Camp Curtin YMCA GSI - Develop visible GSI improvements as part of the community center rehabilitation and beautification	2.25
HarrisburgC-40	Support Capital Region Water's Stormwater COH East-West Multimodal Connector - GSI - Capture and manage stormwater in green stormwater elements designed to also serve as traffic calming elements.	2.25
HarrisburgC-48	Implement the recommendations of the Harrisburg Authority's ongoing combined sewer overflow impact study.	2.25
LondonderryT-07	Work with PennDOT to study Colebrook Road to identify measures to reduce transportation accidents.	2.25
LowerSwataraT-09	Install a backup power generator at the Jamesway Pump Station.	2.25
MiddletownB-03	Work with PennDOT to study Main Street/Harrisburg Pike to identify measures to reduce transportation accidents.	2.25
PillowB-11	Map the borough's water infrastructure.	2.25
PillowB-14	Installation of new water lines and improve the water infrastructure.	2.25
SteeltonB-11	Borough Storm Sewer Management System to conduct an assessment on storm sewer system inlets being old and need to be replaced as well as cleaned up	2.25
SusquehannaT-08	Work with PennDOT to assess the flooding problem along Front Street to identify feasible mitigation actions, and implement them.	2.25
SusquehannaT-16	Separate stormwater and sanitary sewer in Ward 1 (Front Street corridor).	2.25
SwataraT-17	Assess the geology at the Swatara Township Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	2.25
UpperPaxtonT-10	Assess the flooding problem on River Street to identify feasible mitigation actions, and implement them.	2.25
WilliamstownB-01	Assess the Williamstown Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	2.25
HarrisburgC-30	Work with PennDOT to assess and improve the stormwater management infrastructure on the 1800 block of Derry Street.	2.20
SusquehannaT-11	Work with PennDOT to assess the flooding problem along Paxton Church Road to identify feasible mitigation actions, and implement them.	2.20
DerryT-16	Assess the drainage and stormwater management infrastructure in the area of Hersheypark Drive and Walton Avenue to determine appropriate mitigation measures to reduce the risk of flooding, and implement them.	2.15

Mitigation Actions		Priority
DerryT-17	Work with FEMA and the PA Department of Environmental Protection to obtain certification for the levee in Palmdale	2.15
HummelstownB-01	Assess the geology at the Lower Dauphin School District campuses to determine if mitigation measures are necessary, and to implement them if they are.	2.15
LondonderryT-05	Assess the geology at the Londonderry Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	2.15
PenbrookB-05	Assess the stormwater management infrastructure throughout the borough and determine what upgrades need to be made.	2.15
RoyaltonB-04	Provide assistance to remove built-up debris from around bridge pillars	2.15
DauphinC-11	Assess the geology at the following sites and determine if mitigation measures are necessary, and to implement them if they are: 333 Market Street Tower Site, Administration Building, Adult Probation, Assistance Office, Bar Association, Children and Youth, Conewago CWT Tower Site, Coroner's Office, County Offices – 100 Chestnut Street, Court House, Dauphin ECC Tower Site, Department of Public Safety, Harrisburg Tower Site, Judicial Center, Lower Swatara Tower Site, Market Street Tower Site, Prison, Recycling Center, Reservoir Park Tower Site, Superior Court, Veteran's Building Tower Site, and Work Release	2.10
DauphinC-33	Develop a new Comprehensive Plan or amend an existing Comprehensive Plan to include an assessment and associated mapping of the municipality's vulnerability to location-specific hazards and appropriate recommendations for the use of these hazard areas.	2.10
DauphinC-35	Develop a new Subdivision and Land Development Ordinance or revise an existing Subdivision and Land Development Ordinance to include municipal-specific, hazard mitigation-related development criteria and/or provisions for the mandatory use of conservation subdivision design principles to regulate the location and construction of buildings and other infrastructure in known hazard areas.	2.10
DauphinC-37	Update and implement a comprehensive water resources management plan that analyzes the County's existing water resources supply and evaluates the County's anticipated water use demand to identify suspected water supply shortages and potential new water supply sources.	2.10
DauphinC-40	Develop a technical proficiency at the municipal level for conducting post-disaster damage assessments and continue to regulate through local planning and zoning reconstruction activities to ensure compliance with NFIP substantial damage/substantial improvement requirements.	2.10
DauphinC-41	Develop technical proficiency at the municipal level for assisting residents and business owners in applying for hazard mitigation and assistance funds and identifying cost-beneficial hazard mitigation measures to be incorporated into reconstruction activities.	2.10
DauphinC-48	Increase the number of NOAA Weather Alert radios in public places across the County that currently do not have them (such as personal care homes) above and beyond what is required of the County by the NWS's Storm Ready Program.	2.10
DauphinC-50	The Dauphin County Department of Information Technology will make natural and human-made hazard data available for municipal use.	2.10
DauphinC-51	Assess the Station 77 property to determine the risk from wildfires and what vegetation needs to be cleared.	2.10
BerrysburgB-01	Install a backup power generator at the Berrysburg Borough municipal building.	2.10
BerrysburgB-03	Discuss with the owner/operator of critical facilities vulnerable to hazardous materials release the risk and possible protective measures.	2.10
DerryT-07	Install a generator at the Derry Township Public Works building	2.10
DerryT-12	Work with PennDOT to improve Elizabethtown Road to mitigate traffic accidents	2.10
EastHanoverT-06	Obtain a warning system for residents from outside contractors to alert residents, including renters and tourists, to hazardous materials incidents or other hazards	2.10
ElizabethvilleB-01	Assess stormwater management infrastructure in the borough to determine what improvements need to be made to control runoff and reduce flooding.	2.10
ElizabethvilleB-03	Install a backup power generator at the Elizabethville Borough building.	2.10
GratzB-02	Assess the Gratz Fire Department station to determine the risk from wildfires and what vegetation needs to be cleared.	2.10
HalifaxB-01	Ensure that the borough has plans in place to continue operations if a hazardous materials release causes an evacuation of the Halifax Borough Office.	2.10
HalifaxB-02	Discuss with the US Postal Service that the Halifax Post Office is vulnerable to a hazardous materials release and possible protective measures.	2.10

