

Hazard Mitigation Plan

2019

Schuylkill County

HAZARD MITIGATION PLAN

Planning Together for a Resilient Schuylkill County

Prepared for:
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Schuylkill County
**Emergency
Management
Agency**



PLANNING · ZONING · GIS
SCHUYLKILL COUNTY

Prepared by:



TETRA TECH

2019 Schuylkill County Hazard Mitigation Plan Update

Planning Together for a Resilient Schuylkill County

Prepared for:

Schuylkill County Planning Department
Schuylkill County Emergency Management Agency



Prepared by:



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Project 103S5407

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PLANNING TOGETHER FOR A RESILIENT SCHUYLKILL COUNTY

Schuylkill County is vulnerable to a wide range of natural and non-natural hazards that impact lives, property, and the economy. The recent federal disaster declaration (DR-4408), resulting from the August 2018 severe storms and flooding, is a recent example of the loss Schuylkill County residents continue to experience. Past events and anticipated future events demonstrate the critical need to identify next steps to mitigate future losses and become more resilient.

Schuylkill County's Hazard Mitigation Plan (HMP) serves as the County's action plan to reduce or eliminate the long-term risk to life and property from hazards. A multi-disciplinary Core Planning Team was formed to provide guidance, leadership, and oversight of the 2019 Schuylkill County HMP update planning process. This team acted as the point of contact for all participating jurisdictions and the various interest groups in the County. The Core Planning Team selected the following vision statement for the 2019 HMP update to serve as a guide for plan development and represent what plan participants want to achieve over the 5-year performance period of the plan.

Hazard Mitigation

Sustained action to reduce or eliminate the long-term risk to human life and property from hazards (FEMA 2016).

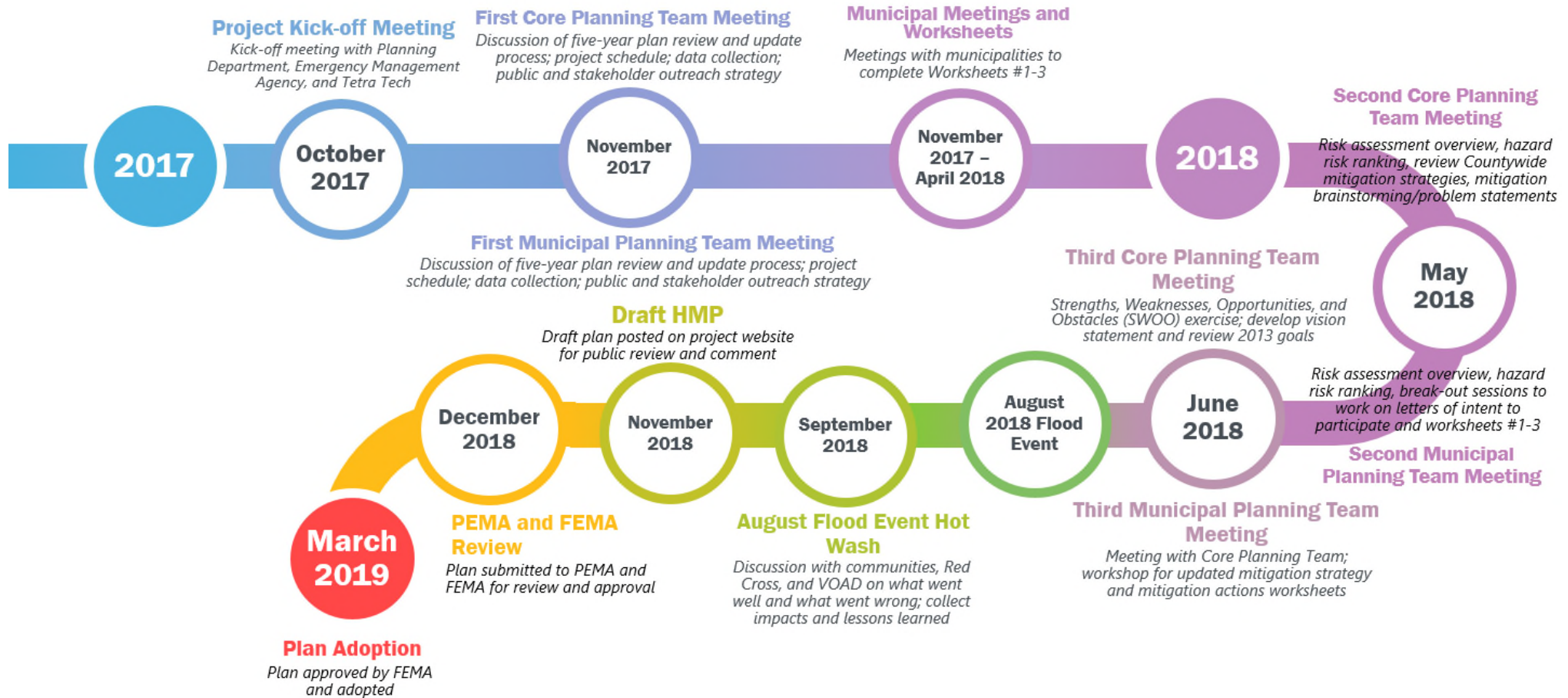
Schuylkill County will be resilient because reducing hazard risk is an integral part of the County's livability and sustainability.

The development and update of this plan is a critical element in identifying pre-disaster mitigation actions in advance of a hazard event to break the typical disaster cycle of damage, reconstruction, and repeated damage. Schuylkill County's FEMA-approved HMP ensures Schuylkill County and participating municipalities maintain eligibility for future FEMA funding in support of mitigation and disaster recovery efforts.

Planning Process

The 2019 Schuylkill County HMP update is the result of 14 months of collaboration between the citizens and officials of the County and representatives from Tetra Tech, Inc. (Tetra Tech) to develop a pre-disaster, multi-hazard mitigation plan that will guide the County toward greater disaster resistance, while respecting the character and needs of each community. The Schuylkill County Planning Department and the Schuylkill County Emergency Management Agency co-led the update to the 2013 HMP. All 67 municipalities were invited to participate in the planning process. In addition, to maximize effectiveness of the HMP, the County fostered continual public and stakeholder engagement through a variety of methods, as described further in Section 3. Exhibit ES-1 summarizes the planning process and highlights key milestones in accordance with the Disaster Mitigation Act of 2000.

Exhibit ES-1. Summary of the 2019 Schuylkill County HMP Planning Process



Risk Assessment

The 2019 HMP risk assessment described in Section 4 (Risk Assessment) provides the scientific foundation and quantitative basis for developing a mitigation strategy. Risk assessments highlight the connection between existing vulnerability and the potential reduction of risk due to proposed hazard mitigation actions.

Since 1955 Schuylkill County has been affected by 21 Presidential Disaster and Emergency Declarations, including the flood and severe storms in July and August 2018. After a review of historical events in the Commonwealth focusing on those in which Schuylkill County was designated for federal assistance, the Core Planning Team and participating municipalities evaluated 12 hazards of concern, both natural and non-natural, for the 2019 HMP update.

The evaluation yielded 7 of the 12 hazards of concern scoring a high-risk factor in accordance with the methodology identified in the Pennsylvania Emergency Management Agency (PEMA) All-Hazard Planning Standard Operating Guide (PEMA October 2013). The hazards of concern are presented below in Exhibit ES-2 in accordance with their hazard ranking as determined by the Core Planning Team and participating municipalities.

Exhibit ES-2. Hazards of Concern by Risk Factor

High		
<ul style="list-style-type: none"> • Blight • Drought and Water Deficiencies 	<ul style="list-style-type: none"> • Flood • Winter Storm • Radon 	<ul style="list-style-type: none"> • Hurricane/Windstorm • Nuclear
Moderate		
<ul style="list-style-type: none"> • Mine Subsidence • Hazardous Materials and Transportation Incidents 	<ul style="list-style-type: none"> • Dam and Levee Failure • Wildfire 	
Low		
<ul style="list-style-type: none"> • Tornado 		

Focusing on the high-ranked hazards, the following sections highlights results from the vulnerability assessments conducted and provide examples of mitigation actions identified in text boxes (2019-SC-xx). Section 4 provides individual hazard sections for more detailed discussions of each hazard’s location, extent, historic events, probability of occurrence and potential impacts to the population, buildings and critical facilities, economy, and the environment.

BLIGHT

In Schuylkill County, blight is a substantial issue and a top priority for municipal officials to address. Blight conditions could occur anywhere within the County; however, it is more likely to occur in those municipalities with a greater vacancy rate (occupied/vacant housing) and/or those with an older housing stock.

According to the American Community Survey, the total vacancies in Schuylkill County generally have been increasing since 2009. The vacancy rate in Schuylkill County is approximately 25 percent greater than the average vacancy rate in Pennsylvania and across the U.S. (estimated at 12 percent). The housing units indicated as vacant by the U.S. Census can be vacant for several reasons, including: 1) for rent; 2) rented, not occupied; 3) for sale only; 4) sold, not occupied; 5) for seasonal, recreational or occasional use (e.g., North Union and East Union Townships); 6) for migratory workers or 7) other.

Exhibit ES-3. Top 10 Municipalities More Likely to Experience Blight

Municipality	Number of 'Other Vacant' Housing Units
Shenandoah Borough	547
Pottsville City	429
Mahanoy City Borough	378
Ashland Borough	230
Tamaqua Borough	230
Frackville Borough	194
West Mahanoy Township	170
Saint Clair Borough	146
Minersville Borough	138
Girardville Borough	108

Source: U.S. Census Bureau, 2010

To correlate the U.S. Census vacant housing statistics to blight, we need to examine the municipalities with the 'other vacant' category. Exhibit ES-3 summarizes the top ten (10) municipalities with the greatest number of vacant housing units in the 'other vacant' category and therefore more likely to experience blight in Schuylkill County.

Blight Mitigation Actions
16 of the 67 communities in Schuylkill County have mitigation actions to address blighted properties throughout their jurisdiction.

Although the quantitative impacts of blight could not be determined for this risk assessment, Section 4.3.1 (Blight) provides a qualitative discussion on the impacts to the County's assets. The greatest impact is to the local economy. In addition to the drain on local revenue due to abandoned structures and lack of thriving business, the cost

to redevelop these areas is great. In January 2017, Schuylkill County was awarded a grant for \$1.4 million from the Commonwealth to demolish and remediate blighted properties throughout the County. The following municipalities received funding to address blighted properties within their community.

- The Borough of Minersville received \$200,000 to demolish the former American Legion building and turn the area into a community park.
- The Borough of Shenandoah received a portion of the grant to demolish 13 homes along Centre Street that were destroyed by a fire in 2016. Two properties, one on North Main Street and one on West Coal Street, were also taken down in the Borough.
- The Borough of Mahanoy City received \$420,000 to demolish the Kaier Brewery building on Main Street. After demolition, the site was transformed into a community park and playground as part of Phase IV of the Borough's Central Business District Streetscape Revitalization Program.
- The City of Pottsville had been awarded Community Development Block Grant money to demolish approximately 9 blighted properties. With the January 2017 funds, the City tore down 8 blighted properties.

2019-Ashland-03
Rehabilitate or demolish blighted properties in the borough.

DROUGHT AND WATER DEFICIENCIES

2019-SC-09

Cooperate with local water authorities, including mapping water source data and mapping locations of water sources needed during fires (such as ponds and dry hydrants). The boy scouts have mapped 11 municipalities for water to date.

Schuykill County residents and businesses receive water from three main sources: wells, reservoirs, and springs (Schuykill 2013). Although residents depending on well water can more easily handle short-term droughts, longer-term droughts inhibit groundwater aquifers from recharging and thus can extend the problems of well owners for an indeterminate amount of time. In Schuykill County, there are over 3,500 domestic drinking wells (PADCNR 2017).

Those not receiving drinking water from domestic wells rely on municipal water. The Schuykill County Municipal Authority is the largest public water provider and serves over 30,000 customers in 25 municipalities (SCMA 2017). Additional municipal water providers include the Aqua PA, PA America, as well as many other municipal authorities, several privately-owned water suppliers, and two out-of-county suppliers including Aqua PA and Langsford/Coaldale JT Water Authority. All of these water sources rely on surface water and are vulnerable to drought-related water deficiencies.

Jurisdictions that are designated for agricultural use are particularly vulnerable to drought. According to the County's 2006 Comprehensive Plan, 29 percent of the County's land area is considered agricultural (Schuykill 2006). According to the 2012 USDA Census of Agriculture, the County provided over 105 thousand acres of farmland producing \$166 million in agricultural products. Notable agricultural products produced in the County are Christmas trees, potatoes, dairy products, and grain. Schuykill County is located in a 'Christmas tree belt'. Christmas tree farming costs build over an approximate eight-year period before a return on investment is realized. Therefore, a loss due to a natural hazard event, such as a drought, can be more devastating compared to annual crops, as the interest on investment compounds over the production period (Bates 2016).

Since 1999, there have been 11 drought-related events in the County; 7 of these events were watches, 2 of these events were a warning, and 1 was an emergency. Of these events, 3 had documented agricultural impacts to the County impacting a total of 5,213 acres of agricultural land resulting in damages of \$425,230.

FLOOD

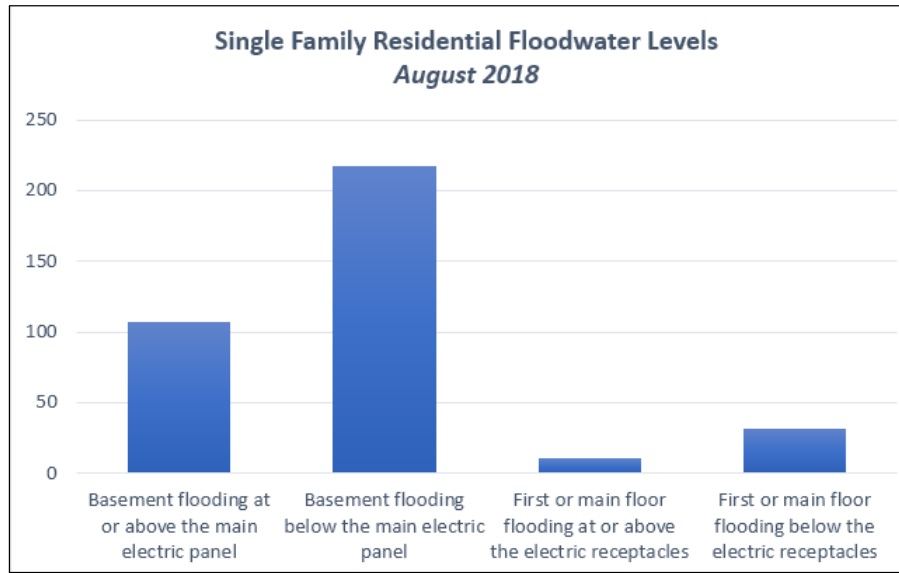
Schuykill County has experienced significant impacts as a result of flood events, most recently in July and August 2018, which took place during the update of the HMP. The County collected information from residents and business owners impacted by the August 2018 flood event via a survey on the County Emergency Management Agency (EMA) website. Nearly 90-percent of the 408 structures that reported impacts were single-family residential. Exhibit ES-4 summarizes the single-family residential floodwater levels for the 367 structures reported documenting basement and first-floor flooding. Exhibit ES-5 illustrates the 2018 flood event water levels documented across the County for all occupancy types (apartments, mobile homes, single-family residential, and business/commercial).

Flood-related Actions

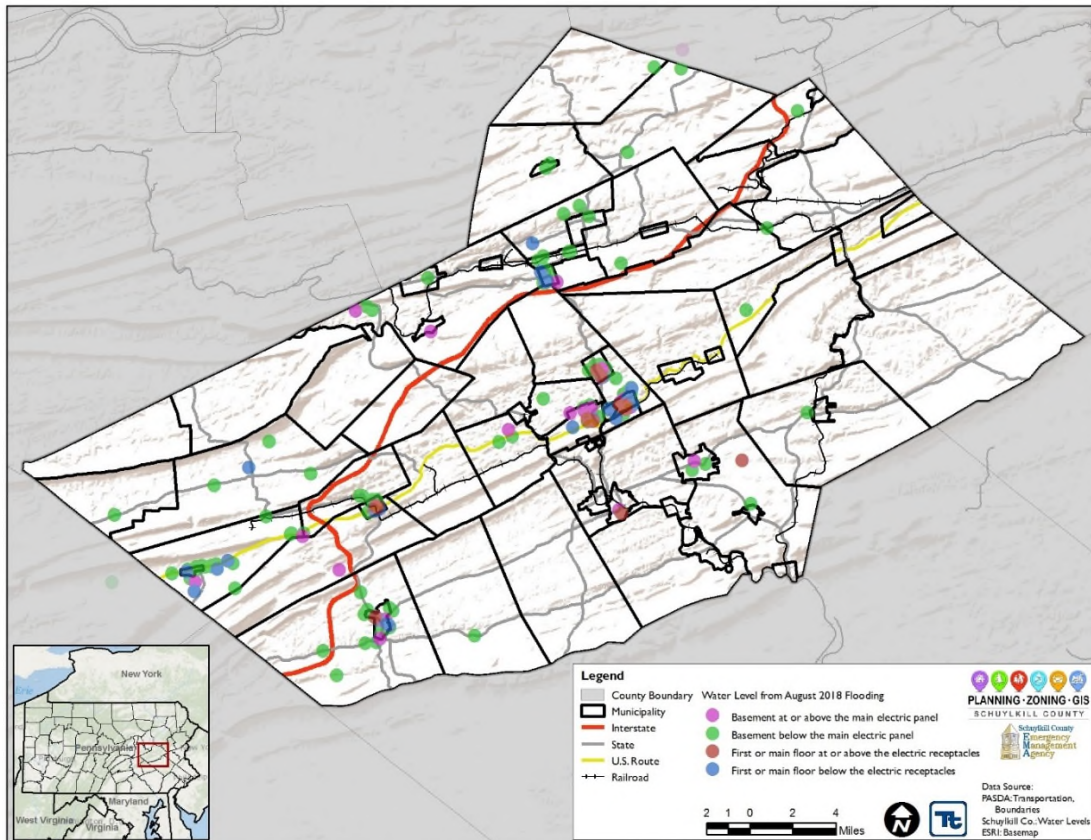
The 2019 Schuykill County HMP proposes 111 flood-related actions. The actions are categorized by the following types:

- Education and Awareness: 1
- Local Plans and Regulations: 10
- Natural Systems Protection: 13
- Structure and Infrastructure Projects: 87

ES-4. Single-Family Residential Floodwater Levels Reported to the County



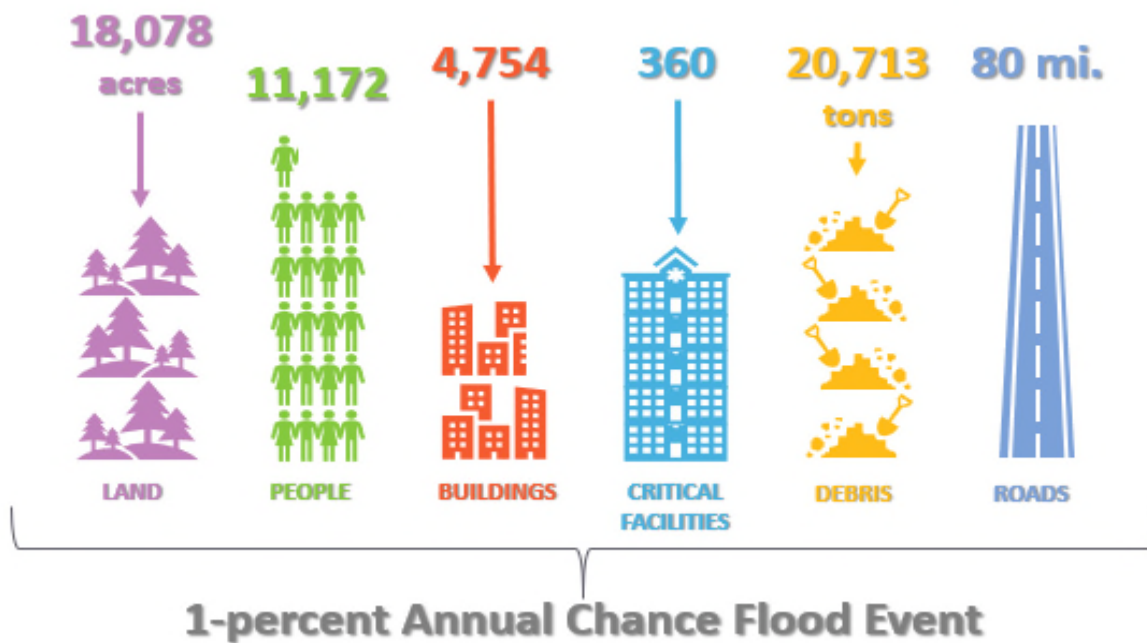
ES-5. August 2018 Flood Event Water Levels



2019-SC-04
Create a centralized hazard mitigation position at the County-level to assist with floodplain management and National Flood Insurance Program (NFIP) compliance.

To assess the County’s flood risk further, the analysis used FEMA Risk Map products dated October 2017. Exhibit ES-6 summarizes the assets exposed to and estimated potential losses resulting from the 1-percent annual chance flood event. For flood loss estimates by municipality, refer to Section 4.3 (Flood). HAZUS-MH v4.0 estimated approximately \$742 million in losses (structure and contents) for the 1-percent annual chance flood event, which equates to approximately 3-percent of the County’s total replacement cost value. Residential structures are responsible for the greatest losses among all occupancy types.

Exhibit ES-6. Summary of Potential Impacts in the 1-Percent Annual Chance Floodplain



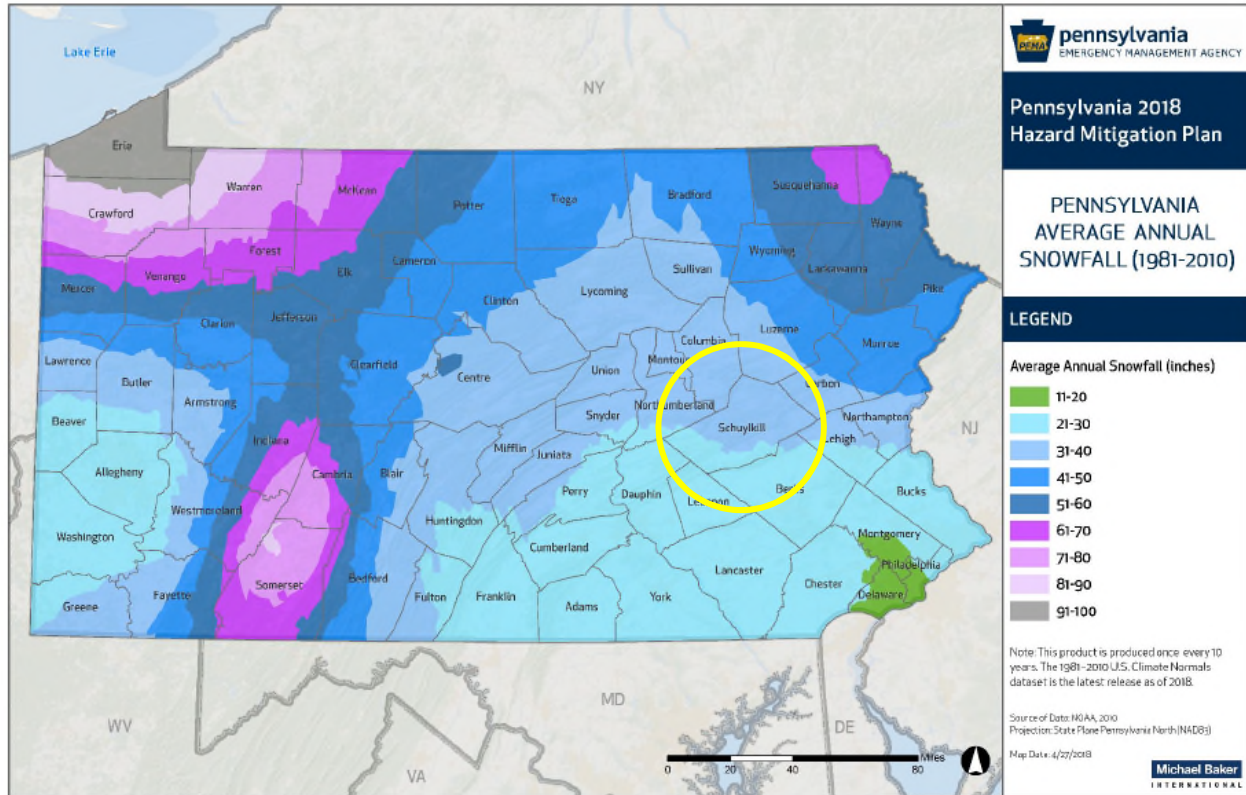
While the drafting of the 2019 HMP was nearing completion, FEMA released preliminary Digital Flood Insurance Rate Maps (DFIRMs) in August 2018, which provides differences from the October 2017 map products. Overall, the 2018 preliminary DFIRMs depict an increase of approximately 61 acres and 124 acres in the floodplain for the 1- and 0.2-percent annual chance flood events, respectively. Of the 67 communities in the County, 39 municipalities see an increase in area for both the 1- and 0.2-percent annual chance flood event boundaries. At the time of the 2019 HMP FEMA review, the appeal period for the preliminary 2018 DFIRM was scheduled to take place over the winter of 2018 into 2019; with a 90-day duration after the appeal period starts.

2019-SC-12
Conduct a capability assessment to determine which municipalities are capable to enroll and sustain participation in the Community Rating System (CRS).

WINTER STORM

Between 2009 and 2017, Schuykill County experienced 11 major winter storm events, according to the NOAA-NCDC storm events database; no reported loss information was available for these events. Since 1954, Schuykill County has been a declared disaster area for 6 of the 8 FEMA declared winter storm-related disasters and emergencies. Exhibit ES-7 below displays the average annual snowfall for the Commonwealth of Pennsylvania between 1981 and 2010. Schuykill County experiences an average of 21-40 inches of snowfall annually, with the greatest snowfall occurring in the northern two-thirds of the County.

Exhibit ES-7. Average Annual Snowfall



Source: PEMA 2018

Note: The yellow oval surrounds Schuykill County.

The January 1996 snowstorm has been referred to as the “storm of the century,” and was the worst-case scenario of a winter storm in Schuykill County. As a result of the ‘Blizzard of 1996’ Schuykill County received 16 to 32 inches of snow. This amount was equal to that of the County’s average snowfall that is experienced throughout the year. Emergency services throughout the County were unable to continue normal operations and most road travel was impossible due to high winds causing snow drifts. The National Guard was called upon to help transport people to hospitals either to work or for various treatments. The County reported one fatality. According to Schuykill County 911 call records, between January 8 to 11,

Winter Storm-related Actions

Several municipalities proposed actions to improve drainage, which can reduce flooding and help to decrease the likelihood of severe icing conditions along roadways.

1996, 4 residential properties suffered structural damage from collapse and 2 unknown type structures received damage (Schuylkill 2013).

Although quantitative impacts for winter storms could not be determined for this risk assessment, Section 4.3.12 (Winter Storm) provides a qualitative discussion on the impacts to the County’s assets. As seen with the January 1996 snowstorm, winter storms can cause widespread impacts to all aspects of the County. Structural damages affected 6 properties during this event, which would represent less than 1-percent of the County’s total structural replacement cost value. Therefore, for the purposes of this HMP, a 1-percent damage assumption has been applied as a conservative loss estimate and is equal to approximately \$156 million of structural replacement cost value Countywide (FEMA HAZUS-MH v4.0).

2019-SC-01
Ensure the most accurate road closure data is obtained and is consistent across all platforms and levels of government in a timely fashion through coordination with PennDOT, 911 center, EOC and municipalities; push information to the public.

RADON

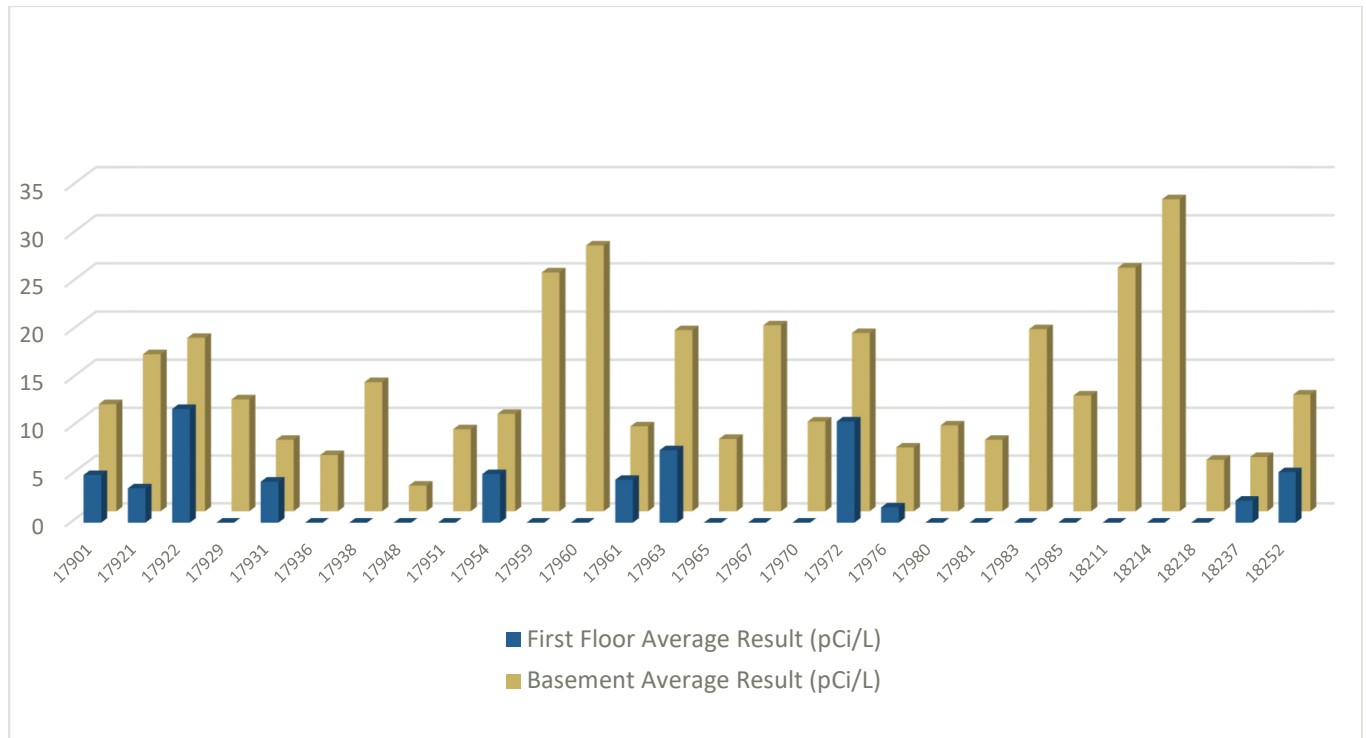
The Pennsylvania Department of Environmental Protection (PADEP) Bureau of Radiation Protection provides information for homeowners on how to test for radon in their houses. If a test results in radon concentrations over 4.0 pCi/L, then the Bureau works to help the homeowners make repairs to their houses to mitigate against high radon levels. The Bureau’s website summarizes the total number tests reported to the Bureau since 1990 and publishes their results by zip code. Figure ES-8 summarizes the results for Schuylkill County, provided if over 30 tests total were reported to best approximate the average for the area (PADEP 2016).

In Schuylkill County, 28 of 58 zip codes reported results from a sufficient number of tests to allow the Bureau to report the findings, which are shown in the table below. PADEP does not post public results unless a zip

2019-SC-15
Conduct education and training to improve capabilities of municipal officials and staff at local emergency operation centers, including personnel (staffing) and communications as follows. This may be part of the ‘Mitigation Day’ as described in Section 7 (Plan Maintenance).

code has had at least 30 tests conducted. The PADEP 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 that **all** homeowners test for radon, regardless of test results within their respective zip codes. Despite a low average test result within a zip code, many homes in that zip code may have elevated radon levels.

Exhibit ES-8. Average Basement and First Flood Radon Level Tests for Zip Codes in Schuykill County



Note: Zip Codes with 0 pCi/L for average first floor value had insufficient data to estimate a value.

HURRICANE/WINDSTORM

According to the National Oceanographic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI) storm events database, Schuykill County experienced 201 hurricane and windstorm events between January 1, 1950 and December 31, 2017. Total property damages as a result of these hurricane and windstorm events were estimated at \$495,000. Overall, there was one fatality and two injuries associated with these events. These totals may also include damages to other counties and do not include other losses associated with hurricane and windstorms (e.g., rain, flooding, etc.) (NOAA NCEI 2018).

Between 1954 and 2017, the Commonwealth of Pennsylvania experienced 15 FEMA-declared wind-related major disasters (DR) or emergencies (EM) classified as one or a combination of the following disaster types: tropical storm, high winds, flash floods, severe storms, tornadoes, hurricane, or tropical depression. Generally, these disasters cover a wide region of the Commonwealth; therefore, they may have impacted many counties. However, not all counties were included in the disaster declarations. Of the events since 1954, Schuykill County was included in five of the declarations; one of which was Hurricane Sandy (FEMA 2018). Between

2012 and 2017, the County experienced 9 identified major hurricane and wind-related events. These events had documented damages of over \$100,000. Loss and impact information can vary depending on the source; therefore, the accuracy of monetary figures discussed is based only on

2019-NManheim-08

Ensure buildings in the Township meet International Building Code specifications for wind loadings.

the available information identified during research for this HMP.

HAZUS-MH v4.0 estimated projected wind speeds for 100- and 500-year probabilistic hurricane events. The estimated maximum 3-second gust wind speeds are 46 to 58 mph (Tropical Storm) and 60 to 77 mph (Tropical Storm to Category 1) for the 100- and 500-year events, respectively.

2019-Saint Clair-05
Rock-line swale along Lawson Street and re-grade as necessary to ensure surface flow enters existing drainage network.

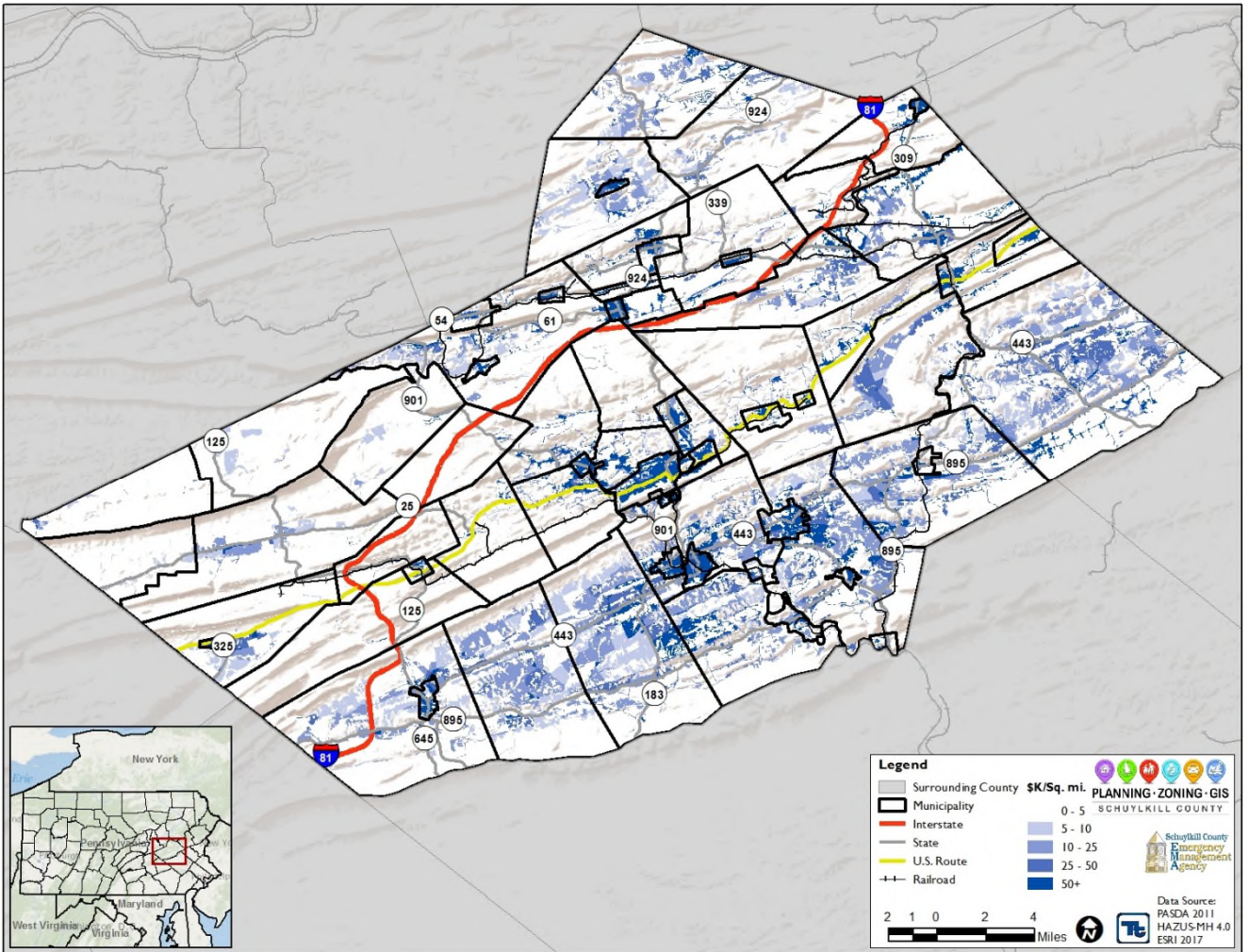
These wind speeds correlate to an estimated total structural damage for all occupancy types of \$232,000 for the 100-year mean return period (MRP) wind-only event, and approximately \$10.1 million for the 500-year MRP wind-only event. Most of these losses are to the residential building category, which account for over 99-percent and 95-percent of the total losses for the 100- and 500-year events, respectively. 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. Mobile homes are the most vulnerable to damage, even if tied down, and offer little protection to people inside. As discussed in Section 4.3.10 (Tornado), nearly 2,500 manufactured homes located in Schuylkill County are considered highly vulnerable to wind events. Exhibit ES-9 displays the density of structural losses for all occupancy classes as a result of the 500-year MRP event.

2019-Schuylkill Haven B-02
Sediment and debris in the River cause more frequent flooding of the Island Park area. Remove sediment and debris from the River.

Debris management can be costly and impact the local economy. HAZUS-MH v4.0 estimates the amount of debris that might be produced as result of the 100- and 500-year MRP wind events. HAZUS-MH estimates over 30 tons of debris for the 100-year MRP event and over 2,000 tons of

debris for the 500-year MRP event. HAZUS-MH also estimates eligible tree volume, which is the estimated volume of downed trees that would likely be collected and disposed at public expense. The eligible tree volume for the 100-year MRP event is estimated to be 22 cubic yards and for the 500-year MRP event is estimated to be 223 cubic yards.

ES-9. Density of Losses for Structures (All Occupancies) for the 500-Year Mean Return Period Event



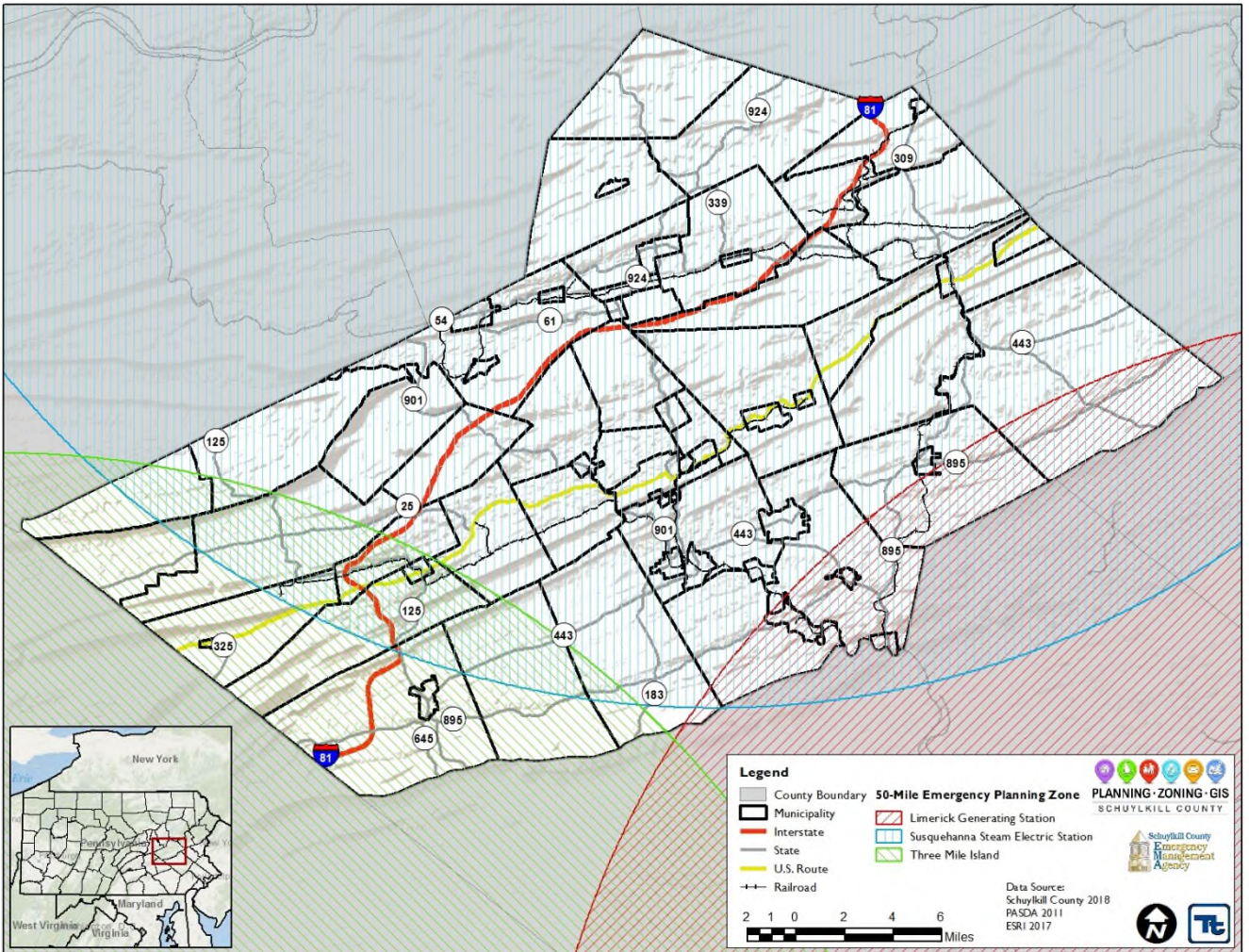
NUCLEAR

Schuykill County is located wholly within the 50-mile Ingestion Exposure Pathway Zone (EPZ) of the Susquehanna Steam Electric Station located in Luzerne County, and portions of the County are located within the Three Mile Island and Limerick Generating Station EPZ located in Dauphin and Montgomery Counties, respectively. Should an accident occur at any of these facilities, the area within the Ingestion EPZ could receive some radioactive contamination. Exhibit ES-10 provides visual representation of where Schuykill County falls in the 50-mile EPZ of nuclear power plants.

Ingestion Exposure Pathway Zone (EPZ)

An area with a radius of 50 miles from a nuclear facility. Exposure is primarily from ingestion of water or foods such as milk and fresh vegetables that have been contaminated with radiation as a result of a release.

Exhibit ES-10. Schuykill County Jurisdictions in the 50-Mile Ingestion Exposure Pathway Zone



2019-SC-08

Implement database and ESRI-based solutions to support emergency management operations, planning/community development and improve situation reporting between county and municipalities during an event.

No municipalities are located in the 10-mile Plume Exposure Pathway, which refers to whole-body external exposure to radiation from a radioactive plume and deposited materials and inhalation exposure from the passing radioactive plume. All municipalities have a portion of their community located within the 50-mile Ingestion EPZ of the Susquehanna Steam Electric Station except Pine Grove Borough and Tower City

Borough. Additionally, the location of Three Mile Island Generating Station and Limerick Generating Station place some municipalities within two or three Ingestion EPZs. The municipalities located within an EPZ are more vulnerable to the contamination effects of nuclear incidents.

Capability Assessment

Assessing the County’s mitigation capabilities is an integral part of the mitigation planning process in which current resources for reducing the impact of hazards are identified and assessed. Mitigation capabilities provide the means to accomplish desired mitigation outcomes. Section 5 (Capability Assessment) provides a comprehensive review and evaluation of county and local capabilities used to support and facilitate mitigation activities. In conjunction with additional preparedness activities such as response planning, training and exercises, these mitigation capabilities form the foundation of resilient communities.

Overall, limited staffing and limited funding are critical barriers to the implementation of hazard mitigation activities in the County. The County and municipalities will need to rely on regional, state, and federal partnerships for financial assistance. Schuylkill County will continue to alert municipalities when FEMA grant funding is available to apply and implement eligible projects in this HMP update.

Mitigation Strategy

The mitigation strategy is also known as the ‘heart of the plan.’ Schuylkill County’s mitigation strategy is composed of a vision statement, goals, and actions that directly address the risks and vulnerabilities identified in the risk assessment, as well as the findings of the capability assessment.

The 2013 HMP goals were reviewed and determined to need rewriting. Based on the input received from the Core Planning Team and participating municipalities, the 2019 HMP goals were finalized and meet the following: 1) align with Commonwealth mitigation goals, 2) embody the overarching needs and concerns of the County and participating municipalities, and 3) address both natural and non-natural hazard risk reduction. The 2019 County HMP goals are listed below:

- **Goal 1:** Reduce or eliminate the risk to people, property, the economy, and the environment from hazards.
- **Goal 2:** Prioritize, seek funding for, and implement mitigation and resilience efforts that focus on real, relevant community issues that can be reasonably accomplished in the short-term.
- **Goal 3:** Link natural resource management, land use planning, and watershed planning with hazard mitigation activities to conserve, restore, and enhance natural systems and to protect water resources and property.
- **Goal 4:** Improve local capabilities, including government, emergency, and other critical services, to protect citizens, reduce damage, and ensure continuity of services before, during, and after disasters.
- **Goal 5:** Incorporate mitigation concepts into County and municipal plans, policies, programs, and regulations. This includes compliance with the NFIP for all participating jurisdictions.

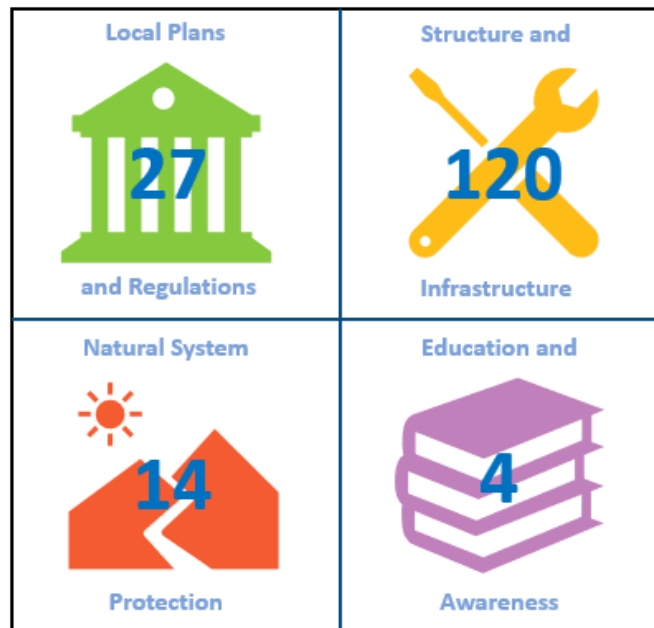
The Core Planning Team made concerted efforts to ensure that the County and its municipalities developed updated mitigation strategies. Further, the team established actionable strategies that could be reasonably accomplished in the 5-year performance cycle of the 2019 HMP update. To assist with the identification of implementable and action-oriented mitigation actions for the 2019 HMP update, a three-step process was followed for the 2019 HMP update:

- 1) Assemble a 'mitigation toolbox'
- 2) Identify problem statements through 'mitigation brainstorming', and
- 3) Update the mitigation action plan.



Overall there are 165 mitigation actions in the updated mitigation action plan, which includes all four FEMA mitigation strategy types: 1) plans and regulations, 2) structure and infrastructure projects, 3) natural system protection, and 4) education and awareness. Exhibit ES-11 summarizes the types of countywide mitigation actions proposed for the 2019 Schuykill County HMP. Of these 165 actions, 155 actions are high priority. Flood-related actions account for the greatest proportion of actions with 111 actions. Section 6 (Mitigation Strategy) provides the comprehensive list of actions.

Exhibit ES-11. Number of Mitigation Actions by Mitigation Type



Plan Maintenance

Maintaining momentum in mitigation strategy implementation can lead to significant long-term changes and overall risk reduction. The development of a plan maintenance process ensures that the HMP remains a “living” document that is intended to be changed and updated throughout its performance period. As such, the Schuylkill County HMP Coordinators, Schuylkill County Planning Department, and Schuylkill County Emergency Management Agency are responsible for overseeing the coordination, implementation, and maintenance of the plan collaboratively across the County throughout the plan’s performance period (2019 to 2024).

Section 7 (Plan Maintenance) evaluates the challenges and successes of the 2013 HMP maintenance procedures, outlines an updated strategy to maintain the 2019 HMP to ensure it remains current, and reflects changes to the mitigation program over time. The Schuylkill County HMP Coordinators will hold quarterly municipal meetings with the theme of ‘Mitigation Day’ and tie quarter 3 with Preparedness Month in September. These meetings will be held either as stand-alone meetings or scheduled as part of a regularly scheduled meeting, such as the Emergency Management Coordinator quarterly meetings or the Schuylkill County Planning Commission meetings, to ensure greater participation and feedback. Regularly revisiting the plan during meetings will ensure change in priorities are captured, progress on mitigation action is documented, and new mitigation actions are included in the plan. In addition, the plan will continue to be available on the County Emergency Management website at: <http://www.scema.org/hazard-mitigation-plan-update-2019/>.

The Plan Maintenance also outlines how non-participating municipalities in the plan can meet the full participation requirements.

This 2019 Schuylkill County HMP update fulfills the County and participating municipality’s requirements and will ensure continued funding eligibility under certain Stafford Act grant programs, including the following FEMA funding programs:

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM), soon to be Building Resilient Infrastructure and Communities (BRIC)
- Flood Mitigation Assistance (FMA)

Continual planning using the partnerships developed through the Schuylkill County HMP will result in a resilient Schuylkill County.

Certification of Annual Review Meetings

The Schuylkill County Hazard Mitigation Core and Municipal Planning Teams have reviewed this Hazard Mitigation Plan (HMP). The HMP Coordinators hereby certify the review.

Year	Date of Meeting	Public Outreach?*	Signature
2013	N/A	N/A	Adoption of the 2013 HMP
2014	N/A	N/A	No HMP progress reports were submitted from municipalities for the period of 2013 to 2018. Several mitigation actions were accomplished during this period and reported in the 2019 HMP; refer to Section 6 (Mitigation Strategy).
2015	N/A	N/A	
2016	N/A	N/A	
2017	Refer to Section 3 – Schuylkill County initiated the 2019 HMP update.		
2018	Refer to Section 3 – The Schuylkill County 2019 HMP update was in progress.		
2019			
2020			
2021			
2022			
2023			

* Confirm yes here annually and describe on record of changes page (next page).
 N/A Not applicable

Record of Changes

Date	Description of Change Made, Mitigation Action Completed, or Public Outreach Performed	Change Made By (Print Name)	Change Made By (Signature)
2013-2018	To the best of the knowledge of Schuylkill County, no HMP progress reports were submitted from municipalities for the period of 2013 to 2018. Mitigation actions were accomplished during this period and are reported in the 2019 HMP update. Progress on actions is discussed in detail in Section 6 (Mitigation Strategy).	N/A	N/A
2019			
2020			
2021			
2022			
2023			

N/A Not applicable

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

SECTION 1. INTRODUCTION

This section presents background information, describes the purpose, and defines the scope of the 2019 update of the Schuylkill 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 exhausts resources, diverting attention from important public programs and private agendas.

Schuylkill County, Pennsylvania, has experienced a significant number of statewide or County-specific disaster declarations since 1954. The emergency management community, citizens, elected officials, and other stakeholders in Schuylkill County recognize the impact of disasters on their community and concluded that proactive efforts need to be taken to reduce the impact of natural and human-caused hazards.

“Hazard mitigation” describes actions taken to prevent or reduce the long-term risks to life and property caused by a hazard event. Pre-disaster mitigation actions are taken in advance of a hazard event and are essential to breaking the typical disaster cycle of damage, reconstruction, and repeated damage. With careful selection, mitigation actions can be long-term, cost-effective means of reducing the risk of loss.

The Schuylkill County Hazard Mitigation Core and Municipal Planning Teams, composed of Schuylkill County officials, municipal representatives, emergency responders, representatives from state agencies, academia, utility companies and the private sector, have updated the 2013 HMP. Through an open-bid process, Schuylkill County contracted Tetra Tech, Inc. (Tetra Tech), to facilitate this process.

The HMP update is the result of 14 months of collaboration between the citizens and officials of the County and representatives from Tetra Tech to develop a pre-disaster, multi-hazard mitigation plan that will guide the County toward greater disaster resistance, 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 Schuylkill County. This document exists to provide the background information and rationale for the mitigation actions that the Core Planning Team and municipal 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] §201.6, published February 26, 2002). Local jurisdictions must comply with the DMA 2000 and these regulations to remain eligible for funding and technical assistance from State and federal hazard mitigation programs.

1.3 Scope

The implementation actions within this HMP apply to Schuykill County and any municipalities within the County that adopt this HMP as their own. However, only those municipalities that have participated in the plan update process may adopt this plan and will remain eligible for State and federal hazard mitigation funding through the HMP.

In October 2017, Schuykill County notified all 67 municipalities within the County via postal mail of the pending planning process and invited them to formally participate. The cover letter outlined municipal participation requirements:

- 1) Indicate your municipality’s interest to participate by submitting a Letter of Intent to Participate (LOIP)
- 2) Attend meetings
- 3) Provide data and information about your community as requested by the County Mitigation Coordinators (i.e., worksheets)
- 4) Adopt the updated plan once approved by FEMA

For the purpose of this plan, municipal participation was defined as submitting a LOIP to the County, attend a planning or public meeting conducted as part of the planning process (by an official municipal representative), and complete and submit the following: Evaluation of Identified Hazards Worksheet; Capability Assessment Survey; Mitigation Strategy 5-Year Plan Review Worksheet; Updated Mitigation Strategy. The following outlines the three levels of municipal participation achieved during the planning process. Table 1-1 summarizes municipal participation.

- Full participation (**green**): All participation requirements were met [LOIP submitted, meeting(s) attended and worksheet(s) submitted]
- Good faith effort (**orange**): One or more of the participation requirements were met; however, the municipality needs to complete outstanding items to achieve full participation and adopt the plan. *If the meeting requirement is needed, the municipality must attend the annual review meetings as outlined in Section 7 (Plan Maintenance).
- Did not participate (**red**) – No participation requirements were met. All requirements outlined above must be met prior to adopting the plan. Refer to the discussion in Section 7 (Plan Maintenance) on further details on how a non-participating municipality can be added to the HMP in the future.

Refer to Section 3 (Planning Process) which outlines in more detail which meetings were attended and which worksheets were submitted by each municipality.

Table 1-1. Schuykill County Municipalities and Participation

Jurisdiction	Letter of Intent to Participate Returned	Attended Meeting(s)*	Submitted Worksheets
Ashland Borough	Yes	Yes	Yes
Auburn Borough	Yes	Yes	Yes

Jurisdiction	Letter of Intent to Participate Returned	Attended Meeting(s)*	Submitted Worksheets
Barry Township	Yes	Yes	Yes
Blythe Township	Yes	Yes	Yes
Branch Township	Yes	Yes	Yes
Butler Township	Yes	Yes	Yes
Cass Township	No	No	No
Coaldale Borough	No	No	No
Cressona Borough	Yes	Yes	Yes
Deer Lake Borough	Yes	Yes	Yes
Delano Township	No	Yes	Yes
East Brunswick Township	Yes	Yes	Yes
East Norwegian Township	Yes	Yes	Yes
East Union Township	Yes	No**	No
Eldred Township	Yes	Yes	Yes
Foster Township	Yes	Yes	Yes
Frackville Borough	Yes	Yes	Yes
Frailey Township	Yes	Yes	Yes
Gilberton Borough	Yes	Yes	Yes
Girardville Borough	Yes	No	No
Gordon Borough	Yes	Yes	Yes
Hegins Township	Yes	Yes	Yes
Hubley Township	Yes	Yes	Yes
Kline Township	No	Yes	Yes
Landingville Borough	No	No	No
Mahanoy Township	No	No**	No
Mahanoy City Borough	Yes	Yes	No
McAdoo Borough	No	Yes	Yes
Mechanicsville Borough	No	No	No
Middleport Borough	No	No	No
Minersville Borough	Yes	Yes	Yes
Mount Carbon Borough	No	Yes	Yes
New Castle Township	Yes	Yes	Yes
New Philadelphia Borough	No	No	No
New Ringgold Borough	No	Yes	No
North Manheim Township	Yes	Yes	Yes
North Union Township	Yes	Yes	Yes
Norwegian Township	Yes	Yes	Yes
Orwigsburg Borough	No	Yes	Yes

Jurisdiction	Letter of Intent to Participate Returned	Attended Meeting(s)*	Submitted Worksheets
Palo Alto Borough	Yes	Yes	Yes
Pine Grove Borough	Yes	Yes	Yes
Pine Grove Township	No	Yes	Yes
Port Carbon Borough	Yes	Yes	Yes
Port Clinton Borough	Yes	Yes	Yes
Porter Township	Yes	Yes	No
Pottsville City	Yes	Yes	Yes
Reilly Township	Yes	Yes	Yes
Ringtown Borough	No	No	No
Rush Township	No	Yes	No
Ryan Township	Yes	Yes	No
Saint Clair Borough	Yes	Yes	Yes
Schuylkill Township	Yes	Yes	Yes
Schuylkill Haven Borough	Yes	Yes	Yes
Shenandoah Borough	Yes	Yes	No
South Manheim Township	Yes	Yes	Yes
Tamaqua Borough	Yes	Yes	Yes
Tower City Borough	Yes	Yes	Yes
Tremont Borough	Yes	Yes	Yes
Tremont Township	No	Yes	Yes
Union Township	Yes	Yes	Yes
Upper Mahantongo Township	Yes	Yes	Yes
Walker Township	Yes	Yes	Yes
Washington Township	Yes	Yes	Yes
Wayne Township	Yes	Yes	Yes
West Brunswick Township	Yes	Yes	Yes
West Mahanoy Township	No	No**	No
West Penn Township	Yes	Yes	Yes

*Attendance at a minimum of one meeting.

**A third-party engineering firm indicated they provide services to this municipality and attended the meeting on their behalf.

Green font indicates the municipality met all planning process requirements (full participation).

Orange font indicates the municipality met some of the planning process requirements, but additional requirements need to be met prior to adoption.

Red font indicates the municipality did not participate in the planning process.

1.4 Authority and Reference

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

- FEMA “Local Mitigation Planning Handbook,” March 2013
- FEMA “Integrating Hazard Mitigation into Local Planning,” March 1, 2013
- FEMA “Plan Integration: Linking Local Planning Efforts,” 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, Oct. 1, 2002, Oct. 28, 2003, and Sept. 13, 2004 Interim Final Rules)
- FEMA “How-To Guide for Using HAZUS-MH for Risk Assessment” (Document No. 433), February 2004
- FEMA Mitigation Planning How-To Series (FEMA 386-1 through 4), 2002
Available on-line at: <http://www.fema.gov/fima/planhowto.shtm>.
- FEMA “Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards,” January 2013
- Commonwealth of Pennsylvania’s All-Hazard Mitigation Planning Standard Operating Guide, October 18, 2013

As discussed in Section 5 and throughout the plan, numerous plans, reports and resources were consulted to update the 2019 HMP. A full set of references used in updating the HMP is included in Appendix A.

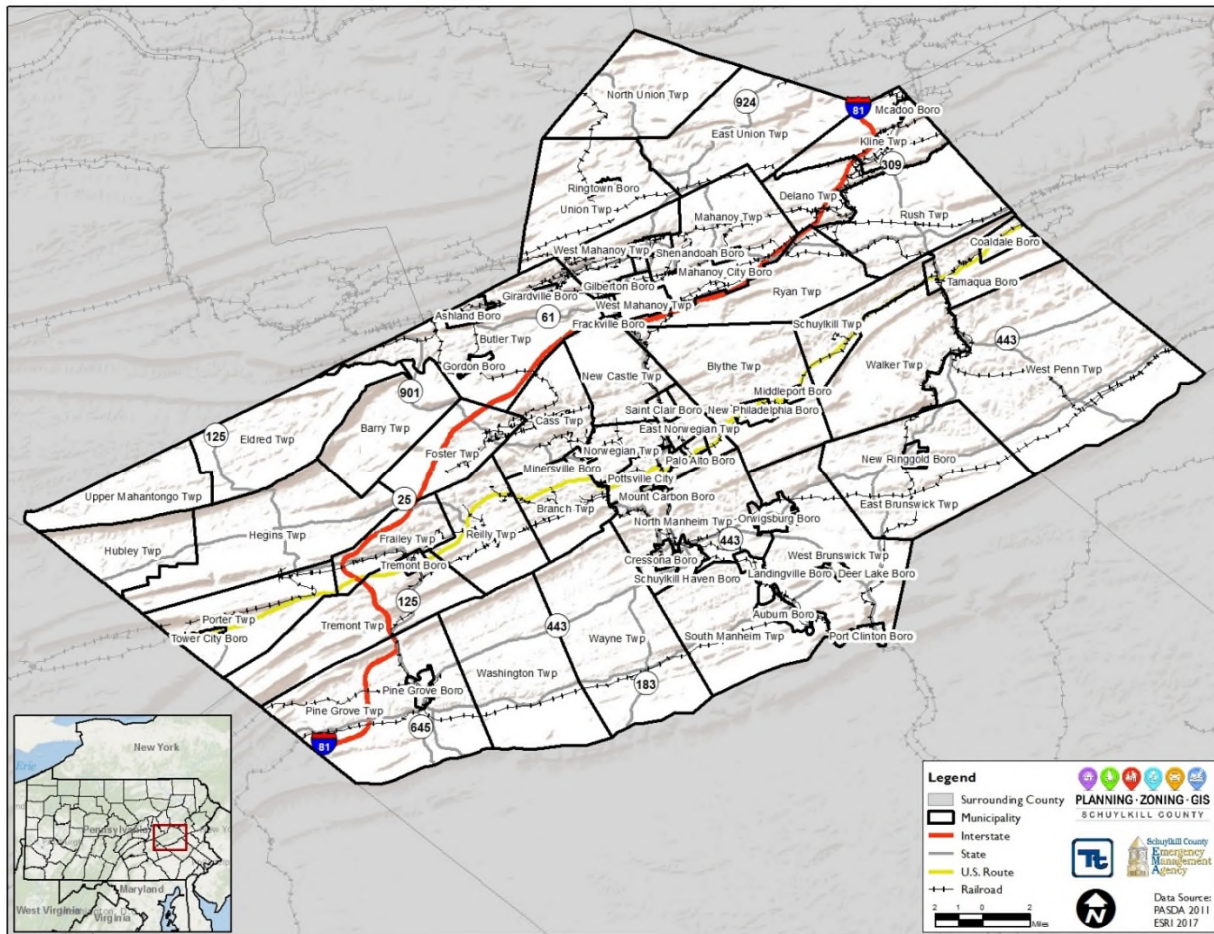
SECTION 2. COUNTY PROFILE

This section discusses the geography and environment, community facts, population and demographics, land use and development and critical facilities in Schuykill County.

2.1 Geography and Environment

Schuykill County is located in eastern Pennsylvania and is approximately 780 square miles. It is bordered by Dauphin and Lebanon Counties to the southwest, Northumberland and Columbia Counties to the northwest, Luzerne County to the north, Carbon and Lehigh Counties to the east and Berks County to the south. Rich in mining history and culture, Schuykill County is home to 67 municipalities located amongst a diverse natural landscape. The County consists of 36 townships, 30 boroughs and one city; in addition, there are 33 unincorporated communities. The County seat is the City of Pottsville, which is also the most populated municipality in Schuykill County (refer to Figure 2-1).

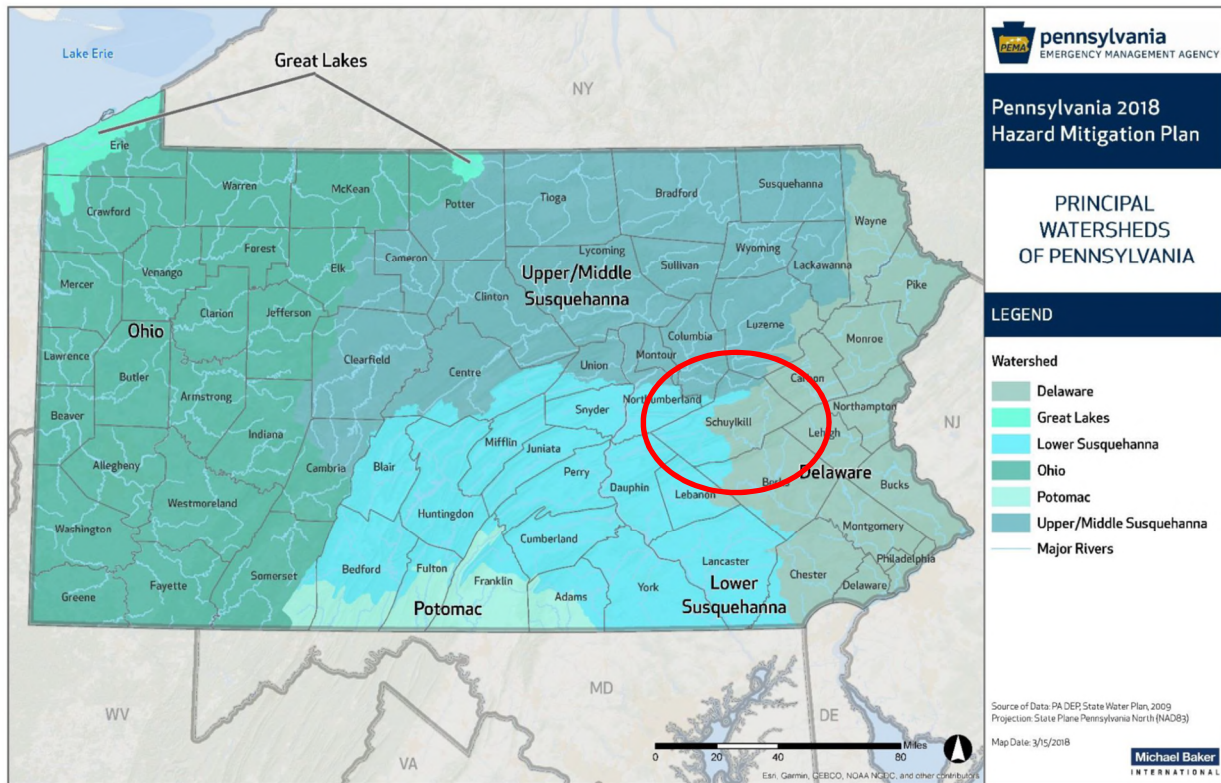
Figure 2-1. Map of Schuykill County



Schuykill County is located in the Appalachian Mountains characterized by alternating mountain ridges and lowland valleys running in a northeast-southwest direction. The County is home to the Blue Mountain, Broad Mountain, and the Appalachian Trail. A portion of the eastern county is part of the Pocono Mountains.

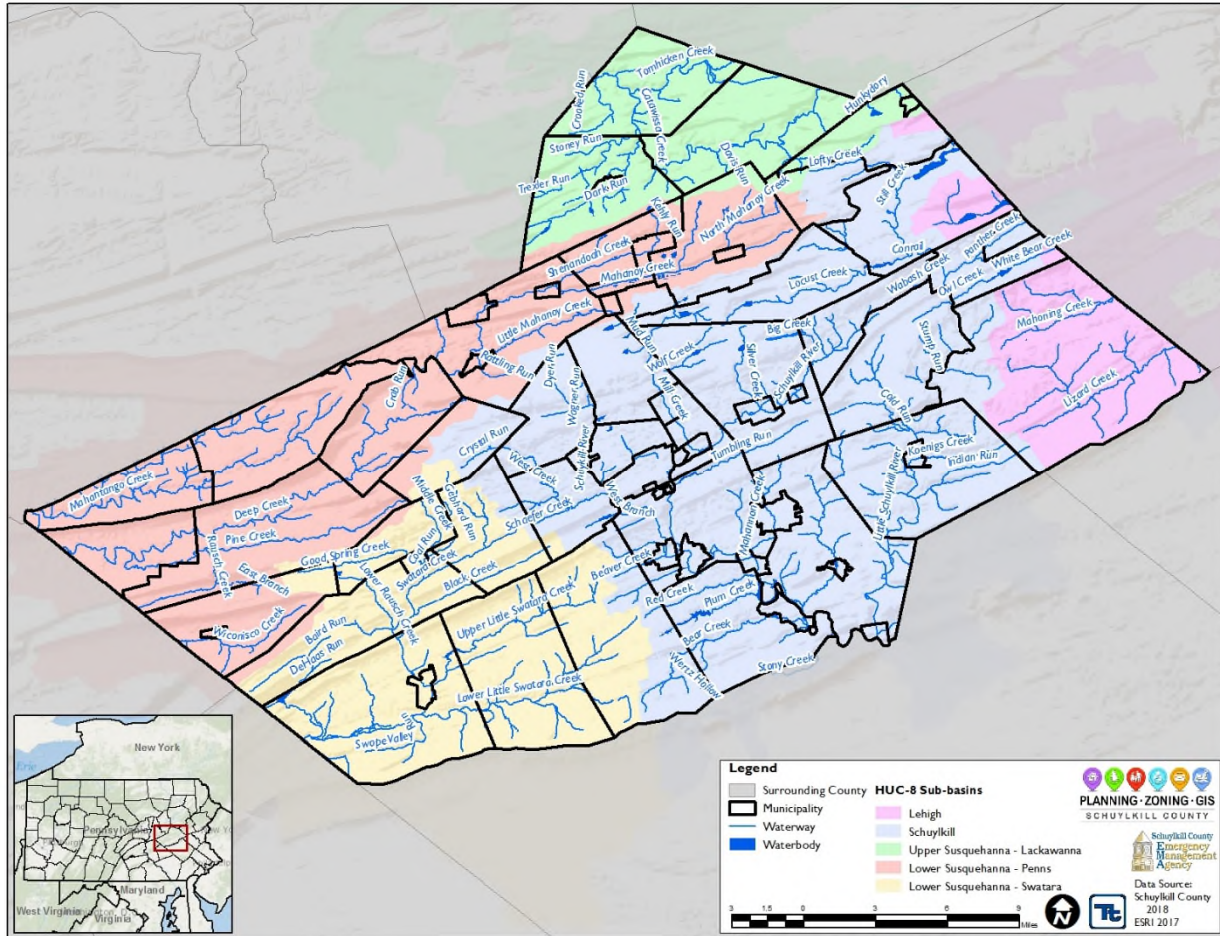
The County is located in three major watersheds, the Delaware and the Upper/Middle and Lower Susquehanna, which are separated by the Broad Mountain (refer to Figure 2-2). There are many smaller sub-basins located in the County. Figure 2-3 illustrates the Hydrologic Unit Code 8 sub-basins and major waterbodies. Generally, hydrologic features and water runoff in the eastern side of the county flow into the Delaware drainage basin, while flows from the western part of the county reach the Susquehanna drainage basins.

Figure 2-2. Major Watersheds in Pennsylvania



Source: PEMA 2018
Circle indicates the location of Schuykill County.

Figure 2-3. HUC-8 Sub-basins in Schuykill County



2.2 Historic Overview

Schuykill County was founded on March 1, 1811 via an Act of Assembly. It was originally made from portions of Berks and Northampton Counties, with more land added in 1818 from portions of Columbia and Luzerne Counties (History of Schuykill County PA, 1881). The County was named after the Schuylkill River, Schuylkill meaning “hidden river” in Dutch.

Schuykill County is part of Pennsylvania’s Coal Region which also includes Lackawanna, Luzerne, Columbia, Carbon and Northumberland Counties, and a portion of Dauphin County. The region is home to the largest known deposits of anthracite coal in North America that helped fuel the Industrial Revolution in the 19th and 20th centuries.

Schuykill County’s location within the coal region led the coal mining industry to be a primary economic driver in the area. Anthracite coal was discovered in the County in 1770 and 1790, but the industrial value of anthracite wasn’t recognized until the 1820’s. In 1829, the Yuengling Brewery was founded in Pottsville and has continuously operated since then becoming America’s oldest brewery in operation. By the 1840’s creation

of the Schuylkill Canal and railroads helped to fuel the County’s economy as coal was being exported to New York City, Baltimore and Philadelphia. By 1900, anthracite coal and the existing transportation networks had allowed for the County’s economy to flourish. *“As the demand for mining equipment and machinery grew, the county’s economy evolved into a diversified base that included powder mills, mining equipment, iron manufacturing, and boat building. Tanneries, sawmills, slaughter houses, distilleries and breweries dotted the landscape as Schuylkill County’s economy grew more diversified. Textile manufacturing evolved as a major industry in the county near the beginning of the 20th Century. As the century wore on, this industry, which employed significant numbers of women, rivaled the coal mining industry in importance, especially after the end of World War II”* (excerpted from Schuylkill County Chamber of Commerce, 2017).

As the dominant industries of coal mining and textiles industries declined, Schuylkill County has focused efforts on redeveloping its economy which is now *“balanced between heavy manufacturing and service-related businesses”* (Schuylkill County Chamber of Commerce, 2017). The County also has a strong history of agriculture and as of 2012, there were 105,749 acres of farmland (United States Department of Agriculture, 2012). Notable agricultural products produced in the County are Christmas trees, potatoes, dairy products, grain and poultry products.

2.3 Population and Demographics

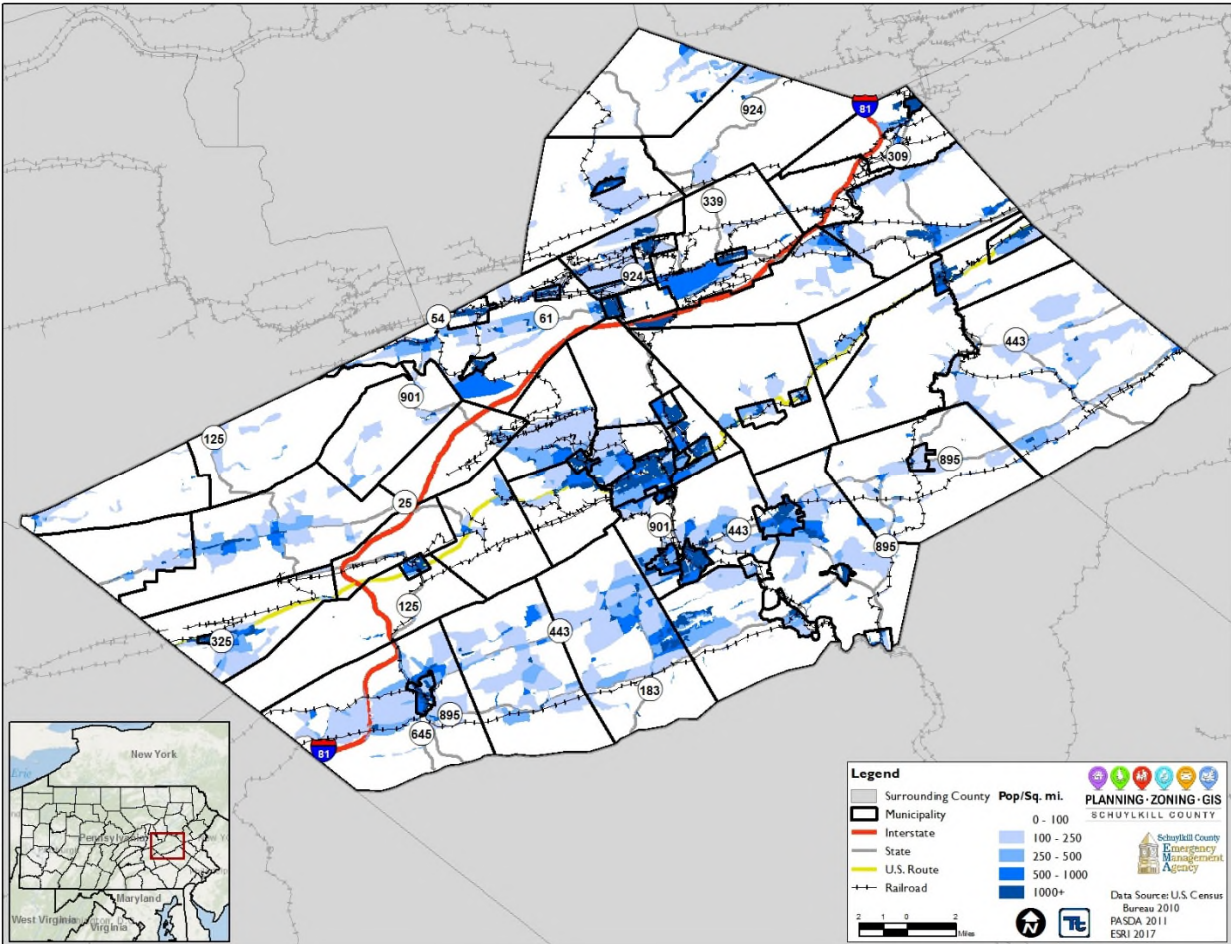
Knowledge of the composition of the population, how it has changed in the past and how it may change in the future is needed to make informed decisions. Information about population is a critical part of planning because it directly relates to needs such as housing, industry, stores, public facilities and services, and transportation. In 2010 the population of Schuylkill County was 148,289. According to the U.S. Census Bureau, this is a 1.4% decrease in population from 2000 (150,336 people). Based on 2017 data from the U.S. Census Bureau, the population has decreased to 142,569, which is a 3.9% loss from the 2010 Census. Baseline demographic information about Schuylkill County is listed in Table 2-1 and illustrated in Figure 2-4.

Table 2-1. Schuylkill County Demographics

Demographics	2010 Census	2016 Estimate
Total population	148,289	145,503
Male	75,175	74,295
Female	73,114	71,208
Median age (years)	43.7	44.1
Under 5 years	7,711	7,049
18 years and over	118,551	116,953
65 years and over	26,828	27,994
Household population	141,509	138,269
Group quarters population	6,780	13,276

Source: U.S. Census Bureau 2010, *General Population and Housing Characteristics, Schuylkill County*; 2016 American Community Survey 5-year estimates, Schuylkill County

Figure 2-4. Schuykill County 2010 Population Distribution



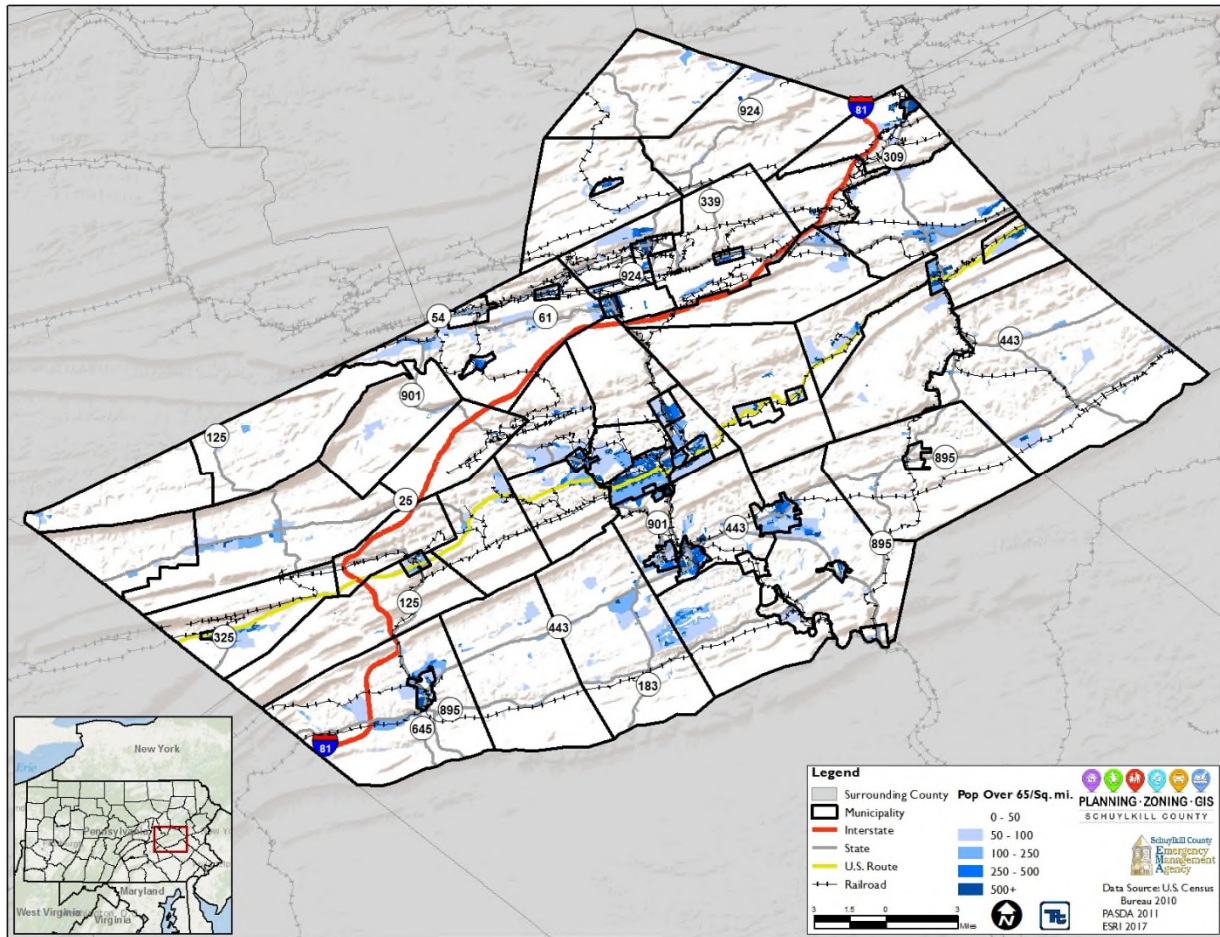
Source: U.S. Census Bureau 2010

Schuykill County ranks as the 24th most populous county in the Commonwealth of Pennsylvania. It has a relatively dense population (190.4 people per square mile [U.S. Census Bureau Quick Facts 2010]). A higher population density means that people are concentrated in groups, rather than spread throughout the County. A higher population density facilitates dissemination of information, instructions, and resources to residents; however, centralization of population can also pose challenges, including (1) increased likelihood that a hazard will affect a significant number of people concurrently, (2) more rapid spread of diseases among people in close contact, and (3) more rapid spread of fires among structures located close to each other.

Nearly 20% of the Schuykill County population is over the age of 65. Refer to Figure 2-5 for the distribution of population in Schuykill County over the age of 65. As a group, the elderly is more likely to lack the physical and economic resources necessary for response to hazard events and are more likely to suffer health-related consequences making recovery slower. They are more likely to be vision, hearing, and/or mobility impaired, and more likely to experience mental impairment or dementia. Additionally, the elderly are more likely to live in assisted-living facilities where emergency preparedness occurs at the discretion of facility operators. These facilities are typically identified as “critical facilities” by emergency managers because they require extra notice to implement evacuation. Elderly residents living in their own homes may have more difficulty evacuating their

homes and could be stranded in dangerous situations. This population group is more likely to need special medical attention, which may not be readily available during natural disasters due to isolation caused by the event. Specific planning attention for the elderly is an important consideration given the current aging of the American population.

Figure 2-5. Schuykill County Population Over 65 Years



Source: U.S. Census Bureau 2010; HAZUS-MH 4.0

Children are also particularly vulnerable to disaster events because of their young age and dependence on others for necessities. Very young children may additionally be vulnerable to injury or sickness; this vulnerability can be worsened during a natural hazard event. Approximately 5-percent of the population is less than 5 years in age.

Changes in population or demographics may be used to identify higher-risk populations. According to the U.S. Census, the racial composition of the planning area is predominantly white. The largest minority populations are African American and Hispanic or Latino (refer to Table 2-2). According to the 2012-2016 American Community, 4.5 percent of the County’s population speaks a language other than English with 29.6 percent of that demographic speaking English less than “very well.” While currently a low percentage, future hazard mitigation strategies should consider addressing language barriers to ensure that all residents can receive

emergency instructions. Maintaining up-to-date data on demographics will allow Schuykill County to better assess magnitudes of hazards and develop more specific mitigation plans and strategies.

Table 2-2. Race and Ethnicity in Schuykill County

Race and Ethnicity	2010 Census
One race	146,806
White	140,013
Black or African American	3,967
American Indian and Alaska Native	212
Asian	710
Pacific Islander	26
Other	1,878
Two or more races	1,483
Hispanic or Latino	4,080

Source: U.S. Census Bureau 2010, Race and Hispanic or Latino Origin, Schuykill County

The 2010 U.S. Census estimates that 54 million non-institutionalized Americans with disabilities live in the U.S. This equates to about one-in-five persons. Individuals with disabilities are more likely to have difficulty responding to a hazard event than the general population. Local government is the first level of response to assist these individuals, and coordination of efforts to meet their access and functional needs is paramount to life safety efforts. It is important for emergency managers to distinguish between functional and medical needs in order to plan for incidents that require evacuation and sheltering. Knowing the percentage of population with a disability will allow emergency management personnel and first responders to have personnel available who can provide services needed by those with access and functional needs. According to the 2011-2015 American Community Survey, 7.3 percent under the age of 65 are living with some form of disability within the planning area.

Schuykill County is experiencing population loss which is mainly attributed to the death rate exceeding the birth rate. Population loss has been due to out-migration (1980 to 1990). Although a gain in net-migration was seen from 1990 to 1996m it was not enough to offset the death rate (Schnell 2001). According to a PADEP report, Schuykill County’s population is anticipated to continue to decrease through the year 2040; with some municipalities experiencing minor population increases (PADEP 2012). Table 2-3 summarizes these population projections.

Table 2-3. Population Estimates in Schuykill County per Municipality

Municipality	2000 Census	2010 Census	2020 Projected	2030 Projected	2040 Projected
Ashland Borough	3,283	2,817	2,563	2,333	2,089
Auburn Borough	839	741	674	614	550
Barry Township	967	932	987	990	1,023
Blythe Township	905	924	865	850	810
Branch Township	1,871	1,840	1,724	1,656	1,561
Butler Township	4,987	5,224	5,833	6,229	6,747
Cass Township	1,840	1,958	1,867	1,895	1,855
Coaldale Borough	2,295	2,281	2,140	2,072	1,962

Municipality	2000 Census	2010 Census	2020 Projected	2030 Projected	2040 Projected
Cressona Borough	1,635	1,651	1,624	1,622	1,605
Deer Lake Borough	528	687	743	857	938
Delano Township	487	445	405	369	330
East Brunswick Township	1,601	1,793	1,930	2,098	2,248
East Norwegian Township	864	863	785	751	693
East Union Township	1,419	1,605	1,710	1,862	1,987
Eldred Township	719	758	765	790	805
Foster Township	268	251	228	208	186
Frackville Borough	4,361	3,805	3,463	3,151	2,822
Frailey Township	416	429	390	381	355
Gilberton Borough	867	769	700	637	570
Girardville Borough	1,742	1,519	1,382	1,258	1,126
Gordon Borough	781	763	763	752	748
Hegins Township	3,519	3,516	3,491	3,478	3,458
Hubley Township	889	854	817	781	744
Kline Township	1,591	1,438	1,309	1,191	1,066
Landingville Borough	175	159	145	132	118
Mahanoy Township	4,647	4,162	3,787	3,447	3,086
Mahanoy City Borough	3,093	3,152	3,708	3,980	4,415
McAdoo Borough	2,274	2,300	2,205	2,180	2,115
Mechanicsville Borough	515	457	416	378	339
Middleport Borough	458	405	369	335	300
Minersville Borough	4,552	4,397	4,145	3,948	3,720
Mount Carbon Borough	87	91	83	82	76
New Castle Township	395	414	377	372	348
New Philadelphia Borough	1,149	1,085	987	909	820
New Ringgold Borough	291	276	256	239	220
North Manheim Township	3,287	3,770	3,910	4,246	4,470
North Union Township	1,225	1,476	1,630	1,840	2,018
Norwegian Township	2,172	2,310	2,503	2,664	2,844
Orwigsburg Borough	3,106	3,099	3,282	3,357	3,494
Palo Alto Borough	1,052	1,032	939	888	813
Pine Grove Township	3,930	4,123	4,338	4,540	4,749
Pine Grove Borough	2,154	2,186	2,220	2,253	2,287
Port Carbon Borough	2,019	1,889	1,768	1,641	1,518
Port Clinton Borough	288	326	319	338	343
Porter Township	2,032	2,176	1,980	1,979	1,866
Pottsville City	15,549	14,324	13,197	12,009	10,856
Reilly Township	802	726	675	614	558
Ringtown Borough	826	818	799	786	770
Rush Township	3,957	3,412	3,456	3,145	3,036
Ryan Township	2,461	2,459	2,552	2,591	2,661
Saint Clair Borough	3,254	3,004	2,734	2,488	2,228
Schuykill Township	1,123	1,129	1,070	1,049	1,006
Schuykill Haven Borough	5,548	5,437	5,354	5,255	5,165
Shenandoah Borough	5,624	5,071	4,615	4,199	3,761
South Manheim Township	2,191	2,507	2,949	3,320	3,731



Municipality	2000 Census	2010 Census	2020 Projected	2030 Projected	2040 Projected
Tamaqua Borough	7,174	7,107	6,639	6,400	6,030
Tower City Borough	1,396	1,346	1,255	1,187	1,106
Tremont Borough	1,784	1,752	1,721	1,690	1,658
Tremont Township	250	280	266	277	274
Union Township	1,308	1,273	1,172	1,109	1,025
Upper Mahantongo Township	652	655	631	623	605
Walker Township	936	1,054	1,097	1,183	1,245
Washington Township	2,750	3,033	3,341	3,635	3,937
Wayne Township	4,721	5,113	5,734	6,224	6,788
West Brunswick Township	3,428	3,327	3,399	3,372	3,401
West Mahanoy Township	3,175	2,872	2,614	2,378	2,130
West Penn Township	3,852	4,442	4,786	5,270	5,674
Schuykill County	150,336	148,289	146,579	145,376	143,883

Source: PA DEP 2012

Seasonal fluctuations in population are important for emergency managers and responders to be aware of. A significant landmark is the Vraj Hindu Temple in Schuykill Haven. This temple is one of the largest in the region and attracts an average of 100,000 visitors each year which can cause spikes in population throughout the year (Vraj, 2008).

2.4 Housing Characteristics

Structures 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 Schuykill County building footprint spatial layer, there are 73,818 residential structures in the County.

According to the U.S. Census, approximately 15.4 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 may be structurally deficient and at risk of collapse.

Approximately 22.5 percent of the County’s population lives in rented homes. Because renters are more transient than homeowners, communicating with renters may be more difficult than communicating with homeowners. Refer to Table 2-4 which summarizes the housing characteristics of residential properties in Schuykill County.

Table 2-4. Housing Characteristics

Housing Characteristics	2010 Census	2016 Estimate
Total housing units	69,323	68,954
Owner-occupied housing units	60,192	43,484
Renter-occupied housing units	14,696	14,857

Housing Characteristics	2010 Census	2016 Estimate
Vacant housing units	9,131	10,137
Average household size of owner-occupied	2.35	2.47
Average household size of renter-occupied	2.12	2.10
Housing units with a mortgage	24,918	21,966
Housing units (owned) without a mortgage	20,578	21,518

Source: U.S. Census Bureau 2010; American Community Survey 2017

In 2016, the median household income in the County was \$46,573, which was lower than the Commonwealth of Pennsylvania’s estimated median household income (\$54,895). The County’s 2016 estimated per capita income of \$24,275 was lower than the Commonwealth’s 2013 estimated per capita income of \$30,137. Approximately 9.3 percent of family incomes were below poverty level, and 13 percent of individual incomes were below poverty level. Emergency responders may have difficulty connecting with individuals within this economic bracket for several reasons, including less access to the technology within these communities. Additionally, low-income families and individuals may not own vehicles, and therefore may require assistance during an evacuation. Table 2-5 summarizes the economic characteristics of Schuylkill County. Figure 2-6 illustrates the population density with annual income less than \$20,000.

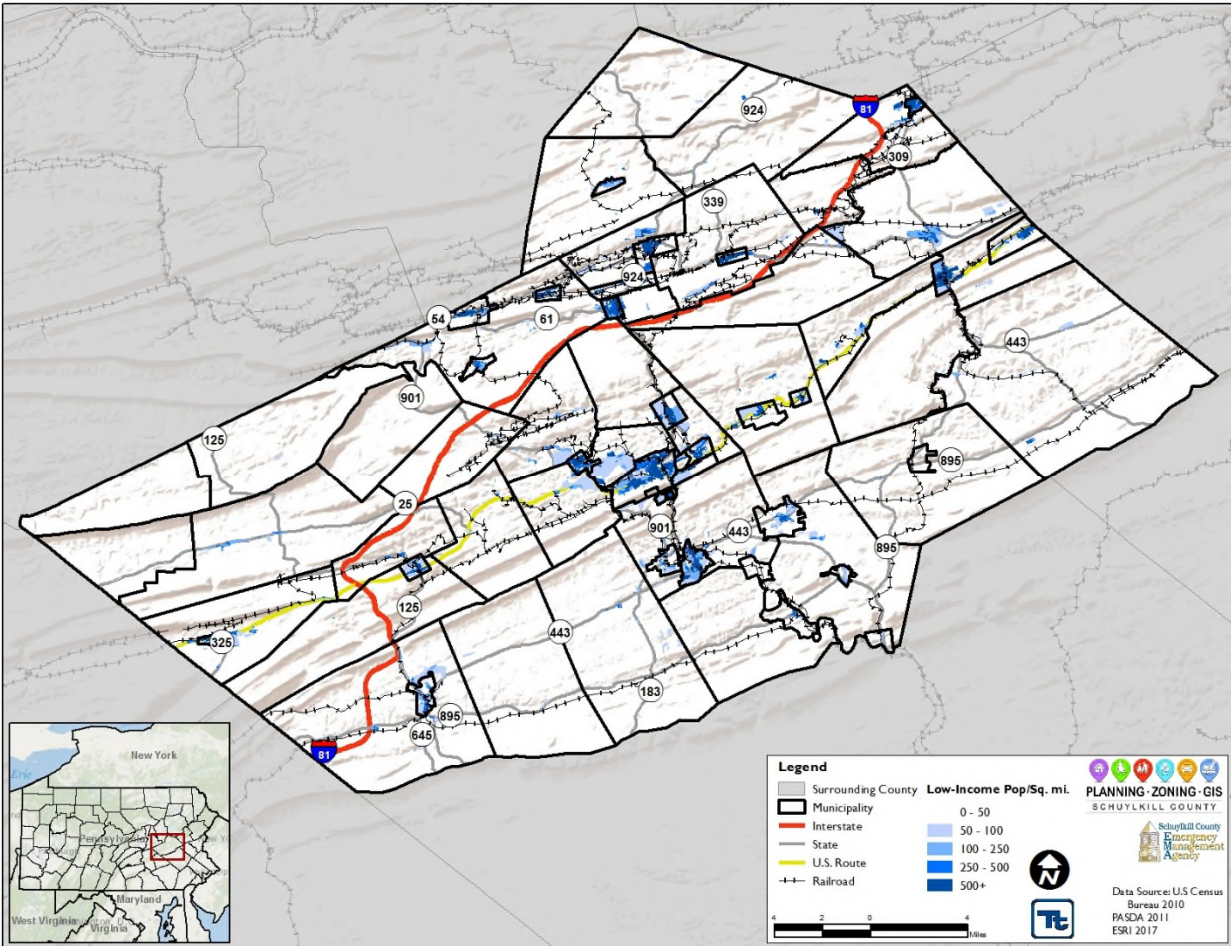
Table 2-5. Schuylkill County Economic Characteristics

Economic Characteristics	2016 Data
Median household income in 2016	\$46,573
Median family income in 2016	\$58,932
Per capita income in 2016	\$24,475
Families below poverty level	9.3%
Individuals below poverty level	13%

Source: U.S. Census Bureau Selected Economic Characteristics 2016 American Community Survey 5-Year Estimates, Schuylkill County and Pennsylvania

The largest occupation sectors within Schuylkill County are: management, business, science, arts; sales and office; and production, transportation and material moving. The top three employers within the County are: Wal-Mart Associates, Inc; the Commonwealth of Pennsylvania; and Hydro (Schuylkill County Chamber of Commerce, 2018).

Figure 2-6. Schuykill County Population Below the Poverty Level



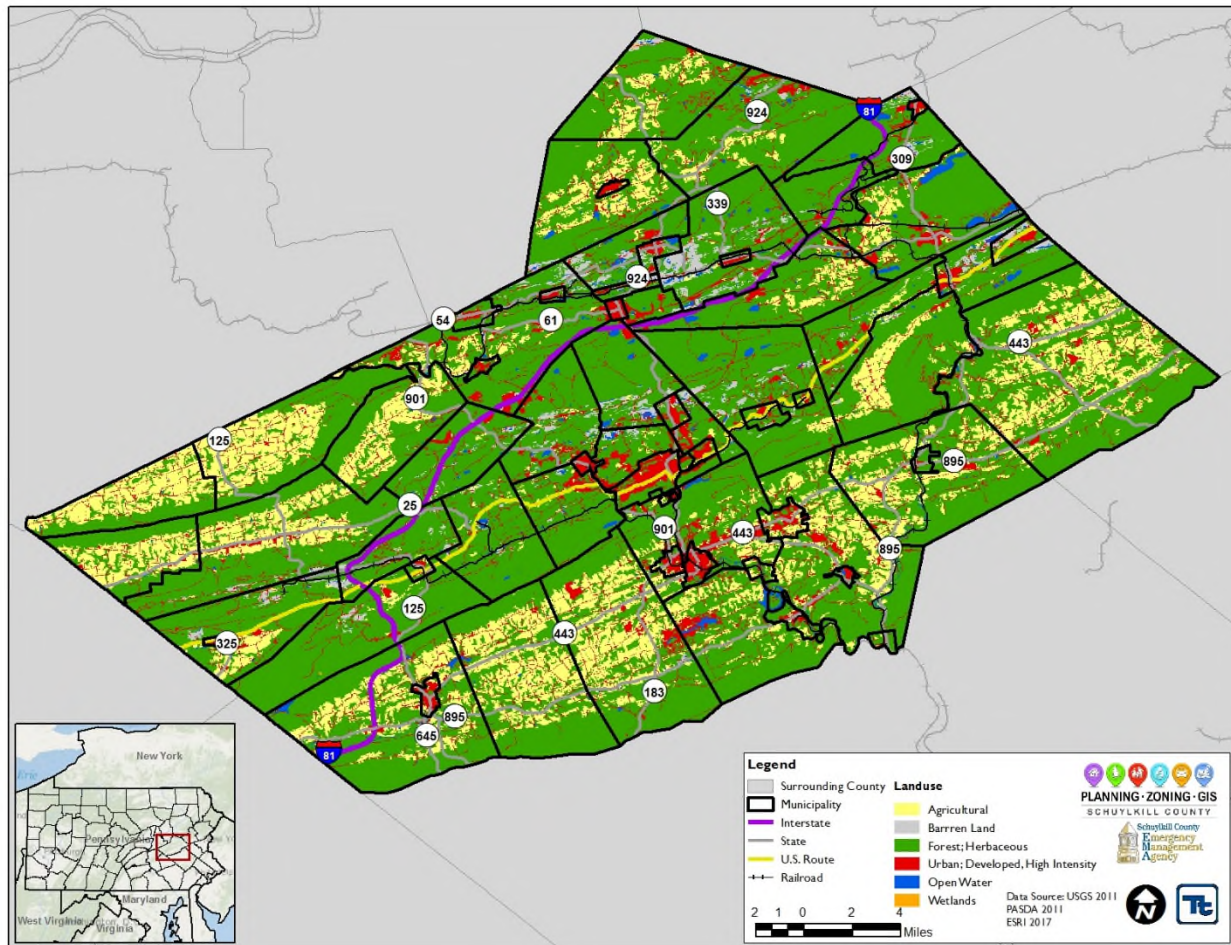
Source: U.S. Census Bureau 2010; HAZUS-MH 4.0

2.5 Land Use and Development

Most of Schuykill County remains nonurbanized, consisting of lands under cultivation, open fields, mining areas, woodlands, surface water bodies and wetlands. Over 68 percent of Schuykill County’s land cover is forested with almost 87 percent of this total devoted to forest and agricultural land uses. Refer to Figure 2-7 which illustrates land uses throughout Schuykill County.