Mitigation Actions		Priority
HalifaxT-03	Assess the topography around the Halifax Area Water Authority Well #1 to determine if mitigation measures are necessary, and to implement those measures if they are.	2.10
HarrisburgC-22	Assess the geology at the Paxton Fire Station historic property to determine if mitigation measures are necessary, and to implement them if they are.	2.10
HarrisburgC-36	Work with PennDOT to study State Street to identify measures to reduce transportation accidents.	2.10
HarrisburgC-38	Support Capital Region Water's Stormwater SW Pond Retrofit – Bellevue Park Design - Employing green stormwater infrastructure (GSI) to manage stormwater runoff and prevent flows from entering the combined sewer system, thereby reducing combined sewer overflow (CSO) activity.	2.10
HarrisburgC-42	Support Capital Region Water's Stormwater South Allison Hill GSI - Capture and manage stormwater in green stormwater elements designed to also serve as traffic calming elements.	2.10
HarrisburgC-45	Work with PennDOT to study the intersection of 2nd and Geiger Streets to identify measures to reduce transportation accidents.	2.10
HarrisburgC-49	Identify, assess, and, as necessary, implement solutions to reduce impacts on human life from the Dock Street Dam	2.10
HarrisburgC-50	Study options to restore Paxton Creek within City limits and collaborate with Whole Community Partners to implement findings of the study to re-establish the historic floodplain of the creek.	2.10
HighspireB-01	Protect the wastewater treatment plant from the 0.2 percent annual chance flood level.	2.10
HighspireB-03	Assess the Highspire Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	2.10
JeffersonT-02	Assess the Jefferson Township Municipal Office property to determine the risk from wildfires and what vegetation needs to be cleared.	2.10
LondonderryT-06	Install a backup power generator at the public works building.	2.10
LondonderryT-08	Work with PennDOT to study Harrisburg Pike to identify measures to reduce transportation accidents.	2.10
LowerPaxtonT-03	Install a backup power generator at the Central Dauphin School District transportation facility.	2.10
LowerPaxtonT-06	Work with PennDOT to study Jonestown Road to identify measures to reduce transportation accidents.	2.10
LowerPaxtonT-07	Work with PennDOT to study Linglestown Road to identify measures to reduce transportation accidents.	2.10
LowerPaxtonT-08	Work with PennDOT to study Nyes Road to identify measures to reduce transportation accidents.	2.10
LowerSwataraT-10	Install a backup power generator at the North Union Street Pump Station.	2.10
MiddletownB-04	Protect the Mill Street electrical substation from the 0.2 percent annual chance flood level.	2.10
RushT-01	Assess the Rush Township Municipal Office property to determine the risk from wildfires and what vegetation needs to be cleared.	2.10
SteeltonB-02	Work with PA American Water to protect the Steelton Water Filtration Plant to at least the 0.2 percent annual chance flood level.	2.10
SteeltonB-07	Assess the flooding problem along South Front Street near the quarry to identify feasible mitigation actions, and implement them.	2.10
SusquehannaT-01	Assess the Susquehanna Township Administration Building property to determine the risk from wildfires and what vegetation needs to be cleared.	2.10
SusquehannaT-05	Assess the geology at the Thomas Holtzman Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	2.10
SusquehannaT-12	Assess and improve drainage near the Latshmere Swim Club.	2.10
SwataraT-03	Work with Capital Region Water to protect the Harrisburg Advanced Wastewater facility to at least the 0.2 percent annual chance flood level.	2.10
SwataraT-07	Work with PennDOT to study Paxton Street to identify measures to reduce transportation accidents.	2.10
UpperPaxtonT-01	Assess the Lenkerville Elementary School property to determine the risk from wildfires and what vegetation needs to be cleared.	2.10
UpperPaxtonT-03	Assess the Millersburg Area Senior Center property to determine the risk from wildfires and what vegetation needs to be cleared.	2.10

Mitigation Actions		Priority
WestHanoverT-04	Work with PennDOT to study Hershey Road to identify measures to reduce transportation accidents.	2.10
WiconiscoT-02	Assess the topography around the Wiconisco Township WWTP to determine if mitigation measures are necessary, and to implement those measures if they are.	2.10
WiconiscoT-05	Assess the Wiconisco Township Office property on Arch Street to determine the risk from wildfires and what vegetation needs to be cleared.	2.10
WiconiscoT-06	Assess the Wiconisco Township Fire Department property to determine the risk from wildfires and what vegetation needs to be cleared.	2.10
DauphinC-01	Provide public outreach about hazards and protective measures people, including renters and tourists, can take to protect themselves (e.g., receiving emergency alerts through South Central Alert) and their property.	2.05
SteeltonB-06	Renovate or demolish vacant structures that were damaged by fire and are at risk of collapse.	2.05
DauphinC-12	Identify and provide incentives to recruit and retain volunteer firefighters.	2.00
DauphinC-19	Work with the owners/operators of privately owned critical facilities in the area subject to inundation due to a failure of the Raystown Lake Dam to discuss their risk of flooding and protective measures they can take.	2.00
DauphinC-42	Investigate the feasibility of constructing a levee/floodwall system along Swatara Creek between East Main Street and the Pennsylvania Turnpike to minimize Middletown Borough's flood hazard potential.	2.00
DauphinB-09	Work with PennDOT to improve US-22/322 to mitigate traffic accidents	2.00
HarrisburgC-33	Assess and improve the stormwater management infrastructure at the intersection of Herr and Plum Streets.	2.00
HummelstownB-03	Assess the geology at the Hummelstown Fire Department property to determine if mitigation measures are necessary, and to implement them if they are.	2.00
LondonderryT-11	Conewago Creek Stream Restoration - restore 1 mile of stream, remove approximately 125,000 cubic yards of sediment, and re-establish the historic floodplain of the creek.	2.00
WashingtonT-03	Assess the Upper Dauphin Middle School property to determine the risk from wildfires and what vegetation needs to be cleared.	2.00
WiconiscoT-08	Assess the geology at the Wiconisco Township Police Department property to determine if mitigation measures are necessary, and to implement them if they are.	2.00
DauphinC-08	Assess the following properties to determine the risk from wildfires and what vegetation needs to be cleared: Agriculture Building, Blue Mountain Tower Site, Conewago CWT Tower Site, Lower Swatara Tower Site, and Mahantango Tower Site	1.95
LowerSwataraT-05	Assess the geology at the Middletown Area High School property to determine if mitigation measures are necessary, and to implement them if they are.	1.95
LowerSwataraT-06	Assess the geology at the Reid Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	1.95
LykensB-02	Protect the Lykens Borough Authority WWTP to at least the 0.2 percent chance of flood level	1.95
LykensT-02	Work with PennDOT to study North Crossroads Road to identify measures to reduce transportation accidents.	1.95
MiddletownB-06	Assess the geology at the Middletown Borough Building property to determine if mitigation measures are necessary, and to implement them if they are.	1.95
MiddletownB-09	Work with Suez to assess the geology at the Veolia Wastewater Plant property to determine if mitigation measures are necessary, and to implement them if they are.	1.95
Low Priority		
DauphinC-18	Work with the owners/operators of privately owned critical facilities in the special flood hazard area to discuss their risk of flooding and the protective measures they can take.	1.80
DauphinB-03	Install a generator at the Borough Building	1.80
DerryT-01	Assess stormwater management infrastructure in the township to determine what improvements need to be made, then implement the improvements.	1.80