Urban land uses are concentrated in the boroughs and along major roads. Residential uses predominate, comprising the major land use in the boroughs and villages as well as the most significant type of urban land use along roadways. Commercial activity is predominantly located in the larger communities and along major transportation routes that serve the cities and boroughs including the City of Pottsville and the Boroughs of Tamaqua, Frackville, Minersville, Port Carbon, Schuykill Haven, St. Clair, Shenandoah, Ashland, Ringtown, Pine Grove and Tremont. Industrial land uses are generally close to the urbanized areas, but more remote locations may also be found (Schuykill County 2006).

Figure 2-7. Schuykill County Land Use



Source: USGS National Land Cover Dataset

The County has various recreational resources including various campgrounds, an extensive trail network and the Sweet Arrow Lake County Park. The Appalachian Trail runs along a large portion of the County’s southern border. In addition to the locally managed recreational resources, there are State-operated lands within the County including Weiser State Forest, various areas of State gameland, and three State parks: Locust Lake, Swatara, and Tuscarora State Park (Schuykill County, 2006). The Schuykill and Little Schuykill Rivers also provide ample recreation opportunity throughout the County (Schuykill County Visitors Bureau, 2018). Various historical attractions are also located throughout the County.

Transportation systems within Schuykill County include highway and rail systems and facilities. The County’s highway system is formed around approximately 85 miles of Interstate Route 81. This road runs from the northeast to southeast corners across the center of the County. The interstate has nine exits throughout Schuykill county. Pennsylvania Route 61 is a four-lane highway that runs through the center of the County and provides access to commercial and industrial businesses. Pennsylvania Route 309 runs between Allentown and Hazleton and it serves as an important transportation route for the eastern side of the County (Schuykill County 2006).

According to the County Comprehensive Plan, there is a population shift taking place in the Schuylkill County. New development is taking place in rural areas, away from older settlements creating additional challenges; for example, ensuring adequate public services in rural areas, increased dependence on vehicles and road infrastructure, a decline of local city, borough, and village business districts, and loss of the strong social fabric inherent in these communities. The scattered pattern of urban uses that has begun to occur in parts of Schuylkill County also represents potential threats to environmentally sensitive resources, visual intrusions into the countryside, and a weakening of the economic base of the county in agricultural production and tourism (Schuylkill County 2006).

There are initiatives in place to focus on economic development throughout the County due to the decline of major industries. Schuylkill County and neighboring Carbon County form the Schuylkill/Carbon Keystone Opportunity Zone. This zone consists of nineteen (19) subzones, of which fourteen (14) subzones are located in Schuylkill County. *“The goal of the Keystone Opportunity Zone Program is to revive economically distressed communities utilizing a powerful market-based incentive - state and local tax abatement. It is anticipated that this initiative will help foster reinvestment in some of our more economically distressed areas.”* Each subzone has a coordinator that can serve as a resource to assist with inquiries and municipal issues including zoning, subdivision, land development planning and construction/building permitting (Schuylkill County Office of Economic Development, 2017).

There are several areas of proposed development identified throughout the County at this time. The Schuylkill Mall, located in New Castle Township near the intersection of I-81/SR 61, was demolished and two new logistics/warehousing centers totaling between the two approximately 1.25 million square feet are in the planning/permitting phase. According to the County Planning Department, this area of Pennsylvania may see an increase development from big box stores because of access to the interstate and the increased protection from coastal storm events (e.g., Hurricane Sandy which disrupted the supply-chain along the eastern seaboard). Therefore, the I-81 corridor in Schuylkill County may see increased development and increased traffic volume in the future.

In terms of new critical facilities, St. Luke’s and Geisinger Hospital are building a new hospital in West Brunswick Township along State Route 61; currently under construction. This large development is mixed use and in the planning stage, expecting additional growth with a convenience store, additional medical office buildings and townhome/apartment buildings. In addition, a skilled nursing home along State Route 901 (Gordon Nagle Trail) in North Manheim Township is in the planning stage.

The County is seeing several new large poultry operations in the Wayne and Washington Township area. In addition, the PA Department of Health has approved a marijuana grower/processor in Norwegian Township immediately north of the City of Pottsville.

2.6 Critical Facilities

This section describes critical facilities in Schuykill County, including essential facilities, transportation systems, lifeline utility systems, and high-potential loss facilities. Transportation systems include roadways, bridges, tunnels, airways and waterways. Lifeline utility systems include potable water, wastewater and emergency communication systems.

A comprehensive inventory of critical facilities in the County was developed from various sources including input from representatives of the Core Planning Team. The inventory of critical facilities presented in this section represents the current state of the effort at the time of publication of this HMP and was used for the risk assessment presented in Section 4. Figure 2-8 illustrates the critical facilities identified for the HMP update and their approximate locations within Schuykill County.

Critical facilities are those facilities considered critical to the health and welfare of the population, and that are especially important following a hazard. As defined for this HMP, critical facilities include essential facilities, transportation systems, lifeline utility systems, and high-potential loss facilities.

Essential facilities are a subset of critical facilities that include those facilities important to ensure full recovery following the occurrence of a hazard event. For the County risk assessment, this category was defined to include police, fire, Emergency Medical Services (EMS), schools, shelters, senior accommodations, and medical facilities.

2.6.2 ESSENTIAL FACILITIES

This section provides information on emergency facilities, hospital and medical facilities, shelters, schools, and senior care and living facilities.

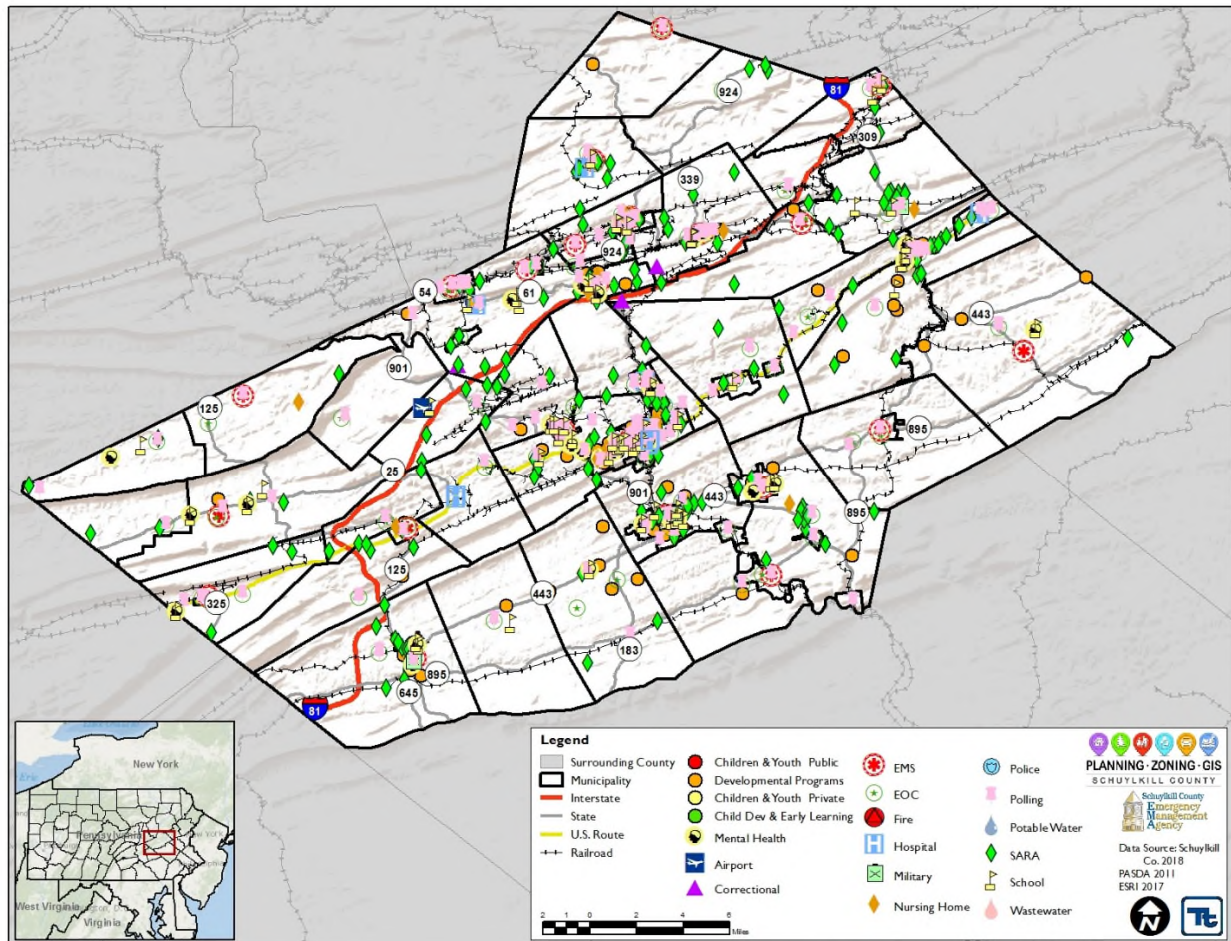
EMERGENCY FACILITIES

Police stations, fire stations, vehicle and equipment storage facilities and emergency operations centers are needed for disaster response before, during and after hazard events. For the purposes of this HMP update, emergency facilities include police, fire, and emergency operation centers (EOC).

Law enforcement services are provided to all 67 municipalities by full-time and part-time police departments, Pennsylvania State Police, University Police, Railroad Police, State Park Rangers and County Sheriff's Department based on location and jurisdiction. There are a total of 16 Townships with police departments, two of which provide 24/7/365 coverage and 14 departments part-time coverage. There are 17 Boroughs that have police departments; seven (7) of which provide 24/7/365 cover and 10 provide part-time coverage. The City of Pottsville has a full-time police department.

Fire protection is provided to all municipalities by volunteer fire stations in the County; and emergency medical services are provided by both full- and part-time volunteer ambulance services (Schuykill County EMA 2018). Table 2-6 lists types of emergency facilities in each municipality and whether they have access to backup power.

Figure 2-8. Critical Facilities in Schuykill County



Source: Schuykill County, 2018

Table 2-6. Emergency Facilities in Schuykill County

Municipality	EOC	Fire	Police
Ashland Borough	✓	✓	✓
Auburn Borough	✓	✓	✓
Barry Township	✓		
Blythe Township	✓	✓	✓
Branch Township	✓	✓	✓
Butler Township	✓	✓	✓
Cass Township	✓	✓	✓
Coaldale Borough	✓	✓	✓
Cressona Borough	✓	✓	
Deer Lake Borough	✓	✓	
Delano Township	✓	✓	
East Brunswick Township	✓		
East Norwegian Township	✓	✓	

Municipality	EOC	Fire	Police
East Union Township	✓	✓	✓
Eldred Township	✓	✓	
Foster Township	✓	✓	✓
Frackville Borough	✓	✓	✓
Frailey Township	✓	✓	
Gilberton Borough	✓	✓	✓
Girardville Borough	✓	✓	✓
Gordon Borough	✓	✓	
Hegins Township	✓	✓	✓
Hubley Township	✓	✓	
Kline Township	✓		✓
Landingville Borough	✓	✓	
Mahanoy Township	✓		✓
Mahanoy City Borough	✓	✓	✓
Mcadoo Borough	✓	✓	✓
Mechanicsville Borough	✓		
Middleport Borough	✓	✓	
Minersville Borough	✓	✓	✓
Mount Carbon Borough	✓	✓	
New Castle Township	✓	✓	✓
New Philadelphia Borough	✓	✓	✓
New Ringgold Borough	✓	✓	
North Manheim Township	✓		✓
North Union Township	✓		✓
Norwegian Township	✓	✓	
Orwigsburg Borough	✓	✓	✓
Palo Alto Borough	✓	✓	✓
Pine Grove Township	✓	✓	
Pine Grove Borough	✓	✓	✓
Port Carbon Borough	✓	✓	✓
Port Clinton Borough		✓	✓
Porter Township	✓	✓	
Pottsville City	✓	✓	✓
Reilly Township	✓	✓	
Ringtown Borough	✓	✓	✓
Rush Township	✓	✓	✓
Ryan Township	✓	✓	✓
St. Clair Borough	✓	✓	✓
Schuykill Township	✓	✓	✓
Schuykill Haven Borough	✓	✓	✓
Shenandoah Borough	✓	✓	✓
South Manheim Township	✓		

Municipality	EOC	Fire	Police
Tamaqua Borough	✓	✓	✓
Tower City Borough	✓	✓	✓
Tremont Borough	✓	✓	✓
Tremont Township	✓		
Union Township	✓		✓
Upper Mahantongo Township	✓		
Walker Township	✓	✓	✓
Washington Township	✓		
Wayne Township	✓	✓	✓
West Brunswick Township	✓		
West Mahanoy Township	✓	✓	✓
West Penn Township	✓	✓	✓

Sources: Schuykill County 2018

Notes: Some municipalities may have multiple fire stations (i.e., fire substations).

✓ = Facility is located in the identified municipality.

HOSPITAL AND MEDICAL SERVICES

In addition to providing essential services during an emergency, hospitals also contain occupants who may not be sufficiently mobile to avoid injury or death during a hazard event. Table 2-7 below provides an inventory of hospitals and major medical facilities in Schuykill County.

Table 2-7. Hospitals and Medical Centers in Schuykill County

Name	Address	Municipality	# Beds	Building Type	Backup Power
Lehigh Valley Hospital-Schuykill – South Jackson Street Campus	420 S Jackson St	Pottsville City	TBD	Hospital	TBD
Lehigh Valley Hospital – Schuykill – East Norwegian Street Campus	East Norwegian Street	Pottsville City	TBD	Hospital	TBD
Pottsville Hosp & Warne Clinic	Mauch Chunk Street	Pottsville City	TBD	Hospital	TBD
Pottsville Hosp & Warne Clinic	Mauch Chunk Street	Pottsville City	TBD	Hospital	TBD
Pottsville Hosp & Warne Clinic	Mauch Chunk Street	Pottsville City	TBD	Hospital	TBD
St. Luke’s University Hospital - Miners Campus	Seventh Street	Coaldale Borough	TBD	Hospital	TBD
Ashland Community	1309-1311 Center St	Ashland Borough	N/A	EMS	TBD
Auburn Ambulance	131 Front St	Auburn Borough	N/A	EMS	TBD
Pitman-Mahantongo Valley Ambulance	89 Main Rd	Eldred Township	N/A	EMS	TBD
Frackville Ambulance	52 E Arch St	Frackville Borough	N/A	EMS	TBD
Girardville Ambulance	100 W Main St	Girardville Borough	N/A	EMS	TBD
Hegins Area Ambulance	352 Gap St	Hegins Township	N/A	EMS	TBD
Mahanoy City Ambulance	212 W Centre St	Mahanoy City Borough	N/A	EMS	TBD
McAdoo Ambulance	38 S Kennedy Dr	McAdoo Borough	N/A	EMS	TBD
Minersville Ambulance	25 North St	Minersville Borough	N/A	EMS	TBD

Name	Address	Municipality	# Beds	Building Type	Backup Power
New Ringgold Ambulance	15 Railroad St	New Ringgold Borough	N/A	EMS	TBD
Schuykill EMS Orwigsburg	500 E Market St	Orwigsburg Borough	N/A	EMS	TBD
Pine Grove Community Ambulance	36 Spruce St	Pine Grove Borough	N/A	EMS	TBD
Schuykill EMS Pottsville Station	320 N 9th St	Pottsville City	N/A	EMS	TBD
Ryan Township Rescue Squad	9 3rd Ave	Ryan Township	N/A	EMS	TBD
Schuykill EMS Schuykill Haven Station	Dock St & Haven St	Schuykill Haven Borough	N/A	EMS	TBD
Shenandoah Ambulance	220 N White St	Tamaqua Borough	N/A	EMS	TBD
Tamaqua Community Ambulance	98 N Railroad St	Tamaqua Borough	N/A	EMS	TBD
Tower Porter EMS	633 E Colliery Ave	Tower City Borough	N/A	EMS	TBD
Tremont Area Ambulance	49 North St	Tremont Borough	N/A	EMS	TBD

Source: Schuykill County 2018

Notes:

N/A = Not applicable

TBD = To be determined

SHELTERS

There is no spatial dataset of shelters available for Schuykill County. As a result of the recent 2018 flood events, the following locations were opened as shelters or evacuation centers:

- Tremont Fire Company #1 (American Red Cross opened)
- Pottsville Area School District Middle School (American Red Cross opened)
- St. Stephens in Port Carbon (Evacuation Center)
- Schuykill Haven High School (Evacuation Center)
- Frackville Borough Building (Evacuation Center)
- Pottsville Middle School (Penn Live 2018).

SCHOOLS AND INSTITUTIONS OF HIGHER EDUCATION

There are several college and university campuses located in Schuykill County summarized below. Table 2-8 lists schools located in Schuykill County.

- Alvernia College
- Penn State Schuykill Campus
- Lehigh Carbon Community College

Table 2-8. Schools in Schuykill County

Name	Address	Municipality
Minersville Area Early Childhood Education Center	Llewellyn Rd	Branch Township
North Schuykill Jr/Sr High School	Academy Ln	Butler Township
North Schuykill Elementary School	Line St	Butler Township

Name	Address	Municipality
Ashland Mennonite Bible School	Broad St	Butler Township
Minersville Area Jr/Sr High School	Battlin Miner Dr	Cass Township
Blue Mountain El Cressona	Wilder St	Cressona Borough
Tri Valley High School	E Main St	Hegins Township
Hegins Valley Mennonite School	E Mountain Rd	Hegins Township
Hegins-Hubley Elementary School	W Main St	Hegins Township
Fearnot Amish School	Fearnot Rd	Hubley Township
Mcadoo-Kelayres Elementary School	Kelayres Rd	Kline Township
Mahanoy Area Middle School	Golden Bear Dr	Mahanoy Township
Mahanoy Area Elementary School	Golden Bear Dr	Mahanoy Township
Mahanoy Area High School	Golden Bear Dr	Mahanoy City Borough
St Nicholas School	N Front St	Minersville Borough
Minersville Area Elementary School	N 5th St	Minersville Borough
Schuykill Technology Center North	Technology Dr	New Castle Township
Blue Mountain High School	W Market St	North Manheim Township
St Ambrose School	Randel St	North Manheim Township
Penn State University Schuylkill	University Dr	North Manheim Township
Alvernia University	Route 61 Hwy S	North Manheim Township
Schuylkill Technology Center South	Maple Ave	Norwegian Township
Schuylkill IU 29 Maple Ave Campus	Maple Ave	Norwegian Township
Blue Mountain El East School	Red Dale Rd	Orwigsburg Borough
Blue Mountain Middle School	Red Dale Rd	Orwigsburg Borough
Pine Grove Area Elementary School	School St	Pine Grove Borough
Pine Grove Area High School	School St	Pine Grove Borough
Pine Grove Area Middle School	School St	Pine Grove Borough
Williams Valley Elementary School	State Route 209	Porter Township
Pottsville Area High School	Elk Ave	Pottsville City
Pottsville Area DHH Lengel Middle School	Laurel Blvd	Pottsville City
Assumption BVM Elementary School	S 7th St	Pottsville City
St Joseph Center for Special Learning	W Norwegian St	Pottsville City
Nativity BVM High School	Lawtons HI	Pottsville City
John S Clarke El Center	N 16th St	Pottsville City
Gillingham Charter School	W Howard Ave	Pottsville City
Marian Catholic High School	Marian Ave	Rush Township
St Clair Area Elementary/Middle School	Mill St	Saint Clair Borough
Schuylkill Haven Middle School	Haven St	Schuylkill Haven Borough
Schuylkill Haven Sr High School	E Main St	Schuylkill Haven Borough
Schuylkill Haven El Center	Main St	Schuylkill Haven Borough
Trinity Academy	Cherry St	Shenandoah Borough

Name	Address	Municipality
Shenandoah Valley Elementary	W Centre St	Shenandoah Borough
Shenandoah Valley Jr/Sr High	W Centre St	Shenandoah Borough
St Jerome Regional School	Meadow Ave	Rush Township
Tamaqua Elementary School	Boyle Ave	Tamaqua Borough
Mahantongo Elementary School	Ridge Rd	Upper Mahantongo Township
Lehigh Carbon Community College	Morgan Center High St	Tamaqua Borough
Tamaqua Area Middle School	Penn St	Walker Township and Tamaqua Borough
Tamaqua Area High School	Penn St	Walker Township
New England Valley Mennonite	Evergreen Dr	Walker Township
Flat Hill Amish Parochial School	Flat Hill Rd	Washington Township
Blue Mountain El West School	Long Run Rd	Wayne Township
West Penn Twp Elementary School	School Dr	West Penn Township
Overcomer's Christian Academy	Mush Dahl Rd	West Penn Township
Commonwealth Connections Academy Cyber Charter School	Cold Spring Rd	West Penn Township

Source: Schuylkill County 2018

SENIOR CARE AND SENIOR LIVING FACILITIES

Nursing homes and senior care facilities are likely to contain occupants who may not be sufficiently mobile to avoid injury or death during a hazard event. Table 2-9 lists nursing home facilities in Schuylkill County.

Table 2-9. Nursing Home and Personal Care Facilities in Schuylkill County

Name	Address	Municipality	Type
Green Valley Nursing & Rehab Center	Taylorville Road	Eldred Township	Nursing Home
Broad Mountain Nursing and Rehabilitation Center	Laurel Street	Frackville Borough	Nursing Home
Rosewood	University Dr	North Manheim Township	Nursing Home
Seton Manor	Seton Dr	Orwigsburg Borough	Nursing Home
Orwigsburg Center/Genesis Healthcare	Orwigsburg Manor Rd	Orwigsburg Borough	Nursing Home
Golden Living Center – York Terrace	2401 W Market St	Pottsville City	Nursing Home
Manorcare Health Services Inc	Pulaski Drive	Pottsville City	Nursing Home
Hometown Nursing and Rehabilitation Center	149 Lafayette Ave	Rush Township	Nursing Home
Ridgeview	Washington Street	Shenandoah Borough	Nursing Home
Shenandoah Manor Nursing Center	101 East Washington Street	Shenandoah Borough	Nursing Home
Tremont Health and Rehabilitation Center	Donaldson Rd	Tremont Borough	Nursing Home
Arnold Home Inc	Pennsylvania Avenue	West Mahanoy Township	Nursing Home
Angel Villa	Center Street	East Union Township	Personal Care
Luther Ridge at Seiders Hill	160 Red Horse Road	North Manheim Township	Personal Care
Andsher Personal Care Home	20 North Kennedy Drive	McAdoo Borough	Personal Care
Providence Place of Pine Grove	24 Hikes Hollow Road	Pine Grove Township	Personal Care
Schoolyard Square	11 High Street	Pine Grove Borough	Personal Care
Providence Place of Pottsville	2200 First Avenue	Pottsville City	Personal Care
Schuylkill Center	Schuylkill Manor Rd	Pottsville City	Personal Care
Greenwood Hills Estate	452 Greenwood Avenue	Pottsville City	Personal Care
Heritage Mills Personal Care Center	846 East Wiconisco Avenue	Tower City Borough	Personal Care
Weston Senior Living Center At Pinebrook	2 Woodbridge Road	West Brunswick Township	Personal Care

Source: Schuylkill County 2018

2.1.1 TRANSPORTATION SYSTEMS

This section presents available inventory data regarding roadways, airports, railways, and other public transportation systems in Schuylkill County.

HIGHWAY, ROADWAYS, AND ASSOCIATED SYSTEMS

The major roads and highways in the County include, I-81, U.S. Route 209, PA Route 25, PA Route 54, PA Route 61, PA Route 125, PA Route 183, PA Route 309, PA Route 325, PA Route 339, PA Route 443, PA Route 501, PA Route 895, PA Route 901, and PA Route 924. The State roads are maintained by PennDOT. Schuylkill County has 859 bridges throughout the County with a number of these being historical truss bridges: 684 State-owned, 61 County-owned, 71 Township-owned, 25 City or Borough-owned, 3 State forest or State park, 5 private, 10 railroad (PennDOT 2018).

Schuylkill County maintains the Schuylkill Transportation System (STS) to meet the public transportation needs of the County's residents while providing safe, dependable, and cost-effective transportation. The STS and the rest of the County rely on its roads and highway system to transport residents and visitors to and from the County; over 55 percent of the County's residents rely on an automobile to commute to work.

AIRPORTS

There is one public airport located in Schuylkill County: the Pottsville-Schuylkill County Airport also known as the Schuylkill County Joe Zerby in Foster Township. To fly internationally, residents need to travel to Lehigh Valley International Airport or Harrisburg International.

RAILWAYS

The railroads once drove the Schuylkill County economy due to the region's geographic importance to the anthracite coal mining industry. Today there are still active rail lines owned by the Reading Blue Mountain and Northern Railroad that service County industries (Schuylkill County 2006). There are several inactive lines in the County as well. Many rail lines have been converted to recreation trails (e.g., Lehigh and New England Rail Trail and Bartram Trail) under the Rails-to-Trails program.

PUBLIC TRANSPORTATION

The STS provides safe, dependable, and cost-effective transportation. This includes a Fixed Route Bus Program and a Shared Ride program for seniors and persons with disabilities. Transportation is provided at no cost to medical appointments. To qualify for this service, you must be a Medical Assistance cardholder and register with the Medical Assistance Transportation Program Office. Persons with low income, who do not have an Access Card and who are between the ages of 18 and 59 may qualify for transportation to medical appointments and social service agencies under the Human Services Development Fund. Schuylkill County is also a participating County with Commuter Services of Pennsylvania.

2.1.2 LIFELINE UTILITY SYSTEMS

Public and private utilities, facilities and infrastructure are vital to maintaining or restoring normal services to areas damaged by hazard events. This section presents potable water, wastewater and energy resource utility system data. Because of heightened security concerns, only partial local utility lifeline data—sufficient to complete the analysis—have been obtained.

POTABLE WATER SUPPLY

The County receives their water from three sources, wells, reservoirs and springs to meet its water demand. According to the Schuylkill County Water Supply Study, 56.1% of water is supplied via surface water, 43.8% is provided by wells, and 0.08% is provided by springs (Schuylkill County Water Supply Study, 2002). The major drinking water service provider is the Schuylkill County Municipal Authority (SCMA); drinking water is supplied from the Authority's six surface water reservoirs and seven groundwater wells serving over 30,000 Schuylkill County residents in all or portions of 22 municipalities. The potable water is physically and chemically treated at one of the six SCMA water filtration and treatment facilities (SCMA 2018). Table 2-10 summarizes the potable water facilities in the County. Figure 2-9 illustrates the public waters services areas in the County.

Table 2-10. Potable Water Facilities in Schuylkill County

Facility Name	Facility Location	Owner
Blythe Twp Municipal Authority - Silver Creek WTP	Blythe (T)	Blythe Township Municipal Authority
Schuylkill County Municipal Authority - Broad Mountain WTP	Blythe (T)/New Castle (T)	Schuylkill County Municipal Authority
Ashland Municipal WTP	Butler (T)	Ashland Area Municipal Authority
Schuylkill County Municipal Authority - Gordon Well Treatment Facility	Butler (T)	Schuylkill County Municipal Authority
Blythe Twp Municipal Authority - Crystal Run WTP	Cass (T)	Blythe Township Municipal Authority
Minersville WTP	Cass (T)	Minersville Borough Water Authority
The Pines Tank	Deer Lake (B)	Aqua PA
Oneida Tank	East Union (T)	Aqua PA
PAWC - Laurel Street Station	Frackville (B)	Pennsylvania-American Water Company
PAWC - Nice Street Station	Frackville (B)	Pennsylvania-American Water Company
Hegins - Hubley Water Authority - Wells and Storage Tanks	Hegins (T)	Hegins - Hubley Water Authority
Hegins - Hubley Water Authority - Well and Storage Tank	Hubley (T)	Hegins - Hubley Water Authority
Mahanoy Township WTP	Mahanoy (T)	Mahanoy Township Authority
Schuylkill County Municipal Authority - Indian Run WTP	New Castle (T)	Schuylkill County Municipal Authority
Schuylkill County Municipal Authority - Mount Laurel WTP	New Castle (T)	Schuylkill County Municipal Authority
Schuylkill Haven Tumbling Run WTP	North Manheim (T)	Schuylkill Haven Borough
Schuylkill Haven Willow Lake (Water Storage Tank)	North Manheim (T)	Schuylkill Haven Borough
Orwigsburg Borough WTP	Orwigsburg (B)	Orwigsburg Borough
Pine Grove Borough Water Department	Pine Grove (T)	Pine Grove Borough
Ringtown Borough Water Well #1 (Pump House)	Ringtown (B)	Ringtown Borough
Tamaqua Area Water Authority - Still Creek WTP	Rush (T)	Tamaqua Area Water Authority
Blythe Twp Municipal Authority - Moss Glen WTP	Schuylkill (T)	Blythe Township Municipal Authority
Schuylkill County Municipal Authority - Tremont WTP	Tremont (T)	Schuylkill County Municipal Authority
Ringtown Borough Water Well #3 (Pump House)	Union (T)	Ringtown Borough
Ringtown Borough Water Storage Tank	Union (T)	Ringtown Borough
Schuylkill County Municipal Authority - Pinebrook Well Treatment Facility	West Brunswick (T)	Schuylkill County Municipal Authority
Shenandoah Water Treatment Plant	West Mahanoy (T)	Shenandoah Municipal Authority

Source: Schuylkill County 2018

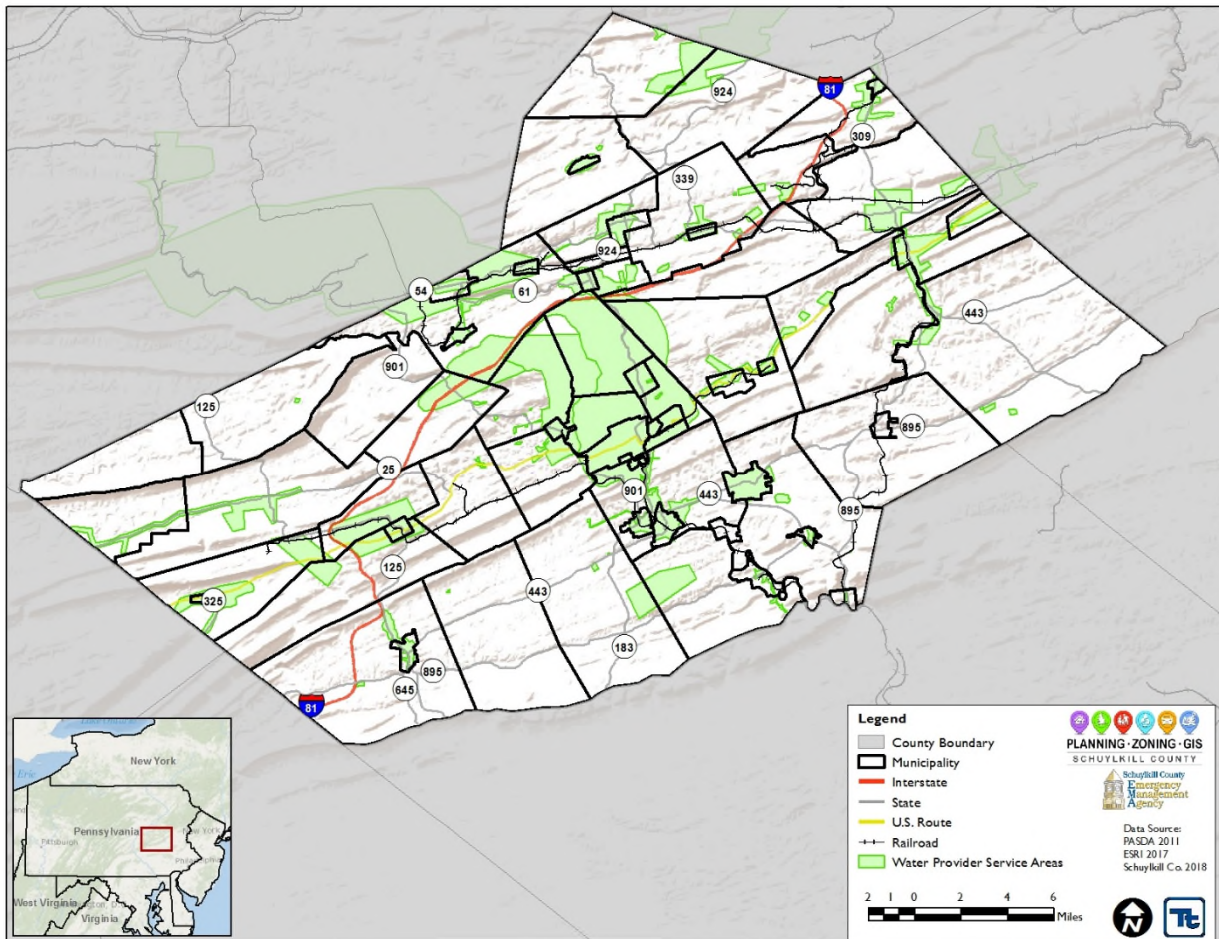
Note: This tables includes water treatment plants, pumps, tanks and a reservoir.

WTP = Water Treatment Plant

B = Borough

T = Township

Figure 2-9. Public Water Service Areas



WASTEWATER FACILITIES

The SCMA provides collection, conveyance and treatment services for sanitary sewage generated in 11 municipalities (SCMA 2018). Wastewater facilities as identified by Schuykill County are listed in Table 2-11. Figure 2-10 illustrates the existing and proposed sewer services areas in the County.

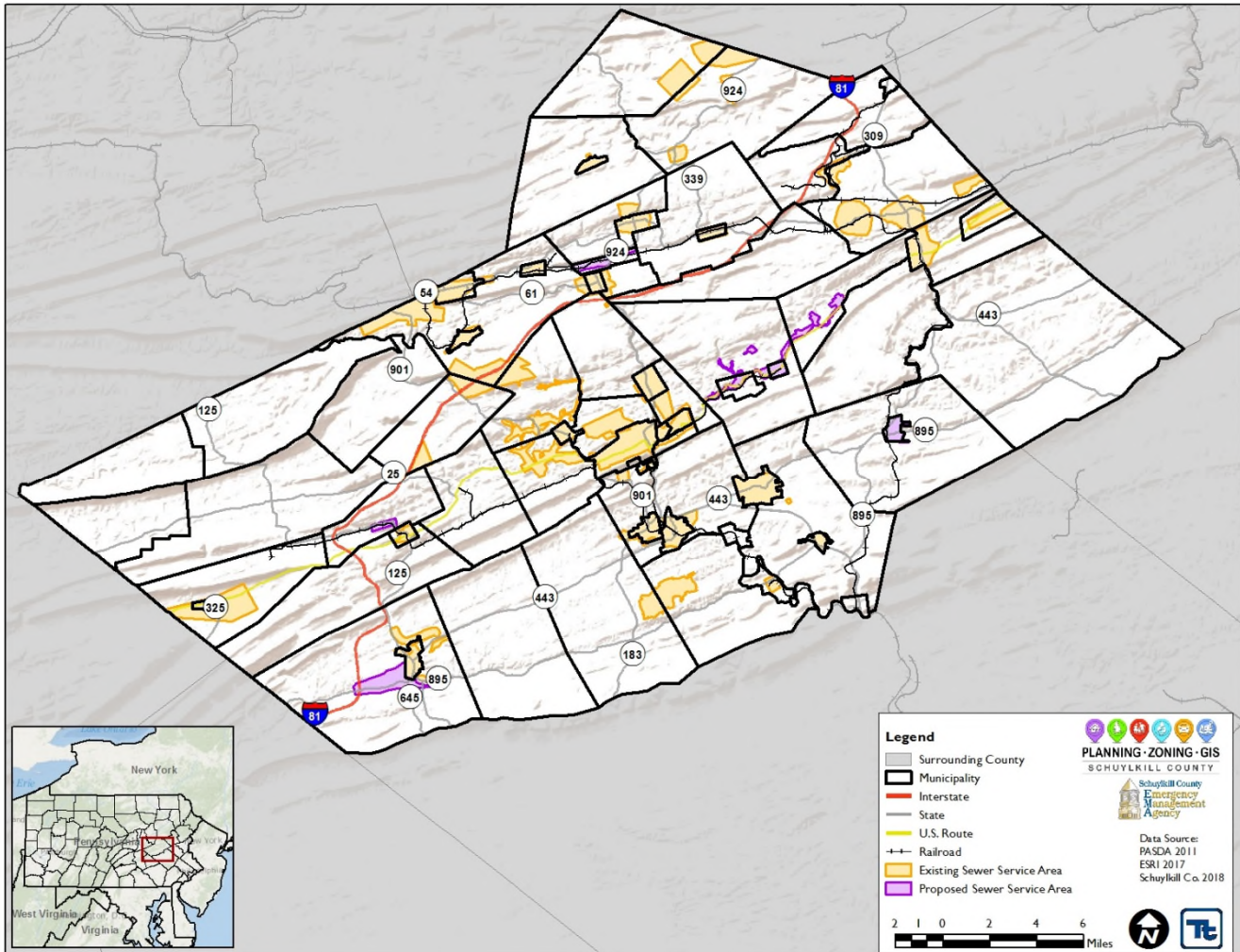
Table 2-11. Wastewater Facilities in Schuykill County

Facility Name	Facility Location
Ashland Area Municipal Authority WWTP	Ashland (B)
Greater Pottsville Area Sewer Authority - West WWTP	Pottsville City/Branch (T)
Schuykill Municipal Authority - Branch-Cass Regional WWTP	Branch (T)
Minersville Sewer Authority WWTP	Branch (T)/Norwegian (T)
Butler Township Municipal Authority WWTP	Butler (T)
Frackville Area Municipal Authority WWTP	Butler (T)
Coaldale Lansford Summit Hill Sewer Authority WWTP	Coaldale (B)
Cressona Borough WWTP	Cressona (B)
St Clair Municipal Authority WWTP	East Norwegian (T)

Facility Name	Facility Location
Schuylkill Municipal Authority - Gordon WWTP	Gordon (B)
Mahanoy City WWTP	Mahanoy (T)
Orwigsburg Borough WWTP	North Manheim (T)/West Brunswick (T)
Eagle Rock	North Union (T)
Cove Village	North Union (T)
Pine Grove Joint Treatment Authority - WWTP	Pine Grove (T)
Greater Pottsville Area Sewer Authority - Main WWTP	Pottsville City
Ringtown Borough Municipal Authority WWTP	Ringtown (B)
Schuylkill Haven Borough WWTP	Schuylkill Haven (B)
Plum Creek Municipal Authority	South Manheim (T)
Schuylkill Municipal Authority - Tremont WWTP	Tremont (T)
Tamaqua Borough WWTP	Walker (T)
Schuylkill Municipal Authority - Deer Lake WWTP	West Brunswick (T)
Shenandoah Municipal Sewer Authority WWTP	West Mahanoy (T)

Source: Schuylkill County 2018
 WWTP = Wastewater Treatment Plant
 B = Borough
 T = Township

Figure 2-10. Existing and Proposed Sewer Service Areas



ENERGY RESOURCES

Electric power is provided by several service providers in the County including PPL. There are two municipalities that have their own service providers: Schuykill Haven Borough and Saint Clair Borough. There is also a propane distribution facility located in Porter Township.

COMMUNICATION RESOURCES

Table 2-12 summarizes the communication towers were identified in the Schuykill County critical facility inventory.

Table 2-12. Communication Radio Towers in Schuykill County

Facility Name	Municipality
WPPA 1360	Norwegian Township
WPAM 1450	Pottsville City
WMGH-FM CH 288	Schuykill Township

Facility Name	Municipality
WMBT 1530	West Mahanoy Township
WAVT-FM CH 270	West Mahanoy Township

Source: Schuylkill County 2018

2.1.3 HIGH-POTENTIAL LOSS FACILITIES

High-potential loss facilities include military installations, dams, levees, nuclear power plants, and hazardous materials (HAZMAT) facilities.

HAZMAT FACILITIES

Schuylkill County is home to 190 identified facilities that utilize, ship, or house chemicals considered hazardous. These facilities have been identified under the Superfund Amendments and Reauthorization Act (SARA) as exceeding the quantity threshold for reporting. These facilities are required to comply with regulations set forth by the federal SARA and comply with reporting requirements specified in the Pennsylvania Hazardous Materials Emergency Planning and Response Act (Act 165). The County monitors these reporting requirements, as necessary, to ensure facility safety.

DAMS AND LEVEES

According to spatial data obtained from Schuylkill County, there are 72 dams in Schuylkill County, 47 of which are classified as high hazard dams. There are also two levees located within the County (1) the Willow Creek Project in Schuylkill Haven Borough and (2) the Celebration Creek Project in McAdoo Borough (Schuylkill County HMP 2013). Refer to Section 4.3.2 (Dam and Levee Failure) for more information on the dam and levee inventory in Schuylkill County.

2.1.4 OTHER CRITICAL FACILITIES

Table 2-13 lists additional facilities identified by the Core Planning Team as critical to operations during a hazard event, or priority in terms of response and recovery because they house vulnerable populations.

Table 2-13. Additional Critical Facilities in Schuylkill County

Name	Municipality	Building Type
Child Development-Fountain Springs Center	Butler Township	Child Development and Early Learning
Carbon County Hs-Coaldale Center	Coaldale Borough	Child Development and Early Learning
Little Bear Cub Care	Coaldale Borough	Child Development and Early Learning
Rad Property Management LLC	Deer Lake Borough	Child Development and Early Learning
Kimberly Ann Zula	Foster Township	Child Development and Early Learning
Frackville Learning Center	Frackville Borough	Child Development and Early Learning
Sisters Early Learning Center LLC	Frackville Borough	Child Development and Early Learning
Mini Miracles	Girardville Borough	Child Development and Early Learning
Precious Moments Day Care Enterprises	Girardville Borough	Child Development and Early Learning
Bunch of Monkeys Learning Center and Daycare	Hegins Township	Child Development and Early Learning

Name	Municipality	Building Type
Kathy Maurers Day Care Service	Hegins Township	Child Development and Early Learning
Little Blessings Daycare and Preschool	Hegins Township	Child Development and Early Learning
Trinity Lutheran Day Care Center	Hegins Township	Child Development and Early Learning
Child Development Inc/Mahanoy City	Mahanoy City Borough	Child Development and Early Learning
First Friends Preschool and Day Care	Mechanicsville Borough	Child Development and Early Learning
Denise M Leonard	Minersville Borough	Child Development and Early Learning
Grammys Kiddie Kare Inc	Minersville Borough	Child Development and Early Learning
Little Beans Learning Exploring Creating	Minersville Borough	Child Development and Early Learning
Anita L Butz Day Care	North Manheim Township	Child Development and Early Learning
The Doodle Bug Preschool and Daycare Center	North Manheim Township	Child Development and Early Learning
Schuylkill I U Day Care and Pre-School	Norwegian Township	Child Development and Early Learning
Blue Mountain Elementary East	Orwigsburg Borough	Child Development and Early Learning
The Growing Tree Learning and Daycare	Orwigsburg Borough	Child Development and Early Learning
Dawn to Dusk Learning and Child Care Center	Pine Grove Borough	Child Development and Early Learning
Lil Angels Daycare Center	Pine Grove Township	Child Development and Early Learning
Old Schoolhouse Day Care	Pine Grove Township	Child Development and Early Learning
Little Sunshine's Day Care Center	Port Carbon Borough	Child Development and Early Learning
Child Development Inc-Pottsville Center	Pottsville City	Child Development and Early Learning
Debra Ann Matz	Pottsville City	Child Development and Early Learning
Lacies Little Ones	Pottsville City	Child Development and Early Learning
The Dancing Dandelion Daycare LLC	Pottsville City	Child Development and Early Learning
The Perception Training Center	Pottsville City	Child Development and Early Learning
Lois Knadler	Rush Township	Child Development and Early Learning
Kiddin Around LLC	Saint Clair Borough	Child Development and Early Learning
Schuylkill YMCA-Saint Clair Elementary School	Saint Clair Borough	Child Development and Early Learning
Bumblebee Academy Daycare & Preschool	Schuylkill Haven Borough	Child Development and Early Learning
Bumblebee Academy Early Learning Center LLC	Schuylkill Haven Borough	Child Development and Early Learning
Jerusalem Child Care	Schuylkill Haven Borough	Child Development and Early Learning
Lil Rascals Day Care Center	Schuylkill Haven Borough	Child Development and Early Learning
Safe Haven Daycare and Preschool	Schuylkill Haven Borough	Child Development and Early Learning
Sugar and Spice Daycare and Preschool	Schuylkill Haven Borough	Child Development and Early Learning
Nanny's Day Care	Shenandoah Borough	Child Development and Early Learning
Villa Day Care Center	Shenandoah Borough	Child Development and Early Learning
Kelly Boerner Family Day Care	Tamaqua Borough	Child Development and Early Learning
Linda Wisniewski	Tamaqua Borough	Child Development and Early Learning

Name	Municipality	Building Type
Little Dreamers Learning Center	Tamaqua Borough	Child Development and Early Learning
Little People Child Care	Tamaqua Borough	Child Development and Early Learning
Lovely Leaps and Bounds Child Care Facility	Tamaqua Borough	Child Development and Early Learning
Marion Cipkos Day Care	Tamaqua Borough	Child Development and Early Learning
Tamaqua Childcare Center Inc	Tamaqua Borough	Child Development and Early Learning
Bonita D Raho Family Day Care	Tower City Borough	Child Development and Early Learning
Mary A Griffith	Tower City Borough	Child Development and Early Learning
Helping Hands Group Day Care LLC	Tremont Township	Child Development and Early Learning
Helping Hands Group Daycare	Tremont Township	Child Development and Early Learning
Kids R Kids Child Care Center	Tremont Township	Child Development and Early Learning
Candice L Freeman	Washington Township	Child Development and Early Learning
A Step Ahead LLC	Wayne Township	Child Development and Early Learning
Blue Mountain Elementary-West	Wayne Township	Child Development and Early Learning
The Dancing Dandelion Daycare LLC	West Brunswick Township	Child Development and Early Learning
Wee People Day Care and Learning Center	West Brunswick Township	Child Development and Early Learning
Tammy's Little Rascals	West Mahanoy Township	Child Development and Early Learning
Cope Childcare and Learning Center LLC	West Penn Township	Child Development and Early Learning
West Penn Child Care Center	West Penn Township	Child Development and Early Learning
New Life in Christ Ministries Boys Home	Blythe Township	Children and Youth Private
Cloud Home	Norwegian Township	Children and Youth Private
Access Services, Inc	Orwigsburg Borough	Children and Youth Private
Access Services, Inc	Orwigsburg Borough	Children and Youth Private
Eihab Human Services Pine Grove Group Home	Pine Grove Borough	Children and Youth Private
Catholic Charities	Pottsville City	Children and Youth Private
Catholic Charities	Pottsville City	Children and Youth Private
Kidspace National Centers	Pottsville City	Children and Youth Private
Kidspace National Centers	Pottsville City	Children and Youth Private
Kidspace National Centers	Pottsville City	Children and Youth Private
NHS Schuylkill Mountain Center	Pottsville City	Children and Youth Private
NHS Schuylkill Mountain Center	Pottsville City	Children and Youth Private
NHS Schuylkill Mountain Center	Pottsville City	Children and Youth Private
Schuylkill Learning Academy Schuylkill Intermediate Unit 29	Norwegian Township	Children and Youth Private
Schuylkill County Children & Youth Services	Pottsville City	Children and Youth Private
The ReDCo Group Spruce Street	Ashland Borough	Developmental Programs
Community Services Group	Branch Township	Developmental Programs

Name	Municipality	Building Type
The ReDCo Group Woodland Dr Pottsville	Branch Township	Developmental Programs
The ReDCo Group Broad St Ashland 0051	Butler Township	Developmental Programs
The ReDCo Group Fairground Rd Lavelle 0082	Butler Township	Developmental Programs
The ReDCo Group Robin Ln Pottsville 0093	Cass Township	Developmental Programs
The ReDCo Group Schuylkill Street Cressona	Cressona Borough	Developmental Programs
NW Human Services at Schuylkill Mountain Center Bryn Mawr	East Norwegian Township	Developmental Programs
Community Services Group	Frackville Borough	Developmental Programs
Community Services Group	Frackville Borough	Developmental Programs
The ReDCo Group N Broad Mt Ave Frackville 0029	Frackville Borough	Developmental Programs
Avenues Valley Treasures	Hegins Township	Developmental Programs
The ReDCo Group W Main St Valley View 0265	Hegins Township	Developmental Programs
Access Services Pine	Mahanoy City Borough	Developmental Programs
Avenues	Mahanoy City Borough	Developmental Programs
Avenues	Mechanicsville Borough	Developmental Programs
Avenues Eldergarden	Mechanicsville Borough	Developmental Programs
Habilitation-Horticultural Extension	Mechanicsville Borough	Developmental Programs
Cares Penn Street	Minersville Borough	Developmental Programs
The ReDCo Group Flp Sunbury Street	Minersville Borough	Developmental Programs
The ReDCo Group Front St Minersville	Minersville Borough	Developmental Programs
Community Services Group Inc, Oakledge	North Manheim Township	Developmental Programs
KHS Oak Ledge Ave	North Manheim Township	Developmental Programs
The ReDCo Group Albert Blvd Pottsville	North Manheim Township	Developmental Programs
Access Services-Faux Hill	North Union Township	Developmental Programs
Access Services Inc	Orwigsburg Borough	Developmental Programs
Lifepath Inc 044 West Market	Orwigsburg Borough	Developmental Programs
NHS Of SMC Inactive	Orwigsburg Borough	Developmental Programs
The ReDCo Group Eisen Dr Orwig 0055	Orwigsburg Borough	Developmental Programs
NW Human Services at Schuylkill Mountain Center Fourth St	Pine Grove Borough	Developmental Programs
Supportive Concepts for Families 13 Ridge Vista	Pine Grove Borough	Developmental Programs
Supportive Concepts for Families Ridge Vista	Pine Grove Borough	Developmental Programs
Supportive Concepts for Families Walters Street	Pine Grove Borough	Developmental Programs
Supportive Concepts for Families Hillside Vista	Pine Grove Township	Developmental Programs
The ReDCo Group Bethel Rd Pine Grove 0264	Pine Grove Township	Developmental Programs
Access Services-Arch Street	Pottsville City	Developmental Programs