Mitigation Actions		Priority
EastHanoverT-02	Work with PennDOT to eliminate highway flooding at the intersection of PA-443 and Firehouse Road during heavy rainfalls.	**1.80**
HarrisburgC-04	Protect the Station 1 EMS facility to at least the 0.2 percent chance of flood level	**1.80**
HarrisburgC-21	Assess the geology at the Melrose School property to determine if mitigation measures are necessary, and to implement them if they are.	**1.80**
HarrisburgC-41	Support Capital Region Water's Wastewater (Combined, Sanitary & Storm) Collection System Rehabilitation - Rehabilitate priority defects to avoid failures using a variety of methods including conventional replacement and "trenchless" structural pipe lining procedures.	**1.80**
LondonderryT-03	Assess the geology at the Derry Township Municipal Authority Southwest property to determine if mitigation measures are necessary, and to implement them if they are.	**1.80**
PillowB-01	Assess the Pillow Borough Building property to determine the risk from wildfires and what vegetation needs to be cleared.	**1.80**
PillowB-05	Determine appropriate measures for preventing injuries at blighted properties	**1.80**
RoyaltonB-06	Structural assessment and reinforcement of Edgewater Development retaining wall.	**1.80**
SouthHanoverT-01	Work with PennDOT to study Grandview Drive to identify measures to reduce transportation accidents.	**1.80**
SteeltonB-08	Assess the geology at the Steelton Borough office property to determine if mitigation measures are necessary, and to implement them if they are.	**1.80**
SteeltonB-10	Assess the type and number of vacant/abandoned buildings in the Borough and determine if mitigation measures are necessary.	**1.80**
SusquehannaT-02	Assess the Thomas Holtzman Elementary School property to determine the risk from wildfires and what vegetation needs to be cleared.	**1.80**
SusquehannaT-03	Assess the geology at the Susquehanna Township Administration Building property to determine if mitigation measures are necessary, and to implement them if they are.	**1.80**
DerryT-08	Assess the topography around the following structures to determine if mitigation measures are necessary, and to implement those measures if they are: Quarries of the Hummelstown Brownstone Company historic site and Derry Township LDFL Wastewater facility	**1.30**
SusquehannaT-22	Assess the geology at the Susquehanna Middle School property to determine if mitigation measures are necessary, and to implement them if they are.	**1.30**
SwataraT-12	Assess the geology at the Steelton-Highspire Elementary School property to determine if mitigation measures are necessary, and to implement them if they are.	**1.30**

SECTION 7 PLAN MAINTENANCE PROCEDURES

The process of monitoring, evaluating, and updating the Dauphin County Hazard Mitigation Plan (HMP) is critical to maintaining its value and supporting the success of Dauphin County's hazard mitigation efforts. Ensuring effective implementation of mitigation activities paves the way for continued momentum in the planning process and supports future resiliency.

This section describes the system that all planning partners to the Dauphin County HMP have established to monitor, evaluate, and update the HMP (Section 7.2) and the strategy to continue public involvement for plan maintenance (Section 7.3). Section 7.1 summarizes how this content was updated from the 2020 HMP.

7.1 UPDATE PROCESS SUMMARY

The Dauphin County HMP Hazard Mitigation Steering Committee (Steering Committee) reviewed the 2020 plan maintenance procedures and carried them forward to the current HMP update, as described in the sections below. The updated plan maintenance procedures describe how this plan may be integrated into other planning mechanisms in the county. Going forward, the plan will be available on the Dauphin County Department of Public Safety website.

7.2 MONITORING, EVALUATING, AND UPDATING THE PLAN

The following sections describe the monitoring, evaluating, and updating processes and protocols for the Dauphin County HMP.

7.2.1 Participation

The Steering Committee will remain intact as the organization responsible for monitoring, evaluating, and updating this plan. The Planning Specialist of the Dauphin County Department of Public Safety's Office of Emergency Management will serve as HMP Coordinator for the Steering Committee. Each participating jurisdiction will designate a representative to support the jurisdiction's responsibilities to monitor, evaluate, and update the HMP as identified in this section. Section 3 lists the current Steering Committee members. As individual commitments change over time, each jurisdiction will be responsible for informing the HMP Coordinator by a formal letter of any changes in representation. The HMP Coordinator will ensure the Steering Committee represents all planning partners in the county. The HMP Coordinator will maintain the membership of the Steering Committee on the Dauphin County Department of Public Safety website or in publicly accessible county records.

Dauphin County contains 50 jurisdictions (the county, 40 municipalities, 10 school districts, and two special districts [authorities]); 6 of these jurisdictions did not participate in the 2025 HMP update process and are therefore not currently eligible for federal mitigation funding to implement projects. Each of these jurisdictions can elect to join the 2025 HMP to achieve eligibility for such funding by working with the Dauphin County HMP Coordinator to complete the following steps:

1. Provide information on the hazards and risks that can affect the jurisdiction's operations, residents, businesses, property, and environment.
2. Provide information on its capabilities.
3. Provide an update on the status of its mitigation actions from the 2020 version of the HMP (as applicable).
4. Identify mitigation actions to include in the current HMP.
5. Adopt the current HMP by resolution (see Section 8).

Steps 1 to 3 above can be accomplished by completing the information-gathering worksheets that were used during the planning process. Any jurisdiction that has adopted the 2025 HMP will not have to re-adopt the 2025 HMP if the HMP is updated to include another jurisdiction's information.

7.2.2 Monitoring

The Steering Committee will be responsible for monitoring progress on the plan, evaluating its effectiveness, and documenting annual progress. Each year, beginning one year after plan approval, Dauphin County and Steering Committee representatives will collect and process information from the departments, agencies, and organizations involved in implementing the mitigation actions listed in Section 6 of this plan.

In the first year of the performance period, this will be accomplished by utilizing an online performance progress reporting system (the BATool[SM]) that will enable municipal and county representatives to directly access and update the status of each mitigation action, document successes or obstacles to implementation, and add or delete projects. Participating partners will be prompted by the tool to update progress every quarter, which encourages participants to refresh their mitigation strategies and continue the implementation of projects. By facilitating the sorting and prioritization of projects, this reporting system can support the submittal of an increased number of project grant fund applications.

In addition to progress on the implementation of mitigation actions, Steering Committee representatives will document the following, as needed:

- Any grant applications filed on behalf of their jurisdiction
- Hazard events and losses occurring in their jurisdiction
- Additional mitigation actions that are appropriate and feasible
- Public and stakeholder input

Plan monitoring for years 2 through 4 of the plan performance period will be addressed via the BATool[SM] or manually.

7.2.3 Evaluating

The evaluation of the HMP is an assessment of whether the planning process and actions have been effective, the plan's goals are being reached, and changes are needed. The plan will be evaluated on an annual basis to determine the effectiveness of the programs and to reflect changes that may affect mitigation priorities or available funding.

Information gathered on the status of the HMP, as described in Section 7.2.2, will be discussed and documented at an annual plan review meeting of the Steering Committee. At least one month before the plan review meeting, the Dauphin County HMP Coordinator will advise Steering Committee members of the meeting date, agenda, and expectations of the members. The HMP Coordinator may also distribute additional mitigation surveys and mitigation project opportunity forms for jurisdictions with new information or for those who did not participate in the update process.

The HMP Coordinator will be responsible for calling and coordinating the progress plan review meeting and assessing progress toward achieving plan goals and objectives. The meeting will assess whether:

- Goals and objectives address current and expected conditions
- The nature or magnitude of the risks has changed
- The HMP has been implemented into land-use processes on the county and municipal levels
- Current resources are appropriate for implementing the HMP or different or additional resources are now available
- Actions are cost-effective
- Schedules and budgets are feasible

- Implementation problems exist—such as technical, political, legal, or coordination issues with other agencies
- Outcomes have occurred as expected
- Changes in county or municipal resources have impacted plan implementation (for example, funding, personnel, and equipment)
- New agencies, departments, or staff should be included, including other local governments, as defined under 44 Code of Federal Regulations (CFR), Section 201.6
- Documentation has been completed for any hazards that occurred during the last year

The Steering Committee will review mitigation goals, objectives, activities, and projects using the following performance-based indicators:

- New agencies or departments that have the authority to implement mitigation actions or are required to meet goals, objectives, and actions
- Current needs of the mitigation plan
- Progress of proposed or ongoing actions
- Spending on mitigation action budgets
- Achievement of goals and objectives
- Whether resources are required to implement mitigation activities
- Whether proposed schedules are sufficient to address actions
- Whether the budget basis should be changed or is sufficient
- Whether there is an adequate commitment on the part of lead or support agencies
- Whether any goals, objectives, or actions have become unfeasible

Finally, the Steering Committee will evaluate the ways other programs and policies have conflicted with or augmented planned or implemented measures and will identify policies, programs, practices, and procedures that could be modified to accommodate hazard mitigation actions (described further in Section 5). These other programs and policies can include those that address the following:

- Economic development
- Environmental preservation and permitting
- Historic preservation
- Redevelopment
- Health and safety
- Recreation
- Land use and zoning
- Public education and outreach
- Transportation

During the Steering Committee meeting, participants will establish a schedule for the development, review, amendment, and submission of an annual HMP progress report to the State Hazard Mitigation Officer. The Dauphin County HMP Coordinator will be responsible for preparing the annual HMP progress report based on annual local progress reports provided by each jurisdiction, information presented at the Steering Committee meeting, and other information as appropriate and relevant. These annual HMP county progress reports will provide data for the five-year update of this HMP and will assist in pinpointing implementation challenges. By monitoring the implementation of the plan, the Steering Committee will assess which projects are completed, are no longer feasible, or may require additional funding.

The annual HMP progress report will apply to all planning partners who have provided input and will be developed according to an agreed-upon format. Each planning partner will have adequate allowance for input and comment before completion and submission to the State Hazard Mitigation Officer. Each participating jurisdiction will be responsible for providing this report to its governing body for review. The HMP Coordinator will ensure that the reports are submitted to the State Hazard Mitigation Officer and FEMA Region 3.