Name	Municipality	Building Type
Community Services Group	Pottsville City	Developmental Programs
Habilitation	Pottsville City	Developmental Programs
Habilitation Inc	Pottsville City	Developmental Programs
Habilitation Inc	Pottsville City	Developmental Programs
NHS Of SMC E Norwegian St	Pottsville City	Developmental Programs
St Joseph's Center for Special Learning	Pottsville City	Developmental Programs
The ReDCo Group 20 A2 Pottsville 0020	Pottsville City	Developmental Programs
The ReDCo Group 20 A4 Pottsville 0274	Pottsville City	Developmental Programs
The ReDCo Group 20 A5 Pottsville 0273	Pottsville City	Developmental Programs
The ReDCo Group Mahantongo Dr Pottsville 0030	Pottsville City	Developmental Programs
The ReDCo Group N 20Th St Pottsville 0069	Pottsville City	Developmental Programs
The ReDCo Group W Market St Pottsville/0223	Pottsville City	Developmental Programs
The ReDCo Group W Norwegian St Pottsville 0039	Pottsville City	Developmental Programs
The ReDCo Group Woodglen Pottsville	Pottsville City	Developmental Programs
Access Services Crest Street	Ryan Township	Developmental Programs
Cares Crest Street	Ryan Township	Developmental Programs
Cares South Nicholas Street	Saint Clair Borough	Developmental Programs
Cares Jones Street	Schuylkill Township	Developmental Programs
NHS Of SMC High Street	Schuylkill Haven Borough	Developmental Programs
The ReDCo Group Hickory St	Schuylkill Haven Borough	Developmental Programs
Access Services-East Center	Shenandoah Borough	Developmental Programs
Avenues Expressions	Shenandoah Borough	Developmental Programs
The ReDCo Group Woodland Auburn	South Manheim Township	Developmental Programs
Access Services	Tamaqua Borough	Developmental Programs
Cares Inc	Tamaqua Borough	Developmental Programs
Cares Lafayette Street	Tamaqua Borough	Developmental Programs
NHS Of SMC At Clay Street	Tamaqua Borough	Developmental Programs
NHS Of SMC Columbia St	Tamaqua Borough	Developmental Programs
Resources for Human Dev Schuylkill	Tamaqua Borough	Developmental Programs
The ReDCo Group E Broad St Tamaqua 0258	Tamaqua Borough	Developmental Programs
Access Services Goodspring Street	Tremont Borough	Developmental Programs
ReDCo Tremont	Tremont Borough	Developmental Programs
ReDCo Tremont	Tremont Borough	Developmental Programs
The ReDCo Group Echo Lane Tremont 0048	Tremont Township	Developmental Programs
Access Services-Grouse Ridge	Walker Township	Developmental Programs

Name	Municipality	Building Type
Access Services-Valley Road	Walker Township	Developmental Programs
Cares 841 Catawissa	Walker Township	Developmental Programs
Cares Gameland Drive	Walker Township	Developmental Programs
The ReDCo Group Harvey Dr Pine Grove 0012	Washington Township	Developmental Programs
Cares Panter Valley Road	Wayne Township	Developmental Programs
Community Services Group	Wayne Township	Developmental Programs
NHS Of SMC At Moonhill	Wayne Township	Developmental Programs
Nw Human Svcs At Schuylkill Mt Ctr Fisher Rd	Wayne Township	Developmental Programs
Spectrum Community Services Frieden	Wayne Township	Developmental Programs
NHS Of Smc Inactive	West Brunswick Township	Developmental Programs
NHS Schuylkill Mountain Center	West Brunswick Township	Developmental Programs
The ReDCo Groupe Pine St Frackville 0079	West Mahanoy Township	Developmental Programs
The ReDCo Group-Schuy Lighthouse	West Mahanoy Township	Developmental Programs
Cares Penn Pike	West Penn Township	Developmental Programs
Community Services Group	West Penn Township	Developmental Programs
Sharpvisions Inc-629	West Penn Township	Developmental Programs
Salisbury Behavioral Health	Branch Township	Mental Health
Geisinger Clinic	Butler Township	Mental Health
The ReDCo Group Behavioral Health Services	Butler Township	Mental Health
Child & Family Support Services	Cass Township	Mental Health
Child & Family Support Services	Cressona Borough	Mental Health
Child & Family Support Services	Hegins Township	Mental Health
Child & Family Support Services	Hegins Township	Mental Health
The ReDCo Group Behavioral Health Services	Mahanoy Township	Mental Health
New Beginnings	Mahanoy City Borough	Mental Health
Child & Family Support Services	North Manheim Township	Mental Health
Child & Family Support Services	Norwegian Township	Mental Health
The ReDCo Group Behavioral Health Services	Norwegian Township	Mental Health
Access Services, Inc	Orwigsburg Borough	Mental Health
Access Services Outpatient Psychiatric Clinic	Orwigsburg Borough	Mental Health
Child & Family Support Services	Orwigsburg Borough	Mental Health
Child & Family Support Services	Orwigsburg Borough	Mental Health
NHS Schuylkill Mountain Center	Pine Grove Borough	Mental Health
The ReDCo Group Behavioral Health Services	Pine Grove Borough	Mental Health
The ReDCo Group Behavioral Health Services	Porter Township	Mental Health

Name	Municipality	Building Type
Allied Services CRR Program	Pottsville City	Mental Health
Alternative Consulting Enterprises	Pottsville City	Mental Health
Alternative Consulting Enterprises	Pottsville City	Mental Health
Child & Family Support Services	Pottsville City	Mental Health
Community Services Group Hidden River Clubhouse	Pottsville City	Mental Health
Geisinger Clinic	Pottsville City	Mental Health
Kidspace National Centers, Inc	Pottsville City	Mental Health
New Beginnings	Pottsville City	Mental Health
NHS Schuylkill Mountain Center	Pottsville City	Mental Health
NHS Schuylkill Mountain Center	Pottsville City	Mental Health
Schuylkill Medical Center East Norwegian Street	Pottsville City	Mental Health
Schuylkill Medical Center South Jackson Street	Pottsville City	Mental Health
Schuylkill Medical Center South Jackson Street	Pottsville City	Mental Health
The ReDCo Group Behavioral Health Services	Pottsville City	Mental Health
The ReDCo Group Behavioral Health Services	Pottsville City	Mental Health
The ReDCo Group Behavioral Health Services	Pottsville City	Mental Health
The ReDCo Group Behavioral Health Services	Pottsville City	Mental Health
The ReDCo Group Cru	Pottsville City	Mental Health
Universal Community Behavioral Health	Pottsville City	Mental Health
Child & Family Support Services	Saint Clair Borough	Mental Health
Child & Family Support Services	Schuylkill Haven Borough	Mental Health
Child & Family Support Services	Schuylkill Haven Borough	Mental Health
Child & Family Support Services	Schuylkill Haven Borough	Mental Health
The ReDCo Group Behavioral Health Services	Shenandoah Borough	Mental Health
Child & Family Support Services	Tamaqua Borough	Mental Health
Child & Family Support Services	Tamaqua Borough	Mental Health
Child & Family Support Services	Tamaqua Borough	Mental Health
Child & Family Support Services	Upper Mahantongo Township	Mental Health
Child & Family Support Services	Wayne Township	Mental Health
Child & Family Support Services	West Mahanoy Township	Mental Health
Child & Family Support Services	West Penn Township	Mental Health

Source: Schuylkill County 2018

SECTION 3. PLANNING PROCESS

A successful planning process builds partnerships and brings together members representing government agencies, the public, and other stakeholders to reach 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 HMP. Participants involved in the HMP planning process gained 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.

This section describes the planning process used to update the Schuylkill County HMP. This section also describes the hazard mitigation Core Planning Team, Municipal Planning Team, meetings and documentation, multi-jurisdictional planning, public and stakeholder participation and existing planning mechanisms implemented during the HMP update process. Additional details about the process of updating each section of this HMP appear at the beginnings of those sections.

3.1 UPDATE PROCESS AND PARTICIPATION SUMMARY

In accordance with the DMA 2000 requirements, this plan documents the following topics:

- Planning process
- Hazard identification
- Risk assessment
- Mitigation strategy
- 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. Hazard vulnerabilities and the risk assessment are described in Section 4 (Risk Assessment), and the mitigation strategy is described in Section 6 (Mitigation Strategy) of this HMP.

Public participation, planning meetings and stakeholder engagements served as the main forums for gathering information to update the HMP. The Core Planning Team, Municipal Planning Team and Tetra Tech, Inc. (contract consultant) were afforded access to information in relevant and approved plans, policies, and procedures for Schuylkill County. These meetings are described further later in this section (Section 3.3 – Meeting Documentation).

The Schuylkill County Planning, Zoning and GIS Department (County Planning Department) and the Schuylkill County Emergency Management Agency (County EMA) attended numerous stakeholder engagements where the HMP was discussed and meeting participants were offered opportunities to participate in the planning process. This included Fire Chief’s Association quarterly meetings, Schuylkill County Township Association and

Schuylkill County Borough Association meetings where participants could prioritize or ‘vote’ on mitigation strategies to be implemented in the County; refer to 3.5 later in this section. Opportunities for public participation included County Planning Commission meetings, Local Emergency Planning Committee meetings, Board of Commissioners meeting, a citizen survey and reviewing and commenting on the draft HMP posted to the County Emergency Management Agency website.

To develop all sections of the HMP, meetings, surveys, e-mail correspondence, and teleconferences were used to solicit input from County, municipal, and other stakeholders, including members of the general public; most information received for this update came from Schuylkill County, its municipalities, and the Core Planning Team. Through this planning process, the County established a comprehensive approach to reduce effects of hazards on the County and its municipalities.

3.2 THE HAZARD MITIGATION PLANNING TEAM

Recognizing the need to manage risk within the County, and to meet the requirements of the DMA 2000, the Schuylkill County Planning Department and the Schuylkill County EMA co-led the update to the 2013 HMP. Ms. Susan Smith (Director of Planning and GIS) and Mr. John Matz (County Emergency Management Coordinator) served as the County leads. Ms. Smith and Mr. Matz developed a Core Planning Team to provide guidance and direction to the planning effort, and to ensure the resulting document will be embraced both politically and by the constituency within the planning area.

Ms. Smith and Mr. Matz were supported by the members of the Core Planning Team listed in Table 3-1. At the first meeting, the Core Planning Team received a copy of the ‘Core Planning Team Guidelines’ which outlined their role for the plan update (refer to Appendix C – Meeting Documentation). The Core Planning Team was charged with:

- Providing guidance and overseeing the planning process on behalf of the general planning partnership (Municipal Planning Team).
- Attending and participating at Core Planning Team meetings.
- Assisting 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 the data and information used in the plan update process is best available;
 - Reviewing and updating the hazard mitigation planning goals and objectives;
 - Identifying and screening of appropriate mitigation strategies and activities;
 - Reviewing and updating plan maintenance procedures; and
- Reviewing and commenting on plan documents prior to submission to PEMA and FEMA.

The Core Planning Team provided guidance and leadership, oversight of the planning process and acted as the point of contact for all participating jurisdictions and the various interest groups in the County.

Table 3-1. Core Planning Team Members

Entity	Title	Name	Area of Expertise Pertaining to the HMP
Schuylkill County Planning Department	Director	Susan Smith	Land use planning and GIS
Schuylkill County Emergency Management Agency	County Coordinator	John Matz	Emergency management and emergency planning
Lehigh Valley Health Network - Schuylkill	Director, Department of Public Safety and Security	John Brobst Jr., MEP	Impact to critical facilities (hospital-specific)
Alfred Benesch	Project Manager	Ryan Fasnacht, PE	Floodplain management, municipal capabilities, engineering
Pine Grove Borough	Vice President	Thomas Fickinger	Municipal capabilities, impact of flooding to municipalities, hazard mitigation grant funding, member of Pine Grove Borough's Flood Mitigation Committee
St. Luke's Hospital/Tamaqua Borough	Councilperson Tamaqua Borough, NEPA MPO Technical and Policy Committees	Micah Gursky	Impact to critical facilities (hospital-specific), municipal capabilities, transportation planning
Schuylkill Economic Development Corporation (SEDCO)	Vice President	Brian Hansbury	Economic impacts to businesses post-disaster
Lieberman, Tamulonis & Hobbs/Schuylkill County	Partner/Assistant County Solicitor	Christopher Hobbs, Esq.	Municipal capabilities, municipal law, land use law
Ryan Township	Supervisor	Champ Holman	Municipal capabilities, PA DCED resources and programs
Schuylkill County Vision	Program Director	Kay Jones	Recovery capabilities (responsible for VOAD)
Schuylkill County Local Emergency Planning Committee	Chair	Randy Kalce	Integration of land use planning and emergency planning, hazardous materials incidents, hazardous materials response capabilities
Delano Township Supervisors, County Association of Township Supervisors, Schuylkill County Landbank	Supervisor, Treasurer, Chair	Ken Karlavage	Municipal capabilities, blight
PPL Electric Utilities	Regional Engineering Manager	John P. Kellman	Impact to critical facilities (utility-specific)
Mahanoy City Borough	Code Enforcement Officer/ Emergency Management Coordinator	Bill Killian	Municipal capabilities, blight, emergency management

Entity	Title	Name	Area of Expertise Pertaining to the HMP
Schuylkill County Conservation District	County Natural Resource Specialist	Wayne Lehman	Watershed planning, flood recovery projects
Schuylkill County Planning Commission	Chair	John Malinchok	Integration of land use planning and emergency planning
Realtor, Frackville Borough	Realtor, Councilperson	Helen Miernicki	Public education and awareness as part of the real estate sale process, municipal capabilities
Local Emergency Planning Commission	Vice Chair	Mark Mikita	Integration of land use planning and emergency planning, hazardous materials incidents, hazardous materials response capabilities
Port Carbon Borough	Councilperson	Andy Palokas	Municipal capabilities, impact of flooding to municipalities, chair of Port Carbon's Watershed Committee for the preparation of the Borough's Flood Study
Schuylkill Haven Fire Department	Assistant Chief	Jim Reed	Fire capabilities, impacts to critical facilities (fire-specific)
Schuylkill County Conservation District	Watershed Maintenance Technician/ Flood Recovery Manager	Bill Reichert	Watershed planning, flood recovery projects
Lehigh Valley Health Network - Schuylkill	President	William Reppy	Impacts to critical facilities (hospital-specific)
Concord University	Assistant Professor	Thomas Saladyga, Ph.D.	Wildfire hazards – currently conducting a brush fire/wild fire research project in Schuylkill County
Schuylkill County Planning Commission/Schuylkill County Volunteer Firefighters Association/Pine Grove Borough	Member/President/Fire Chief	David Sattizahn	Integration of land use and emergency planning, capabilities of fire service, impact to fire service, specific knowledge of flooding response capabilities
Schuylkill EMS	Business Manager	Kurt Shelhamer	EMS capabilities, impact to critical facilities (EMS-specific)
Schuylkill County Municipal Authority	Utility Manager	Joseph J. Smith	Impacts to critical facilities (utilities-specific)
Light-Heigel and Associates	UCC Program Manager	Marty Sowers, CFM	Municipal capabilities, impacts to municipalities

Entity	Title	Name	Area of Expertise Pertaining to the HMP
Schuylkill County Chamber of Commerce	Executive Vice President	Monica Walborn	Economic impacts to businesses post-disaster
Orwigsburg Borough	Borough Manager	Robert Williams	Municipal capabilities, impacts to municipalities
Pottsville Police Department	Chief	Richard Wojciechowsky	Law enforcement capabilities, impacts to critical facilities (police)
Pennsylvania Department of Environmental Protection	Chief, Bureau of Mine Safety, Anthracite & Industrial Minerals Division	Troy Wolfgang	Mining, mine subsidence

HMP = Hazard Mitigation Plan

PA DCED = Pennsylvania Department of Community and Economic Development

VOAD = Voluntary Organizations Active in Disaster

In October 2017, Schuylkill County notified all municipalities within the County via postal mail of the pending planning process and invited them to formally participate. Jurisdictions were asked to formally notify the County of their intent to participate via a Letter of Intent to Participate (LOIP). The LOIP identified the municipal planning points of contact to facilitate municipal participation and represent the interests of their respective communities. In addition, the LOIP authorized the Core Planning Team to represent the jurisdiction in the completion of certain planning elements as outlined above and acknowledged participation expectations. Returned LOIPs are provided in Appendix D (Municipal Participation), as available. Table 3-2 lists all municipalities invited to participate in the HMP update, and the municipal points of contact identified on their LOIP. Blank cells indicate a LOI was not returned and/or points of contact were not identified and provided to the County.

A Municipal Planning Team was assembled to represent each of the municipalities participating in the HMP update. The Municipal Planning Team consisted of the points of contact identified in the LOIPs; however, participation from additional municipal representatives was welcomed. For a complete list of participants, through attendance at meetings, completion of worksheets, or submission of comments, please refer to Appendices C (Planning Process Documentation) and D (Municipal Participation). Please note that Core Planning Team members were also part of the Municipal Planning Team, fulfilling these responsibilities on behalf of Schuylkill County; and participants representing multiple jurisdictions are listed more than once.

It is recognized that the jurisdictions in Schuylkill 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 hazard risks being considered in this plan. It was Schuylkill County's intent 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 Core Planning Team, 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.

Throughout the HMP update planning process, both the County Planning Department and County EMA served as a support system to the participating municipalities. The departments offered to meet individually with each municipality to assist with the update of their capabilities and mitigation strategies. This support was offered through phone calls, emails and in-person meetings at their municipal offices for the municipalities that expressed interest.

Table 3-2. Municipal Planning Team Members

Jurisdiction	Primary Point of Contact		Secondary Point of Contact	
	Name	Title	Name	Title
Ashland Borough	Raymond Jones Jr	Borough Manager		
Auburn Borough	Zachary Sullivan	Engineer	Steve Moyer	Engineer
Barry Township	David Miller	Engineer	Daniel J. Hepler	Supervisor/EMC
Blythe Township	Bill Anders	Engineer	Adam Nothstein	Township Chairman
Branch Township	John Andruchek	Zoning		
Butler Township	Paul Fetterol	Supervisor	Kate Staudenmeier	Secretary
Cass Township				
Coaldale Borough				
Cressona Borough	Steve Moyer	Engineer	Regina Sonon	Secretary
Deer Lake Borough	William Anders	Engineer	Dave Crouse	Council President
Delano Township	Ken Karlavage*	Delano Township Supervisor		
East Brunswick Township	John Heim	Supervisor/EMC/Floodplain	Kelly Coldren	Secretary
East Norwegian Township	Kevin Davenport	Road Foreman	James Tohill, PE	Township Engineer
East Union Township	Bill McMullen	Engineer	Kyle Mummey	EMC
Eldred Township	Dan Dietrich	Supervisor		
Foster Township	Christopher Rowlands	Supervisor	G. Robert Sterling	Supervisor
Frackville Borough	Helen Miernicki*	Councilperson/Realtor		
Frailey Township	Donald Allar	Supervisor Chair	Keith Allar	Supervisor/Roadmaster
Gilberton Borough	Mark Keirse	Borough Council Member		
Girardville Borough	Dan Heiser	Borough Council Member	Fred McDonald	Borough Council Member
Gordon Borough	Jason Quick	Borough Manager/EMC	George Brocious	Mayor
Hegins Township	Gary Hornberger	Secretary	Allan Swab	Zoning Officer
Hublely Township	Keith Masser	Supervisor Chair	Kathy Krammes	Secretary
Kline Township				
Landingville Borough				
Mahanoy Township				
Mahanoy City Borough	Bill Killian*	Code Enforcement Officer		
McAdoo Borough				
Mechanicsville Borough				
Middleport Borough				
Minersville Borough	Eric Eichenberg	Minersville Fire Chief	James O'Brien	Minersville Fire Chief, 1st Assistant

Jurisdiction	Primary Point of Contact		Secondary Point of Contact	
	Name	Title	Name	Title
Mount Carbon Borough				
New Castle Township	William Anders	Municipal Engineer	Kimberly Lutzkanin	Secretary, Building Code Enforcement Officer
New Philadelphia Borough				
New Ringgold Borough				
North Manheim Township	Steve Moyer	Engineer	Wayne Bowen	Supervisor
North Union Township	Steve Motil	EMC	Clyde Spiece	Supervisor
Norwegian Township	Mike Miller	Manager	Stan Petchulis	Chairman of Supervisors
Orwigsburg Borough	Robert Williams*	Borough Manager		
Palo Alto Borough				
Pine Grove Borough	Thomas Fickinger*	Borough Council Vice President	Anthony Gurski	Borough Council Member
Pine Grove Township				
Port Carbon Borough	Andy Palokas*	Borough Council Member		
Port Clinton Borough	John Blackwell	Borough Council Member	Paul Naftzinger	Borough Council President
Porter Township	Gary Bender	Supervisor Chair	Ryan Fasnacht	Engineer
Pottsville City	Richard Wojciechowsky*	Pottsville Police Chief		
Reilly Township	James Diechert	Public Works Administrator/EMC	Robert Butensky	Supervisor
Ringtown Borough				
Rush Township				
Ryan Township	William McMullen	Permit Officer	Franklin Fetter	Supervisor
Saint Clair Borough	Roland Price	Secretary	Brian Baldwin	Engineer
Schuylkill Township	Charles Fayash	Supervisor Chair	Charles Hosler	Supervisor
Schuylkill Haven Borough	Scott Graver	Borough Manager	Michael Paulin	Code Enforcement Officer
Shenandoah Borough	Leo Pietkiewicz	President of Council	Joseph Palubinsky	Secretary/Treasurer
South Manheim Township	Steve Moyer	Zoning Officer	Kelly Handling	Secretary
Tamaqua Borough	Kevin Steigerwalt	Borough Manager	Robert Jones	Public Works Director/EMC
Tower City Borough	Stephen Bohr	EMC	Irene Dubbs	Secretary
Tremont Borough	Pryce Parker	EMC	James Scheibley	Council President
Tremont Township				
Union Township	Robert Murray	Supervisor	Darrell Laudeman	Supervisor Chair
Upper Mahantongo Township	Dave Miller	Engineer	Kyle Brown	Supervisor Chair
Walker Township	Chad Felty	Roadmaster/EMC	Ann Ostergaard	Secretary

Jurisdiction	Primary Point of Contact		Secondary Point of Contact	
	Name	Title	Name	Title
Washington Township	Dawn Koch	Township Manager	Lynn Brown	Roadmaster
Wayne Township	Paul Moyer Sr	EMC	Randall Moyer	Zoning Officer
West Brunswick Township	Jason Stoudt	Supervisor		
West Mahanoy Township				
West Penn Township	Katie Orlick	Secretary	Herb Woodring	Assistant Secretary

**Core Planning Team Member*

Blank cells indicate no primary and/or secondary point of contact was submitted to the County.

As the contract consultant, Tetra Tech guided the Core and Municipal Planning Teams through the HMP update planning process. More specifically, Tetra Tech was tasked with:

- Assisting with the organization of a Core Planning Team and Municipal Planning Team;
- Assisting with the development and implementation of a public and stakeholder outreach program;
- Data collection;
- Facilitation and attendance at meetings;
- Assisting with the review, update and ranking of the hazards of concern, and hazard profiling and risk assessment;
- Assistance with the review and update of mitigation planning goals and objectives;
- Assistance with the review of progress of past mitigation strategies;
- Assistance with the screening of mitigation actions and the identification of appropriate actions;
- Assistance with the prioritization of mitigation actions; and
- Authoring of the draft and final HMP documents.

3.3 MEETINGS AND DOCUMENTATION

As noted, the Core Planning Team and Municipal Planning Team partnered with Tetra Tech to aid in the update of the HMP. Tetra Tech assisted the County in drafting planning documents, preparing meeting materials, and facilitating meetings. The Core Planning Team reviewed any documentation produced by Tetra Tech, provided validation, and acted as an advocate for the HMP update.

To maximize everyone’s time and leverage the planning process, the County Planning Department started engaging the Core Planning Team very early in the update process through ‘Lunch & Learn’ emails. These visually-compelling emails were designed to be brief and inform the Core Planning Team on a variety of mitigation topics. Topics included general information on mitigation, the value of participating in the HMP update, an opportunity to vote on various aspects of the plan (e.g., plan title), solicit input via surveys, share mitigation success stories and schedule meetings. In addition, the Lunch & Learn emails were used to engage the entire Municipal Planning Team and motivate participation; example shown below (Figure 1). These emails served as the main form of communication between the County and the Core and Municipal Planning Teams regarding upcoming meetings, distribution of meeting materials and serve as reminders about upcoming deadlines. The Lunch & Learn emails distributed throughout the planning process are included in Appendix C (Meeting Documentation).

Table 3-3 lists meetings held as part of the process of updating the Schuykill County HMP.

Table 3-3. Planning and Public Meetings

Date	Description of Meeting
February 13, 2017	Kickoff meeting with PEMA representatives, including administrative and grant requirements overview.
August 10, 2017	Schuykill County initiated the Lunch & Learn email campaign with the Core Planning Team to serve as an education tool for the HMP update and solicit feedback on various aspects of the planning process

Date	Description of Meeting
September 13, 2017	Core Planning Team – Survey to vote on HMP update plan title and request review of the 2013 HMP including the goals, hazards of concern and previous mitigation actions.
October 11, 2017	Kickoff meeting with Schuylkill County Planning Department and Emergency Management Agency, and Contract Consultant, Tetra Tech
October 17, 2017	Schuylkill County Fire Chief’s Association Quarterly Meeting Overview of the hazard mitigation plan; distribution of information; ballot box questions to survey preferred mitigation project types
October 17, 2017	County Planning Commission Meeting (Public) Overview of the hazard mitigation plan; ballot box questions to survey preferred mitigation project types
October 18, 2017	Schuylkill County distributed the Letters of Intent to Participate (LOIP) to all 67 municipalities via postal mail, and as a hyperlink on the Lunch & Learn emails. The LOIP outlined the requirements and expectations for municipal participation for the 2019 HMP update. All municipalities were asked to document their intent to participate and return to the Schuylkill County Planning Department.
October 18, 2017	Schuylkill County Township Association Meeting Overview of the hazard mitigation plan; distribution of information; ballot box questions to survey preferred mitigation project types
October 19, 2017	Schuylkill County Borough Association Meeting Overview of the hazard mitigation plan; distribution of information; ballot box questions to survey preferred mitigation project types
November 9, 2017	First Core Planning Team Meeting, including five-year plan review and update process, role of the County, Core Planning Team, municipalities and stakeholders; project schedule; data collection; public and stakeholder outreach strategy; and county and municipal worksheets.
November 9, 2017	Kickoff Meeting for the Municipal Planning Team, including five-year plan review and update process, role of the County, Core Planning Team, municipalities and stakeholders; project schedule; data collection; public and stakeholder outreach strategy; county and municipal worksheets; and action items (worksheets #1-3: 1. Events/losses; 2. Capability Assessment; 3. Previous Mitigation Strategy Review).
November 2017 through April 2018	Meetings with municipalities on worksheets #1-3
January 14, 2018	Swatara Watershed Recovery Meeting - Ballot box questions to survey meeting attendees on preferred mitigation project types
May 22, 2018	Second Core Planning Team Meeting, risk assessment overview, hazard risk ranking, review countywide previous mitigation strategy; mitigation brainstorming/problem-statement development.
May 22, 2018	Second Municipal Team Meetings: two sessions Review risk assessment and hazard risk ranking; break-out groups to work on letters of intent to participate; worksheets #1-3 (1. Events/losses; 2. Capability Assessment; 3. Previous Mitigation Strategy Review)
June 27, 2018	Third Core Planning Team Meeting, including Strengths, Weaknesses, Opportunities and Obstacles (SWOO) exercise; develop vision statement; review 2013 goals.

Date	Description of Meeting
June 27, 2018	Third Municipal Team Meeting with extended Core Planning Team, including updated mitigation strategy and mitigation action worksheets
July 17, 2018	Schuykill County Fire Chief's Association Meeting, including a discussion of updates on the HMP
September 5, 2018	2018 Flood Events Hot Wash, invited 14 municipalities who experienced the 2018 flood events as well as the American Red Cross and Volunteer Organizations Active in Disaster (VOAD) to capture what went well and why, and what went wrong and why; collected impacts and lessons learned
October 16, 2018	Outreach to the Core Planning Team to finalize the Vision and Goals for the HMP
October 17, 2018	Schuykill County Township Association meeting, including HMP status update and 2018 flood impacts. The County Planning Department discussed the following: <ul style="list-style-type: none"> • Five (5) statistics related to flooding (i.e. NFIP claims, properties reporting damage from this last event) • 5 Lessons Learned from the Hot Wash • 5 Opportunities identified in the HMP • 5 To Do's (about ½ were related to the HMP) – review documents, pass resolution when asked, implement! • 5 Mitigation resources
October 31, 2018	Core Planning Team Meeting was provided the draft plan maintenance strategy and requested to review and provide comments
November 14, 2018	Core and Municipal Team Meeting to review the draft HMP and how to submit comments
	Draft HMP posted on the project website for public, Core Planning Team and Municipal Planning Team review
	Schuykill County Board of Commissioner meeting (public), including the announcement of the draft HMP for public review and an overview of the upcoming adoption process.
	Schuykill County Planning Commission meeting (public) discussed the HMP planning process and the draft HMP for public review.
December 13, 2018	LEPC Meeting to discuss an update on the HMP and upcoming adoption process.
Placeholder	Draft HMP submitted to PEMA for review
Placeholder	Draft HMP submitted to FEMA for review
To be determined – upon receipt of APA designation	HMP adoption by County Commissioners


Notes: APA = Approval Pending Adoption; HMP = Hazard Mitigation Plan; LEPC = Local emergency planning committee; PEMA = Pennsylvania Emergency Management Agency

Note: All Lunch & Learn emails distributed to the Core and Municipal Planning Teams are provided in Appendix C.

Schuykill County's contractor, Tetra Tech, followed up each Core and Municipal Planning Team meeting with meeting notes that documented all agenda topics, decisions, and action items identified. The meeting notes were shared with the Core Planning Team. Documentation from all meetings is located in Appendix C (Meeting Documentation).

Figure 3-1. Example Lunch & Learn Email


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Schuykill County Hazard Mitigation Plan 2019 Update

The Hazard Mitigation Planning Process

The Planning Process is as Important as the Plan Itself!



In last week's **Lunch and Learn Email**, we talked about the Federal Requirement to develop and maintain a Hazard Mitigation Plan. **The Planning Process is as important - or even more important - than the Plan itself!**

Mitigation is most effective when it is based on a comprehensive, long-term plan that is developed **before** the disaster occurs. The Mitigation Plan belongs to us! According to the *Beyond the Basics Mitigation Guide*, when developing mitigation plans, we should keep the following guiding principles in mind:

1. **Focus on the Mitigation Strategy.** The mitigation strategy is the plan's primary purpose. All other sections contribute to and inform the mitigation strategy and specific hazard mitigation actions.
2. **Process is as Important as the Plan Itself.** (Have you heard this before?) In mitigation planning, as with most other planning efforts, the plan is only as good as the process and people involved in its development. The plan should serve as the written record, or documentation, of the planning process.
3. **This is our Community's Plan.** To have value, the plan must represent the current needs and values of the community and be useful for local officials and stakeholders. The Mitigation Plan should be developed in a way that best serves our community's purpose and people.

The Hazard Mitigation Planning Process involves **four** basic phases to help determine how to reduce or eliminate the loss of life and property damage resulting from hazards.

Below, we will explore each of these 4 phases....

References (FEMA, 2017)

Refer to Appendix C for all Lunch & Learn emails distributed throughout the planning process.

3.4 MULTI-JURISDICTIONAL PLANNING

Schuykill County took a multi-jurisdictional approach to preparing its HMP, so that the HMP 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, Schuykill County depended on municipal buy-in because the municipalities have the legal authority to enforce compliance with land use planning and development directives; the County has legal authority as it relates to subdivision and zoning for approximately half of the municipalities (discussed further in Section 5 – Capability Assessment). Schuykill County undertook an intensive effort to involve all 67 municipalities in the update process.

As noted above, in October 2017, each municipality was invited to participate in this planning process. Each municipality was asked to identify a primary and secondary point of contact to represent their jurisdiction at plan meetings. All municipalities were invited to attend the Municipal Planning Team kick-off meeting and were provided worksheets to update the hazards of concern capabilities and mitigation strategy and were asked to review and prioritize the mitigation actions; refer to Figures 3-2. Schuylkill County reached out to each community, in some cases on numerous occasions, to schedule a meeting at their municipal offices to complete the worksheets together. All municipalities were invited to the Risk Assessment and Mitigation Strategy meetings as well, both with opportunities to work with the planning consultant and County to complete their worksheets. Figure 3-3 is the June 2018 Core Planning Team meeting in-session.

Figure 3-2. Municipal Kickoff Meeting



Figure 3-3. June 2018 Core Planning Team Meeting



In early June 2018, letters went out to 19 municipalities that did not return a LOIP and did not attend any meetings. These municipalities were informed that the June 27, 2018 Municipal Planning Team meeting was their final opportunity to participate.

In early June 2018, a separate set of letters was sent out to municipalities who returned a LOIP, however they had not returned all completed worksheets. The letter also served as a reminder regarding the June 27, 2018 Municipal Planning Team meeting.

Municipal participation culminated in formal adoption of the HMP; copies of municipal adoption resolutions are in Appendix F (Adoption Resolutions). Table 3-4 indicates how each municipality participated in the planning process. Blank cells indicate the jurisdiction either did not attend the meeting or submit the stated worksheet or information.

Table 3-4. Participation Matrix

Jurisdiction	Meetings					Worksheets						2019 Plan Adoption Date
	Municipal Planning Team Kick-Off Meeting	Risk Assessment Meeting	Mitigation Strategy Workshop	Municipal Support Meeting (as needed)	Draft Plan Review Meeting	Evaluation of Identified Hazards and Risk Worksheet Received	Capabilities Assessment Worksheet Received	Previous Mitigation Review Worksheet Received*	Hazard Risk Ranking Worksheet Received	Mitigation Brainstorming/Problem Statements Worksheet Received	Updated Mitigation Strategy Worksheet Received*	
Schuylkill County	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	TBD
Ashland Borough	Yes	Yes			Yes	Yes		N/A		Yes	Yes*	TBD
Auburn Borough		Yes	Yes		Yes**	Yes	Yes				Yes*	TBD
Barry Township	Yes	Yes	Yes		Yes	Yes		Yes*	Yes	Yes	Yes*	TBD
Blythe Township	Yes	Yes	Yes		Yes	Yes	Yes	Yes*	Yes	Yes	Yes*	TBD
Branch Township		Yes	Yes	Yes 7/2/18		Yes	Yes	N/A	Yes	Yes	Yes*	TBD
Butler Township		Yes	Yes		Yes	Yes	Yes	Yes*	Yes	Yes	Yes*	TBD
Cass Township												TBD
Coaldale Borough												TBD
Cressona Borough		Yes	Yes		Yes**	Yes	Yes				Yes*	TBD
Deer Lake Borough		Yes	Yes		Yes	Yes	Yes	Yes*	Yes	Yes	Yes*	TBD
Delano Township	Yes		Yes		Yes						Yes*	TBD
East Brunswick Township	Yes		Yes		Yes	Yes	Yes	Yes	Yes	No	Yes*	TBD
East Norwegian Township	Yes	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes*	TBD
East Union Township					Yes**							TBD
Eldred Township		Yes				Yes		Yes*	Yes	Yes	Yes*	TBD
Foster Township	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes*	TBD
Frackville Borough	Yes		Yes		Yes	Yes						TBD
Frailey Township			Yes		Yes	Yes	Yes		Yes		Yes	TBD
Gilberton Borough			Yes			Yes	Yes		Yes	Yes	Yes	TBD
Girardville Borough												TBD
Gordon Borough	Yes	Yes	Yes		Yes	Yes	Yes	Yes*		Yes	Yes*	TBD
Hegins Township			Yes		Yes	Yes	Yes	Yes		Yes	Yes	TBD
Hubley Township	Yes	Yes	Yes		Yes	Yes		Yes*	Yes		Yes*	TBD
Kline Township			Yes		Yes	Yes	Yes	Yes*	Yes	Yes	Yes*	TBD

Jurisdiction	Meetings					Worksheets						2019 Plan Adoption Date
	Municipal Planning Team Kick-Off Meeting	Risk Assessment Meeting	Mitigation Strategy Workshop	Municipal Support Meeting (as needed)	Draft Plan Review Meeting	Evaluation of Identified Hazards and Risk Worksheet Received	Capabilities Assessment Worksheet Received	Previous Mitigation Review Worksheet Received*	Hazard Risk Ranking Worksheet Received	Mitigation Brainstorming/Problem Statements Worksheet Received	Updated Mitigation Strategy Worksheet Received*	
Landingville Borough								N/A				TBD
Mahanoy Township					Yes**							TBD
Mahanoy City Borough			Yes	Yes	Yes							TBD
McAdoo Borough			Yes			Yes				Yes	Yes*	TBD
Mechanicsville Borough								N/A				TBD
Middleport Borough												TBD
Minersville Borough	Yes	Yes	Yes			Yes		N/A		Yes	Yes	TBD
Mount Carbon Borough		Yes	Yes		Yes	Yes	Yes	N/A	Yes	Yes	Yes	TBD
New Castle Township	Yes						Yes	N/A	Yes	Yes	Yes	TBD
New Philadelphia Borough								N/A				TBD
New Ringgold Borough		Yes	Yes									TBD
North Manheim Township	Yes	Yes	Yes		Yes**	Yes	Yes				Yes*	TBD
North Union Township			Yes		Yes		Yes		Yes			TBD
Norwegian Township			Yes	Yes 6/20/18		Yes	Yes	N/A	Yes			TBD
Orwigsburg Borough					Yes	Yes						TBD
Palo Alto Borough			Yes	Yes 2/5/18	Yes	Yes	Yes	N/A	Yes	Yes	Yes	TBD
Pine Grove Borough	Yes				Yes	Yes	Yes	Yes	Yes		Yes*	TBD
Pine Grove Township		Yes	Yes		Yes	Yes	Yes	Yes*	Yes	Yes	Yes*	TBD
Port Carbon Borough	Yes		Yes	Yes 2/12/18		Yes	Yes	Yes		Yes	Yes	TBD
Port Clinton Borough	Yes		Yes							Yes	Yes	TBD
Porter Township		Yes	Yes		Yes							TBD
Pottsville City				Yes 2/12/18	Yes	Yes	Yes	N/A; commented on 2013 goals	Yes		Yes*	TBD
Reilly Township	Yes	Yes				Yes	Yes	Yes	Yes		Yes*	TBD
Ringtown Borough												TBD

Jurisdiction	Meetings					Worksheets						2019 Plan Adoption Date
	Municipal Planning Team Kick-Off Meeting	Risk Assessment Meeting	Mitigation Strategy Workshop	Municipal Support Meeting (as needed)	Draft Plan Review Meeting	Evaluation of Identified Hazards and Risk Worksheet Received	Capabilities Assessment Worksheet Received	Previous Mitigation Review Worksheet Received*	Hazard Risk Ranking Worksheet Received	Mitigation Brainstorming/Problem Statements Worksheet Received	Updated Mitigation Strategy Worksheet Received*	
Rush Township			Yes		Yes							TBD
Ryan Township	Yes		Yes		Yes							TBD
Saint Clair Borough	Yes	Yes	Yes		Yes		Yes	Yes	Yes			TBD
Schuykill Township	Yes		Yes		Yes	Yes		N/A				TBD
Schuykill Haven Borough	Yes	Yes				Yes	Yes	Yes	Yes		Yes*	TBD
Shenandoah Borough			Yes									TBD
South Manheim Township	Yes	Yes	Yes		Yes**	Yes	Yes	N/A				TBD
Tamaqua Borough	Yes	Yes	Yes			Yes		Yes*	Yes	Yes	Yes	TBD
Tower City Borough	Yes	Yes				Yes	Yes	Yes			Yes*	TBD
Tremont Borough		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	TBD
Tremont Township	Yes	Yes	Yes		Yes	Yes	Yes	Yes*	Yes	Yes	Yes	TBD
Union Township			Yes			Yes	Yes	N/A	Yes			TBD
Upper Mahantongo Township	Yes	Yes	Yes		Yes	Yes		Yes*	Yes		Yes*	TBD
Walker Township	Yes	Yes	Yes			Yes	Yes	Yes*	Yes		Yes*	TBD
Washington Township	Yes	Yes	Yes		Yes	Yes		Yes*		Yes	Yes	TBD
Wayne Township			Yes		Yes		Yes					TBD
West Brunswick Township	Yes			Yes 2/14/18	Yes	Yes	Yes	Yes			Yes*	TBD
West Mahanoy Township					Yes**							TBD
West Penn Township		Yes	Yes	Yes 2/14/18	Yes	Yes	Yes	Yes	Yes	Yes	Yes	TBD

TBD = To be determined after plan is approved-pending adoption by FEMA Region 3.

A blank cell indicates either no attendance at the referenced meeting or no worksheet submitted.

N/A = Municipality did not have any municipal-specific actions in the 2013 HMP.

*In some cases, a previous mitigation action review worksheet and/or the updated mitigation strategy worksheet was not submitted; however, this information was provided to the consultant at the Risk Assessment meeting or via a feasible problem statement. All input received is included in Section 6 (Mitigation Strategy). Therefore, a Yes is indicated for that worksheet.

**A third-party engineering firm indicated they provide services to this municipality and attended the meeting on their behalf.

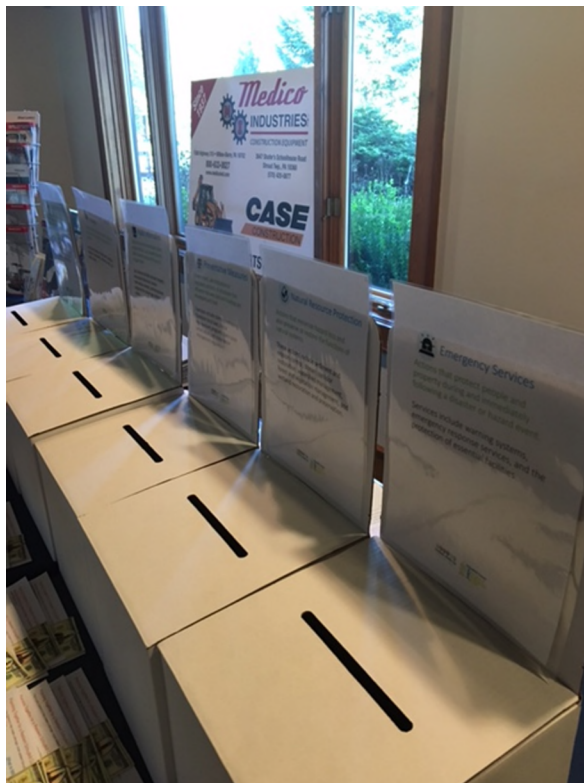
3.5 PUBLIC AND STAKEHOLDER PARTICIPATION

To maximize effectiveness of the HMP, the County fostered continual public and stakeholder engagement. Input was encouraged and collected through a variety of methods as described below.

Early in the planning process, Schuykill County Planning Department attended several stakeholder meetings and set up ballot boxes. Meeting participants were given ‘Schuykill County’ \$100 bills and asked to place the dollars in the corresponding ballot boxes that represent mitigation strategies that they deem to be of highest priority or can best reduce or eliminate risk from hazards in their communities. Refer to Figure 3-4 which illustrates the boxes at a stakeholder meeting and the voting instructions provided. In all, the ballot boxes were placed at the following meetings:

- Schuykill County Planning Commission Meeting (October 17, 2017)
- Schuykill County Township Association Meeting (October 18, 2017)
- Schuykill County Borough Association Meeting (October 19, 2017)
- Core and Municipal Planning Team Meetings (November 9, 2017)
- Swatara Watershed Recovery Meeting (January 24, 2018)

Figure 3-4. Ballot Box Poll



Planning Together for a Resilient Schuykill County!

This is your chance to help create a stronger, more resilient Schuykill County as we update the County's Hazard Mitigation Plan.

Please prioritize the following mitigation actions to help us understand what mitigation actions you believe have the highest priority or can best reduce or eliminate risk from a natural or man made hazard.

Each \$100 bill represents level of priority. Mitigation Actions (boxes) that you give more \$100 bills are higher priorities to you than Actions (boxes) given less.

Place the \$100 bills to invest in the strategies you prefer.

Hazards Included in the 2013 Plan

Blight	Hazardous Events	Riprap
Hurricanes and Windstorms	Hazardous Materials and Transportation Incidents	Miss Subsidence
Flooding	Winter Storms	Wildfires
Drought and Water Deficiencies	Dams Failures	Tornadoes

Planning Together for a Resilient Schuykill County!

This is your chance to help create a stronger, more resilient Schuykill County as we update the County's Hazard Mitigation Plan.

Please prioritize the following mitigation actions to help us understand what mitigation actions you believe have the highest priority or can best reduce or eliminate risk from a natural or man made hazard.

Each \$100 bill represents level of priority. Mitigation Actions (boxes) that you give more \$100 bills are higher priorities to you than Actions (boxes) given less.

Place the \$100 bills to invest in the strategies you prefer.

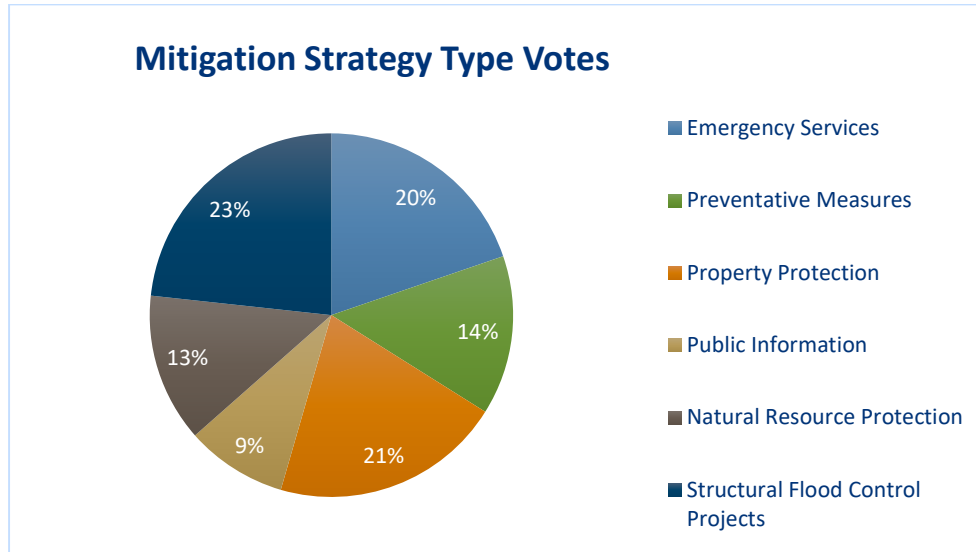
Hazards Included in the 2013 Plan

Blight	Hazardous Events	Riprap
Hurricanes and Windstorms	Hazardous Materials and Transportation Incidents	Miss Subsidence
Flooding	Winter Storms	Wildfires
Drought and Water Deficiencies	Dams Failures	Tornadoes

Overall, the mitigation strategy type that received the greatest number of votes across all events was structural flood control projects (23% of the votes) followed closely by property protection (21% of the votes) and

emergency services (20% of the votes); refer to Figure 3-5. Appendix C (Meeting Documentation) summarizes the voting results from each meeting.

Figure 3-5. Summary of Ballot Box Votes Across All Meetings



The Core Planning Team not only consisted of County and municipal representatives, it also included representatives from numerous public and private entities including utilities and academia. All Core Planning Team representatives were provided numerous opportunities to participate in the planning process through Lunch & Learn emails, surveys, meetings, worksheets and draft plan review. Refer to Section 3.3 and Table 3-1 which describe meeting opportunities for the Core Planning Team to participate and Appendix C for meeting documentation.

Three worksheets – Evaluation of Identified Hazards and Risk, Capabilities Assessment Survey, and Mitigation Strategy 5-Year Plan Review Worksheet (Mitigation Review Worksheet) — were given to all Core Planning Team representatives at their first meeting to collect their input on these topics. Completed worksheets submitted back to the County for consideration in the HMP update are included in Appendix D (Municipal Participation).

A citizen hazard preparedness and mitigation survey was developed to gauge household preparedness and assess level of knowledge of tools and techniques to assist in reducing risk and loss of hazards (<https://www.surveymonkey.com/r/schuykillhmp>). The survey asks quantifiable questions about citizen perception of risk, knowledge of mitigation and support of community programs. It also asks several demographic questions to help analyze trends. The survey was distributed to both the Core and Municipal Planning Teams, as well at several public meetings (County Planning Commission meetings, LEPC meetings and Fire Chief meetings) to solicit stakeholder and resident input. The Core Planning Team and municipalities were encouraged to distribute the survey as possible. All responses to the survey may be found in Appendix E (Public and Stakeholder Outreach). Survey results were used to help inform the updated mitigation strategy.

As noted in Table 3-1, the public was provided several opportunities to attend meetings to learn more about the HMP planning process and how to become engaged further. Public meetings included County Planning

Commission meetings, LEPC meetings and the Schuylkill County Board of Commissioner meeting. These public meetings are advertised on the County website with meeting agendas may found in Appendix E, as available.

During the spring of 2018, central Pennsylvania, including Schuylkill County, were impacted by heavy rain storm events. These flood events occurred during a very active time in the HMP update planning process. The County EMA developed a dedicated web site to keep residents informed on the flood recovery process and serve to collect needed information. A flood survey form was posted to capture information from individuals and businesses regarding their flood impacts from the August 12-14, 2018 event. The Schuylkill County Voluntary Organizations Active in Disasters (VOAD), Long-Term Recovery Committee, Schuylkill County Local Emergency Planning Committee (LEPC) and the County EMA worked with volunteers, faith-based community and non-profit organizations to assist residents with immediate needs.