The plan will be evaluated following any major disasters to determine whether the recommended actions remain relevant and appropriate. The risk assessment will also be revisited to determine whether any changes are necessary based on the pattern of disaster damage or if data listed in Section 4.3 (Hazard Profiles) has been collected to facilitate the risk assessment. Revisiting the risk assessment is an opportunity to increase the community's disaster resistance and build a better and stronger community.

7.2.4 Updating

Section 44 CFR 201.6.d.3 requires local jurisdictions to review, revise (as appropriate), and resubmit their hazard mitigation plans for approval to remain eligible for certain federal benefits. The Dauphin County Steering Committee will update this plan on a five-year cycle from the date of plan approval.

To facilitate the update process, the Dauphin County HMP Coordinator, with support from the Steering Committee, will hold a meeting three years from the date of plan approval to develop and commence with a detailed plan update program. The HMP Coordinator will invite representatives from the Pennsylvania Emergency Management Agency (PEMA) to this meeting to provide guidance on plan update procedures. This program will, at a minimum, establish the parties responsible for managing and completing the plan update, the features needed to be included in the updated plan, and a detailed timeline to ensure that the update is completed according to regulatory requirements.

At this meeting, the Steering Committee will determine the resources needed to complete the update. The Dauphin County HMP Coordinator will be responsible for ensuring that needed resources are secured. The HMP Coordinator will also be responsible for coordinating the plan evaluation portion of the meeting, soliciting and reviewing feedback comments, and ensuring their incorporation in the five-year plan update as appropriate. Additional meetings may also be held, as deemed necessary by the Steering Committee. These meetings will provide an opportunity for the public to express concerns, opinions, and ideas about the HMP.

7.3 CONTINUED PUBLIC INVOLVEMENT

Dauphin County and all HMP planning partners are committed to the continued involvement of the public in the hazard mitigation process. Therefore, this plan will be posted on the HMP website and made available for review during normal business hours at the main county office in Steelton, Pennsylvania (information provided below). Dauphin County will make electronic copies of the plan available for local municipalities to provide to the public.

Following each five-year update of the HMP, the updated plan will be distributed for public comment. After all comments are addressed, the HMP will be revised and distributed to all Steering Committee members and the Pennsylvania State Hazard Mitigation Officer.

The Dauphin County HMP Coordinator will be responsible for receiving, tracking, and filing public comments on the HMP. The public will have an opportunity to comment on the plan at the review meeting for the HMP and during the five-year plan update. Dauphin County will maintain an active link on the Dauphin County Department of Public Safety website to collect public comments.

The Dauphin County HMP Coordinator will ensure the following:

- Public comment and input on the HMP (and hazard mitigation in general) will be recorded and addressed, as appropriate.
- An opportunity to comment on the plan will be provided directly on the Dauphin County Department of Public Safety website.
- Provisions will be made for public comments submitted in writing, addressed to:

  Ms. Lexi Passaro
  Planning Specialist, Office of Emergency Management
  Dauphin County Department of Public Safety

911 Gibson Boulevard
Steelton, PA 17113

- HMP content will be maintained and updated on the Dauphin County Department of Public Safety's website as appropriate.
- All public and stakeholder comments received will be documented and maintained.
- Copies of the latest approved plan will be available for review at the Dauphin County Department of Public Safety office, along with instructions to facilitate public input and comment on the plan.
- Public notices, including media releases, will be developed (as appropriate) to inform the public of the availability of the plan, particularly during plan update cycles.

The Steering Committee representatives will be responsible for ensuring the following:

- Public comment and input on the HMP (and hazard mitigation in general) will be recorded and addressed, as appropriate.
- Copies of the latest approved version of the plan will be available for review at the municipal buildings along with instructions to facilitate public input and comment on the plan.
- Appropriate links to the Dauphin County website will be maintained. The website will be monitored throughout the HMP update process, and a draft copy of the plan will be posted for public comment. Upon conclusion of the update, appropriate links to the county HMP will be maintained on the website.
- Public notices will be made, as appropriate, to inform the public of the availability of the plan, particularly during plan update cycles.

SECTION 8 PLAN ADOPTION

By adopting the Dauphin County Hazard Mitigation Plan (HMP), jurisdictions demonstrate their commitment to fulfilling the mitigation goals and objectives outlined in the plan. Adoption of the HMP by Dauphin County and each participating jurisdiction legitimizes the HMP and authorizes responsible agencies to execute their responsibilities.

Each participating jurisdiction in Dauphin County will continue with formal adoption proceedings upon review of the HMP by the Pennsylvania Emergency Management Agency (PEMA); as the HMP is reviewed by the Federal Emergency Management Agency (FEMA); or upon conditional approval of the HMP from FEMA (known as Approval Pending Adoption). Conditional approval is provided for jurisdictions that meet all planning requirements except the adoption requirement.

Following adoption or formal action on the HMP, each participating jurisdiction must submit a copy of the resolution or other legal instrument showing formal adoption of the HMP to the Dauphin County Hazard Mitigation Coordinator. Dauphin County will forward the executed resolutions to PEMA, which will subsequently forward the resolutions to FEMA. FEMA will transmit an acknowledgment of verification of formal HMP adoption and the official approval of the HMP to the Hazard Mitigation Coordinator. Resolutions reflecting the formal adoption of this HMP by the county and participating jurisdictions are included in Appendix F of this HMP. A sample resolution to be used by the county and its jurisdictions is provided on the following page.

RESOLUTION NO. XXXX-XX
A RESOLUTION OF THE Governing Body OF THE Jurisdiction Name
AUTHORIZING THE ADOPTION OF THE
2025 DAUPHIN COUNTY HAZARD MITIGATION PLAN

WHEREAS Dauphin County and its jurisdictions recognize the threat that hazards pose to people and property within Dauphin County; and

WHEREAS the County and its jurisdictions have prepared a multi-hazard mitigation plan, hereby known as the 2025 Dauphin County Hazard Mitigation Plan in accordance with federal laws, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and the National Dam Safety Program Act, as amended; and

WHEREAS the 2025 Dauphin County Hazard Mitigation Plan identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Dauphin County and its jurisdictions from the impacts of future hazards and disasters; and

WHEREAS adoption by Dauphin County and its jurisdictions demonstrates their commitment to hazard mitigation and achieving the goals outlined in the 2025 Dauphin County Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED BY THE [JURISDICTION NAME], PENNSYLVANIA, THAT:
In accordance with (local rule for adopting resolutions), the (jurisdiction name) adopts the 2025 Dauphin County Hazard Mitigation Plan. While content related to Dauphin County and [jurisdiction name] may require revisions to meet the plan approval requirements, changes occurring after adoption will not require [jurisdiction name] to re-adopt any further iterations of the plan. Subsequent plan updates following the approval of this plan will require separate adoption resolutions.

ADOPTED by a vote of [XX] in favor and [XX] against, and [XX] abstaining, this [XX] day of [Month], [Year].

By: (print name)

ATTEST By: (print name)

APPROVED AS TO FORM By: (print name)

ACRONYMS AND ABBREVIATIONS

This resource identifies acronyms and abbreviations used in or supporting the Dauphin County Hazard Mitigation Plan (HMP). The acronyms and abbreviations listed below are based on documents included in the reference section, with modifications as appropriate to address the Dauphin County-specific identifications and requirements.

%	Percent
%g	Percent acceleration force of gravity
°F	Degrees Fahrenheit
65 PA C.S.A	Pennsylvania Sunshine Act
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
APA	Approval Pending Adoption
APPA	American Public Power Association
ARC	American Red Cross
BFE	Base Flood Elevation
BOCA	Building Officials Code Administration
BRFPW	Pennsylvania Bureau of Rail Freight, Ports, and Waterways
BRIC	Building Resilient Infrastructure and Communities
B-Scale	Beaufort Wind Scales
CDBG	Community Development Block Grant
CDC	Centers for Disease Control and Prevention
CERT	Community Emergency Response Team
cfs	Cubic feet per second
CFR	*Code of Federal Regulations*
COG	Continuity of Government
COOP	Continuity of Operations
CPC	Climate Prediction Center
CPR	Cardiopulmonary Resuscitation
CRREL	Cold Regions Research and Engineering Laboratory
CRS	Community Rating System
CSB	Chemical Safety Board
CSXT	CSX Transportation
DART	Demand and Response Transit
DCED	Department of Community and Economic Development

DCNR	Department of Conservation and Natural Resources
DEM	Digital Elevation Model
DFIRM	Digital Flood Insurance Rate Map
DHHS	U.S. Department of Health and Human Services
DHS	U.S. Department of Homeland Security
DI	Damage Indicators
DMA 2000	Disaster Mitigation Act of 2000
DOD	Degrees of Damage
DOE	U.S. Department of Energy
DOF	Dependent on Funding
DPS	Department of Public Safety
DOT	U.S. Department of Transportation
DR	Disaster Declarations
EAL	Emergency Action Levels
EAP	Education and Awareness Program
EAP	Emergency Action Plan
EDA	U.S. Economic Development Administration
EF Scale	Enhanced Fujita Scale
EM	Emergency Management
EMA	Emergency Management Agency
EMC	Emergency Management Coordinator
EMS	Emergency Medical Services
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right to Know Act
EPZ	Emergency Planning Zone
ESF	Emergency Support Function
FAA	Federal Aviation Administration
FARS	Fatality Analysis Reporting System
FD	Fire Department
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FIA	Flood Insurance Administration
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study