To further engage the municipalities in the HMP update, as well as capture much needed information from the July and August 2018 flood events, on September 5, 2018 Schuylkill County hosted a ‘2018 Flood Hot Wash’ (refer to Figure 3-6). The County invited the 14 municipalities impacted by the flood events, as well as VOAD and the American Red Cross to the evening event. The Hot Wash was organized to have focused discussions on the flood event, by topic. Attendees were divided into groups and rotated every 20 minutes to each table. A facilitator and scribe were present at each table to keep the event running smoothly and ensure all input was captured. Overall, the goal was to determine:

- What went well during the 2018 flood events, and why?;
- How do we sustain what went well?;
- What went wrong during the 2018 flood events and why? and;
- How do we overcome those obstacles?

The tables at the Hot Wash were set up as follows. The information gathered from all attendees was used to inform the updated mitigation strategy (Section 6). For further information on this event, refer to the updated mitigation strategy (Table 6-4 in Section 6) and Appendix E.

1. Communications and Public Information
2. Response Operations
3. Short-Term Recovery
4. Infrastructure Impacts – Mark the map with impacts and provide insights and ideas to mitigate the problem.
 - a. Critical Facilities
 - b. Stormwater Management
 - c. Natural Environment

Figure 3-6. September 5, 2018 Flood Hot Wash Event



The County distributed draft risk assessment sections to subject-matter experts to review the preliminary drafts prior to posting for public review as described below. Table 3-5 summarizes the subject-matter experts invited to review the preliminary draft. All comments received were considered by the HMP Coordinators and incorporated into the plan.

Table 3-5. Subject-Matter Expert Review of Preliminary Draft

Section	Subject-Matter Expert(s)
Section 1 - Introduction	Susan Smith, Schuylkill County Planning Department
Section 2 - County Profile	Susan Smith, Schuylkill County Planning Department
Section 3 - Planning Process	Susan Smith, Schuylkill County Planning Department
Section 4.1 – Risk Assessment Update Process	Susan Smith, Schuylkill County Planning Department
Section 4.2 - Hazard Identification and Methodology	Susan Smith, Schuylkill County Planning Department
Section 4.3.1 - Blight	Susan Smith, Schuylkill County Planning Department
Section 4.3.2 - Dam and Levee Failure	Joe Smith, Schuylkill County Municipal Authority Jesse Weiss, Schuylkill County Municipal Authority

Section	Subject-Matter Expert(s)
Section 4.3.3 - Drought	Joe Smith, Schuylkill County Municipal Authority Jesse Weiss, Schuylkill County Municipal Authority
Section 4.3.4 - Flood	John Matz, Schuylkill County Emergency Management Agency John Blickley, Schuylkill County Emergency Management Agency Wayne Lehman, Schuylkill County Conservation District Bill Reichert, Schuylkill County Conservation District
Section 4.3.5 – Hazardous Materials and Transportation Incidents	John Matz, Schuylkill County Emergency Management Agency John Blickley, Schuylkill County Emergency Management Agency Randy Kalce, Chair of the Local Emergency Planning Committee
Section 4.3.6 – Hurricane and Wind	Susan Smith, Schuylkill County Planning Department
Section 4.3.7 - Mine Subsidence	Troy Wolfgang, Bureau of Mine Safety, Anthracite and Industrial Minerals Division, Pennsylvania Department of Environmental Protection
Section 4.3.8 - Nuclear	John Matz, Schuylkill County Emergency Management Agency
Section 4.3.9 - Radon	Susan Smith, Schuylkill County Planning Department
Section 4.3.10 - Tornado	Susan Smith, Schuylkill County Planning Department
Section 4.3.11 - Wildfire	Jim Reed, CPT member, Schuylkill Haven Fire Department Jacob Novitsky, PA DCNR Weiser Forest District Thomas Saladyga, PhD, Assistant Professor at Concord University
Section 4.3.12 - Winter Storm	Susan Smith, Schuylkill County Planning Department
Section 4.4 – Hazard Ranking	Susan Smith, Schuylkill County Planning Department
Section 5 - Capability Assessment	Susan Smith, Schuylkill County Planning Department
Section 6 - Mitigation Strategy	Susan Smith, Schuylkill County Planning Department
Section 7 - Plan Maintenance	Susan Smith, Schuylkill County Planning Department Core Planning Team
Section 8 – Plan Adoption	Susan Smith, Schuylkill County Planning Department

CPT = Core Planning Team

PA DCNR = Pennsylvania Department of Conservation and Natural Resources

On November 14, 2018, the draft HMP update was posted to the County EMA website (<http://www.scema.org/hazard-mitigation-plan-update-2019/>) for 30 days for review and comment. A meeting was held with the Core and Municipal Plan Teams to review the draft HMP, review gaps still needed to be filled prior to submitting to PEMA and FEMA, and the general procedures on how to comment and submit additional information. Through a press release the general public was invited to visit the County EMA website to review the draft HMP update and provide comments as well. The County also distributed letters to neighboring counties inviting their review and comment. Once the 30-day public review concluded, the County HMP leads reviewed and considered all comments, and made revisions to the draft HMP as appropriate. Refer to Appendix E for copies of public notices and other forms of public and stakeholder outreach.

SECTION 4. RISK ASSESSMENT

4.1 Update Process Summary

In accordance with the FEMA Local Mitigation Planning Handbook, risk is the potential for damage, loss, or other impacts created by the interaction of natural hazards with community assets. Schuylkill 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 and risk assessment methodology.
- 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 hazard ranking results.

The Core and Municipal Planning Teams evaluated the 2013 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 Hazard Mitigation Plan. In addition, the Core and Municipal Planning Teams and stakeholders completed the risk assessment worksheet (Evaluation of Identified Hazards and Risk Worksheet) distributed at the project kickoff meetings. The worksheet listed hazards profiled in the 2013 HMP and requested that participants identify if the frequency of occurrence, magnitude of impact, and/or geographic extent of each hazard increased, decreased or did not change since the preparation of the 2013 HMP. The worksheet also provided the opportunity to identify hazards not profiled in the HMP to determine if those hazards should be included as part of the update.

The Core and Municipal Planning Teams chose to focus on an all-hazards approach rather than to narrow the focus to natural disasters only. Overall, all 2013 hazards of concern are included in the 2019 update; no new hazards were added for evaluation. Refer to copies of the individually-submitted worksheets in Appendix D.

4.2 Hazard Identification and Methodology

The Core and Municipal Planning Teams acknowledged that important steps in developing a comprehensive HMP were identifying hazards that specifically affect Schuykill County, and assessing their likelihood of occurrence, along with potential damage to the people, property and environment of the County. The following sections outline the examination of hazards of concern for Schuykill County and the methodology followed to update the hazard profiles and vulnerability assessments.

4.2.1 DISASTER DECLARATIONS

In reviewing and updating Schuykill County’s hazards of concern, the Core and Municipal Planning Teams reviewed additional information and historical records from a wide range of sources. The following discusses the Presidential Disaster and Emergency Declarations, Gubernatorial Disaster Declarations or Proclamations and Small Business Administration Disaster Declarations that have affected Schuykill 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. Table 4.2-1 lists the Presidential Disaster and Emergency Declarations issued between 1955 through December 31, 2017 that have affected Schuykill County: <https://www.fema.gov/disasters>.

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

Declaration Number	Date(s) of Incident	Event
DR-206	August 18, 1965	Water Shortage
DR-273	August 19, 1969	Severe Storms & Flooding
DR-340	June 23, 1972	Tropical Storm Agnes
DR-485	September 26, 1975	Severe Storms, Heavy Rains & Flooding
DR-523	October 20, 1976	Severe Storms & Flooding
EM-3026	January 29, 1977	Snowstorms
EM-3105	March 13-17, 1993	Severe Snowfall & Winter Storm
DR-1015	January 4-February 25, 1994	Severe Winter Storms
DR-1085	January 6-12, 1996	Blizzard of 96
DR-1093	January 19-February 1, 1996	Severe Storms and Flooding
EM-3180	February 14-17, 2003	Snow
DR-1555	September 8-9, 2004	Severe Storms and Flooding Associated with Tropical Depression Frances
DR-1557	September 17-October 1, 2004	Tropical Depression Ivan
EM-3235	August 29-October 1, 2005	Hurricane Katrina
DR-1649	June 23-July 10, 2006	Severe Storms, Flooding, And Mudslides
DR-1684	November 16-17, 2006	Severe Storms and Flooding
DR-4030	September 3-October 15, 2011	Tropical Storm Lee
EM-3340	September 3-October 15, 2011	Remnants of Tropical Storm Lee
EM-3356	October 26-November 8, 2012	Hurricane Sandy

Declaration Number	Date(s) of Incident	Event
DR-4267	January 22-23, 2016	Severe Winter Storm and Snowstorm

Source: FEMA 2018

Note: There were no declarations for Schuylkill County prior to 1965.

DR Major Disaster Declaration

EM Emergency Declaration

It is important to note that Schuylkill County experienced two major flood events in July and August of 2018 during the update of this HMP. At the time of the draft HMP assembly, no disaster declarations have been made as a result of these events.

In addition to these Presidentially-declared events, 32 events warranted Gubernatorial Disaster Declarations or Proclamations. Table 4.2-2 lists Gubernatorial Disaster Declarations or Proclamations that have been issued for Schuylkill County between 1954 and 2018.

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

Date	Event
January, 1966	Heavy Snow
February, 1972	Heavy Snow
February, 1974	Truckers Strike
January, 1978	Heavy Snow
February, 1978	Blizzard
November, 1980	Drought Emergency
September, 1995	Drought
April, 1997	Snowstorm
July, 1999	Drought
February, 2002	Drought and Water Shortage
September, 2005	Proclamation of Emergency – Hurricane Katrina
June, 2006	Proclamation of Emergency - Flooding
September, 2006	Proclamation of Emergency - Tropical Depression Ernesto
November, 2006	Proclamation of Emergency - Flooding
April, 2007	Proclamation of Emergency - Severe Winter Storm
February, 2007	Proclamation of Emergency - Severe Winter Storm
February, 2007	Proclamation of Emergency - Regulations
April, 2007	Proclamation of Emergency - Severe Winter Storm
February, 2010	Proclamation of Emergency – Winter Storm
January, 2011	Proclamation of Emergency – Severe Winter Storm
August and September, 2011	Proclamation of Emergency – Severe Storms and Flooding (Lee/Irene)
April, 2012	Proclamation of Emergency – Spring Winter Storms
October, 2012	Proclamation of Emergency – Hurricane Sandy
June, 2013	Proclamation of Emergency – High Winds, Thunderstorms, Heavy Rain, Tornado, Flooding

Date	Event
January, 2014	Proclamation of Emergency – Extreme Weather, Utility Interruption
February, 2014	Proclamation of Emergency – Severe Winter Storm
January, 2015	Proclamation of Emergency – Severe Winter Event
August, 2015	Proclamation of Emergency – High Winds, Severe Thunderstorms, Heavy Rains, Tornadoes and Flooding
January, 2016	Proclamation of Emergency – Severe Winter Event
March, 2017	Proclamation of Emergency – Severe Winter Storm
January, 2018	Proclamation of Disaster Emergency – Opioid Crisis
January, 1966	Heavy Snow

Source: PEMA 2018

Schuylkill County has also received Small Business Administration 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 the Small Business Administration Disaster Declarations issued for Schuylkill County between 1954 and July 2018.

Table 4.2-3. Small Business Administration Disaster Declarations affecting Schuylkill County

Date	Event
July, 1991	Drought
August, 2001	Flooding
November, 2006	Severe Storms and Flooding
December, 2006	Severe Storms and Tornadoes
August, 2007	Hail
October, 2009	Fire
July, 2016	Flash Flooding
July, 2018	Flooding

Source: PEMA 2018

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

4.2.2 SUMMARY OF 2019 HMP HAZARDS

As part of the plan update process, the Core and Municipal Planning Teams reviewed the hazards of concern detailed in the 2013 version of the plan as well as those identified in the current 2013 State HMP and 2018 State draft HMP. They also considered the history of hazard events occurring in Schuylkill County, as well as events occurring after the completion of the 2013 HMP. This review of historical events included an evaluation of all emergency and disaster

declarations in the Commonwealth, with a focus on those in which Schuylkill 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 significant risk to Schuylkill County, including any that may not have been considered in either the 2013 version of the plan or the State HMP. Completed worksheets submitted by the municipalities are included in Appendix D. The Core and Municipal Planning Teams decided to keep all 2013 hazards of concern. The invasive species hazard was identified by a select few municipalities on the *Hazard Identification/ Evaluation of Risk* worksheet. During the May 2018 risk assessment review meetings with the Core and Municipal Planning Teams, it was noted that this may be an emerging hazard to consider evaluating in future plan updates. The non-natural hazard, opioid/drug overdose, was identified by the Core Planning Team as a hazard of concern to the County; however, it was not included in the 2019 HMP update because this hazard will be more appropriately discussed and handled by other County plans or programs.

Based on all available information and input, the Core and Municipal Planning Teams selected the following natural and non-natural hazards for consideration in this plan.

- Natural Hazards
 - Drought and Water Supply Deficiencies
 - Flood
 - Hurricane and Windstorm
 - Radon
 - Tornado
 - Wildfire
 - Winter Storm
- Non-Natural Hazards
 - Blight
 - Dam and Levee Failure
 - Hazardous Materials and Transportation Incidents
 - Mine Subsidence
 - Nuclear Incidents

4.2.3 RISK ASSESSMENT METHODOLOGY

A risk assessment is the process of measuring the potential loss of life, personal injury, economic 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 most accurately assess risk for the County and each jurisdiction.

ASSET INVENTORIES

Schuylkill County assets were identified to assess potential exposure and loss associated with the hazards of concern. For the HMP update, the County assessed exposure and potential loss to the following asset types: population, buildings and critical facilities/infrastructure and the environment. Some assets may be more vulnerable because of their physical characteristics or socioeconomic uses.

Population

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. The 2010 U.S. Census block data layers were used to estimate exposure and potential impacts to the general population. The 2010 U.S. Census demographic data available in FEMA's HAZUS-MH was used to estimate potential impacts to the elderly (over 65 years of age) and populations with income below the poverty threshold.

The U.S. Census blocks do not follow the boundaries of the hazard areas, possibly leading to gross overestimates or underestimates of exposed populations from use of centroids or intersects of Census blocks with these zones. Therefore, where noted, residential parcels were selected using the Schuylkill County parcel layer and Land Use descriptions; these parcels were used to then select building footprints with their centroid located in the residential parcel boundaries. The total number of buildings was multiplied by the average household size to provide an estimate of the population located in the dam failure inundation areas and 1-percent annual chance floodplain. According to the 2010 U.S. Census, the average household size in Schuylkill County is 2.35 people. Limitations of these analyses are recognized, and thus the results are used only to provide a general estimate.

Buildings

The building footprint spatial layer provided by the Schuylkill County Planning Department and the default general building stock data in HAZUS-MH based on the 2010 U.S. Census and RS Means 2016 valuations, were used to assess exposure and estimate potential losses to flood and wind events at the municipal level. As noted above, Census blocks do not follow hazard boundaries, possibly leading to gross overestimates or underestimates of exposed building stock value. Limitations of these analyses are recognized, and thus the results are used only to provide a general estimate.

Critical Facilities

The critical facility inventory, which includes essential facilities, utilities, transportation features and user-defined facilities as outlined in Section 2 (County Profile), was updated beginning with all GIS data provided by the Schuylkill County Planning Department. To protect individual privacy and the security of assets, in some cases, asset information is presented in aggregate, without details about specific individual properties or facilities.

METHODOLOGY

To address the requirements of the DMA 2000 and better understand potential vulnerability and losses associated with hazards of concern, Schuylkill 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 upon the data available for each hazard as described below.

1. **Historic Occurrences and Qualitative Analysis** – This analysis level includes an examination of historic impacts to understand potential future impacts for events of similar size. In addition, potential impacts and losses are discussed qualitatively using best available data and professional judgement.
2. **Exposure Assessment** – This analysis level 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 may 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 flood and hurricane/wind hazards. In addition, an examination of historic impacts and an exposure assessment was conducted for these spatially-delineated hazards.

Spatial Tools

ESRI ArcGIS

ESRI ArcGIS was used to assess exposure for hazards with delineated hazard areas in Schuylkill County. The defined hazard areas were overlaid upon the asset data (population, building stock, critical facilities and environment) to estimate the exposure to each hazard.

Hazards U.S. – Multi-Hazard (HAZUS-MH)

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 the need to identify areas that face the highest risk and potential for loss. HAZUS was expanded into a multi-hazard methodology, HAZUS-MH, with new models for estimating potential losses from wind (hurricanes) and flood (riverine and coastal) hazards. HAZUS-MH is a GIS-based software tool that applies engineering and scientific risk calculations that 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-MH uses GIS technology to produce 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-MH uses default data for inventory, vulnerability, and hazards; the 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, and economic impact) depending on the hazard and available local data. HAZUS-MH's open data architecture 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. The guidance "Using HAZUS-MH for Risk Assessment: How-to Guide" (FEMA 433) was relied upon to support the application of HAZUS-MH for this risk assessment and plan (FEMA 2015). More information on HAZUS-MH is available at <https://www.fema.gov/hazus>.

HAZUS provides default data for inventory, vulnerability, and hazards; the default data can be supplemented with local data to provide a more refined analysis. The model can carry out three levels of analysis, depending on the format and level of detail of information about the planning area:

- **Level 1**—All of the information needed to produce an estimate of losses is included in the software’s default data. This data is derived from national databases and describe in general terms the characteristic parameters of the planning area.
- **Level 2**—More accurate estimates of losses require more detailed information about the planning area. To produce Level 2 estimates of losses, detailed information is required about local geology, hydrology, hydraulics, and building inventory, as well as data about utilities and critical facilities. This information is needed in a GIS format.
- **Level 3**—This level of analysis generates the most accurate estimate of losses. It requires detailed engineering and geotechnical information to customize it for the planning area.

HAZUS-MH has two types of Census block-based data, homogenous and dasymetric. Homogenous blocks display the full extent of each block, while the dasymetric census blocks have had homogenous undeveloped areas (bodies of water, forests, etc.) removed. The dasymetric blocks were developed to provide more accurate loss estimates by excluding uninhabited and undeveloped areas of a Census block. To estimate the replacement cost value of structures located within the hazard areas, the default dasymetric Census block general building stock data in HAZUS-MH 4.0 was used.

In general, probabilistic analyses are performed to develop estimates of long-term average losses (annualized losses), as well as an expected/estimated distribution of losses (mean return period losses) for the flood and hurricane/wind hazards. The probabilistic hazard analysis generates estimates of damage and loss for specified return periods. For annualized losses, HAZUS-MH 4.0 calculates the maximum potential annual dollar loss resulting from various return periods averaged on a "per year" basis. It is the summation of all HAZUS-supplied return periods (e.g., 10, 50, 100, 200, 500) multiplied by the return period probability (as a weighted calculation). In summary, the estimated cost of a hazard (earthquake and wind) each year is calculated.

Methodology by Hazard

Blight

To assess the vulnerability to blight, a qualitative assessment was conducted using available U.S. Census housing statistics and available reports.

Drought and Water Deficiencies

To assess the vulnerability to drought and its associated impacts, a qualitative assessment was conducted. The United States Department of Agriculture Census of Agriculture 2012 was used to estimate economic impacts to the County. Information regarding the number of farms, land area in farms, total market value of products sold, etc. was extracted from the report and summarized in the vulnerability assessment.

Dam and Levee Failure

A combined spatial layer with multiple dam inundation areas was provided by the Schuylkill County Planning Department. This layer does not contain the dam failure risk to all dams located in the County. The dams included in

the analysis are: Auburn Dam, Hosenoek, Indian Run Dam, Kauffman Dam, Koenigs Creek, Little Schuylkill, Mahanoy Township #2, Mount Laurel Dam, Neiferts Creek, Pine Run Dam #4, Pole Run #4, Raven Run #2, Raven Run #3, Ringtown Dam #5, Ringtown Dam #6, Upper and Lower Owl Creek, Waste House #1 and #3, and Wolf Creek Dam. Because of the recognized limitations of this analysis, data are only used to provide a general estimate of risk.

To determine the assets that are exposed to this hazard, the dam failure inundation areas were overlaid upon the assets. Assets with their centroid in the hazard area were totaled to estimate exposure. Residential parcels were selected using the Schuylkill County parcel layer and Land Use descriptions; these parcels were used to then select building footprints with their centroid located in the residential parcel boundaries. The exposed building count was multiplied by the average household size to provide an estimate of the population located in the dam failure inundation area. According to the 2010 U.S. Census, the average household size in Schuylkill County is 2.35 people. The limitations of this analysis are recognized and should only be used to provide a general estimate.

The levee protected areas are not included in the FEMA effective DFIRM and Risk Map spatial databases for Schuylkill County. Further, spatial layers were not available by the County; therefore, a qualitative assessment was conducted.

Flood

The 1-percent and 0.2-percent annual chance flood events were examined to evaluate Schuylkill County's risk to the riverine flood hazard. These flood events are generally those considered by planners and evaluated under federal programs such as the NFIP. Schuylkill County's effective map date is November 19, 2014.

FEMA Risk Map products dated October 2017 from the Flood Risk Database (FRD) were considered best available data for Schuylkill County at the time the 2019 HMP was drafted. The 2017 Risk Map 1- and 0.2-percent annual chance floodplains were used to estimate exposure. The 1-percent annual chance flood depth grid available from Risk Map was integrated into the HAZUS-MH 4.0 riverine flood model to estimate potential losses in the County. The following is an excerpt from FEMA's 2018 "Guidance for Flood Risk Analysis and Mapping" describing this data: *In many cases, the core spatial data compiled for the FRD [Flood Risk Database] is derived from other FEMA datasets (e.g., the S_CSLF_Ar feature class is derived from the S_Fld_Haz_Ar feature class from the National Flood Hazard Layer (NFHL) and new Flood Insurance Rate Map (FIRM) databases. These FEMA datasets should have been compiled to FEMA specifications as described in the FIRM Database Technical Reference and other FIRM Database Guidance. In this regard, the flood risk datasets should inherit much of the quality and integrity with which their parent datasets were created (FEMA 2018).*

To estimate exposure to the 1- and 0.2-percent annual chance flood events, the 2017 Risk Map flood boundaries, default general building stock data in HAZUS-MH 4.0, Schuylkill County building footprint layer, updated critical facility inventories and 2010 U.S. Census population data were used; assets with their centroid located in the hazard areas were totaled to estimate exposure. The HAZUS-MH 4.0 riverine flood model was run to estimate potential losses for Schuylkill County for the 1-percent annual chance flood event. HAZUS-MH 4.0 calculated the estimated potential losses to the population (default 2010 U.S. Census data) and potential damages to the updated general building stock and critical facility inventories based on the depth grid generated and the default HAZUS damage functions in the flood model.

To estimate debris generated by the 1-percent annual chance flood event, HAZUS-MH v4.2, which was released on January 29, 2018, was used instead of HAZUS-MH v4.0. This is because a FEMA-known error in v4.0 was detected, and the issue appears to have been resolved with the latest software release.

Schuylkill County collected information from residents and business owners impacted by the August 2018 flood event. A flood survey was developed and posted to the County EMA website to provide the opportunity to document and submit flood impacts to support the request to PEMA and FEMA for a Presidential Disaster Declaration. The Planning Department geocoded the information and generated a building inventory with details regarding the extent of damage. The 408-structure inventory includes the following attributes: occupancy class, water level and structure status (i.e. whether or not it has reopened to date or is still closed/cannot be re-inhabited). Section 4.3.4 (Flood) discusses impacts to structures and the flood damage experienced in the 'Past Events' subsection.

In August 2018, FEMA released a Preliminary DFIRM database for Schuylkill County. The data was released after the risk assessment was completed for the 2019 HMP update. The appeal period will take place approximately over the winter of 2018 into 2019; which will have a 90-day duration after the appeal period starts. As per the Community Coordination and Outreach meeting in September 2018, there have been increases and decreases in floodplain area throughout the County. The preliminary FIRMs are available on the FEMA Map Service Center for review (<https://msc.fema.gov/portal>).

Hazardous Materials and Transportation Incidents

The Federal Title III Superfund Amendments and Reauthorization Act (SARA), the Emergency Planning and Community Right to Know Act, and the Commonwealth of Pennsylvania set up requirements for producing, storing, and transporting hazardous materials. These hazardous materials may be released either at their storage facility location (fixed site) or in-transit. The Schuylkill County Hazardous Materials Commodity Flow Study (2017) was reviewed to describe the types of hazardous materials being transported through the County and the number of vehicles carrying these materials.

The Pennsylvania Department of Transportation State Roads layer (2011) was used to define the hazard area around major roadways. The hazard area was defined as a ¼ mile buffer around the Interstate, State, and U.S. roadways where hazardous materials may be in transit to estimate areas that may be directly or indirectly impacted by a release. The County provided a rail line spatial layer and a spatial layer for the Atlantic Sunrise Pipeline. Like with the major roadways, the hazard area was defined as a ¼ mile buffer around these features as well. Additionally, the identified primary vulnerability radii around the SARA Title III facilities from the County spatial layer was used to estimate potential exposure.

Hurricane/Wind

A HAZUS-MH 4.0 probabilistic analysis was performed to analyze the wind hazard. The probabilistic 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 Schuylkill County. HAZUS-MH 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. Annualized losses and the 100- and 500-year MRPs were examined for the wind/severe storm hazard. Default demographic and updated building and critical facility inventories in HAZUS-MH 4.0 were used for the analysis.

There is currently a FEMA-acknowledged issue with importing user-defined facilities in HAZUS-MH versions 4.0 and 4.2, available at the time of the 2019 HMP update. To estimate potential losses to user-defined facilities identified by Schuylkill County, they were appended to the Emergency Operation Centers input in HAZUS-MH Comprehensive Data Management System (CDMS) and uploaded to the program.

Nuclear Incident

Schuylkill County is located within the Ingestion Exposure Pathway Emergency Planning Zones (EPZs) of the Susquehanna Steam Electric Station located in Luzerne County, PA, the Limerick Generating Station in Montgomery County, PA, and Three Mile Island in Dauphin County, PA. The 50-mile EPZs were used to define the hazard area for a nuclear incident. The defined hazard area was overlaid upon the asset data (population, building and critical facilities) to estimate exposure to the nuclear incident hazard.

Mine Subsidence

There is no standard loss estimation model available for the mine subsidence hazard. To determine the assets that are exposed to this hazard, available and appropriate spatial data delineating the extent of Pennsylvanian Rock and anthracite fields (generated by the Pennsylvania Bureau of Topographic and Geologic Survey in 2015) were overlaid upon the asset data (population, buildings, critical facilities). The assets with their center located in the hazard area are reported as exposed and potentially vulnerable to mine subsidence events. The U.S. Census blocks do not align with the anthracite field polygon in the spatial data; therefore, these estimates are for planning purposes only. The limitations of this analysis are recognized and are only used to provide a general estimate of exposure.

Radon

A qualitative analysis was conducted for the radon hazard based on best available data and professional judgment.

Tornado

To assess the tornado hazard, the number of manufactured homes was total per each municipality to provide an estimate of the vulnerability from a tornado event. The structure totals were pulled from tax assessment data by the Schuylkill County Planning and Zoning Department. The following three categories were used to calculate the number of manufactured homes per municipality:

- RT = a trailer where the trailer owner and land owner are the same, but the land is less than 10 acres.
- AT = a trailer where the trailer owner and land owner are the same, but the land is greater than 10 acres.
- T= a trailer where the trailer owner and the land owner are not the same and the land is typically leased.

Wildfire

The wildfire urban interface, known as WUI, obtained through the SILVIS Lab, Department of Forest Ecology and Management, University of Wisconsin-Madison was used to define the wildfire hazard areas. The University of Wisconsin-Madison wildland fire hazard areas are based on the 2010 Census and 2006 National Land Cover Dataset and the Protected Areas Database. For the purposes of 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. The defined hazard area was overlaid upon the asset data (population, building stock, critical facilities) to estimate the exposure to each hazard.

Winter Storm

The entire general building stock inventory in Schuylkill 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. Given professional knowledge and the 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.

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, Schuylkill County will collect additional data to assist in developing refined estimates of vulnerabilities to natural and non-natural hazards.

Potential economic loss is based on the present value of the general building stock utilizing best available data. The County acknowledges significant impacts may 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 to industry such as tourism and the real-estate market were not analyzed.

4.3 Hazards of Concern

The following sections assess each hazard of concern. For each hazard, there is a profile and vulnerability assessment. The profile includes the hazard description; its location and extent; range of magnitude, past occurrence and future occurrence. The vulnerability assessment includes the impact to life, health and safety; impact to general building stock and critical facilities; impact to the economy; impact to the environment; impact to future growth and development; and effect of climate change on vulnerability.

4.3.1 BLIGHT

PROFILE

Blight is defined as a vacant property that is a public nuisance; condemned under the municipal code; seriously tax delinquent or abandoned. An abandoned property under current state law consists of any building that has not been legally occupied for at least 12 months and is also a blighted property meeting any of the following:

- Premises which, because of physical condition or use are regarded as a public nuisance in accordance with the local housing, building, plumbing, fire, and related codes and ordinances, including nuisance and dangerous building ordinances
- Premises which, because of physical condition, use, or occupancy, are considered an attractive nuisance to children, including, but not limited to, abandoned wells, shafts, basements, excavations, and unsafe fences or structures
- A dwelling which, because it is dilapidated, unsanitary, unsafe, vermin-infested condition, or lacking in the facilities and equipment required under the housing code of the municipality, has been designated by the municipal department responsible for enforcement of the code as unfit for human habitation
- A structure which is a fire hazard or is otherwise dangerous to the safety of persons or property
- A structure from which the utilities, plumbing, heating, water, sewage or other facilities have been disconnected, destroyed, removed, or rendered ineffective so that the property is unfit for its intended use
- A vacant or unimproved lot or parcel of ground in a predominantly built-up neighborhood which by reason of neglect or lack of maintenance, has become a place for accumulations of trash and debris or a haven for rodents or other vermin
- An unoccupied property which has been tax delinquent for a period of two years
- A property which is vacant but not tax delinquent and which has not been rehabilitated within one year of the receipt of notice to rehabilitate from the appropriate code enforcement agency (Schuylkill County HMP 2013).

In 2012, a Pennsylvania law was signed to allow local governments to take control of blighted properties and cancel tax liens and bank foreclosures, so the land can be sold to responsible owners or developers willing to improve the neighborhoods. Governor Tom Corbett signed the Land Bank Act in October 2012 to streamline the process of returning delinquent properties to tax rolls in municipalities struggling to boost their tax bases (Boren 2012).

Location and Extent

In Schuylkill County, blight is a substantial issue and a top priority of municipal officials to address. Blight conditions could occur anywhere within Schuylkill County; however, it is more likely to occur in those municipalities with a greater vacancy rate (occupied/vacant housing) and/or those with an older housing stock (**Error! Reference source not found.**).

According to the American Community Survey, the total vacancies in Schuykill County have been generally increasing since 2009; refer to Table 4.3.1-1 below. The vacancy rate in Schuykill County is approximately 25% greater than the average vacancy rate in Pennsylvania and across the U.S. (estimated at 12%).

Table 4.3.1-1. Housing Unit Occupancy Status in Schuykill County

Year	Total Housing Units	Occupancy Status		
		Occupied	Vacant	% Vacant
2016	68,954	58,341	10,613	15.4%
2015	69,143	58,554	10,589	15.3%
2014	69,232	59,122	10,110	14.6%
2013	69,147	59,658	9,489	13.7%
2012	69,333	60,121	9,212	13.3%
2011	69,335	60,029	9,306	13.4%
2010	69,271	60,347	8,924	12.9%
2009	69,906	60,835	9,071	13.0%

Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates

It should be noted that the housing units indicated as vacant by the U.S. Census can be vacant for several reasons including: 1) for rent; 2) rented, not occupied; 3) for sale only; 4) sold, not occupied; 5) for seasonal, recreational or occasional use; 6) for migratory workers or 7) other. For example, North Union and East Union Townships located in the northern portion of the County have a very high vacancy rate; however, both have over 50-percent vacancies attributed to seasonal, recreational or occasional use due to a larger number of seasonal/part-time residents.

To correlate the U.S. Census vacant housing statistics to blight, we need to examine the municipalities with the ‘other vacant’ category. Table 4.3.1-2 summarizes the top ten (10) municipalities with the greatest number of vacant housing units in the ‘other vacant’ category and therefore more likely to experience blight. Refer to Figure 4.3-1 for the distribution of percent of ‘other vacant’ housing units across the County.

Table 4.3.1-2. Top Ten Municipalities with the Greatest Number of ‘Other Vacant’ Housing Units in Schuykill County

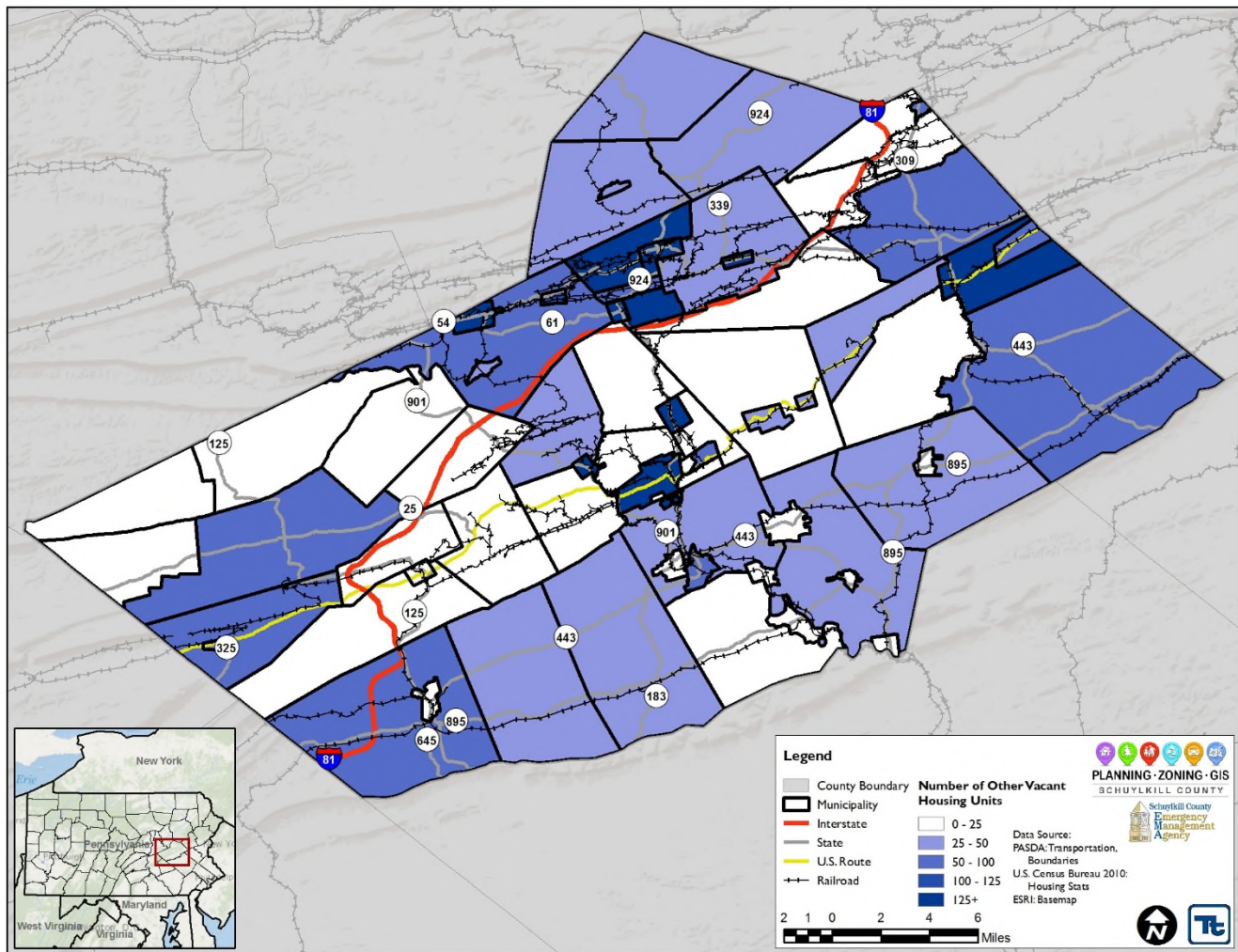
Municipality	Total Housing Units	Occupancy Status			
		Number of Vacant Housing Units (All Categories)	Number of ‘Other Vacant’ Housing Units	Percent (%) ‘Other Vacant’ of Total Vacant Housing Units (All Categories)	Percent (%) ‘Other Vacant’ of Total Housing Units
Shenandoah Borough	3,112	899	547	60.8%	17.6%
Pottsville City	7,040	1009	429	42.5%	6.1%
Mahanoy City Borough	2,414	634	378	59.6%	15.7%
Ashland Borough	1,677	376	230	61.2%	13.7%
Tamaqua Borough	3,566	531	230	43.3%	6.4%
Frackville Borough	1,977	320	194	60.6%	9.8%
West Mahanoy Township	1,499	273	170	62.3%	11.3%
Saint Clair Borough	1,598	216	146	67.6%	9.1%

Municipality	Total Housing Units	Occupancy Status			
		Number of Vacant Housing Units (All Categories)	Number of 'Other Vacant' Housing Units	Percent (%) 'Other Vacant' of Total Vacant Housing Units (All Categories)	Percent (%) 'Other Vacant' of Total Housing Units
Minersville Borough	2,315	324	138	42.6%	6.0%
Girardville Borough	807	178	108	60.7%	13.4%

Source: U.S. Census Bureau, 2010

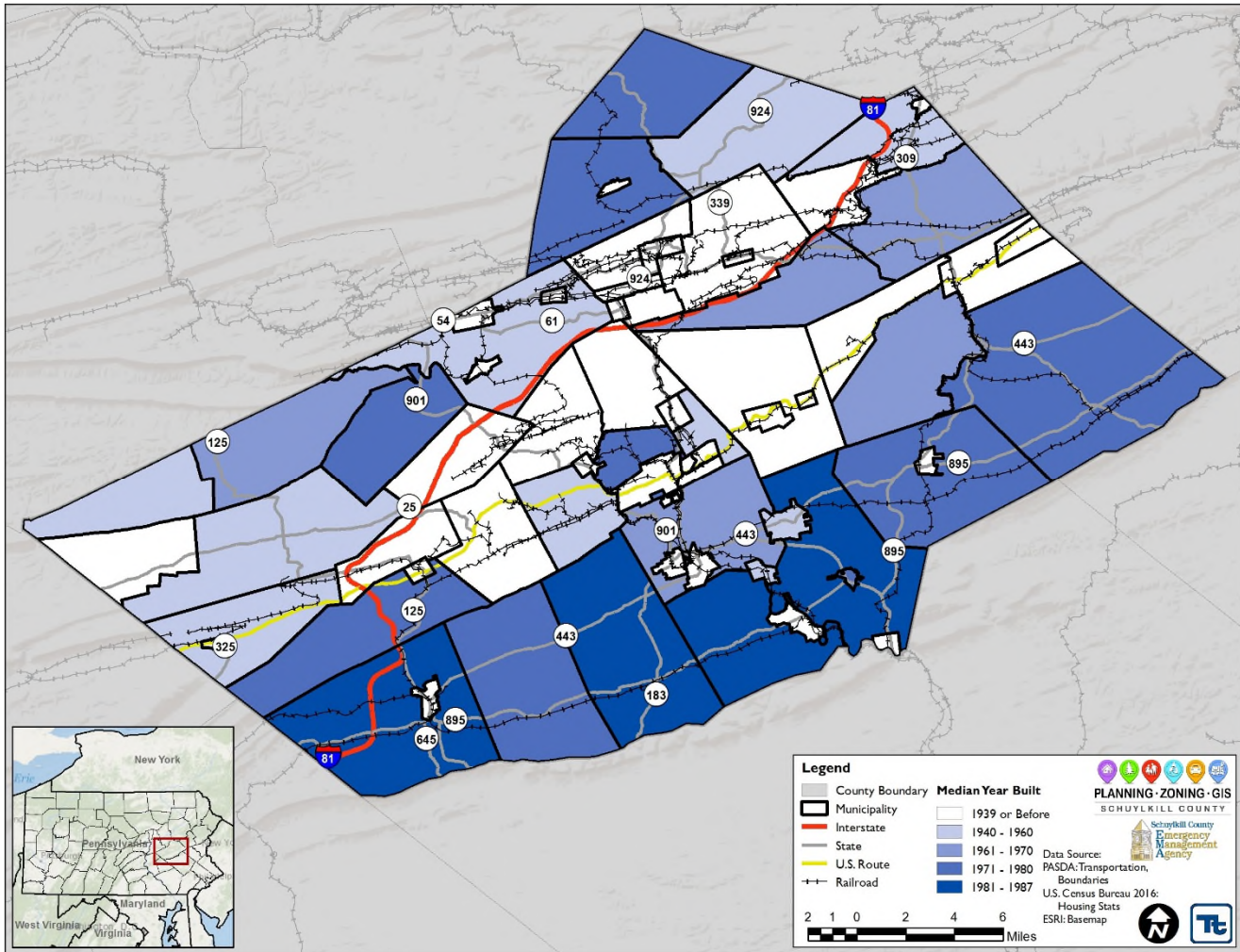
Note: The 'other vacant' housing units best correlate to blight.

Figure 4.3.1-1. 'Other Vacant' Housing Units, Census 2010



It is interesting to note that nearly 40 municipalities have housing stock with a median year built of 1939 or older; refer to Figure 4.3.1-2. These areas of Schuykill County may also be more susceptible to blight, and the hardships associated with blight. According to a recent article, there are approximately 270 blighted buildings in the City of Pottsville alone (Bianco, 2017).

Figure 4.3.1-2. Housing Unit Median Year Built, Census 2016



Range of Magnitude

Quantifying the hazard impact is difficult at this time given the lack of standardized record-keeping by municipalities. However, as data becomes available, the costs that vacant and abandoned properties impose upon communities will be tracked and reported. This data may include what the National Vacant Properties Campaign define in their report “Vacant Properties: The True Costs to Communities” as the costs that vacant and abandoned properties impose upon communities, including:

- Costs to Municipal Services – Crime, Arson and Accidental Fires, Public Nuisances and Health,
- Decreased Property Values and Tax Revenues – Lost Tax Revenue, Lower Property Values
- Costs to Homeowners – Higher Insurance Premiums, Poorer Quality of Life (Schuykill County HMP 2013).

Past Occurrence

In January 2017, Schuykill County was awarded a grant for \$1.4 million from the State to demolish and remediate blighted properties throughout the County. The following municipalities received funding to address blighted

properties within their community. It should be noted that while the communities below received grant funding, other municipalities in Schuylkill County have blighted properties.

- The Borough of Minersville received \$200,000 to demolish the former American Legion building and turn the area into a community park.
- The Borough of Shenandoah received a portion of the grant to demolish 13 homes along Centre Street that were destroyed by a fire in 2016. Two properties, one on North Main Street and one on West Coal Street, were also taken down in the Borough.
- The Borough of Mahanoy City received \$420,000 to demolish the Kaier Brewery building on Main Street. After demolition, the site was transformed into a community park and playground, as part of Phase IV of the Borough's Central Business District Streetscape Revitalization Program.
- The City of Pottsville was awarded Community Development Block Grant money to demolish approximately nine blighted properties. With the January 2017 funds, the City tore down eight blighted properties.

Future Occurrence

Predicting the future occurrence for blight is difficult. It is anticipated that during the five-year performance period of this plan, Schuylkill County will continue to experience the impacts of blight; however, with the various programs and grants available, the County has the potential to continue to reduce the number of blighted properties.

The Core Planning Team ranked the hazards 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 blight in Schuylkill County is considered "highly likely" (greater than 90% annual probability) as defined by the Risk Factor Methodology probability criteria (Section 4.4). Blight is ranked as a high-risk hazard in Schuylkill County.

VULNERABILITY ASSESSMENT

To understand risk, a community must evaluate assets exposed and vulnerable within the identified hazard area. The following section discusses potential impacts of the blight hazard on Schuylkill County, including:

- Impacts 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 collections that will assist in understanding this hazard over time.

Blighted and vacant properties can have profound impacts on a community. These include, but are not limited to, damage to the fabric of the community, cost significant dollars to maintain or respond to, and erode the local tax base because of the tax delinquency often associated with blighted properties (Delta Development Group, 2013). A qualitative assessment was conducted to evaluate the assets exposed and the potential impacts associated with the blight hazard. The U.S. Census data for Schuylkill County, as well as other federal and local sources and academic reports were referenced to support this evaluation.

Impact on Life, Health, and Safety

Research indicates a correlation between housing and neighborhood conditions and the well-being of residents. The Centers for Disease Control and Prevention (CDC) developed the Healthy People 2020 Initiative to "create social and physical environments that promote good health for all." The initiative identifies five key "social determinants of

health” – economic stability, education, social and community context, health and healthcare, and neighborhood and built environment (CDC, 2018). Blighted conditions contribute to the neighborhood and built environment determinant (i.e., poor housing quality, crime and violence, and deteriorated environmental conditions) and in turn have negative implications on public health.

A report written by the Urban Institute and Columbia University looked at the impacts of blight on health; at the individual and neighborhood level. Living near vacant homes, abandoned buildings and vacant lots may lead to lower literacy scores for pre-K children, stunted brain and physical development in children, mass retreat into unhealthy eating and exercise habits, violence, higher rates of chronic illness and a breakdown of social networks and capital. Additionally, the report found blighted areas “create a climate of social and psychological disorder that attracts criminal activity and violence and becomes a breeding ground for vermin” (de Lean and Schilling, 2017).

Abandoned or condemned structures can be a danger to the physical health of the community. As discussed earlier, these structures present unsafe conditions to the public. If they are not properly secured or boarded up, a person may be able to enter the structure and put him- or herself at risk to physical harm. Vermin and other wildlife that nest within these structures can bring diseases and other nuisances like noise and unpleasant scents to the community. A resident of New Philadelphia described living next to an abandoned structure facing these problems, and noted the presence of animals, both living and deceased, and the scent that filled the air as “like a rotting smell, a flesh rotting smell” (Bianco, 2016).

Impact on General Building Stock, Critical Facilities, and the Economy

Overall the general building stock and critical facility inventory in the County will not be directly affected as a result of blight, because the effects of the physical condition of a structure are isolated to that specific structure. The physical effects of blighted areas discussed in the previous section can lead to residents leaving a neighborhood due to the area’s deteriorating condition. This could then potentially lead to more vacant and/or abandoned structures in the neighborhood and expand the blighted areas causing an increased drain on municipal and emergency resources.

As structures continue to age there are increased costs to maintain their physical condition. These maintenance costs can be a challenge for low-income residents causing the continued deterioration of the building stock and increase the number of blighted structures.

Businesses located near blighted neighborhoods may be impacted as the aesthetics of the neighborhood will act as a deterrent to those that do not reside there. Blight prevents new, private investments into the neighborhoods it is prevalent. The values of real estate in the surrounding area are undermined, which makes market driven redevelopment unlikely (Delta Development Group, 2013).

Impacts to County and local governments to address blighted buildings can be immense. As noted above, the following are economic impacts associated with blighted properties:

- Costs to Municipal Services – Crime, Arson and Accidental Fires, Public Nuisances and Health,
- Decreased Property Values and Tax Revenues – Lost Tax Revenue, Lower Property Values
- Costs to Homeowners – Higher Insurance Premiums, Poorer Quality of Life (Schuylkill County HMP 2013).

In addition, blighted properties have a higher fire risk. The Schuylkill County Fire Chiefs Association initiated a process with the local electric company to disconnect the electrical utilities to blighted buildings.

Impact on the Environment

As discussed above, blighted areas can attract vermin and wildlife to the neighborhood, and with them, unwanted pests and diseases could infect the environment. Older, abandoned structures may have been built before current building codes were adopted with significant physical or health hazards, including damaged plumbing, gas leaks, or lead (Ross, Parsons, and Vallas 2016). These pollutants can leach out from the structures and affect the surrounding environment. Pollutants, like lead or sewage, could infiltrate surrounding ground water and impact the residents relying on those sources.

Future Growth and Development

Areas targeted for potential future growth and development within the next 5 years have been identified across the County (further discussed in Section 2.4 of this HMP). Any new land development located near blighted areas may be exposed to this hazard. However, blighted areas can provide an opportunity for future growth and development, which can lead to rehabilitation and revitalization of a neighborhood.

Effect of Climate Change on Vulnerability

Climate change will not influence the persistence of the blight hazard in Schuylkill County.

Additional Data and Next Steps

The qualitative assessment above identifies the potential human health and economic impacts associated with blight. Additional next steps to further enhance the evaluation of this hazard include developing an inventory of blighted buildings, track costs and assess outcomes from enforcements, policies and programs.

4.3.2 DAM AND LEVEE FAILURE

PROFILE

This section discusses both the dam and levee failure hazard in Schuylkill County.

Dam Failure

A dam is an artificial barrier that has the ability to store 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 2013).

Man-made dams can be classified according to the type of construction material used, the methods used in construction, the slope or cross-section of the dam, the way the dam resists the forces of the water pressure behind it, the means used for controlling seepage, and, occasionally, the purpose of the dam. The materials used for construction of dams 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 2013).

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 waters that rush downstream, damaging or destroying anything in its path (Federal Emergency Management Agency [FEMA] 2005).

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

- 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 (FEMA 2015).

Regulatory Oversight for Dams

The potential for catastrophic flooding caused by dam failures led to the enactment of the National Dam Safety Act (Public Law 92-367). The National Dam Safety Program (NDSP) has been used for 30 years to protect Americans from dam failure. The NDSP is a partnership between the states, federal agencies, and other stakeholders that encourages individual and community responsibility for dam safety. Under FEMA's leadership, state assistance funds have allowed all participating states to improve their programs through increased inspections, emergency action planning, and the purchase of needed equipment. FEMA has also expanded existing training programs and initiated new ones. Grant assistance from FEMA provides support for improvement of dam safety programs that regulate most of the dams in the United States (FEMA 2016).