Flu	Influenza
FMA	Flood Mitigation Assistance
F-Scale	Fujita Scale
g	Gravity
GBS	General Building Stock
GIS	Geographic Information System
HazMat	Hazardous Materials
Hazus	Hazards U.S.
Hazus-MH	Hazards U.S. – Multi-Hazard
HMA	Hazard Mitigation Assistance
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Plan
HUD	U.S. Department of Housing and Urban Development
HVAC	Heating, Ventilation, and Air Conditioning
IA	Individual Assistance
I-	Interstate
ILI	Influenza-like Illnesses
ISO	Insurance Services Office, Inc.
K	Thousand ($)
Km	Kilometer
Kts	Knots
LCSN	Lamont-Doherty Cooperative Seismographic Network
LEPC	Local Emergency Planning Committee
LPR	Local Plans and Regulations
M	Million ($)
MESO	Multi-Community Environmental Storm Observatory
mi	Mile
MMI	Modified Mercalli Intensity
MPC	Municipal Planning Code
mph	Miles per hour
MPO	Metropolitan Planning Organization
MRP	Mean Return Period
mw	Megawatts
N/A	Not Applicable
NA	Not Available
NASA	National Aeronautics and Space Administration

NCDC	National Climatic Data Center
NCEI	National Centers for Environmental Information
NDMC	National Drought Mitigation Center
NDSP	National Dam Safety Program
NEHRP	National Earthquake Hazard Reduction Program
NEPA	National Environmental Policy Act
NESEC	Northeast States Emergency Consortium
NFIA	National Flood Insurance Act
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NGO	Nongovernmental Organization
NHTSA	National Highway Traffic Safety Administration
NID	National Inventory of Dams
NIH	National Institute of Health
NIMS	National Incident Management System
NLCD	National Land Cover Data
NLD	National Levee Database
NOAA	National Oceanic and Atmospheric Administration
NRC	Nuclear Regulatory Commission
NRF	National Response Framework
NRCC	Northeast Regional Climate Center
NRCS	Natural Resource Conservation Service
NS	Norfolk-Southern Corporation
NSP	Natural Systems Protection
NSSL	National Severe Storms Library
NTAS	National Terrorism Advisory System
NTSB	National Transit Safety Board
NWI	National Wind Institute
NWS	National Weather Service
PA	Pennsylvania
PA DCED	Pennsylvania Department of Community and Economic Development
PA DCNR	Pennsylvania Department of Conservation and Natural Resources
PA DEP	Pennsylvania Department of Environmental Protection
PA HMP	Commonwealth of Pennsylvania All-Hazard Mitigation Plan
PA-	Pennsylvania State Route ##
PAG	Protective Action Guide

PaGWIS	Pennsylvania Groundwater Information System
PaSTAR	Pennsylvania Statewide Telecommunication Alerting and Reporting [Network]
pCi/L	picoCuries per liter
PDSI	Palmer Drought Severity Index
PEMA	Pennsylvania Emergency Management Agency
PennDOT	Pennsylvania Department of Transportation
PGA	Peak Ground Acceleration
PHMSA	Pipeline and Hazardous Materials Safety Administration
PIO	Public Information Officer
ppm	Parts per million
PRA	Probabilistic Risk Assessment
PSAP	Public Safety Answering Point
PSP	Pennsylvania State Police
PSU	Pennsylvania State University/Penn State University
PUC	Public Utilities Commission
Ra-226	Radium-226
RACES	Radio Amateur Civil Emergency Services
RCV	Replacement Cost Value
RF	Risk factor
RFC	Repetitive Flood Claims
RLP	Repetitive Loss Property
Rn-222	Radon-222
RSI	Regional Snowfall Index
S-waves	Shear waves
SA	Spectral Association
SARA	Superfund Amendments and Reauthorization Act
SBA	Small Business Administration
SCMRTF	South Central Mountains Regional Task Force
SEVAN	Satellite Emergency Voice Alerting Network
SF	Summary File
SFHA	Special Flood Hazard Area
SHSP	State Homeland Security Program
SIP	Structure and Infrastructure Project
SOG	Standard Operating Guide
SPC	Storm Prediction Center

SPI	Standardized Precipitation Index
Sq. Mi.	Square mile
SRL	Severe Repetitive Loss
TBD	To Be Determined
TDD	Telecommunications Device for the Deaf
Tetra Tech	Tetra Tech, Inc.
TOD	Transit-Oriented Development
TRI	Toxic Release Inventory
US-	U.S. Route #
USACE	U.S. Army Corps of Engineers
USAR	Urban Search and Rescue
USC	*U.S. Code*
USD	U.S. Dollar
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USGS	U.S. Geological Survey
VIP	Very Important Person
WHO	World Health Organization
WMD	Weapons of Mass Destruction
WUI	Wildland Urban Interface