The Federal Energy Regulatory Commission Dam Safety Program (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. There are 3,036 dams that are part of regulated hydroelectric projects and are included in the FERC program. Two-thirds of these are more than 50 years old. As dams age, concern about their safety and integrity grows, so oversight and regular inspection are important (FERC 2011). FERC staff inspects 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 the terms and conditions of a license (FERC 2011).

Every five years, an independent consulting engineer, approved by FERC, must inspect and evaluate projects with dams higher than 32.8 feet or with a total storage capacity of more than 2,000 acre-feet (FERC 2011). High hazard dams receive two inspections each year – once by a professional engineer on behalf of the owner and once by a Pennsylvania Department of Environmental Protection (PADEP) inspector (PADEP 2008). Dams which are considered high hazard are required to submit Emergency Action Plans (EAPs) to the Schuylkill County Emergency Management Agency, among other agencies. During plan development, the dam owner is required to delineate an “inundation area” and identify critical facilities, businesses, and a total population within that inundation area. The County Emergency Management Agency and Planning Department have been working with the Dam Owners to provide the dam inundation area in GIS. Once received, the County creates a GIS database which captures the digital inundation areas for high hazard dams. According to the County, there are 47 high hazard dams in Schuylkill County. Refer to Table 4.3.2-2 for the names of these high hazard dams.

FERC monitors and evaluates seismic research in geographic areas where there are concerns about seismic activity. This information is applied in investigating and performing structural analyses of hydroelectric projects in these areas. FERC staff also evaluates the effects of potential and actual large floods on the safety of dams. During and after floods, FERC staff visits dams and licensed projects, determines the extent of damage, and directs any studies or remedial measures the licensee must undertake. FERC’s Engineering Guidelines for the Evaluation of Hydropower Projects guides the FERC engineering staff and licensees in evaluating dam safety. The publication is frequently revised to reflect current information and methodologies (FERC 2011).

FERC requires licensees to prepare emergency action plans and conducts training sessions on how to develop and test these plans. The plans outline an early warning system if there is an actual or potential sudden release of water from a dam failure. The plans include operational procedures that may be used, such as reducing reservoir levels and reducing 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 everyone knows what to do in emergency situations (FERC 2011).

The PADEP Division of Dam Safety provides for the regulation and safety of dams and reservoirs throughout the Commonwealth to protect the health, safety and welfare of its citizens and their property. This division is required to assure proper planning, design review, construction review, maintenance monitoring and supervision of dams and reservoirs. This requirement is mandated by the Dam Safety and Encroachments Act, as amended, and the Pennsylvania Code. The division directs and coordinates field investigations with regional offices on authorized projects during construction; provides program guidance and coordination to regional program staff in the periodic inspection of all

existing dams to determine their condition and safety; and directs, coordinates and develops policies and technical standards in the area of dam safety for the Department (PADEP 2016).

The Dam Safety and Encroachments Act (Act 325 of 1978) and the Amendment for “High Hazard Dam” provide for the regulation of dams and reservoirs, water obstructions, and encroachments in the Commonwealth, to protect the health, safety and welfare of people and property. The Pennsylvania Code Title 25, Chapter 105, Dam Safety and Water Management, provides for the comprehensive regulation and supervision of dams, reservoirs, water obstructions and encroachments in the Commonwealth to protect the health, safety and welfare of people and property. The Run-of-the-River Dam Act (Act 91 of 1998) is administered by the PADEP and the PA Fish & Boat Commission and regulates the run-of-the-river (low-head) dams in the Commonwealth (PADEP 2016).

Hazard Potential Category 1 dams are those “where its failure could result in significant loss of life, excessive economic losses, and significant public inconvenience” (PADEP 2009). 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” (PADEP 2009). Hazard Category 1 and 2 dams are high hazard dams and are defined by the DEP as “any dam so located as to endanger populated areas downstream by its failure” [Def. added May 16, 1985, P.L.32, No. 15]. Owners of dams classified as Hazard Categories 1 or 2 (“high hazard” dams) are required to create an 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).

Levee Failure

Levees are typically barriers between floodwaters and the built landscape. They include a series of culverts, canals, ditches, storm sewers, or pump stations, called “interior drainage” systems. These systems channel water from the land side of a levee over to the water side. When floodwaters exceed the height of a levee, overtopping occurs. As the water passes over the top, it can erode the levee, worsening the flooding and potentially causing an opening or breach in the levee. A levee breach occurs when part of a levee gives way, creating an opening through which floodwaters may pass. A breach can occur gradually or suddenly. The most dangerous breaches happen quickly during periods of high water. The resulting torrent can quickly swamp a large area behind the failed levee with little to no warning (American Society of Civil Engineers 2010).

The United States Army Corps of Engineers (USACE) operates, maintains, and evaluates levees to determine if they meet accreditation requirements. Most levees are owned by local communities and flood control districts that must ensure proper operation and maintenance of the levee system (FEMA 2013).

Regulatory Oversight for Levees

USACE and FEMA have differing roles and responsibilities related to levees. USACE addresses a range of operation and maintenance, risk communication, risk management, and risk reduction issues as part of its responsibilities under the Levee Safety Program. FEMA addresses mapping and floodplain management issues related to levees, and it accredits levees as meeting requirements set forth by the National Flood Insurance Program.

Depending on the levee system, USACE and FEMA may be involved with the levee sponsor and community independently or—when a levee system overlaps both agency programs—jointly. Under both scenarios, the long-term goals are similar: to reduce risk and lessen the devastating consequences of flooding. Some USACE and FEMA partnering activities related to levees include:

- Joint meetings with levee sponsors and other stakeholders
- Integration of levee information into the National Levee Database
- State Silver Jackets teams
- Sharing of levee information
- Targeted task forces to improve program alignment

The Silver Jackets is a program that provides an opportunity to consistently bring together multiple state, federal, tribal, and local agencies to learn from each other and apply their knowledge to reduce risk. The Program’s primary goals include the following:

- Create or supplement a mechanism to collaboratively identify, prioritize, and address risk management issues and implement solutions;
- Increase and improve risk communication through a unified interagency effort;
- Leverage information and resources and provide access to such national programs as FEMA’s Risk MAP and USACE’s Levee Inventory and Assessment Initiative;
- Provide focused, coordinated hazard mitigation assistance in implementing high-priority actions such as those identified by state hazard mitigation plans;
- Identify gaps among agency programs and/or barriers to implementation, such as conflicting agency policies or authorities, and provide recommendations for addressing these issues.

Pennsylvania has an active Silver Jackets Team. The team is an interagency team dedicated to working collaboratively with the Commonwealth and appropriate stakeholders in developing and implementing solutions to flood hazards by combining available agency resources, which include funding, programs, and technical expertise. The team provides a variety of Flood Risk Management Resources for the public – before, during and after a flood – on their website at <http://www.nab.usace.army.mil/Home/Silver-Jackets/>.

Coordination between USACE and FEMA with regard to levees is now standard within many of each agency’s policies and practices. Over the past several years, both agencies coordinated policies where appropriate; jointly participated in meetings with stakeholders; and participated in many multiagency efforts, such as the National Committee on Levee Safety, the Federal Interagency Floodplain Management Task Force, and the Silver Jackets Program.

The National Committee on Levee Safety was created by Congress to “develop recommendations for a national levee safety program, including a strategic plan for implementation of the program.” The Committee adopted the vision of “an involved public and reliable levee system working as part of an integrated approach to protect people and property from floods,” and has been working toward this goal since October 2008 (National Committee on Levee Safety 2010). The Committee is made up of representatives from state, regional, and local agencies; the private sector; USACE; and FEMA.

Location and Extent

Dam Failure

There are many sources that track the number and classification of dams in Schuylkill County. According to the U.S. Army Corps of Engineers, there are 54 dams located in Schuylkill County that are both publicly and privately owned (USACE 2018; NPDP 2015). This database does not have dam classifications provided. According to spatial data obtained from the Schuylkill County Geographic Information Systems Office, there are 72 dams in Schuylkill County, 47

of which are classified as high hazard dams (category 1 and 2) as defined in Table 4.3.2-1. Table 4.3.2-2 lists the 72 dams in Schuylkill County.

Table 4.3.2-1. PADEP Dam Classification Definition

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: 025 Pa. Code § 105.91.

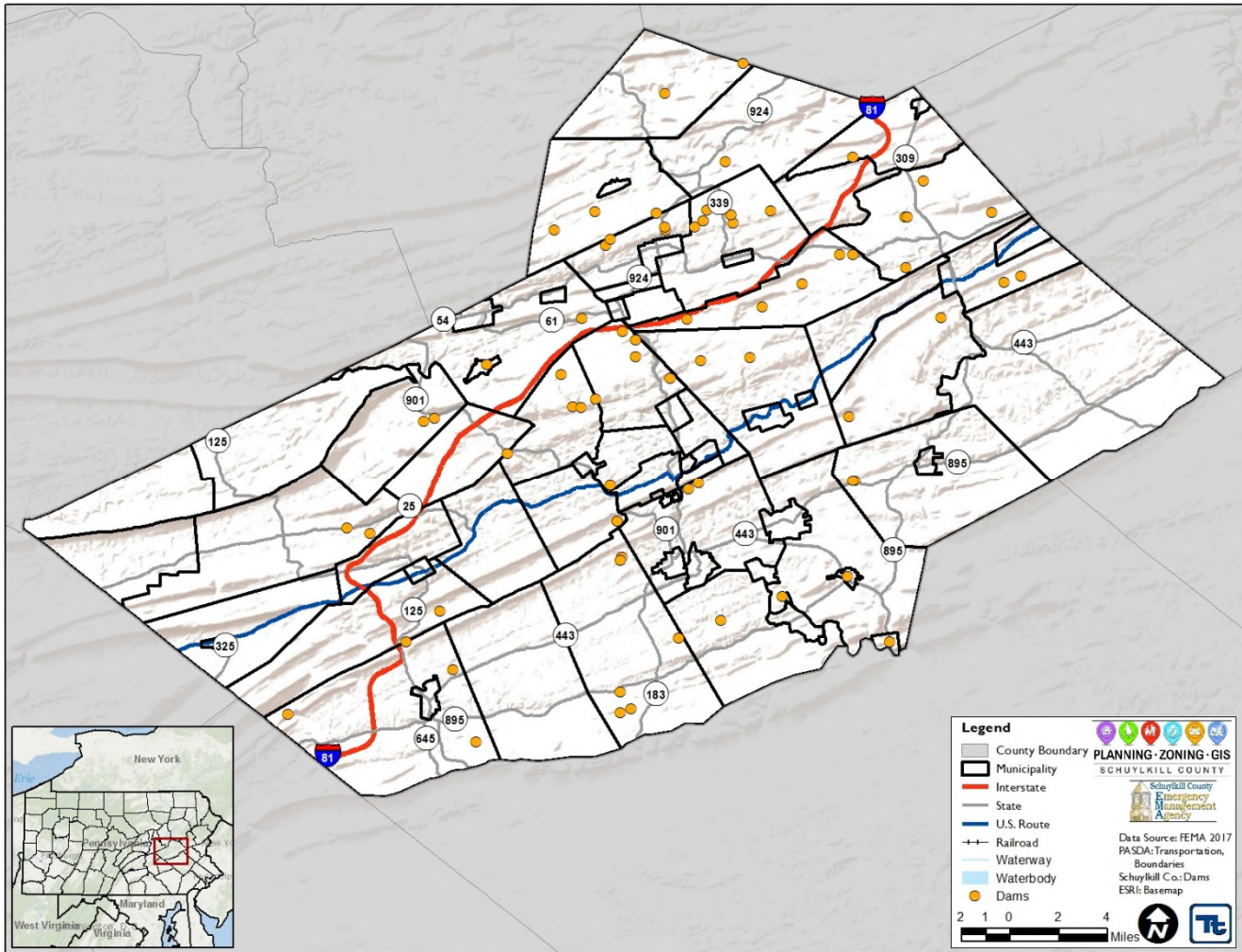
Table 4.3.2-2. Dams in Schuylkill County

Class	Dam Name	Stream	Permittee	Type	Purpose
A-1	Siegrist Dam	Fishing Creek	City of Lebanon Authority	Earth	Water Supply
B-1	Ringtown No. 5	Dresher Run	Shenandoah Municipal Authority	Earth	Water Supply
B-1	Lower Tumbling Run	Tumbling Run	Borough of Schuylkill Haven	Earth	Water Supply
B-1	Greenwood	Nesquehoning Creek	Dual Valley Recreation Association	Earth	Recreation
B-1	Upper Tumbling Run	Tumbling Run	Borough of Schuylkill Haven	Earth	Water Supply
B-1	Wolf Creek Reservoir	Wolf Creek	Schuylkill County Municipal Authority	Earth	Water Supply
B-1	Kauffman Reservoir	Kauffman Run	Schuylkill County Municipal Authority	Earth	Water Supply
B-1	Eisenhuth Reservoir	Eisenhuth Run	Schuylkill County Municipal Authority	Earth	Water Supply
B-1	Ashland Reservoir	Little Mahanoy Creek	Borough of Ashland	Earth	Water Supply
B-1	Ringtown Reservoir No. 6	Whiskey Mill Creek	Shenandoah Municipal Authority	Earth	Water Supply
B-1	Upper Owl Creek	Owl Creek	Tamaqua Borough Authority	Earth	Water Supply
B-1	Sweet Arrow Lake	Upper Little Swatara Creek	Borough of Pine Grove	Earth	Recreation
B-1	Indian Run	Indian Run	Schuylkill County Municipal Authority	Earth	Water Supply
B-1	Still Creek	Still Creek	Tamaqua Borough Authority	Earth	Water Supply
B-1	Pine Run	Tar Run	Schuylkill County Municipal Authority	Earth	Water Supply
B-1	Auburn	Schuylkill River	DER - Bureau of Abandoned Mine Reclamation	Gravity	Recreation
B-1	Locust Lake	Locust Creek	DER - Bureau of State Parks	Earth	Recreation
B-1	Locust Creek Dam (Pa-423)	Locust Creek	DER - Bureau of State Parks	Earth	Recreation/Flood Control
B-1	Little Schuylkill (Pa-422)	Little Schuylkill River	Schuylkill County	Earth	Flood Control
B-1	Fawn Lake	Plum Creek	Lake Wynonah Property Owners Association	Earth	Recreation
B-1	Lake Wynonah	Plum Creek	Lake Wynonah Property Owners Association	Earth	Recreation
B-2	Waste House No.1	Tributary to Mahanoy Creek	Mahanoy Township Authority	Earth	Water Supply
B-2	Wastehouse Run No. 3	Wastehouse Run	Mahanoy Township Authority	Earth	Water Supply
B-2	Neifert Creek (Pa-422A)	Neifert Creek	Schuylkill County	Earth	Flood Control/Recreation
C-1	Lower Owl Creek	Owl Creek	Tamaqua Borough Authority	Earth	Water Supply
C-1	Raven Run No. 2	Lost Creek	Shenandoah Municipal Authority	Earth/Rockfill	Water Supply
C-1	Raven Run No. 3	Lost Creek	Shenandoah Municipal Authority	Earth	Water Supply
C-1	Park Place No. 3	Tributary of Mahanoy Creek	Hazleton City Authority	Earth	Water Supply
C-1	Crystal	West Br Of Schuylkill River	Municipal Authority of the Township of Blythe	Earth	Water Supply
C-1	Kehly Run No. 3	Kehly Run	Shenandoah Municipal Authority	Earth	Water Supply
C-1	Kehly Run No. 5	Kehly Run	Shenandoah Municipal Authority	Earth	Water Supply
C-1	Silver Creek	Silver Creek	Municipal Authority of the Township of Blythe	Earth	Water Supply
C-1	Mount Laurel (Mud Run)	Mud Run	Schuylkill County Municipal Authority	Earth	Water Supply
C-1	Mahanoy Township Dam No. 2	Cold Run	Mahanoy Township Authority	Earth	Water Supply
C-1	Pole Run No. 4	Pole Run	Mahanoy Township Water Authority	Earth	Water Supply
C-1	Minersville No.3 Dam	Dyer Run	Municipal Authority of the Borough of Minersville	Earth/Stone/Masonry	Water Supply

Class	Dam Name	Stream	Permittee	Type	Purpose
C-1	Minersville No. 4 Dam	Dyer Run	Municipal Authority of the Borough of Minersville	Rockfill	Water Supply
C-1	Deer Lake	Pine Creek	Borough of Deer Lake	Earth/Concrete	Recreation
C-1	Hosensock (Pa-424)	Hosensock Creek	Schuykill County	Earth	Flood Control
C-1	Koenigs Creek (Pa-425)	Koenigs Creek	Schuykill County	Earth	Flood Control
C-1	Lake Choctaw	Little Sugarloaf Creek	C.B.G. Limited	Earth	Recreation
C-1	Hawk Mountain	Lower Little Swatara Creek	Hawk Mountain Council #528/BSA	Earth	Recreation
C-2	Lofty Reservoir	Messers Run	Pa Game Commission	Earth	Water Supply
C-2	Mar Lin Dam	Raccoon Creek	Stanley Petchulis	Earth	Recreation
C-2	Brandonville Pumping Station	Davis Run	Borough of Shenandoah	Earth	Recreation
C-2	Kunkles	Pine Creek	Harry N. Kunkle	Earth/Rockfill	Recreation
C-2	Black Creek Intake	Black Creek	Borough of Pine Grove	Earth	Water Supply
C-3	Rabbit Run Dam	Rabbit Run	Borough of Tamaqua	Earth	Not Listed
C-3	No.2 Dam	Kehley Run	Shenandoah Municipal Authority	Earth	Not Listed
C-3	Mahanoy Township Dam No.1	Cold Run	Mahanoy Township Authority	Earth	Not Listed
C-3	Minersville No. 2 Dam	Wagoners Run	Municipal Authority of The Borough of Minersville	Earth/Stone/Masonry	Not Listed
C-3	Minersville No. 1 Dam	Wheeler Creek	Municipal Authority of The Borough of Minersville	Earth	Not Listed
C-3	Panther Crk.Dam	Panther Creek	Not Listed	Earth/Stone/Masonry	Not Listed
C-3	Codorus Dam	Codorus Creek	T. J. Tancelosky	Earth	Not Listed
C-3	Supply Dam	Wastehouse Run	Mahanoy Township Authority	Earth	Not Listed
C-3	Wolf Creek Intake	Wolf Creek	Schuykill Co. Mun. Authority	Not Listed	Not Listed
C-3	Adams Run Dam	Adams Run	Borough of Pine Grove	Earth	Not Listed
C-3	Lakewood Dam	Hosensock Creek	Lakewood Realty Company	Earth	Recreation
C-3	Unnamed Dam	Not Listed	Rosemount Campground	Earth/Masonry	Not Listed
C-3	Neale Dam	Deep Creek	Alan Green	Not Listed	Not Listed
C-3	Moon Lake Dam	Not Listed	Moon Lake P.O.A.	Not Listed	Not Listed
C-3	Catch Basin Dam	Not Listed	Schuykill Haven Water Authority	Concrete/Masonry	Not Listed
C-3	Indian Run Lower Dam	Not Listed	Schuykill County Municipal Authority	Earth	Not Listed
C-3	Unnamed	Not Listed	Boy Scouts of America	Earth/Concrete/Masonry	Not Listed
C-3	Unnamed	Not Listed	Pushti Margiya Vaishnav Samaj of North America	Earth	Not Listed
C-3	Seitzinger Dam	Not Listed	Nancy Villarreal	Earth/Concrete	Not Listed
C-3	Red Ridge Lake	Not Listed	Joyce Cournoyer	Earth/Concrete	Not Listed
C-3	Shenandoah Creek Dam	Tributary to Shenandoah Creek	Girard Estate	Earth	Water Supply
C-3	Unnamed	Rattling Run	Reading Co.	Concrete/Run of River	Not Listed
C-3	Stanhope Dam	Stanhope Creek	Boy Scouts (Camp Pine Grove)	Earth/Stone/Masonry	Not Listed
C-3	Dell Dam	Pine Creek	Pa Game Commission	Concrete/Run of River	Not Listed
C-3	Unnamed Dam	Stutzmans Run	Bonita Otto	Concrete/Run of River	Not Listed

Source: Schuykill County 2018

Figure 4.3.2-1. Dams in Schuykill County



Levee Failure

FEMA completed an inventory of all known levees across Pennsylvania in 2009 with an update in 2012, known as the Mid-Term Levee Inventory (MLI). The MLI contains levee data gathered first and foremost for structures designed to protect from the 1%-annual chance flood event. The area behind a maintained and certified levee that is designed to protect from a 1%-annual chance flood is called a Levee Protected Area. The MLI also frequently includes levees that were not designed to protect against this base flood, but the MLI does not include every levee in every county – especially small levees and agricultural levees not engineered or able to be accredited to the 1% annual chance event (FEMA, 2011). FEMA’s inventory was compiled using all effective Flood Insurance Rate Maps and Flood Insurance Study reports in Pennsylvania, the USACE levee inventory, the DEP’s Flood Control Project summaries, information from local governments, aerial photography, and additional information such as news articles and websites (PEMA 2013). There are no FEMA-accredited levees in Schuykill County.

A complete levee failure, like a dam failure, is rather infrequent and typically coincides with events that cause them such as heavy rainfall or storm events. In the event of a levee failure, floodwaters may ultimately inundate the protected area landward of the levee. The extent of inundation is dependent on the flooding intensity. Failure of a levee during a

1%-annual chance flood will inundate the floodplain previously protected by the levee. Residential and commercial buildings located nearest the levee overtopping or breach location will suffer the most damage from the initial embankment failure flood wave. Landward buildings will be damaged by inundation (FEMA 2004).

Levees require maintenance to continue to provide the level of protection they were designed and built to offer. Maintenance responsibility belongs to a variety of entities including local, state, and federal government and private landowners. Well-maintained levees may obtain certification through independent inspections. Levees may not be certified for maintaining flood protection when the levee owner does not maintain the levee or pay for an independent inspection. The impacts of an un-certified levee include higher risk of levee failure. In addition, insurance rates may increase because FEMA identifies on Flood Insurance Rate Maps that the structures are not certified to protect from a 1% annual chance flood event (FEMA 2004).

There are two levees located within the County (1) the Willow Creek Project in Schuylkill Haven Borough and (2) the Celebration Creek Project in McAdoo Borough (Schuylkill County HMP 2013).

According to the 2014 FEMA Flood Insurance Study (FIS) for Schuylkill County, in an effort to reduce flood losses in Schuylkill County, the McAdoo Flood Protection Project was constructed and completed in 1967 by the PADEP. The project consists of a 1.25-mile-long, alternating concrete and earth channel, with a design discharge of 450 cubic feet per second (cfs) at the downstream Kline Township corporate limit. This channel is able to minimize the potential for flooding on Celebration Creek (FEMA 2014).

The Little Schuylkill River Project, sponsored by the Schuylkill County Soil Conservation District, Schuylkill County Commissioners, Carbon County Soil Conservation District, Berks County Soil Conservation District, Pennsylvania Department of Environmental Resources, and the Pennsylvania Fish Commission, consists of four single-purpose floodwater retarding structures and one multi-purpose structure for flood prevention, fish and wildlife development, and recreational purposes. The completed County-owned structural measures are three floodwater retarding structures above Tamaqua and one floodwater retarding structure above New Ringgold on Koenigs Creek. All structures are upstream of Port Clinton (FEMA 2014). Figure 4.3.2-1 is a photograph of Koenigs Dam.

Figure 4.3.2-1. Koenigs Creek Dam



Source: Schuylkill County 2018

There is a local flood protection project along Willow Creek. The project extends from the confluence with the Schuylkill River to approximately 1,500 feet upstream. The existing channel was realigned and deepened in addition to the construction of an earthfill levee. FEMA specifies that all levees must have a minimum of 3-foot freeboard against the 1% annual chance flooding event to be considered a safe flood protection structure. During a field investigation on February 20, 1985, with USACE and FEMA representatives, it was concluded that the project is ineffective in protecting against high stages on the Schuylkill River and Berger Creek. This situation exists due to the lack of a closure structure and a ponding area or pumping station for the Berger Creek passage through the levee at the confluence with the Schuylkill River (FEMA 2014).

Range of Magnitude

Dam Failure

FEMA has three classification levels of dams: low, significant, and high. The classification levels build on each other. The hazard potential classification system should be used with the understanding that the failure of any dam or water-retaining structure could represent a danger to downstream life and property (FEMA 2004). Each of FEMA's dam classification levels is described below:

- 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 can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification 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.

The USACE developed the classification system shown in Table 4.3.2-3 for the hazard potential of dam failures. The USACE hazard rating system is based only on the potential consequences of a dam failure; it does not consider the probability of failures.

Table 4.3.2-3. U.S. Army Corps of Engineers Hazard Potential Classification

Hazard Category ^a	Direct Loss of Life ^b	Lifeline Losses ^c	Property Losses ^d	Environmental Losses ^e
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 location, 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 2011

Notes:

- Categories are assigned to overall projects, not individual structures at a project.
- Loss-of-life potential is based on inundation mapping of the area downstream of the project. Analysis of loss-of-life potential should take into account the population at risk, time of flood wave travel, and warning time.
- 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.
- 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.
- 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.

Levee Failure

Flood-related hazards due to levees range in magnitude from overtopping, when the water level rises over the top of the levee, to back-ending, when water flows around the back of the levee outside of the edge of the levee system, to total failure as seen during Hurricane Katrina (PEMA 2013).

Levees are typically designed with three feet of freeboard to prevent overtopping, but older levees were not built to that standard. The failure of a levee or other flood protection structure could be devastating depending on the level of flooding for which the structure is designed and the amount of landward development present. In some instances, the magnitude of flooding could be more severe under a levee failure event compared to a normal flooding event. If an abrupt failure occurs, the rushing waters of a flood wave could result in catastrophic losses (PEMA 2013).

The worst-case levee failure is one which occurs abruptly with little warning and results in deep, fast-moving flood waters through a highly-developed or highly-populated area. While any levee may be overtopped and fail, it is these levees with large protected areas that have the potential to cause the most damage (PEMA 2013). If the levee failure is

caused by overtopping, the community may or may not be able to recognize the impending failure and evacuate. If a levee failure occurs suddenly, evacuation may not be possible.

Past Occurrence

There have been no FEMA disaster declarations associated with dam or levee failures. However, the County Emergency Management Agency has activated dam EAPs on three occasions issuing notifications to residents:

- June 2006 for Moon Lake, Barry Township and Still Creek Dam, Rush Township
- March 2011 for Christian E. Siegrist Dam, Pine Grove Township
- July, August 2018 for Moon Lake, Barry Township – one full-time resident was advised to evacuate (Schuylkill County EMA 2018; PEMA 2018).

Future Occurrence

The likelihood of a dam or levee failure in Schuylkill County is difficult to predict. For dams, the risk of a failure increases for each dam as the dam’s age increases and/or frequency of maintenance decreases. For levees, a complete failure is infrequent and typically coincides with events that cause. Future climate change may impact storm patterns, increasing the probability of more frequent, intense storms with varying duration. Since dam overtopping and levee failures are often caused by excessive rainfall, it is appropriate to relate the future vulnerability of dams and levees directly with the potential for increased rainfall in Schuylkill County.

The probability of a dam or levee failure in Schuylkill County cannot be calculated; however, based on the Risk Factor Methodology Probability Criteria, dam and levee failures are considered *unlikely* (refer to Section 4.4 for definition).

VULNERABILITY ASSESSMENT

To understand risk, a community must evaluate the assets exposed and vulnerable within the identified hazard area. For the dam and levee failure hazard, dam failure inundation zones and levee protected areas are examined. The following section discusses the estimated potential impacts of the dam and levee failure in Schuylkill County, including:

- Impacts 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 collections that will assist in understanding this hazard over time.

The dam and levee failure hazard is of significance because there are two levees and 72 dams present in Schuylkill County. Of the 72 dams, 47 are classified as high-hazard by PADEP. Warning time for dam and levee failure is often limited. These events can also frequently be associated with other natural hazard events such as earthquakes, landslides, or severe weather, limiting their predictability and compounding the hazard. Populations without adequate warning of the event are highly vulnerable to this hazard. Direct and indirect losses associated with dam and levee failures include injury and loss of life, damage to structures and infrastructure, agricultural losses, utility failure (power outages), and stress on community resources.

The following discusses the assets exposed to a dam failure. It should be noted that this analysis does not assess all dam and levee failure risk in the County because only a subset of inundation areas was available. To conduct the analysis, a composite dam failure inundation area was developed for all available dams. Therefore, if an asset is indicated as exposed below, it is at minimum, located in one dam failure inundation area. The dams evaluated in this

analysis are: Auburn Dam, Hosensock, Indian Run Dam, Kauffman Dam, Koenigs Creek, Little Schuylkill, Mahanoy Township #2, Mount Laurel Dam, Neiferts Creek, Pine Run Dam #4, Pole Run #4, Raven Run #2, Raven Run #3, Ringtown Dam #5, Ringtown Dam #6, Upper and Lower Owl Creek, Waste House #1 and #3, and Wolf Creek Dam.

Refer to Section 4.3.4 (Flood) for additional impacts related to flooding not discussed below.

Impact on Life, Health, and Safety

Dam and levee failure impacts depend on several factors including severity of the event and whether or not adequate warning time is provided to residents. The population living in or near the inundation areas are considered exposed to the hazard. However, exposure should not be limited only to those who reside within a defined hazard zone, but 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); the degree of that impact varies and is not strictly measurable.

Vulnerable populations are all populations downstream from dam failures that are incapable of escaping the area within the allowable time frame. This population includes the elderly, young and individuals with disabilities, access or functional needs who may be unable to get themselves out of the inundation area. The vulnerable population also includes individuals who would not have adequate warning from the emergency warning system (e.g., television or radio); this would include residents and visitors. The population adversely affected by a dam failure may also include those beyond the disaster area that rely on the dam for providing potable water.

Floods created from a dam or levee failure and their aftermath present numerous threats to public health and safety including exposure to unsafe food, contaminated drinking and washing water, mosquitoes, animals, mold and mildew. For more detailed descriptions of these and additional threats to public health and safety, refer to Section 4.3.4 (Flood). Current loss estimation models such as Hazus are not equipped to measure public health impacts such as these. The best preparation for these effects includes awareness that they can occur, education of the public on prevention, and planning to deal with them during responses to dam or levee failure events.

The U.S. Census blocks do not align with the inundation areas, and can grossly overestimate or underestimate the exposed population when using the centroid or intersect of the Census block with these zones. To estimate the population exposed, the number of residential building footprints located in the composite dam failure inundation area was multiplied by the average household size in Schuylkill County. According to the 2010 U.S. Census, the average household size in Schuylkill County is 2.35 people. Table 4.3.2-4 lists the estimated population residing in the composite dam failure inundation area by municipality. As noted above, this does not represent all residents in the County exposed to a dam failure; the analysis is limited to the digitized dam failure inundation areas available.

The Borough of St. Clair has the greatest number of residents exposed to the dam failure hazard (1,511 people), which accounts for more than 50% of the Borough's population. While it is not one of the municipalities with the greatest number of people exposed, the Borough of Landingville has approximately 87.2% of its population located in a dam failure inundation area; of this population exposed, the majority are located in five separate dam inundation areas.

Table 4.3.2-4. Estimated Schuylkill County Population Exposed to the Dam Failure Hazard

Municipality	Total Population (2010 Census)	Dam Failure Inundation Area	
		Residential Population in Hazard Area	Percent (%) of Total Residential Population
Ashland Borough	2,817	-	-
Auburn Borough	739	14	1.9%
Barry Township	932	-	-
Blythe Township	924	0	0.0%
Branch Township	1,840	0	0.0%
Butler Township	5,224	16	<1%
Cass Township	1,957	-	-
Coaldale Borough	2,281	-	-
Cressona Borough	1,651	247	14.9%
Deer Lake Borough	687	-	-
Delano Township	445	-	-
East Brunswick Township	1,793	157	8.8%
East Norwegian Township	863	87	10.1%
East Union Township	1,605	-	-
Eldred Township	758	-	-
Foster Township	251	-	-
Frackville Borough	3,805	-	-
Frailey Township	429	-	-
Gilberton Borough	773	284	36.8%
Girardville Borough	1,519	463	30.5%
Gordon Borough	763	-	-
Hegins Township	3,516	-	-
Hubley Township	854	-	-
Kline Township	1,438	-	-
Landingville Borough	159	139	87.2%
Mahanoy City Borough	4,162	374	9.0%
Mahanoy Township	3,152	92	2.9%
Mcadoo Borough	2,300	-	-
Mechanicsville Borough	455	0	0.0%
Middleport Borough	405	-	-
Minersville Borough	4,397	-	-
Mount Carbon Borough	91	0	0.0%
New Castle Township	415	0	0.0%
New Philadelphia Borough	1,085	-	-
New Ringgold Borough	276	148	53.6%
North Manheim Township	3,766	207	5.5%
North Union Township	1,476	-	-
Norwegian Township	2,310	-	-

Municipality	Total Population (2010 Census)	Dam Failure Inundation Area	
		Residential Population in Hazard Area	Percent (%) of Total Residential Population
Orwigsburg Borough	3,099	-	-
Palo Alto Borough	1,032	0	0.0%
Pine Grove Borough	2,186	-	-
Pine Grove Township	4,123	-	-
Port Carbon Borough	1,889	524	27.7%
Port Clinton Borough	326	33	10.1%
Porter Township	2,176	-	-
Pottsville City	14,330	7	<1%
Reilly Township	726	-	-
Ringtown Borough	818	-	-
Rush Township	3,412	52	1.5%
Ryan Township	2,459	2	<1%
Schuykill Haven Borough	5,437	193	3.5%
Schuykill Township	1,129	0	0.0%
Shenandoah Borough	5,071	-	-
South Manheim Township	2,504	35	1.4%
St. Clair Borough	3,004	1,511	50.3%
Tamaqua Borough	7,107	1,154	16.2%
Tower City Borough	1,346	-	-
Tremont Borough	1,752	-	-
Tremont Township	280	-	-
Union Township	1,273	78	6.1%
Upper Mahantongo Township	655	-	-
Walker Township	1,054	143	13.6%
Washington Township	3,033	-	-
Wayne Township	5,113	-	-
West Brunswick Township	3,332	63	1.9%
West Mahanoy Township	2,868	197	6.9%
West Penn Township	4,442	275	6.2%
Schuykill County (Total)	148,289	6,495	4.4%

Sources: U.S. Census 2010; Schuykill County 2018

Note: % Percent

- Denotes no digitized dam failure inundation areas are present in the municipality.

The hazard area consists of the composite area of all dam inundation areas provided by Schuykill County; assets were not double counted as a result of overlapping inundation areas.

Impact on General Building Stock

Properties located closest to the dam inundation zone have the greatest potential to experience the largest, most destructive surge of water. To estimate the number of structures exposed to this hazard, the building footprint spatial layer from Schuykill County was used. Structures with their centroid in the hazard area were totaled. To estimate

replacement cost value exposure, default dasymetric building stock data from HAZUS-MH 4.0 was used. Replacement cost values of the dasymetric Census blocks with their centroids in the composite hazard layer were totaled for each municipality. As noted above, the U.S. Census blocks do not align with the inundation areas and can grossly overestimate or underestimate the exposed assets when using the centroid or intersect of the Census block with these areas. The limitations of this analysis are recognized; results should only be used for planning purposes. Table 4.3.4-5 lists building stock exposure per municipality. As noted above, this does not represent all buildings in the County exposed to a dam failure; the analysis is limited to the digitized dam failure inundation areas available.

The Borough of St. Clair has the greatest number of structures exposed to the hazard area (739 structures), while the Borough of Tamaqua has the greatest replacement cost value exposed (approximately \$358 million).

Table 4.3.2-5. Estimated General Building Stock Exposure to the Dam Failure Hazard

Municipality	Total Number of Buildings	Total RCV (Structure and Contents)	Dam Failure Inundation Area			
			Number of Buildings	Percent (%) of Total Number of Buildings	Total RCV (Structure and Contents)	Percent (%) Total RCV
Ashland Borough	1,305	\$620,713,000	-	-	-	-
Auburn Borough	654	\$103,863,000	16	2.4%	\$675,000	<1%
Barry Township	1,424	\$158,166,000	-	-	-	-
Blythe Township	842	\$116,013,000	4	<1%	\$0	0.0%
Branch Township	1,434	\$267,249,000	1	<1%	\$96,000	<1%
Butler Township	3,520	\$678,513,000	14	<1%	\$536,000	0.1%
Cass Township	1,786	\$214,671,000	-	-	-	-
Coaldale Borough	1,204	\$486,727,000	-	-	-	-
Cressona Borough	1,062	\$953,030,000	151	14.2%	\$43,061,000	4.5%
Deer Lake Borough	450	\$99,765,000	-	-	-	-
Delano Township	351	\$83,326,000	-	-	-	-
East Brunswick Township	2,201	\$324,669,000	94	4.3%	\$9,207,000	2.8%
East Norwegian Township	817	\$143,736,000	97	11.9%	\$14,045,000	9.8%
East Union Township	1,650	\$204,679,000	-	-	-	-
Eldred Township	1,266	\$121,735,000	-	-	-	-
Foster Township	318	\$38,321,000	-	-	-	-
Frackville Borough	2,170	\$752,136,000	-	-	-	-
Frailey Township	450	\$53,438,000	-	-	-	-
Gilberton Borough	589	\$128,081,000	164	27.8%	\$35,437,000	27.7%
Girardville Borough	663	\$222,078,000	262	39.5%	\$89,294,000	40.2%
Gordon Borough	532	\$100,774,000	-	-	-	-
Hegins Township	4,433	\$685,956,000	-	-	-	-
Hublely Township	1,574	\$105,069,000	-	-	-	-
Kline Township	1,184	\$240,993,000	-	-	-	-

Municipality	Total Number of Buildings	Total RCV (Structure and Contents)	Dam Failure Inundation Area			
			Number of Buildings	Percent (%) of Total Number of Buildings	Total RCV (Structure and Contents)	Percent (%) Total RCV
Landingville Borough	168	\$27,592,000	71	42.3%	\$14,797,000	53.6%
Mahanoy City Borough	904	\$659,011,000	220	24.3%	\$295,841,000	44.9%
Mahanoy Township	1,079	\$184,548,000	120	11.1%	\$9,022,000	4.9%
Mcadoo Borough	1,262	\$319,053,000	-	-	-	-
Mechanicsville Borough	297	\$59,144,000	0	0.0%	\$0	0.0%
Middleport Borough	304	\$60,507,000	-	-	-	-
Minersville Borough	1,705	\$740,701,000	-	-	-	-
Mount Carbon Borough	65	\$17,094,000	7	10.8%	\$0	0.0%
New Castle Township	337	\$74,575,000	12	3.6%	\$0	0.0%
New Philadelphia Borough	609	\$162,575,000	-	-	-	-
New Ringgold Borough	267	\$37,501,000	98	36.7%	\$14,867,000	39.6%
North Manheim Township	3,235	\$729,771,000	177	5.5%	\$12,628,000	1.7%
North Union Township	1,571	\$263,112,000	0	0.0%	\$0	0.0%
Norwegian Township	1,569	\$504,898,000	-	-	-	-
Orwigsburg Borough	1,611	\$650,863,000	-	-	-	-
Palo Alto Borough	590	\$166,890,000	6	1.0%	\$35,006,000	21.0%
Pine Grove Borough	1,278	\$488,857,000	-	-	-	-
Pine Grove Township	4,729	\$572,921,000	-	-	-	-
Port Carbon Borough	1,040	\$248,182,000	304	29.2%	\$89,736,000	36.2%
Port Clinton Borough	251	\$53,248,000	18	7.2%	\$3,893,000	7.3%
Porter Township	2,522	\$322,132,000	-	-	-	-
Pottsville City	5,667	\$2,835,912,000	7	0.1%	\$34,019,000	1.2%
Reilly Township	615	\$87,148,000	-	-	-	-
Ringtown Borough	591	\$196,315,000	-	-	-	-
Rush Township	3,358	\$638,207,000	48	1.4%	\$1,381,000	<1%
Ryan Township	1,552	\$258,861,000	10	<1%	\$9,436,000	3.6%
Schuykill Haven Borough	1,571	\$1,167,905,000	276	17.6%	\$101,349,000	8.7%
Schuykill Township	2,672	\$148,930,000	0	0.0%	\$0	0.0%
Shenandoah Borough	909	\$1,114,064,000	-	-	-	-
South Manheim Township	1,652	\$472,442,000	68	4.1%	\$691,000	<1%
St. Clair Borough	2,543	\$641,674,000	739	29.1%	\$313,894,000	48.9%
Tamaqua Borough	3,027	\$1,146,438,000	626	20.7%	\$357,575,000	31.2%
Tower City Borough	952	\$275,734,000	-	-	-	-
Tremont Borough	954	\$261,136,000	-	-	-	-

Municipality	Total Number of Buildings	Total RCV (Structure and Contents)	Dam Failure Inundation Area			
			Number of Buildings	Percent (%) of Total Number of Buildings	Total RCV (Structure and Contents)	Percent (%) Total RCV
Tremont Township	372	\$59,522,000	-	-	-	-
Union Township	1,590	\$141,163,000	72	4.5%	\$3,601,000	2.6%
Upper Mahantongo Township	1,203	\$134,904,000	-	-	-	-
Walker Township	1,399	\$129,306,000	108	7.7%	\$2,546,000	2.0%
Washington Township	3,784	\$378,935,000	-	-	-	-
Wayne Township	5,373	\$884,718,000	-	-	-	-
West Brunswick Township	3,297	\$656,084,000	38	1.2%	\$4,308,000	<1%
West Mahanoy Township	2,208	\$586,962,000	220	10.0%	\$12,119,000	2.1%
West Penn Township	5,677	\$552,845,000	177	3.1%	\$9,085,000	1.6%
Schuykill County	108,238	\$26,016,081,000	4,225	3.9%	\$1,518,145,000	5.8%

Source: HAZUS-MH 4.0; Schuykill County

Note:

- Denotes no digitized dam failure inundation areas present in the municipality.

RCV Replacement cost value (structure and contents)

The hazard area consists of the composite area of all dam inundation areas provided by Schuykill County; assets were not double counted as a result of overlapping inundation areas.

Impact on Critical Facilities

It is important to determine what critical facilities and infrastructure may be at risk to flooding as a result of a dam or levee failure, and who may be impacted should damage occur. Critical services during and after an event may not be available if critical facility structures 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, including for emergency service providers needing to get to vulnerable populations or to make repairs. In addition, the flood waters can degrade the integrity of the roads. Sometimes the damage is apparent – a road that washes away, a sinkhole that appears, a bridge that crumbles, but often the damage is less obvious on the surface. Based on the composite hazard area utilized for this analysis, the major roadways that may be impacted by a dam failure event include I-81, PA-183, PA-309, PA-339, PA-443, PA-54, PA-61, PA-895, PA-901, PA-924, AND US-209.

Critical facility and utility exposure to the dam failure hazard was examined. Fire/rescue and hazmat facilities have the greatest number of locations located in the inundation areas assessed. Table 4.3.2-6 summarizes the number of critical facilities and utilities located in the inundation areas by type and municipality.

Table 4.3.2-6. Critical Facilities and Utilities Located in the Dam Failure Inundation Areas

Municipality	Bridge	Dam*	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Hazmat	Hospital	Hydrant	Mental Health	Police	Polling	Potable Water Treatment	School	Wastewater Treatment
Ashland Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Auburn Borough	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barry Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Blythe Township	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Branch Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Butler Township	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cass Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coaldale Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cressona Borough	2	0	0	0	0	1	2	0	0	0	0	0	1	0	0	0
Deer Lake Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Delano Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
East Brunswick Township	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Norwegian Township	2	0	0	0	0	1	0	5	0	0	0	0	0	0	0	1
East Union Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eldred Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Foster Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Frackville Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Frailey Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gilberton Borough	4	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
Girardville Borough	7	0	1	0	1	0	1	1	0	15	0	0	1	0	0	0
Gordon Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hegins Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hubley Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kline Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Landingville Borough	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mahanoy City Borough	4	0	1	1	1	0	3	2	0	0	1	1	5	0	1	0
Mahanoy Township	5	1	0	0	0	1	0	0	0	0	0	1	2	0	1	1
Mcadoo Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mechanicsville Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Municipality	Bridge	Dam*	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Hazmat	Hospital	Hydrant	Mental Health	Police	Polling	Potable Water Treatment	School	Wastewater Treatment
Middleport Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Minersville Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mount Carbon Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Castle Township	5	1	0	0	0	0	0	2	0	0	0	0	0	2	0	0
New Philadelphia Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Ringgold Borough	1	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0
North Manheim Township	6	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0
North Union Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Norwegian Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orwigsburg Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Palo Alto Borough	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pine Grove Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pine Grove Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Port Carbon Borough	5	0	1	0	0	0	1	1	0	0	0	0	1	0	0	0
Port Clinton Borough	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Porter Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pottsville City	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reilly Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ringtown Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rush Township	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ryan Township	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schuykill Haven Borough	2	0	1	0	0	0	1	2	0	0	0	0	0	0	0	1
Schuykill Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shenandoah Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
South Manheim Township	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Municipality	Bridge	Dam*	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Hazmat	Hospital	Hydrant	Mental Health	Police	Polling	Potable Water Treatment	School	Wastewater Treatment
St. Clair Borough	10	0	1	1	1	0	2	1	1	0	1	0	3	0	1	0
Tamaqua Borough	10	0	2	3	1	1	4	3	0	0	0	1	2	0	0	0
Tower City Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tremont Borough	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tremont Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Union Township	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Mahantongo Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Walker Township	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Washington Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wayne Township	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
West Brunswick Township	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
West Mahanoy Township	3	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
West Penn Township	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Schuykill County	107	3	8	5	6	6	15	19	1	15	2	4	17	2	4	4

Source: Schuykill County 2018

- Denotes no digitized dam failure inundation areas present in the municipality.

Notes:

*Exposed dams do not include those that have inundation areas present in the spatial layer.

The hazard area consists of the composite area of all dam inundation areas provided by Schuykill County; assets were not double counted as a result of overlapping inundation areas.

Impact on the Economy

Dam and levee failure events can significantly impact the local and regional economy. Similar to flooding, losses include, but are not limited to, damages to buildings and infrastructure, agricultural losses, business interruption and impacts on tax base. Flooding as a result of dam failure or levee failure can cause extensive damage to public utilities and disruptions in delivery of services. Loss of power and communications may occur and drinking water and wastewater treatment facilities may be temporarily out of operation.

Impact on the Environment

The environment is vulnerable to a number of risks in the event of a dam or levee failure. Water releases from dams usually contain very little suspended sediment; this can lead to scouring of river beds and banks. The inundation may introduce foreign elements into local waterways, resulting in destruction of downstream habitat and impacting many animal and plant species, especially endangered species. The subsequent rush of water downstream can rapidly

increase flow rate and turbidity of streams and rivers in minor dam failures or overwhelm terrestrial habitat with floodwaters in severe dam failure events.

Dam failures can often result in the release of hazardous materials, either swept up in floodwaters or in sediment that is contained behind the dam as is often the case in areas that have had mining activities take place upstream. After the flood waters subside, contaminated and flood damaged building materials and contents must be properly disposed. Contaminated sediment must be removed from buildings, yards and properties.

Dam and levee failures may result in 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 flooding waterway. The contents of unsecured containers of oil, fertilizers, pesticides and other chemicals get added to flood waters. Water supplies and wastewater treatment could be off-line for weeks. After the flood waters subside, contaminated and flood damaged building materials and contents must be disposed of properly.

Future Growth and Development

As discussed in Section 2.4, areas targeted for future growth and development have been identified across the County. Any areas of growth could be impacted by the dam and levee failure hazard if within the identified hazard areas. The County intends to discourage development within vulnerable areas and to encourage higher regulatory standards on the local level.

While existing floodplain development regulations in place may offer some protection for new development located in these areas, such protections would likely not be sufficient in many instances in the event of a catastrophic dam failure. This results from a number of factors such as, the extent of the dam inundation areas may be larger than the regulated floodplain and water depths and velocities may be stronger and higher than the 1% annual chance flood event.

Effect of Climate Change on Vulnerability

The climate of Pennsylvania is already changing and will continue to change over the course of this century. Precipitation is expected to increase over the next several decades. Future climate change may impact storm patterns, increasing the probability of more frequent, intense storms with varying duration. Since dam overtopping is often caused by excessive rainfall, it is appropriate to relate the future vulnerability of dams directly with the potential for increased rainfall in Schuylkill County.

Dams and levees are designed partly based on assumptions about a river's flow behavior, expressed as hydrographs (flow over time). Changes in weather patterns can have significant effects on the hydrograph used for the design of a dam or levee. If the hydrograph changes, it is conceivable that the structure can lose some or all of its designed margin of safety, also known as freeboard. Loss of designed margins of safety may cause floodwaters to more readily overtop the dam or create unintended loads. Such situations could lead to a dam or levee failure.

Climate change may increase the probability of dam and levee failures, as indicated above. Changes in climate may lead to higher intensity rainfall events. As a result, the failure probability of low, significant, and under-designed high hazard dams may increase.

Additional Data and Next Steps

This vulnerability assessment was based on the most current and best available data, including updated building and critical facilities inventories. For future HMP updates, additional dam failure inundation areas and levee protected areas can be delineated and used to spatially assess the asset exposure. A custom-general building stock could be generated for future plans to assess impacts at the structural level versus the census block level. Depth grids could be generated for the inundation areas and used in HAZUS-MH to estimate potential losses similar to Flood (Section 4.3.4).

4.3.3 DROUGHT AND WATER SUPPLY DEFICIENCY

PROFILE

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 can be defined or grouped into four categories:

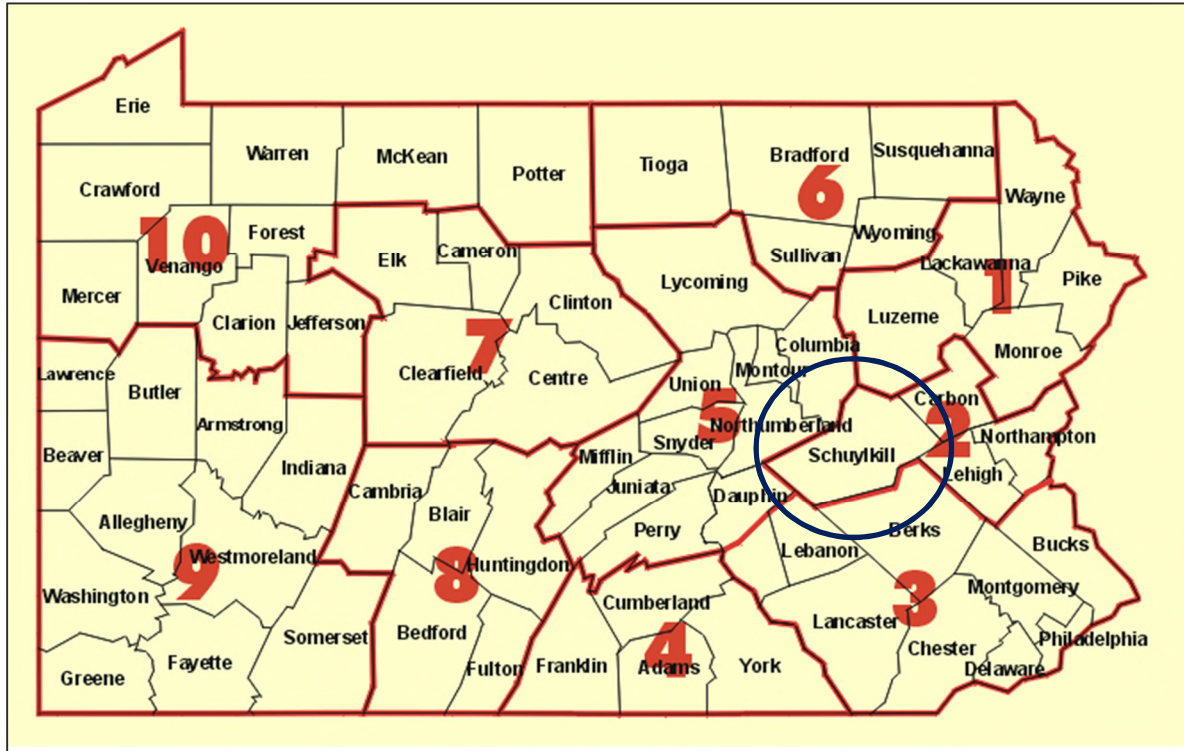
- Meteorological drought is a measure of departure of precipitation from normal, defined solely by reference to relative degree of dryness. Because of climatic differences, dryness considered a drought at one location of the country may not be considered drought at another location.
- Agricultural drought 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 effects of precipitation shortfalls on stream flows and water levels in reservoirs, lakes, and groundwater.
- Socioeconomic drought is associated with 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 (National Drought Mitigation Center ([NDMC] 2017).

Location and Extent

Droughts are regional in scope and may affect the entirety of Schuylkill County rather than only individual municipalities within the County. Droughts may also concurrently affect counties near Schuylkill 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 359 climate divisions. The boundaries of these divisions typically coincide with County boundaries, except in the western United States where they are based largely on drainage basins (NWS 2005). Pennsylvania includes 10 climate divisions. Schuylkill County is within the East Central Mountains climate division. Figure 4.3.3-1 shows the climate divisions of Pennsylvania.

Figure 4.3.3-1. Climate Divisions of Pennsylvania



Source: NWS 2005

Note: Highlight added.

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

Schuykill County residents and businesses receive water from three main sources: wells, reservoirs, and springs (Schuykill 2013). Particularly at locations where citizens rely on wells for drinking water, water supplies are vulnerable to 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. Schuykill 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 Schuykill County was 2.70 million gallons (Mgal) per day in 2010, serving roughly 45,009 residents for a total of roughly 60 gallons per person (dependent on well water) per day (USGS 2014).

Table 4.3.3-1 lists the number of reported domestic wells within each municipality of Schuykill County. The well data were obtained from the Pennsylvania Groundwater Information System (PaGWIS). PaGWIS is maintained by the PA Department of Conservation and Natural Resources (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.

Table 4.3.3-1. Domestic Wells in Schuykill County

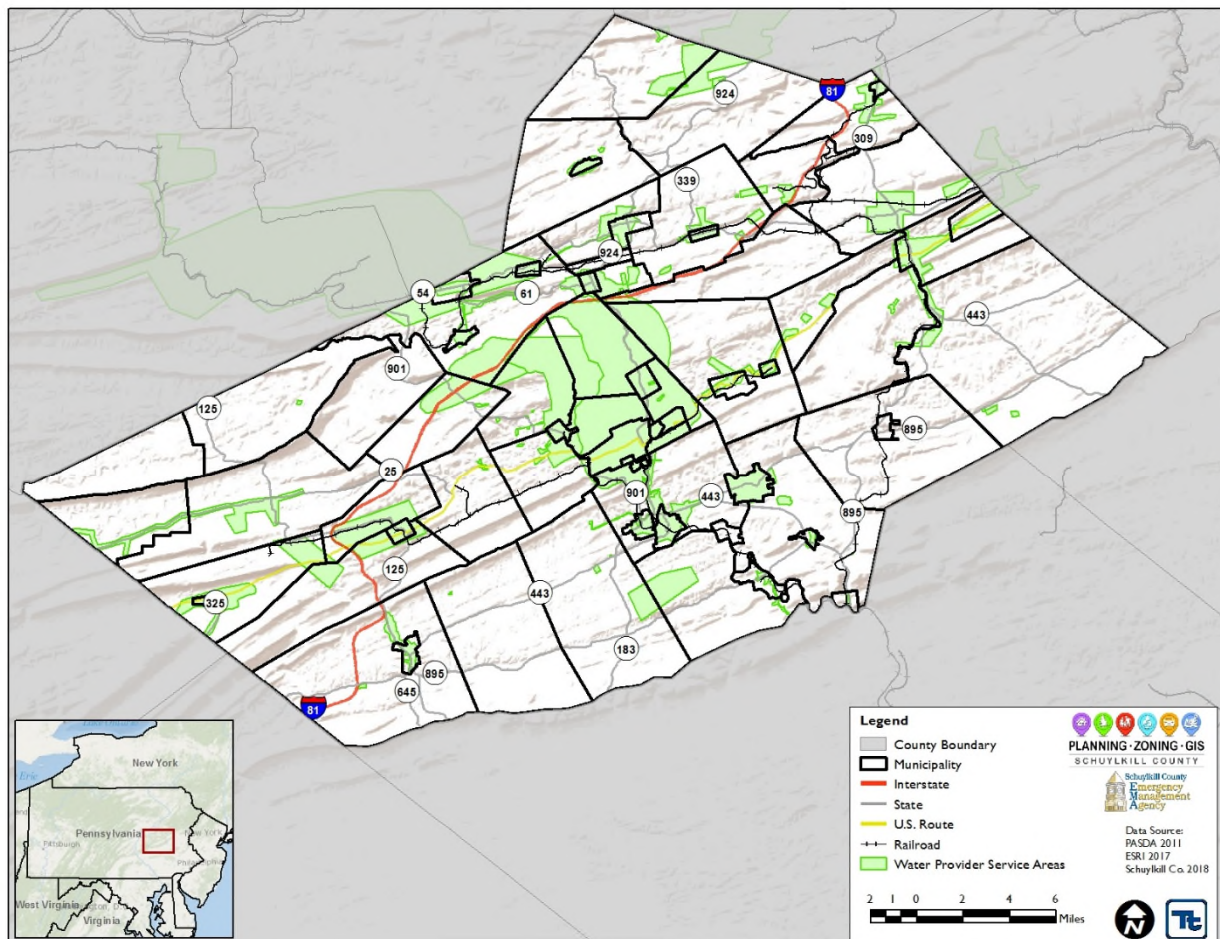
Municipality	Number of Reported Domestic Wells	Municipality	Number of Reported Domestic Wells
Ashland Borough	0	New Ringgold Borough	6
Auburn Borough	8	North Manheim Township	172
Barry Township	41	North Union Township	35
Blythe Township	20	Norwegian Township	10
Branch Township	20	Orwigsburg Borough	16
Butler Township	97	Palo Alto Borough	0
Cass Township	0	Pine Grove Borough	19
Coaldale Borough	0	Pine Grove Township	437
Cressona Borough	16	Port Carbon Borough	6
Deer Lake Borough	5	Port Clinton Borough	6
Delano Township	14	Porter Township	28
East Brunswick Township	207	Pottsville City	11
East Norwegian Township	26	Reilly Township	15
East Union Township	54	Ringtown Borough	7
Eldred Township	25	Rush Township	152
Foster Township	6	Ryan Township	110
Frackville Borough	27	Saint Clair Borough	4
Frailey Township	29	Schuykill Haven Borough	1
Gilberton Borough	0	Schuykill Township	17
Girardville Borough	0	Shenandoah Borough	0
Gordon Borough	11	South Manheim Township	151
Hegins Township	55	Tamaqua Borough	37
Hubley Township	35	Tower City Borough	3
Kline Township	3	Tremont Borough	8
Landingville Borough	6	Tremont Township	11
Mahanoy City Borough	7	Union Township	33
Mahanoy Township	9	Upper Mahantongo Township	25
McAdoo Borough	1	Walker Township	88
Mechanicsville Borough	0	Washington Township	321
Middleport Borough	0	Wayne Township	382
Minersville Borough	0	West Brunswick Township	231
Mount Carbon Borough	0	West Mahanoy Township	11
New Castle Township	0	West Penn Township	464
New Philadelphia Borough	5		

Source: PA DCNR 2017

In addition to domestic wells in the County, residents may also receive their water from municipal water providers. The Schuykill County Municipal Authority is the largest public water provider and serves over

30,000 customers in 25 municipalities (SCMA 2017). Additional municipal water providers include the Aqua PA, PA America, as well as many other municipal authorities, several privately-owned water suppliers, and two out-of-county suppliers including Aqua PA and Langsford/Coaldale JT Water Authority. Figure 4.3.3-2 illustrates the public water service areas in the County; however, this spatial data is outdated and the County plans to actively update it by working with the suppliers to support both the HMP and Comprehensive Plan update in 2019.

Figure 4.3.3-2 Public Water Service Areas



Jurisdictions that are designated for agricultural use are particularly vulnerable to drought. According to the County’s 2006 Comprehensive Plan, 29% of the County’s land area is considered agricultural (Schuykill 2006). The largest band of agricultural land use is in the southern portion of the County and stretches across large areas between Schuylkill Haven to the north, Pine Grove to the west, Auburn to the south, and Carbon County to the east. Another large tract of agricultural land use extends from the westernmost portion of Schuylkill County in Upper Mahantongo Township east into Butler Township. Large portions of Union, North Union, Ryan and Rush Township are also designated for agricultural use.

Range of Magnitude

PADEP and PEMA manage water supply droughts according to the following four conditions:

- **Drought Watch:** A period to alert government agencies, public water suppliers, water users, and the public regarding potential for future drought-related problems. The focus is on increased monitoring, awareness, and preparation for response in the event that 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.
- **Local Water Rationing:** This fourth condition of drought is not defined as a drought stage. Local municipalities 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 2013).

Pennsylvania uses five parameters to assess drought conditions: 1) precipitation deficits; 2) stream flows; 3) reservoir storage levels; 4) groundwater levels; and 5) measure of soil moisture. These parameters are described in detail below.

- **Precipitation Deficits:** As rainfall provides the basis for both groundwater and surface water resources, precipitation deficits are the earliest indicators of a potential drought. The National Weather Service (NWS) records “normal” monthly precipitation data for each county in Pennsylvania. These figures are generated from long-term monthly and decennial averages of precipitation, and are updated at the end of each decade based on the most recent 30 years. Monthly totals with less than normal values represent precipitation deficits, which are then converted to percentages of the normal values. Table 4.3.1-2 lists the drought conditions that are indicated by various precipitation deficit percentages (PEMA 2013).

Table 4.3.3-2. 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
12	15	25	35

Source: PEMA 2013

Table 4.3.3-3 lists normal monthly and annual precipitation from 1981 to 2010 (the most current three-decade data available) at the two NOAA weather stations in Schuykill County. Data from the NOAA weather stations are available through the NCDC, which compiles monthly and annual normal total precipitation (inches) data retrieved from both NWS Cooperative Network (COOP) and Principal Observation (First-Order) locations throughout the United States.

Table 4.3.3-3. Normal Monthly and Annual Precipitation (total in inches) from 1981 to 2010 at NOAA Weather Stations in Schuykill County

Station Name	January	February	March	April	May	June	July	August	September	October	November	December	ANNUAL
Tamaqua	3.67	3.29	4.05	4.56	4.68	5.57	4.53	4.40	4.85	4.53	4.63	4.33	53.09
Mahanoy City 2 N	3.65	2.94	3.85	4.03	4.34	5.21	4.38	4.37	5.00	4.32	4.25	3.89	50.23

Source: NCDC 2014

- Stream Flows:** Stream flows, which typically lag up to 2 months behind normal precipitation amounts in signaling a drought, offer the second earliest indication of drought conditions. PADEP uses 73 USGS-maintained stream gauges throughout the Commonwealth as its drought monitoring network, computing 30-day average stream flow values for each stream gauge based on the entire period of record for each gauge. Drought status is determined from stream flows based on exceedances rather than percentages. The various stages of drought watch, warning, and emergency conditions are indicated, respectively, by 75 percent, 90 percent, and 95 percent exceedances of 30-day average flows (PEMA 2013). These percent exceedances mean the percentage of days on the same date throughout the recorded history of the gage that the current 30-day average flow has been exceeded. A 50% exceedance means the flow is about average. A 75% exceedance means the current flow is lower than average

(drought watch). A 95% exceedance means the current flow is almost always exceeded by historical flows (drought emergency).

- **Reservoir Storage Levels:** Water levels in several large public water supply reservoirs are another indicator that PADEP uses for drought monitoring. Depending on total quantity of storage and length of the refill period for the various reservoirs, PADEP uses varying percentages of storage drawdown to indicate the three drought stages for each reservoir (PEMA 2013).
- **Groundwater Levels:** Groundwater levels can be an indicator of a developing drought, although low readings may lag up to 3 months behind drought-indicative precipitation readings. This lag occurs because storage of nearly 80 trillion gallons of groundwater throughout the Commonwealth disguises precipitation deficits for many months before significant lack of groundwater recharge becomes noticeable (PEMA 2013).

The USGS also maintains groundwater monitoring wells in each county throughout the Commonwealth. Groundwater measurements taken from these wells at exceedances of 75, 90, and 95 percent are used to indicate drought watch, warning, and emergency statuses, respectively. Within the USGS well network, the 30-day average depth-to-groundwater readings are analyzed in relation to long-term, 30-day averages based on the period of record for each county well (PEMA 2013).

- **Soil Moisture:** NOAA’s Palmer Drought Severity Index (PDSI) provides soil moisture information for evaluating the scope, severity, and frequency of prolonged periods of abnormally dry or wet weather. The index tool is frequently used to indicate availability of irrigation water supplies, reservoir levels, range conditions, amount of stock water, and forest fire potential. Although notably ineffective for monitoring short-term drought, the PDSI is effective for determining long-term droughts and as such is most frequently used to delineate disaster areas (NWS 2005).

Table 4.3.3-4 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 (NDMC 2013).

Table 4.3.3-4. Palmer Drought Severity Index (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
Severe drought	-3.0 to -3.99	Warning
Extreme drought	-4.0 or less	Emergency

Source: NDMC 2013; PEMA 2013

Availability and management of water supply are discussed in the 2009 Pennsylvania State Water Plan, a joint effort by the Statewide Water Resources Committee and PADEP. In 2009, the PADEP Secretary approved an updated State Water Plan to guide 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 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 as well as 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 damages from extreme drought and flooding conditions (PADEP 2009).

A Schuylkill County Water Supply Study was conducted in 2002 to determine the long-term viability of existing community water suppliers in the County and evaluate alternative solution strategies to ensure adequate supply of water in the future. Structural, management and municipal solutions are discussed for each individual water supplier based on available information.

Past Occurrence

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 FEMA-declared disaster or emergency. Schuylkill County was included in one of these events. In addition, between 1980 and 2013, PADEP indicated that Schuylkill County has undergone 18 drought watch declarations, 17 drought warning declarations, and 20 drought emergency declarations (PEMA 2013).

According to FEMA, between 1954 and 2017, 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 Schuylkill County was declared a disaster area as a result of a water shortage event in 1965 (FEMA 2017).

The 2013 HMP discussed specific drought events that occurred in the County through 1999 including five drought emergencies: July 1988, July 1991, August 1991, August 1995, and July 1999 (Schuylkill 2013). According to NOAA’s NCDC storm events database, Schuylkill County has not experienced any drought events since 1999. No Commonwealth-wide crop or property losses were reported because of the droughts; statewide losses would have included damages in other counties (NCEI 2018).

Multiple sources provided historical information regarding previous occurrences and losses associated with drought events throughout the State of Pennsylvania and Schuylkill County. For this 2019 HMP update, drought events were summarized between January 1, 1999 and December 31, 2017; refer to Table 4.3.3-5. For events prior to 1999, please refer to the 2013 Schuylkill County HMP (Appendix G).

Table 4.3.3-5. Past Occurrences of Drought Events from 1999 to 2017

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts / PDSI Value
September 1999 – May 2000	Watch	N/A	N/A	Not listed
August – December 2001	Watch	N/A	N/A	Not listed

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts / PDSI Value
December 2001 – February 2002	Warning	N/A	N/A	Not listed
February – November 2002	Emergency	N/A	N/A	Not listed
February – December 2005	N/A	N/A	N/A	Between February and December, drought impacts led to \$272,895 in losses to 3,154 acres of crops in Schuylkill County due to drought conditions, as reported by the USDA RMA.
April – August 2006	Watch	N/A	N/A	Between June and August, drought impacts led to \$152,335 in losses to 2,059 acres of crops in Schuylkill County due to drought conditions, as reported by the USDA RMA.
August 2007 – February 2008	Watch	N/A	N/A	Not listed
September – November 2010	Warning	N/A	N/A	Not listed
August – September 2011	Watch	N/A	N/A	Not listed
March – July 2015	Watch	N/A	N/A	Not listed
August 2016 – March 2017	Watch	N/A	N/A	A drought watch was declared for 38 counties in Pennsylvania, including Schuylkill County. The declaration called for a voluntary 5% reduction in non-essential water use. Schuylkill County was removed from the drought watch in April 2017. The USDA declared a disaster (\$4165) in Pennsylvania for this drought event. Schuylkill County was included in this declaration.

Sources: NRCC 2012, PEMA 2013, NCEI 2018, PADEP 2017

Notes:

- FEMA Federal Emergency Management Agency
- N/A Not applicable
- NCDC National Climatic Data Center
- NRCC Northeast Regional Climate Center
- PADEP Pennsylvania Department of Environmental Protection
- PDSI Palmer Drought Severity Index
- PEMA Pennsylvania Emergency Management Agency
- RMA Risk Management Agency
- USDA U.S. Department of Agriculture

Table 4.3.3-6 lists the crop loss insurance claims due to drought in Schuylkill County since 1999.

Table 4.3.3-6. Crop Loss Insurance Claims Due to Drought, 1999 to 2017

Crop Year	Total Claims	Crop Year	Total Claims
1999	\$940,191	2009	\$1,689.60
2000	\$2,239	2010	\$281,007.69
2001	\$123,748	2011	\$1,685,703.90
2002	\$2,017,121	2012	\$172,325.50
2003	N/A	2013	\$1,889.00

Crop Year	Total Claims	Crop Year	Total Claims
2004	N/A	2014	\$34,974.60
2005	\$272,895	2015	\$37,860.00
2006	\$152,335	2016	\$449,752.25
2007	\$1,073,993.22	2017	N/A
2008	\$403,186.80		

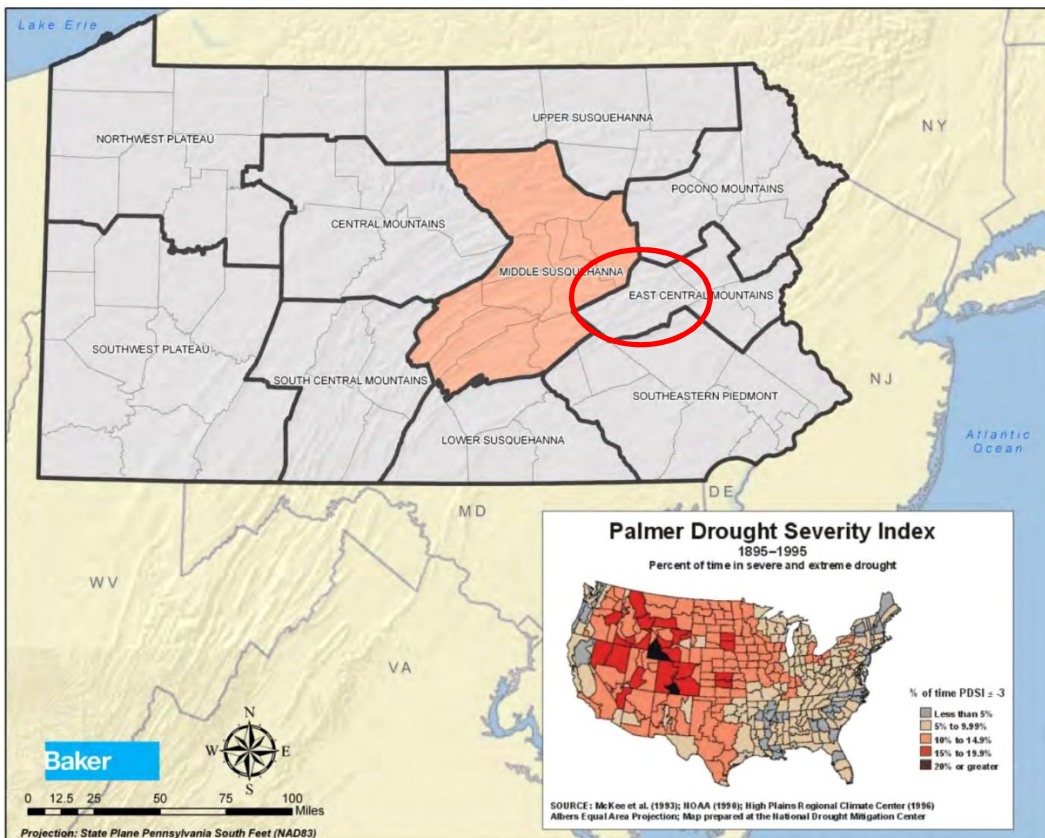
Source: U.S. Department of Agriculture (USDA) 2017

N/A Not available – total claims due to drought conditions were not reported for this year

Future Occurrence

The frequency of droughts is difficult to forecast. It appears that the occurrences of drought are cyclical in nature and thus will occur in the future. Based on national annual data from 1895 to 1995, Schuykill County underwent severe or extreme drought conditions approximately 5 to 9.9% of the time (illustrated on Figure 4.3.3-3). Based on national annual data from 1895 to 2011, the East Central Mountains (climate division 2), in which Schuykill County is located, had an average PDSI of -.25. This climate division has been in severe or extreme drought during approximately 11 percent of the 117 years on record.

Figure 4.3.3-2. Palmer Drought Severity Index for Pennsylvania (1895 to 1995)



Source: PEMA 2013 (red circle added around Schuykill County)

For the 2019 HMP update, the most up-to-date data was collected to calculate the probability of future occurrence of drought events, of all magnitudes, for Schuykill County. Information from NOAA-NCEI storm events database, the 2013

Schuykill County HMP, the Drought Impact Report, and the NRCC were used to identify the number of drought events that occurred between 1950 and 2017. Using these sources ensures the most accurate probability estimates possible. Table 4.3.3-7 presents the probability of future occurrence of flood events in Schuykill County.

Table 4.3.3-7. Probability of Future Flooding Events in Schuykill County

Hazard Type	Number of Occurrences Between 1950 and 2017	Rate of Occurrence or Annual Number of Events (average)	Recurrence Interval (in years) (# Years/Number of Events)	Probability of Event in any given year	Percent chance of occurrence in any given year
Drought	19	0.3	3.6	0.28	28%

Sources: NOAA-NCEI 2018; Schuykill County HMP 2013; NRCC 2018

The Core Planning Team ranked the hazards of concern according to relative risk. The probability of occurrence, or likelihood of the event, is one parameter used for ranking hazards. Based on historical records, the probability of occurrence for drought events in Schuykill County is considered ‘highly likely’. Please refer to Section 4.4 for further information on PEMA’s risk factor methodology and the risk factors used to determine each hazard’s risk rank. Drought is ranked as a high-risk hazard in Schuykill County.

VULNERABILITY ASSESSMENT

To understand risk, a community must evaluate assets exposed and vulnerable within the identified hazard area. For the drought hazard, all of Schuykill County is exposed to drought events. This section discusses the potential impacts of the drought hazard on Schuykill County, including:

- Impacts 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 collections that will assist in understanding this hazard over time.

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.

At the time this plan was updated, insufficient data was available to model long-term potential impacts of a drought on Schuykill County. Over time, additional data will be collected to allow better analysis of this hazard. Preliminary assessments based on available data are provided below.

Impact on Life, Health, and Safety

Drought conditions can cause a shortage of water available for human and livestock consumption and can reduce local firefighting capabilities. Social impacts of a 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 distribution of impacts and disaster relief. The infirm, young, and elderly are particularly susceptible to drought and extreme temperatures, sometimes associated with drought conditions, due to their age, health conditions, and limited ability to mobilize to shelters, cooling, and medical resources. Impacts on the economy and environment may have social implications as well (New York State Disaster Preparedness Commission [NYSDPC] 2011). 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. Section 4.3.11 of this HMP addresses the wildfire hazard in Schuylkill County.

Impact on the Economy

Drought events impact the economy, including loss of business function and damage and loss of inventory. Industries that rely on water for business may be impacted the hardest (e.g., agriculture). Even though a majority of businesses will still be operational, they may be impacted aesthetically. A prolonged drought can exert serious direct and indirect economic impacts on a community or across the County. Economic impacts may include:

- Losses from crop, livestock, timber, and aquaculture production and associated businesses.
- Losses from recreation providers and associated businesses.
- Losses related to the increased costs resulting from increased energy demand and from shortages caused by reduced hydroelectric generation capacity.
- Revenue losses for federal, state, and local governments from a reduced tax base and for financial institutions from defaults and postponed payments.
- Long-term loss of economic growth and development.

Loss estimates are based on lost agricultural revenues statewide. Table 4.3.3-8 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 2012 USDA Census of Agriculture. If the County would lose its agricultural yield due to drought, total losses could amount to over \$165 million. Table 4.3.3-9 details the potential losses associated with County livestock by providing livestock totals for the County and their associated market value. Livestock, poultry, and associated products have a potential loss value of more than \$1.2 billion (USDA 2012). Due to the recent development of poultry farms in the County over the last five years, it is likely the livestock number has increased since reported in the 2012 Census.

Table 4.3.3-8. Estimated County Losses Relating to Agricultural Production

Impacted Farmland Acreage	Market Value of All Agricultural Products
105,749	\$165,853,000

Source: USDA 2012

Table 4.3.3-9. Estimated County Losses Relating to Agricultural Production

Livestock and Poultry	Inventory	Market Value of All Livestock, Poultry, and Their Products
Livestock	1,451,372	\$89,029,000
Cattle and Calves	12,757	
Hogs and Pigs	23,713	
Sheep and Lambs	298	
Total	1,488,140	

Source: USDA 2012

Note: Market value of livestock and poultry is only provided by total value and not available by category.

Additional notable agricultural products produced in the County are Christmas trees, potatoes, dairy products and grain. These products may also be impacted by a drought impacting the income of farmers and the overall local economy. Schuykill County is located in a ‘Christmas tree belt’. Christmas tree farming costs build over an approximate eight-year period before a return on investment is realized. Therefore, a loss due to a natural hazard event such as a drought can be more devastating compared to annual crops as the interest on investment compounds over the production period (Bates 2016).

Impact on the Environment

Environmental impacts of drought include:

- Hydrologic effects – lower water levels in reservoirs, lakes, and ponds; reduced streamflow; loss of wetlands; estuarine impacts; groundwater depletion and land subsidence; effects on water quality such as increases in salt concentration and water temperature
- Damage to animal species – lack of feed and drinking water; disease; loss of biodiversity; migration or concentration; and reduction and degradation of fish and wildlife habitat
- Damage to plant communities – loss of biodiversity; loss of trees from urban landscapes and wooded conservation areas
- Increased number and severity of fires
- Reduced soil quality
- Air quality effects, such as dust and pollutants
- Loss of quality in landscape through loss in plants and plant diversity
- Increase in nitrate levels, which can negatively affect health of pregnant women and children (PEMA 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 (further discussed in Section 2.4 of this HMP). It is anticipated that any new development and new residents will be exposed to the drought hazard.

Effect of Climate Change on Vulnerability

PADEP was directed by the Climate Change Act (Act 70 of 2008) to initiate a study of potential impacts of global climate change on the Commonwealth. The June 2009 Pennsylvania Climate Impact Assessment's main findings indicated that Pennsylvania is very likely to undergo increased temperatures in the 21st century. Increases in temperature will likely lead to increased evapotranspiration, and thus an increase in soil-moisture-related droughts throughout late spring and early fall. Pennsylvania's precipitation climate is projected to become more extreme in the future, with longer dry periods and greater intensity of precipitation. Most models project an increase in the maximum number of consecutive dry days in a year (Shortle et al. 2009 and 2015).

Future improvements in modeling smaller-scale climatic processes can be expected and will lead to improved understanding of how the changing climate will alter temperature, precipitation, storm frequency, and intensity in Pennsylvania. Understanding this information can help provide better indications of future drought events (Shortle et al. 2009 and 2015).

Additional Data

Any additional information regarding localized concerns and past impacts may be collected, analyzed and developed to support future revisions to the plan. Mitigation efforts may include updating the Schuylkill County Water Supply Study (2002), working with providers to update the spatial layer of public water service suppliers as well as building local GIS data on farms and crops.

4.3.4 FLOOD

PROFILE

Floods are one of the most common natural hazards in the United States and are the most prevalent type of natural disaster occurring in Pennsylvania. Over 94 percent of the State’s municipalities have been designated as flood-prone areas. Both seasonal and flash floods have caused millions of dollars in annual property damages, loss of lives and disruption of economic activities (PEMA 2013).

The FEMA’s definition of flooding is “a general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties from the overflow of inland or tidal waters or the rapid accumulation of runoff of surface waters from any source” (FEMA 2015).

Most floods fall into three categories: riverine, coastal, and shallow (FEMA 2015). Other types of floods may include ice jam floods, flash floods, stormwater floods, alluvial fan floods, dam failure floods, and floods associated with local drainage or high groundwater (as indicated in the previous flood definition). For the 2019 HMP update and as deemed appropriate by the Core Planning Team, riverine, flash, ice jam, stormwater/urban flooding, and dam/levee failure (described in Section 4.3.2 [Dam and Levee Failure]) are the main flood types of concern for Schuylkill County. These types of floods are further discussed below.

Riverine floods are the most common flood type and occur along a channel. Channels are defined features on the ground that carry water through and out of a watershed. They may be called rivers, creeks, streams or ditches. When a channel receives too much water, the excess water flows over its banks and inundates low-lying areas. These floods usually occur after heavy rains, heavy thunderstorms, or snowmelt, and can be slow or fast-rising, and generally develop over a period of hours to days (FEMA 2015).

According to the National Weather Service (NWS), **flash floods** are a rapid and extreme flow of high water into a normally dry area, or a rapid water level rise in a stream or creek above a predetermined flood level, beginning within 6 hours of the causative event (e.g., intense rainfall, dam failure, or ice jam) (NWS 2015).

Flash floods can occur very quickly and with very little warning. This type of flood can be deadly because it produces rapid rises in water levels and has devastating flow velocities. Urban areas are more susceptible to flash floods because a high percentage of the surface area is impervious (PEMA 2013). Time elapsed before flash flooding occurs may vary in different parts of the country. Ongoing flooding can intensify to flash flooding where intense rainfall results in a rapid surge of rising flood waters (NWS 2015). A flash flood can have a dangerous wall of roaring water that carries rocks, mud, and other debris, and can sweep away most things in its path. Flash floods usually result from intense storms dropping large amounts of rain within a brief period with little or no warning and can reach their peak within only a few minutes. They normally occur in the summer during the thunderstorm season. The most severe flooding conditions usually occur when direct rainfall is augmented by snowmelt. If the soil is saturated or frozen, stream flow may increase because of inability of the soil to absorb additional precipitation (FEMA 2008).

An **ice jam** is an accumulation of ice that acts as a natural dam and restricts flow of a body of water. Ice jams occur 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 and obstructions (bridges and dams). Ice jams may build up to a thickness great enough to raise the water level and cause flooding (Northeast States Emergency Consortium [NESEC] Date Unknown, U.S. Army Corps of Engineers [USACE] 2002).

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 a heavy rainfall, snowmelt, or warmer temperatures (USACE 2002).

Stormwater flooding occurs when locally heavy precipitation events produce flooding in areas other than delineated floodplains or along recognizable drainage channels. If local conditions (sewage systems and drainage channels) cannot accommodate intense rain events, water may accumulate and cause flooding problems (FEMA 1996).

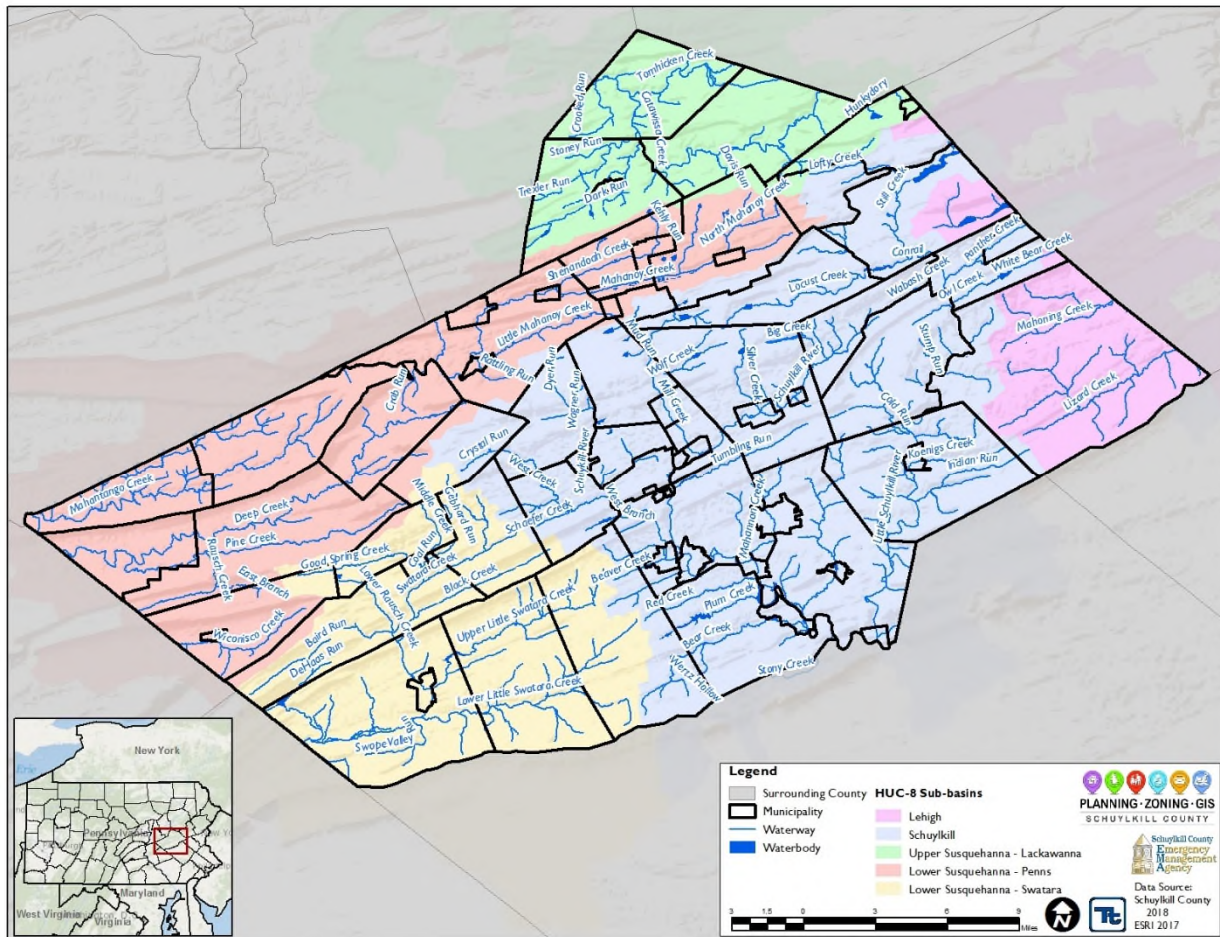
An urban drainage system comprises the ditches, storm sewers, retention ponds and other facilities constructed to store runoff or carry it to a receiving stream, lake, or the ocean. Other manmade features in such a system include yards and swales that collect runoff and direct it to the sewers and ditches. When most of the systems were constructed, they were typically designed to handle the amount of water expected during a 10-year storm. Larger storms overload these systems and the resulting backed-up sewers and ditches produce flooding (FEMA 2006).

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 typically usually occurs in the spring, summer and fall; however, flooding has occurred during the winter months as well (PEMA 2013).

As discussed in Section 2, Schuylkill County is located in three major drainage basins, the Delaware, the Upper Middle and Lower Susquehanna. Within each major drainage basin are smaller watersheds. There are five watersheds that cross Schuylkill County: Lehigh, Schuylkill, Upper Susquehanna-Lackawanna, Lower Susquehanna-Penns, and Lower Susquehanna-Swatara (U.S. EPA 2018). The location of the watersheds in the county are shown in Figure 4.3.4-1.

Figure 4.3.4-1. HUC 8 Sub-basins Located Within Schuykill County



The principal drainage route on the eastern side of the County consists of the West Branch of the Schuylkill River, the Schuylkill River, and the Little Schuylkill River as they flow generally in a southerly direction. The West Branch of the Schuylkill River and the Schuylkill River merge near Cressona and Schuylkill Haven. These branches merge with the Little Schuylkill River near Port Clinton, before leaving the County at its southern border with Berks County. The West Branch of the Schuylkill River forms in Cass Township to the northwest of the City of Pottsville and originates in a number of streams including Crystal Run, West Creek, Schafer Creek and Indian Run. The Schuylkill River originates west of Tamaqua and flows toward the center of the County along Route 209, merging with the West Branch of the Schuylkill River and Panther Creek north of Schuylkill Haven. Traveling southeast, the Schuylkill River intersects with Red Creek, Plum Creek, and Bear Creek, before merging with the Little Schuylkill River just to the northwest of Port Clinton. The Little Schuylkill River originates north of Tamaqua and is fed by Lofty and Neifert Creeks north of Tamaqua as well as Rabbit Run, Owl Creek, Stump Run, and Brushy Run along the shared borders of Walker, West Penn, and East Brunswick Townships (Schuykill County HMP 2013).

The principal water features of the western side of the county include Mahantongo Creek and Little Mahantongo Creek just south of the County’s northern border with Northumberland County, and Deep Creek and Pine Creek which merge just east of the County’s western border after flowing west on either side of Route

25. All of these water features flow toward the west and leave Schuylkill County along its western border with Dauphin and Northumberland counties. Farther to the south are West Branch Fishing Creek, as well as the Lower Little Swatara Creek, Black Creek, Panther Creek and the Upper Little Swatara Creek, which merge to form the Swatara Creek near the community of Pine Grove before flowing west into Lebanon County. Other less significant water features do exist throughout Schuylkill County, including the Catawissa Creek in East and North Union Townships, as well as Panther Creek near Tamaqua and Mahanoy Creek which runs between Shenandoah and Ashland (Schuylkill County HMP 2013).

The most extensive floodplains occur in the lowland areas where stream gradients are less, where there is generally flat land adjacent to or near streams, creeks and drainages and where the valleys are wider than in the mountains. Notable 1-percent annual chance floodplain areas include land in the southwestern part of Schuylkill County adjacent to the Upper Swatara Creek and the Lower Little Swatara Creek and their convergence near the community of Pine Grove into Swatara Creek. Small pockets of land around and within Pine Grove are located in the 0.2-percent annual chance floodplain (Schuylkill County HMP 2013).

In the northwestern part of Schuylkill County, the 1-percent annual chance floodplains follow the Mahantongo and Little Mahantongo Creeks, Mahanoy Creek near the community of Gordon, and Pine and Deep Creeks in the vicinity of Route 25. In the northern part of Schuylkill County, 1-percent annual chance floodplains surround the Little Catawissa Creek and the Catawissa Creek as they meander through North and East Union Townships (Schuylkill County HMP 2013).

In the southeast, 1-percent annual chance floodplains follow Panther Creek as it runs through the town of Tamaqua and the Little Schuylkill River and some of the smaller streams (known as runs) that feed into it as it travels southwest from Tamaqua. Finally, from the center of the county running southeast, is the Schuylkill River. It is surrounded by a 1-percent annual chance floodplain for the majority of its passage through the communities of Middleport, New Philadelphia, Port Carbon, Mechanicsville, Schuylkill Haven, Auburn, and, finally, Port Clinton on Schuylkill County's southern border. There are pockets of land that are located in the 0.2-percent annual chance floodplain along the upper reaches of the Schuylkill River in Port Carbon, along the enlarged Schuylkill River in Schuylkill Haven and nearby Cressona, and throughout the final curves of the Schuylkill River as it reaches Port Clinton and flows south into Berks County (Schuylkill County HMP 2013).

Surface water area in Schuylkill County is not extensive. There are only a few lakes and reservoirs, including Lake Hauto in Rush Township and Sweet Arrow Lake in the southwest, near Pine Grove. However, the total area and widespread pattern of stream courses and their related floodplains are noteworthy (Schuylkill County HMP 2013).

FEMA Regulatory Flood Zones

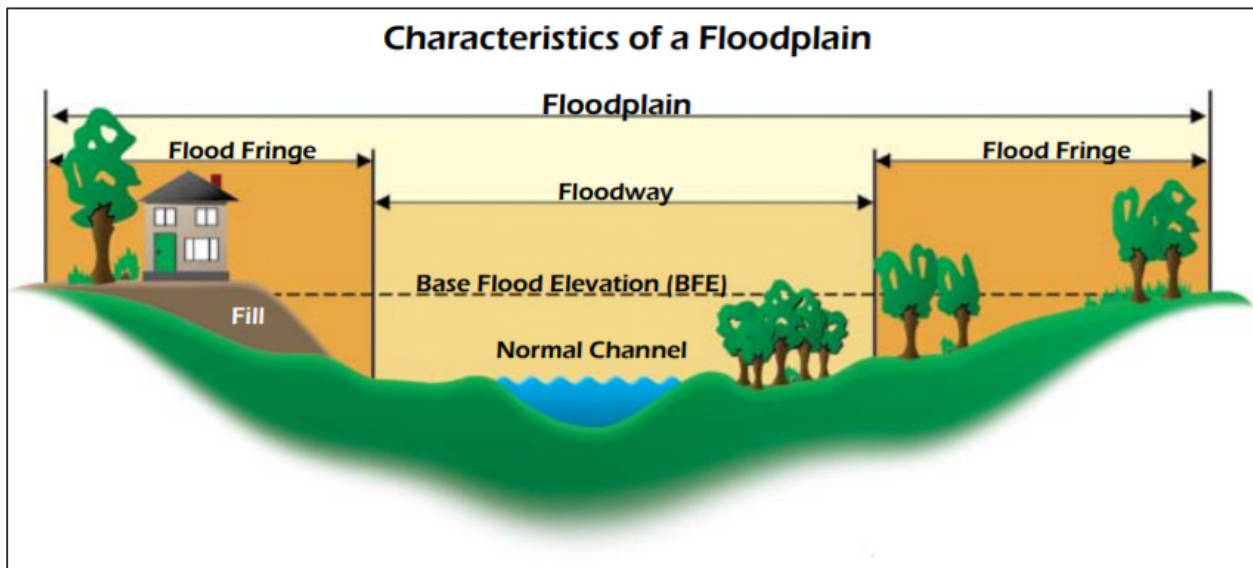
Floodplains are found in lowland areas adjacent to rivers, streams, creeks, lakes, or other bodies of water that become inundated during a flood. The size of a floodplain depends on the recurrence interval of a given flood. A 1-percent annual chance floodplain is smaller than the floodplain associated with a flood that has a 0.2-percent annual chance of occurring (PEMA 2013). Floodplain maps for each jurisdiction in Schuylkill County are available at the end of the section. These maps show locations of both the 1-percent annual chance floodplain and the 0.2-percent annual chance floodplain.

According to FEMA, the Special Flood Hazard Area (SFHA) on the Flood Insurance Rate Map (FIRM) is defined as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent annual chance flood is also referred to as the base flood or 100-year flood. The SFHA is the area where the NFIP’s floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. The SFHA includes Zones A, AO, AH, A1-30, AE, A99, AR, AR/A1-30, AR/AE, AR/AO, AR/AH, AR/A, VO, V1-30, VE, and V. Moderate flood hazard areas, labeled Zone B or Zone X (shaded) are also shown on the FIRM, and are the areas between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood. The areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2-percent-annual-chance flood, are labeled Zone C or Zone X (unshaded) (FEMA 2017a).

The base flood is a flood having a one-percent chance of being equaled or exceeded in any given year. This is the regulatory standard also referred to as the “100-year flood”. The base flood is the national standard used by the NFIP and all federal agencies for the purposes of requiring the purchase of flood insurance and regulating new development. Base Flood Elevations (BFEs) are typically shown on FIRMs (FEMA 2017b). The BFE is the height of the base flood referenced in the Flood Insurance Study (FIS). A structure located within a one-percent floodplain has a 26-percent chance of suffering flood damage during the term of a 30-year mortgage. The one-percent chance flood is a regulatory standard used by federal agencies and most states, to administer floodplain management programs (FEMA 2018).

Figure 4.3.4- depicts the SFHA, the BFE, the flood fringe, and the floodway areas of a floodplain for the 1-percent annual chance flood.

Figure 4.3.4-1. Characteristics of a Floodplain



Source: FEMA 2009

The SFHA serves as the primary regulatory boundary used by FEMA and Pennsylvania. Schuykill County’s effective map date is November 19, 2014. 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 one-percent and 0.2-percent annual chance event. The 2017 FEMA Flood Risk Database was considered best available data

at the time the draft HMP was developed. Figure 4.3.4-2 illustrates the Schuykill County flood zones as depicted on the Risk Map products in the 2017 Flood Risk Database used in the vulnerability assessment. Maps of each municipality's flood zones are included at the end of this profile. Table 4.3.4-1 lists total land area in the 2017 Risk Map 1-percent and 0.2-percent annual chance flood zones.

It is important to note that while the draft 2019 HMP was nearing completion, FEMA released preliminary DFIRMs in August 2018. The appeal period will take place over the winter of 2018 into 2019; which will have a 90-day duration after the appeal period starts. When comparing the August 2018 preliminary DFIRM and 2017 Risk Map data, there is an overall increase of approximately 61 acres and 124 acres in the floodplain, for the 1- and 0.2-percent annual chance flood events, respectively. Of the 67 communities in the County, 39 municipalities see an increase in area for both the 1- and 0.2-percent annual chance flood event boundaries.

Schuykill County's 2017 Flood Risk Database, 2014 effective DFIRMs, and 2018 preliminary DFIRMs can be accessed online via the FEMA Flood Map Service Center (<https://msc.fema.gov/portal>).

Figure 4.3.4-2. NFIP Floodplains in Schuykill County

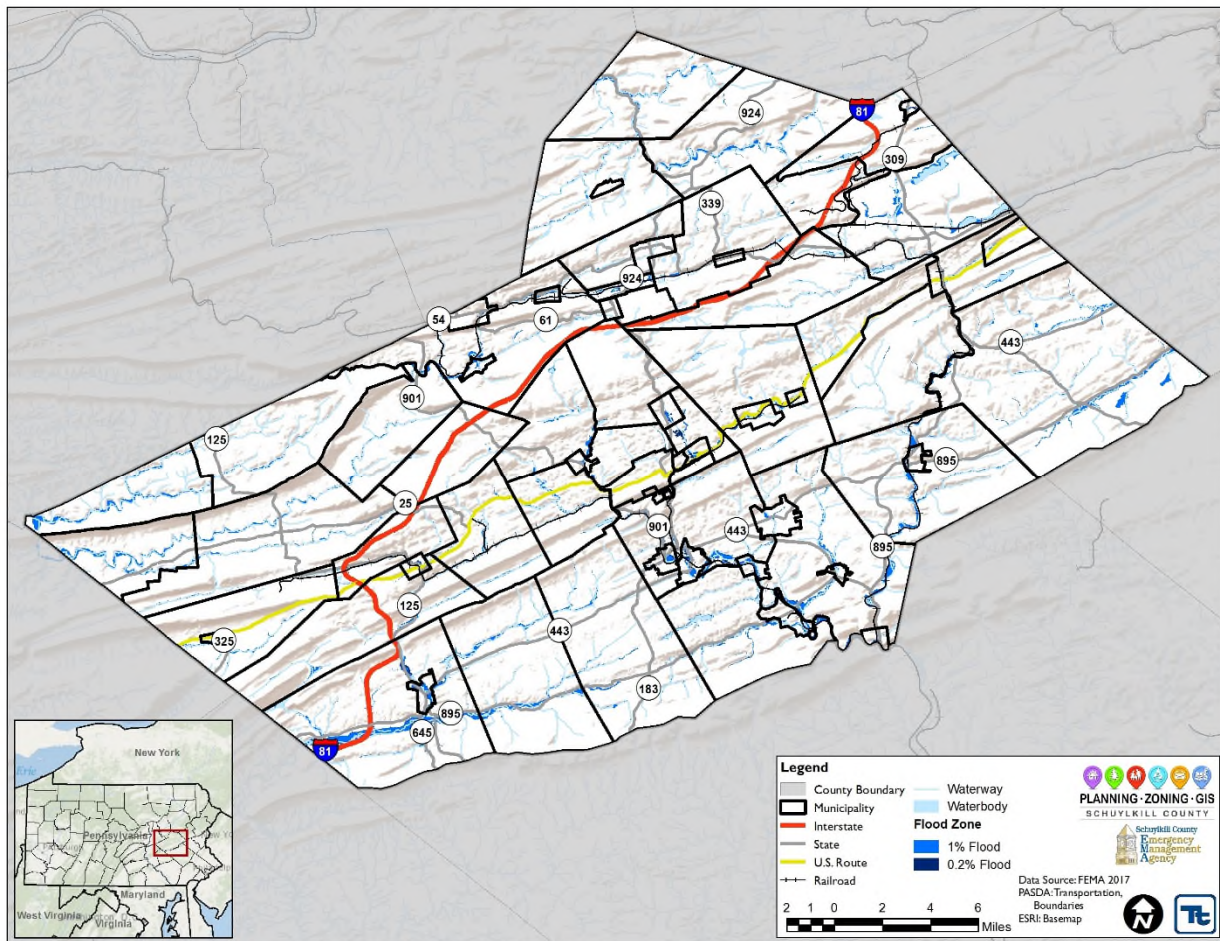


Table 4.3.4-1. Total Land Area in the 1-percent and 0.2-percent Annual Chance Flood Zones (Acres)

Municipality	NFIP- Participating Community	Total Area (acres)	1% Annual Chance Flood Event Hazard Area		0.2% Annual Chance Flood Event Hazard Area	
			Area (acres)	Percent (%) of Total	Area (acres)	Percent (%) of Total
Ashland Borough	Yes	1,038.7	91.5	8.8%	127.3	12.3%
Auburn Borough	Yes	1,021.6	96.0	9.4%	114.3	11.2%
Barry Township	Yes	10,881.4	478.6	4.4%	589.1	5.4%
Blythe Township	Yes	18,209.8	104.8	0.6%	271.8	1.5%
Branch Township	Yes	7,494.4	65.7	0.9%	248.5	3.3%
Butler Township	Yes	17,235.1	109.7	0.6%	200.5	1.2%
Cass Township	Yes	8,660.1	163.4	1.9%	249.6	2.9%
Coaldale Borough	Yes	1,429.3	0.0	0.0%	20.6	1.4%
Cressona Borough	Yes	658.0	204.3	31.0%	263.5	40.0%
Deer Lake Borough	Yes	297.7	364.4	122.4%	369.1	124.0%
Delano Township	Yes	5,340.9	27.8	0.5%	41.7	0.8%
East Brunswick Township	Yes	19,826.0	971.6	4.9%	1,464.4	7.4%
East Norwegian Township	Yes	2,565.9	115.5	4.5%	224.6	8.8%
East Union Township	Yes	16,345.6	0.0	0.0%	362.0	2.2%
Eldred Township	Yes	14,303.8	287.1	2.0%	352.6	2.5%
Foster Township	Yes	8,154.6	8.0	0.1%	22.6	0.3%
Frackville Borough	Yes	382.5	6.8	1.8%	9.5	2.5%
Frailley Township	Yes	5,967.6	99.8	1.7%	135.8	2.3%
Gilberton Borough	Yes	905.5	85.6	9.5%	173.6	19.2%
Girardville Borough	Yes	340.6	137.5	40.4%	146.6	43.0%
Gordon Borough	Yes	382.1	175.7	46.0%	198.0	51.8%
Hegins Township	Yes	20,680.8	1,307.3	6.3%	1,448.7	7.0%
Hubley Township	Yes	8,390.6	0.0	0.0%	170.6	2.0%
Kline Township	Yes	7,926.9	129.2	1.6%	164.2	2.1%
Landingville Borough	Yes	534.4	115.6	21.6%	137.9	25.8%
Mahanoy City Borough	Yes	13,462.4	129.8	1.0%	253.3	1.9%
Mahanoy Township	Yes	345.5	0.0	0.0%	0.0	0.0%
McAdoo Borough	Yes	237.0	6.5	2.7%	17.9	7.6%
Mechanicsville Borough	Yes	215.7	2.8	1.3%	2.8	1.3%
Middleport Borough	Yes	278.5	101.3	36.4%	122.8	44.1%

Table 4.3.4-1. Total Land Area in the 1-percent and 0.2-percent Annual Chance Flood Zones (Acres)

Municipality	NFIP- Participating Community	Total Area (acres)	1% Annual Chance Flood Event Hazard Area		0.2% Annual Chance Flood Event Hazard Area	
			Area (acres)	Percent (%) of Total	Area (acres)	Percent (%) of Total
Minersville Borough	Yes	419.5	137.4	32.7%	140.8	33.6%
Mount Carbon Borough	Yes	49.9	1.8	3.6%	4.4	8.8%
New Castle Township	Yes	8,101.1	50.2	0.6%	77.9	1.0%
New Philadelphia Borough	Yes	975.8	104.2	10.7%	144.4	14.8%
New Ringgold Borough	Yes	513.0	6.6	1.3%	12.5	2.4%
North Manheim Township	Yes	13,216.3	131.8	1.0%	339.9	2.6%
North Union Township	Yes	13,310.0	1,059.5	8.0%	1,230.9	9.2%
Norwegian Township	Yes	3,722.5	0.6	0.0%	48.5	1.3%
Orwigsburg Borough	Yes	1,402.8	71.9	5.1%	83.8	6.0%
Palo Alto Borough	Yes	609.2	14.5	2.4%	29.0	4.8%
Pine Grove Borough	Yes	24,135.5	88.5	0.4%	146.1	0.6%
Pine Grove Township	Yes	700.7	2,102.5	300.0%	2,540.5	362.5%
Port Carbon Borough	Yes	478.1	35.2	7.4%	62.2	13.0%
Port Clinton Borough	Yes	483.5	77.1	15.9%	90.6	18.7%
Porter Township	Yes	11,478.9	163.8	1.4%	218.7	1.9%
Pottsville City	Yes	2,599.0	185.7	7.1%	210.1	8.1%
Reilly Township	Yes	10,244.8	252.8	2.5%	414.9	4.0%
Ringtown Borough	Yes	289.7	7.2	2.5%	16.4	5.7%
Rush Township	Yes	14,945.8	954.9	6.4%	1,288.9	8.6%
Ryan Township	Yes	11,257.8	276.2	2.5%	429.2	3.8%
Schuykill Haven Borough	Yes	799.8	47.9	6.0%	67.6	8.5%
Schuykill Township	Yes	6,599.6	299.1	4.5%	377.7	5.7%
Shenandoah Borough	Yes	920.9	83.5	9.1%	104.7	11.4%
South Manheim Township	Yes	1,029.2	0.0	0.0%	1.2	0.1%
St. Clair Borough	Yes	13,588.8	1,380.6	10.2%	1,723.6	12.7%
Tamaqua Borough	Yes	6,591.8	164.1	2.5%	239.2	3.6%
Tower City Borough	Yes	196.9	171.2	86.9%	171.4	87.0%
Tremont Borough	Yes	491.9	58.3	11.8%	109.5	22.3%
Tremont Township	Yes	15,417.2	246.4	1.6%	447.4	2.9%
Union Township	Yes	14,117.1	119.9	0.8%	268.6	1.9%

Table 4.3.4-1. Total Land Area in the 1-percent and 0.2-percent Annual Chance Flood Zones (Acres)

Municipality	NFIP- Participating Community	Total Area (acres)	1% Annual Chance Flood Event Hazard Area		0.2% Annual Chance Flood Event Hazard Area	
			Area (acres)	Percent (%) of Total	Area (acres)	Percent (%) of Total
Upper Mahantongo Township	Yes	9,458.1	889.7	9.4%	985.3	10.4%
Walker Township	Yes	14,507.4	156.1	1.1%	242.1	1.7%
Washington Township	Yes	19,755.0	1,164.4	5.9%	1,265.5	6.4%
Wayne Township	Yes	22,316.1	297.4	1.3%	488.4	2.2%
West Brunswick Township	Yes	19,390.7	368.6	1.9%	507.3	2.6%
West Mahanoy Township	Yes	6,684.0	21.7	0.3%	39.8	0.6%
West Penn Township	Yes	37,115.4	1,500.1	4.0%	1,924.8	5.2%
Schuylkill County (Total)	N/A	501,426.6	18,078.1	3.6%	24,411.1	4.9%

Source: FEMA 2017
N/A = Not applicable

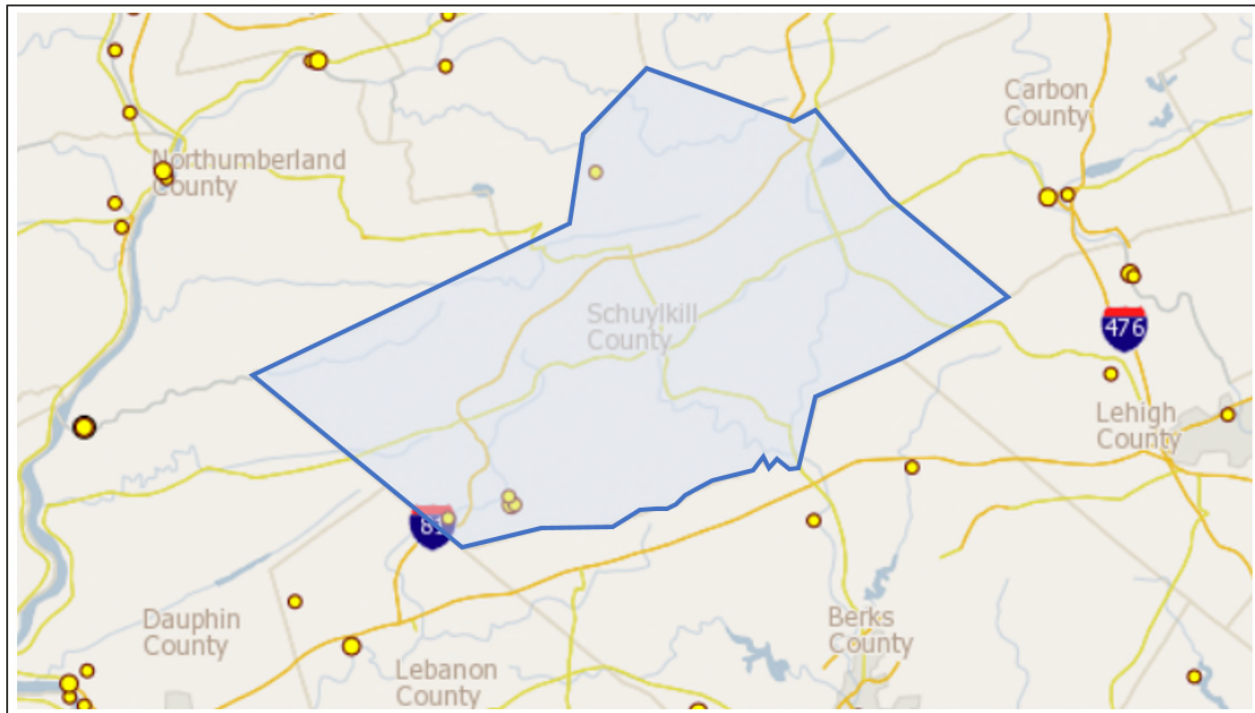
While the FIRMs provide a creditable source to document extent and location of the flood hazard, there are limitations to the accuracy of the data reflected on these maps. As such, it is noted that FIRMs are based upon the existing hydrology conditions at the time of the maps preparation. FIRMs are not set up to account for the possible changes in hydrology that can occur over time.

The 2014 FEMA Flood Insurance Study (FIS) for Schuylkill County documents the major flooding problems in the County. The FIS indicated that flooding in the county has occurred along the Schuylkill River, Mill Creek, Mahanoy Creek, Little Mahanoy Creek, Rattling Run, Swatara Creek, Wide Wake Creek, Dauberts Creek, and Church Creek. Along the 1-percent annual chance floodplain of the Mahanoy Creek, deep mining of coal complicated effects of groundwater levels and surface flooding. In the Borough of Pine Grove, areas immediately adjacent to Swatara Creek are particularly low-lying and subject to flooding even after moderate rain or thaw conditions (FEMA 2014).

Ice Jams

The ice jam database, maintained by the Ice Engineering Group at the USACE Cold Regions Research and Engineering Laboratory (CRREL), currently consists of over 19,000 records from across the United States. According to the USACE-CRREL, Schuylkill County has experienced and/or may have been impacted by 13 historical ice jam incidents between 1780 and 2017. Ice jams have formed along the Allegheny River, Lower Little Swatara Creek, Neshannock Creek, Slippery Rock Creek, Swatara Creek, and Trexler Run (USACE 2018). Figure 4.3.4-3 **Error! Reference source not found.** shows the location of ice jams that have occurred in Schuylkill County. Details regarding these events are discussed later in this section (Past Occurrence).

Figure 4.3.4-3. Historic Ice Jams in Schuykill County



Source: USACE 2018

Note: The blue outline indicates the location of Schuykill County.

Range of Magnitude

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 which promotes quick surface water runoff. Most storms track from west to east; however, some originate in the Great Lakes or the Atlantic Ocean. Rapidly changing weather patterns and temperatures may cause large-scale snow-melting events in which ice jams in the receiving streams may aggravate the already serious problem of large water volumes contributed by thousands of small tributaries (PEMA 2013).

Rainfall in Pennsylvania is about average for the eastern United States. When classified according to amount of precipitation, rainfall can be divided into several categories:

- Very light rain – when precipitation rate of <0.01 inches per hour
- Light rain – when precipitation rate between 0.01 inches and 0.04 inches per hour
- Moderate rain – when precipitation rate between 0.04 inches and 0.16 inches per hour
- Heavy rain – when precipitation rate between 0.16 inches and 0.63 inches per hour
- Very heavy rain – when precipitation rate between 0.63 inches and two inches per hour
- Extreme rain – when precipitation rate greater than two inches per hour (PEMA 2013).

The severity of a flood depends not only on the amount of water that accumulates in a period of time, but also on the land's ability to manage this 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, 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 (Harris 2008).

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

- Minor Flooding - minimal or no property damage, but possibly some public threat or inconvenience.
- Moderate Flooding - some inundation of structures and roads near streams. Some evacuations of people and/or transfer of property to higher elevations are necessary.
- Major Flooding - extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations (NWS 2009).

Past Occurrence

The most significant natural hazard facing Schuykill County in terms of its cumulative probability and impact is flooding. 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. Most recently, the July and August 2018 flood events impacted several communities in the County. Additionally, past building practices often resulted in construction in the FEMA-designated floodplains, exacerbating flooding problems within certain communities.

There are four gauges in Schuykill County that monitor hydrologic conditions. A gauge at Tamaqua (USGS 01469500) monitors Little Schuykill River; a gauge at Port Carbon (USGS 01467492) monitors Mill Creek at Schuykill River; a gauge at Landingville (USGS 01468500) monitors Schuykill River; and a gauge at Pine Grove (USGS 01572025) monitors Swatara Creek. The NWS uses flood categories as forecast points that describe the severity of flood impacts in the river/stream reach. Table 4.3.4-2 summarizes the flood categories in feet at each of these gauges. Table 4.3.4-3 summarizes the top historic crests at these locations.

Table 4.3.4-2. Flood Categories at Schuykill County Gauges

Flood Category	Flood Category Definition	Tamaqua (in feet)	Port Carbon (in feet)	Landingville (in feet)	Pine Grove (in feet)
Major Flood Stage	Life-threatening and extensive inundation of structures and roads; significant evacuations are expected at this stage.	N/A	N/A	14	N/A
Moderate Flood Stage	Inundation of buildings usually begins at this stage; roads are likely to be closed and some areas cut off (evacuations may be necessary).	N/A	N/A	12	N/A
Flood Stage	Gage height above which a rise in water surface level begins to create a hazard to lives, property or commerce; issuance of flood warnings is linked to flood stage.	N/A	N/A	8	N/A
Action Stage	Level where the NWS needs to take some type of mitigation action in preparation for possible significant hydrologic activity.	N/A	N/A	7	N/A

Source: USGS 2018

Table 4.3.4-3. Historic Crests at Schuykill County Gauges

Tamaqua		Pine Grove		Landingville		Port Carbon	
Feet	Feet	Date	Date	Feet	Date	Feet	Date
11.1	8/18/1955	18.24	9/8/2011	17.36	6/22/1972	14.6	6/28/2006
7.95	5/22/1942	16	6/28/2006	17.2	6/28/2006	7.52	3/14/2010
7.64	6/22/1972	15.28	9/18/2004	14.11	9/8/2011	6.94	12/12/2008
7.5	9/30/1924	14.17	11/28/1993	13.85	9/18/2004		
7.5	8/24/1933	13.89	1/19/1996	13.6	4/16/1983		
7.45	6/27/2006	13.19	9/30/2010	13.36	11/28/1993		
7.32	7/9/1935	13.1	3/5/2008	13.29	11/25/1950		
7.18	7/8/1947	12.4	10/19/1996	13.19	8/19/1955		
7.14	11/16/2006	12.24	4/6/2017				

Source: USGS 2018

According to NOAA’s NCEI storm events database, Schuykill County experienced 43 flood events between January 1, 1950 and December 31, 2017. Total property damages, as a result of these flood events, were estimated at \$4.16 million. Overall, there was one fatality associated with these events. These totals may also include damages to other counties (NOAA NCEI 2018).

Between 1954 and 2017, the State of Pennsylvania experienced 33 FEMA-declared flood-related major disasters (DR) or emergencies (EM) classified as one or a combination of the following disaster types: heavy rains, severe storms, high winds, flash floods, flooding, tornadoes, tropical storms, and mudslides. Generally, these disasters cover a wide region of the State; therefore, they may have impacted many counties. However, not all counties were included in the disaster declarations. Of these events, Schuykill County was included in 13 of the declarations, as listed in Table 4.3.4-5 (FEMA 2018).

Table 4.3.4-4. FEMA Declarations

Declaration Number	Date(s) of Incident	Event
DR-273	August 19, 1969	Severe Storms & Flooding
DR-340	June 23, 1972	Tropical Storm Agnes
DR-485	September 26, 1975	Severe Storms, Heavy Rains & Flooding
DR-523	October 20, 1976	Severe Storms & Flooding
DR-1093	January 19-February 1, 1996	Severe Storms and Flooding
DR-1555	September 8-9, 2004	Severe Storms and Flooding Associated with Tropical Depression Frances
DR-1557	September 17-October 1, 2004	Tropical Depression Ivan
EM-3235	August 29-October 1, 2005	Hurricane Katrina
DR-1649	June 23-July 10, 2006	Severe Storms, Flooding, And Mudslides
DR-1684	November 16-17, 2006	Severe Storms and Flooding
DR-4030	September 3-October 15, 2011	Tropical Storm Lee
EM-3340	September 3-October 15, 2011	Remnants of Tropical Storm Lee

Declaration Number	Date(s) of Incident	Event
EM-3356	October 26-November 8, 2012	Hurricane Sandy

Source: FEMA 2018

Many sources provided historical information regarding previous occurrences and losses associated with flooding events in Schuylkill County. The 2013 HMP discussed specific flooding events that occurred in Schuylkill County through 2011. For the 2019 HMP update, flood events were summarized between January 1, 2012 and December 31, 2017. Due to recent flood events, Table 4.3.4-5 also includes the June, July and August 2018 flood events that occurred. For events prior to 2012, please refer to the 2013 Schuylkill County HMP (Appendix G).

With numerous 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 monetary figures discussed is based only on the available information identified during research for this HMP. Additionally, due to the extent of flood documentation for the State of Pennsylvania, it is possible that not all sources have been identified or researched. Therefore, Table 4.3.4-5 may not include all events that have occurred throughout Schuylkill County.

Table 4.3.4-5. Flooding Events in Schuylkill County, 2012 to 2018

Date of Event	Event Type	Location	FEMA Declaration Number (if applicable)	County Designated?	Losses/Impacts
May 26, 2012	Heavy Rains and Flash Flooding	McAdoo Borough, Schuylkill Township	N/A	N/A	Widespread thunderstorms developed across central Pennsylvania, with several producing damaging winds and flash flooding. In Schuylkill County, heavy rain produced flash flooding over the northeastern-third of the county (along and east of Routes 209/309). The McAdoo area experienced some of the worst flooding, impacting 31 homes. A railroad crossing was washed out. Widespread flooding was reported in Schuylkill Township in and around the Tuscarora area. Little Schuylkill River at Tamaqua crested at 5.05 feet (2.5-foot flood stage).
September 18, 2012	Heavy Rains and Flash Flooding	West Penn Township	N/A	N/A	Heavy rainfall and damaging thunderstorm winds impacted portions of the lower Susquehanna Valley. The intense storms produced localized flash flooding. In Schuylkill County, torrential rains resulted in flash flooding and road closures in West Penn Township, especially in the area of Route 895 and Dorset Road. Schuylkill River at Landingville crested at 7.5 feet (8-foot flood stage).
October 29-30, 2012	Hurricane Sandy	Countywide	EM-3356	Yes	<p>Pennsylvania Governor declared a disaster emergency on October 26, 2012 that was followed by a Presidential Emergency Declaration on October 29, 2012 for the entire State of Pennsylvania.</p> <p>In Schuylkill County, heavy rainfall caused minor flooding (mainly basements) throughout the county. State route 202 at Mill Street in Riley Township was closed due to flooding. Schuylkill River at Landingville crested at 6.83 feet (8-foot flood stage) on October 30, 2012. Little Schuylkill River at Tamaqua crested at 3.96 feet (2.5-foot flood stage) on October 31, 2012.</p>
December 21, 2012	Winter Storm, Heavy Rain and Flooding	Countywide	N/A	N/A	In some areas of Pennsylvania, a wintery mix of precipitation fell over parts of northeastern Pennsylvania. In other parts, the precipitation fell as rain, with rainfall totals ranging from 2 inches to 2.3 inches. The heavy rain led to streams reaching and exceeding their flood stages. In Schuylkill County, Little Schuylkill River at Tamaqua crested at 4.25 feet (2.5-foot flood stage) and Schuylkill River at Landingville crested at 7.58 feet (8-foot flood stage).
May 16, 2014	Heavy Rain and Flooding	Countywide	N/A	N/A	A slow moving cold front brought heavy rain to eastern and southeastern Pennsylvania, causing poor drainage flooding and some minor flooding of creeks. Rainfall totals ranged from two to four inches. In Schuylkill County, at Little Schuylkill River at Tamaqua crested at 4.18 feet (2.5-foot flood stage) and Schuylkill River at Landingville crested at 7.96 feet (8-foot flood stage).
May 31, 2015	Flash Flood	Schuylkill Haven Borough	N/A	N/A	Severe thunderstorms developed across central Pennsylvania, causing flash flooding in Schuylkill County. Several homes and a bank were flooded on Center and Progress Avenues in the Borough of Schuylkill Haven.
June 30 – July 1, 2015	Flash Flood	New Philadelphia, Blythe, and Cumbola	N/A	N/A	A series of severe storms resulted in numerous reports of wind damage and localized flash flooding. In Schuylkill County, U.S. Route 209 was closed due to flooding in the area of Blythe Township. The Schuylkill River rose out of its banks between New Philadelphia and the Village of Cumbola. The Little Schuylkill River at Tamaqua crested at 4.57 feet (2.5-foot flood stage).

Date of Event	Event Type	Location	FEMA Declaration Number (if applicable)	County Designated?	Losses/Impacts
July 9, 2015	Thunderstorms and Flash Flooding	Countywide	N/A	N/A	A line of severe thunderstorms downed trees and power lines, spawning an EF-1 tornado in Berks County, and caused flash flooding. In Schuylkill County, Schuylkill River at Landingville crested at 8.53 feet (8-foot flood stage).
February 24, 2016	Thunderstorms and Flooding	Countywide	N/A	N/A	A line of thunderstorms producing heavy rainfall and damaging winds, downing trees and power lines. Flooding was reported in eastern Pennsylvania, including Schuylkill County. Schuylkill River at Landingville crested at 9.92 feet (8-foot flood stage).
February 25-26, 2017	Hail, Heavy Rain, Flooding	Countywide	N/A	N/A	A severe storm brought thunder, lightning, rain, hail, and minor flooding to Schuylkill County. Penny-sized hail struck the Pottsville area. Flooding was also reported in Pottsville, starting on Laurel Boulevard in the area of the 1300 block. It overran the inlets and covered the roadway. Wash outs were reported on Mauch Chunk Street and Anderson Street. The southbound lane of Route 61 between East Norwegian Street and East Union Street. The storm downed trees and caused power outages across the County. Little Schuylkill River at Tamaqua crested at 5.03 feet (2.5-foot flood stage).
April 6, 2017	Thunderstorms and Flooding	Countywide	N/A	N/A	Heavy showers and strong thunderstorms brought gusty winds and flooding to eastern Pennsylvania. In Schuylkill County, Little Schuylkill River at Tamaqua crested at 4.46 feet (2.5 feet flood stage). Schuylkill River at Landingville crested at 9.71 feet (flood stage of 8 feet).
June 27, 2018	Flooding	Pine Grove Borough	N/A	N/A	More than six inches of rain fell in less than six hours Thursday night in Schuylkill County. In Pine Grove Borough, many homes and roadways were flooded. Firefighters performed water rescues overnight as people needed to be rescued from their cars. According to Police Chief Trotter, State Routes 501 and 645 were closed Thursday morning.
July 21-27, 2018 and August 10-14, 2018	Severe Weather and Flooding	Countywide	N/A	N/A	<p>Schuylkill County began to experience significant localized flooding events as early as June 28, 2018 in the Pine Grove Township area. The trend continued into July and through August, impacting areas from the extreme western end of the county through the central, more heavily populated areas. First responders faced significant flash flooding and employed boats and high clearance vehicles to remove stranded victims from homes and vehicles. Emergency services, including mutual aid assistance from all areas of the county, worked tirelessly for days pumping water from flooded basement. Shelters were established at the Pine Grove Area High School and the Tremont Community Center. American Red Cross worked with local volunteers to staff both shelters. The County's Emergency Operations Center was activated for two extended periods throughout July and August. The County had nearly \$8 million in estimated damages for this series of events.</p> <p>In the hours after the August event, the Schuylkill Municipal Authority's main transmission line that provides power to 20,000 residents was threatened. Heavy water runoff caused erosion and large rocks to fall on and round the water line. This also caused concern for the commercial properties in the area that were at risk of being undermined by the runoff. Ten businesses were closed for 11 days until the situation could be assessed and corrected. There was also interruption to the transmission line</p>

Date of Event	Event Type	Location	FEMA Declaration Number (if applicable)	County Designated?	Losses/Impacts
					<p>providing power to the Borough of Saint Clair, which affected 3,000 residents and nearby businesses for 24 hours.</p> <p>The damage to critical infrastructure was widespread throughout the area. The City of Pottsville experienced the collapse of a stone arch which carries the Norwegian Creek through a heavily populated and traveled section of the town. Municipalities experienced damage to roadway, bridges and culverts. Schuylkill Haven Waste Water Treatment Plant was on emergency operations for several days due to flooded electrical equipment.</p> <p>The areas of Schuylkill impacted by flash flooding from the series of storms included the Klingerstown area of Upper Mahantongo Township, Hegins, Hubley, Barry, Porter, Pine Grove, Tremont, Frailey, East Norwegian, West Mahanoy, New Castel, Washington and Butler Townships and the boroughs of Tower City, Pine Grove, Tremont, Port Carbon, Mount Carbon, Saint Clair, Frackville, Girardville, Gilberton, Mechanicsville, Schuylkill Haven and the City of Pottsville. Based on a survey of flooded areas and a review of emergency calls for the time periods in question, about 6,800 persons may have been impacted to some degree by these events.</p> <p>The most significant concerns during the events, have been the dangers to first responders entering flooded areas to rescue stranded motorist, who had driven into a flooded roadway. The situation was significant and dictated extended hours of operation. Mutual aid was utilized to cover routine calls in and around the flooded areas, allowing local first responders to stand down, check on their family and property and get some rest.</p>

Sources: FEMA 2018; USGS 2018; NOAA-NCEI 2018; SPC 2018

EM Emergency Declaration (FEMA)

FEMA Federal Emergency Management Agency

NCEI National Centers for Environmental Information

NOAA National Oceanic and Atmospheric Administration

SPC Storm Prediction Center

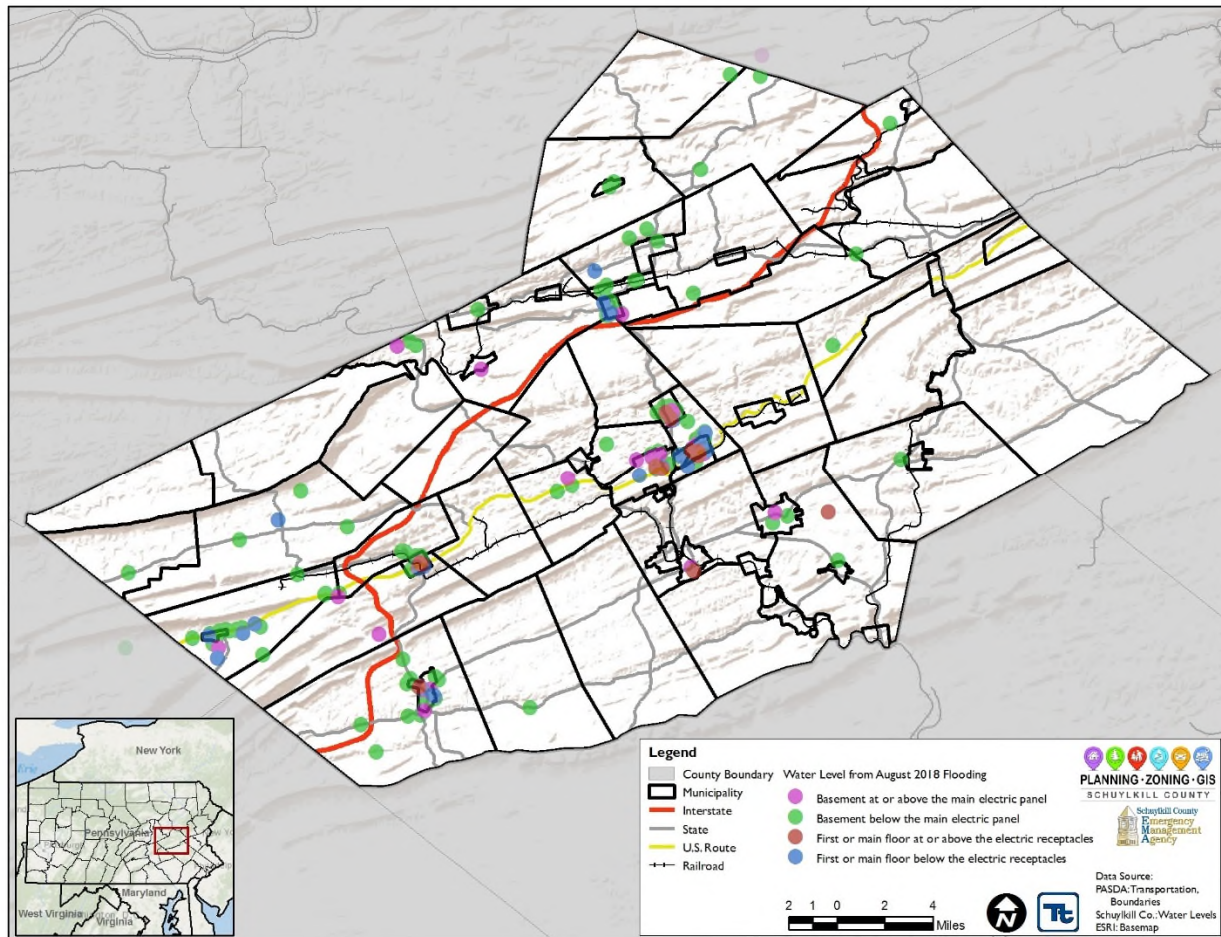
Schuykill County collected information from residents and business owners impacted by the August 2018 flood event. A flood survey was developed and posted to the County EMA website to provide the opportunity to document and submit flood impacts to support the request to PEMA and FEMA for a Presidential Disaster Declaration. The Planning Department geocoded the information and generated a building inventory with details regarding the extent of damage. The 408-structure inventory includes the following attributes: occupancy class, water level and structure status (i.e. whether or not it has reopened to date or is still closed/cannot be re-inhabited). Of these structures, there are 367 single-family residences, 14 apartments, 25 businesses/commercial establishments, and two (2) mobile homes. Table 4.3.4-6 displays the number of structures by occupancy class with the stated flood water level. Figure 4.3.4-4 illustrates the water levels documented across the County.

Table 4.3.4-6. Water Level in Structures from 2018 Flooding Event in Schuykill County by Occupancy class

Floodwater Level	Number of Structures
Apartment	
Basement flooding at or above the main electric panel	4
Basement flooding below the main electric panel	4
First or main floor flooding at or above the electric receptacles	3
First or main floor flooding below the electric receptacles	3
Business/Commercial	
Basement flooding at or above the main electric panel	1
Basement flooding below the main electric panel	8
First or main floor flooding at or above the electric receptacles	7
First or main floor flooding below the electric receptacles	9
Mobile Home	
Basement flooding below the main electric panel	2
Single Family Residential	
Basement flooding at or above the main electric panel	107
Basement flooding below the main electric panel	217
First or main floor flooding at or above the electric receptacles	11
First or main floor flooding below the electric receptacles	32

Source: Schuykill County 2018

Figure 4.3.4-4. August 2018 Flood Event Water Levels



Overall, there were approximately 65 structures with first-floor flooding. There were 24 residential structures (single family and apartment) in Pine Grove Borough, Pine Grove Township, Port Carbon Borough, Pottsville City, Schuylkill Haven Borough, Tremont Borough, Tremont Township, and West Brunswick Township that were unable to be reoccupied after the August 2018 event due to 1) external issues, such as subsidence 2) structural instability or utility failure, structural, electrical or mechanical issues or 3) mold, contamination or health issues. Of these structures, half experienced water levels in the basement below the main electric panel.

In terms of business and commercial structures, there were seven (7) establishments in Hegin Township, Port Carbon Borough, Pottsville City, and Saint Clair Borough that were unable to open after the event. Of these 7 structures, six (6) of these were due to safety and health concerns; the other structure experienced a loss of stock or raw materials and a lack of employees. It is interesting to note that five (5) of the structures that were unable to open had water levels at the first or main floor, or above the electric receptacles.

Future Occurrence

Given the history of flood events in the County, it is anticipated that future flooding of all degrees will continue to occur. In the last century, Pennsylvania has warmed more than half a degree (°F), seen more frequent heavy rainstorms, and the tidal portion of the Delaware River is rising approximately one inch every eight years. In

the coming decades, the changing climate is likely to increase flooding events, potentially in frequency and/or severity.

For the 2019 HMP update, the most up-to-date data was collected to calculate the probability of future occurrence of flooding events, of all magnitudes, for Schuykill County. Information from NOAA-NCEI storm events database, the 2013 Schuykill County HMP, and the CRREL ice jam database were used to identify the number of flood events that occurred between 1950 and 2017. Using these sources ensures the most accurate probability estimates possible. Table 4.3.4-7 presents the probability of future occurrence of flood events in Schuykill County.

Table 4.3.4-7. Probability of Flood Events in Schuykill County

Hazard Type	Number of Occurrences Between 1950 and 2017	Rate of Occurrence or Annual Number of Events (average)	Recurrence Interval (in years) (# Years/Number of Events)	Probability of Event in any given year	Percent chance of occurrence in any given year
Flash Flood	28	0.42	2.43	0.41	41.2%
Flood	20	0.30	3.40	0.29	29.4%
Ice Jam	6	2.00	11.33	0.09	8.8%

Sources: NOAA-NCEI 2018; CRREL 2018; Schuykill County HMP 2013

The Core Planning Team ranked the hazards 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 flood in Schuykill County is considered ‘highly likely’ (greater than 90% annual probability) as defined by the Risk Factor Methodology probability criteria (Section 4.4). Flood is ranked as a high-risk hazard in Schuykill County.

VULNERABILITY ASSESSMENT

To understand risk, a community must evaluate the assets exposed and vulnerable within the identified hazard area. For the flood hazard, the 1- and 0.2-percent annual chance flood events were examined. The following section discusses potential flood impacts, including:

- Impacts 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 collections that will assist in understanding this hazard over time.

The 1- and 0.2-percent annual chance flood events were examined to evaluate Schuykill County’s flood risk. Polygons representing the 1- and 0.2-percent annual chance events from the FEMA Risk Map products dated October 2017 were used to estimate exposure. Figure 4.3.4-3 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-MH riverine flood model to estimate potential losses.

Impact on Life, Health, and Safety

Impacts of flooding on life, health and safety depend on several factors including severity of the event and whether or not adequate warning time is provided to residents. Assumedly, 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 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); the degree of that impact varies and is not strictly measurable.

To estimate the population living in the 1-percent annual chance floodplain, the number of residential building footprints located in the floodplain was multiplied by the 2010 U.S. Census average household size in Schuylkill County (2.35 people). Table 4.3.4-8 summarizes these results by municipality. Overall, there are an estimated 11,172 people living in the 1-percent annual chance floodplain (7.5% of the County’s total population), and 14,161 people living in the 0.2-percent annual chance floodplain (9.5% of the County’s total population). The estimated number of people living in the floodplain may be high because residential properties can have more than one building located on their parcel (e.g., sheds, stand-alone garages) that have been counted as individual residences for this analysis.

Table 4.3.4-8. Estimated Residential Population Located in the 1- and 0.2-Percent Flood Hazard Areas

Municipality	Total Population (U.S. Census 2010)	1-Percent Annual Chance Event		0.2-Percent Annual Chance Event	
		Estimated Population in Hazard Area	Percent (%) of Total Population	Estimated Population in Hazard Area	Percent (%) of Total Population
Ashland Borough	2,817	230	8.2%	331	11.8%
Auburn Borough	741	33	4.5%	47	6.4%
Barry Township	932	28	3.0%	28	3.0%
Blythe Township	924	80	8.6%	103	11.2%
Branch Township	1,840	45	2.4%	45	2.4%
Butler Township	5,224	148	2.8%	183	3.5%
Cass Township	1,958	291	14.9%	291	14.9%
Coaldale Borough	2,281	0	0.0%	0	0.0%
Cressona Borough	1,651	186	11.2%	350	21.2%
Deer Lake Borough	687	24	3.4%	24	3.4%
Delano Township	445	9	2.1%	9	2.1%
East Brunswick Township	1,793	174	9.7%	174	9.7%
East Norwegian Township	863	35	4.1%	80	9.3%
East Union Township	1,605	24	1.5%	24	1.5%
Eldred Township	758	52	6.8%	52	6.8%
Foster Township	251	0	0.0%	0	0.0%
Frackville Borough	3,805	12	0.3%	12	0.3%
Frailey Township	429	19	4.4%	19	4.4%
Gilberton Borough	769	569	73.6%	705	91.2%
Girardville Borough	1,519	580	38.2%	613	40.4%
Gordon Borough	763	369	48.4%	402	52.7%

Municipality	Total Population (U.S. Census 2010)	1-Percent Annual Chance Event		0.2-Percent Annual Chance Event	
		Estimated Population in Hazard Area	Percent (%) of Total Population	Estimated Population in Hazard Area	Percent (%) of Total Population
Hegins Township	3,516	125	3.5%	125	3.5%
Hubley Township	854	28	3.3%	28	3.3%
Kline Township	1,438	0	0.0%	0	0.0%
Landingville Borough	159	52	32.5%	71	44.3%
Mahanoy City Borough	4,162	0	0.0%	0	0.0%
Mahanoy Township	3,152	150	4.8%	150	4.8%
McAdoo Borough	2,300	148	6.4%	261	11.3%
Mechanicsville Borough	457	0	0.0%	0	0.0%
Middleport Borough	405	134	33.1%	134	33.1%
Minersville Borough	4,397	240	5.5%	240	5.5%
Mount Carbon Borough	91	5	5.2%	5	5.2%
New Castle Township	414	7	1.7%	7	1.7%
New Philadelphia Borough	1,085	129	11.9%	169	15.6%
New Ringgold Borough	276	54	19.6%	54	19.6%
North Manheim Township	3,770	242	6.4%	284	7.6%
North Union Township	1,476	85	5.7%	85	5.7%
Norwegian Township	2,310	38	1.6%	38	1.6%
Orwigsburg Borough	3,099	139	4.5%	139	4.5%
Palo Alto Borough	1,032	5	0.5%	7	0.7%
Pine Grove Borough	2,186	935	42.8%	1147	52.5%
Pine Grove Township	4,123	606	14.7%	996	24.2%
Port Carbon Borough	1,889	665	35.2%	771	40.8%
Port Clinton Borough	326	214	65.6%	291	89.4%
Porter Township	2,176	0	0.0%	0	0.0%
Pottsville City	14,324	61	0.4%	61	0.4%
Reilly Township	726	110	15.2%	110	15.2%
Ringtown Borough	818	0	0.0%	0	0.0%
Rush Township	3,412	106	3.1%	106	3.1%
Ryan Township	2,459	2	0.1%	2	0.1%
Schuykill Haven Borough	5,437	710	13.1%	978	18.0%
Schuykill Township	1,129	5	0.4%	5	0.4%
Shenandoah Borough	5,071	5	0.1%	5	0.1%
South Manheim Township	2,504	228	9.1%	244	9.8%
St. Clair Borough	3,004	604	20.1%	1224	40.8%
Tamaqua Borough	7,107	303	4.3%	658	9.3%
Tower City Borough	1,346	0	0.0%	0	0.0%
Tremont Borough	1,752	562	32.1%	651	37.2%
Tremont Township	280	85	30.2%	125	44.5%
Union Township	1,273	35	2.8%	35	2.8%
Upper Mahantongo Township	655	263	40.2%	263	40.2%

Municipality	Total Population (U.S. Census 2010)	1-Percent Annual Chance Event		0.2-Percent Annual Chance Event	
		Estimated Population in Hazard Area	Percent (%) of Total Population	Estimated Population in Hazard Area	Percent (%) of Total Population
Walker Township	1,054	66	6.2%	66	6.2%
Washington Township	3,033	165	5.4%	165	5.4%
Wayne Township	5,113	146	2.8%	146	2.8%
West Brunswick Township	3,327	353	10.6%	367	11.0%
West Mahanoy Township	2,872	2	0.1%	2	0.1%
West Penn Township	4,442	456	10.3%	456	10.3%
Schuykill County (Total)	148,289	11,172	7.5%	14161	9.5%

Sources: U.S. Census 2010; FEMA 2017; Schuykill County 2018

Note: % Percent

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 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.

Using 2010 U.S. Census data, HAZUS-MH estimates potential sheltering needs for planning purposes as a result of a 1-percent annual chance flood event. HAZUS-MH estimates 6,708 households may be displaced, and 3,282 people may need to seek short-term sheltering; refer to Table 4.3.4-9. The estimated displaced population and number of persons seeking short-term sheltering differ from the estimated number of people living in the floodplain because the displaced population numbers take into consideration that not all residents will be significantly impacted enough to be displaced or to require short-term sheltering during a flood event.

Table 4.3.4-9. Estimated Population Displaced or Seeking Short-Term Shelter from the 1-Percent Annual Chance Flood Event

Municipality	Total Population (2010 U.S. Census)	1-Percent Annual Chance Event	
		Displaced Households	Persons Seeking Short-Term Sheltering
Ashland Borough	2,817	120	48
Auburn Borough	741	14	0
Barry Township	932	10	0
Blythe Township	924	57	44
Branch Township	1,840	29	1
Butler Township	5,224	79	10
Cass Township	1,958	90	46
Coaldale Borough	2,281	3	0
Cressona Borough	1,651	177	65
Deer Lake Borough	687	13	0
Delano Township	445	2	0
East Brunswick Township	1,793	63	2

Municipality	Total Population (2010 U.S. Census)	1-Percent Annual Chance Event	
		Displaced Households	Persons Seeking Short-Term Sheltering
East Norwegian Township	863	36	5
East Union Township	1,605	22	1
Eldred Township	758	38	2
Foster Township	251	0	0
Frackville Borough	3,805	32	2
Frailey Township	429	4	0
Gilberton Borough	769	299	123
Girardville Borough	1,519	574	476
Gordon Borough	763	204	106
Hegins Township	3,516	59	3
Hubley Township	854	48	2
Kline Township	1,438	1	0
Landingville Borough	159	13	0
Mahanoy City Borough	4,162	0	0
Mahanoy Township	3,152	71	13
McAdoo Borough	2,300	150	95
Mechanicsville Borough	457	0	0
Middleport Borough	405	87	27
Minersville Borough	4,397	218	99
Mount Carbon Borough	91	0	0
New Castle Township	414	1	0
New Philadelphia Borough	1,085	73	16
New Ringgold Borough	276	46	7
North Manheim Township	3,770	118	16
North Union Township	1,476	23	1
Norwegian Township	2,310	23	2
Orwigsburg Borough	3,099	92	29
Palo Alto Borough	1,032	8	1
Pine Grove Borough	2,186	63	16
Pine Grove Township	4,123	362	165
Port Carbon Borough	1,889	529	376
Port Clinton Borough	326	117	33
Porter Township	2,176	22	1
Pottsville City	14,324	38	12
Reilly Township	726	63	52
Ringtown Borough	818	1	0
Rush Township	3,412	13	0
Ryan Township	2,459	8	0
Schuykill Haven Borough	5,437	625	394
Schuykill Township	1,129	9	1
Shenandoah Borough	5,071	6	0
South Manheim Township	2,504	96	21
St. Clair Borough	3,004	541	436
Tamaqua Borough	7,107	0	0
Tower City Borough	1,346	3	0

Municipality	Total Population (2010 U.S. Census)	1-Percent Annual Chance Event	
		Displaced Households	Persons Seeking Short-Term Sheltering
Tremont Borough	1,752	513	354
Tremont Township	280	9	0
Union Township	1,273	5	0
Upper Mahantongo Township	655	141	78
Walker Township	1,054	26	2
Washington Township	3,033	155	16
Wayne Township	5,113	77	3
West Brunswick Township	3,327	163	49
West Mahanoy Township	2,872	0	0
West Penn Township	4,442	226	31
Schuykill County (Total)	148,289	6,708	3,282

Source: HAZUS-MH 4.0

Note: The population displaced and seeking shelter was calculated using 2010 U.S. Census data.

Total number of injuries and casualties resulting from typical riverine flooding is generally limited because of advance 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.

Cascading flood impacts may include exposure to pathogens such as mold. After flood events, excess moisture and standing water contribute to 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. Molds 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 potential for allergic reactions, asthma episodes, and other respiratory problems. Buildings should be properly cleaned and dried out to safely prevent mold growth (CDC 2015).

Molds and mildews are not the only public health risk associated with flooding. Floodwaters 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-MH are not equipped to measure public health impacts. The best level of mitigation for these impacts is to be aware that they can occur, educate the public on prevention, and be prepared to deal with these vulnerabilities in responding to flood events.

Impact on General Building Stock

To assess potential impacts on buildings, both exposure (structures located in the hazard area) and potential loss to the exposed inventory calculated by HAZUS-MH were estimated for the 1- and 0.2-percent annual chance flood events. Using the County building footprint layer, there are an estimated 4,754 structures (4.4-percent of the County total) and \$2.1 billion of building/content value located in the FEMA effective 1-percent annual chance flood zone. There are an estimated 6,026 structures and over \$26 billion of building/content value located in the FEMA effective 0.2-percent annual chance flood zone. Table 4.3.4-10 lists the buildings exposed per municipality.

The HAZUS-MH flood model estimated greater than \$742 million in potential building damages Countywide as a result of the 1-percent annual chance flood event. Estimated building stock potential loss estimates per municipality are listed in Table 4.3.4-11.

Table 4.3.4-10. Estimated General Building Stock Exposure to the 1- and 0.2-Percent Annual Chance Flood Events

Municipality	Total Number of Buildings	Total RCV (Structure and Contents)	Total (All Occupancies)							
			1-Percent Annual Chance Event				0.2-Percent Annual Chance Event			
			Number of Buildings	Percent (%) of Total	Total RCV (Structure and Contents)	Percent (%) of Total	Number of Buildings	Percent (%) of Total	Total RCV (Structure and Contents)	Percent (%) of Total
Ashland Borough	1,305	\$620,713,000	98	7.5%	\$45,618,000	7.3%	141	10.8%	\$46,518,000	7.5%
Auburn Borough	654	\$103,863,000	14	2.1%	\$1,902,000	1.8%	20	3.1%	\$1,902,000	1.8%
Barry Township	1,424	\$158,166,000	12	0.8%	\$954,000	<1%	12	0.8%	\$954,000	<1%
Blythe Township	842	\$116,013,000	34	4.0%	\$0	0.0%	44	5.2%	\$2,699,000	2.3%
Branch Township	1,434	\$267,249,000	19	1.3%	\$564,000	<1%	19	1.3%	\$564,000	<1%
Butler Township	3,520	\$678,513,000	63	1.8%	\$18,654,000	2.7%	78	2.2%	\$20,484,000	3.0%
Cass Township	1,786	\$214,671,000	124	6.9%	\$9,178,000	4.3%	124	6.9%	\$9,178,000	4.3%
Coaldale Borough	1,204	\$486,727,000	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
Cressona Borough	1,062	\$953,030,000	79	7.4%	\$624,737,000	65.6%	149	14.0%	\$633,507,000	66.5%
Deer Lake Borough	450	\$99,765,000	10	2.2%	\$1,602,000	1.6%	10	2.2%	\$1,602,000	1.6%
Delano Township	351	\$83,326,000	4	1.1%	\$783,000	<1%	4	1.1%	\$783,000	<1%
East Brunswick Township	2,201	\$324,669,000	74	3.4%	\$8,470,000	2.6%	74	3.4%	\$8,470,000	2.6%
East Norwegian Township	817	\$143,736,000	15	1.8%	\$1,667,000	1.2%	34	4.2%	\$15,712,000	10.9%
East Union Township	1,650	\$204,679,000	10	0.6%	\$225,000	<1%	10	0.6%	\$225,000	<1%
Eldred Township	1,266	\$121,735,000	22	1.7%	\$1,350,000	1.1%	22	1.7%	\$1,350,000	1.1%
Foster Township	318	\$38,321,000	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
Frackville Borough	2,170	\$752,136,000	5	0.2%	\$22,782,000	3.0%	5	0.2%	\$22,782,000	3.0%
Frailley Township	450	\$53,438,000	8	1.8%	\$0	0.0%	8	1.8%	\$0	0.0%
Gilberton Borough	589	\$128,081,000	242	41.1%	\$60,250,000	47.0%	300	50.9%	\$71,847,000	56.1%
Girardville Borough	663	\$222,078,000	247	37.3%	\$83,735,000	37.7%	261	39.4%	\$83,735,000	37.7%
Gordon Borough	532	\$100,774,000	157	29.5%	\$50,193,000	49.8%	171	32.1%	\$50,868,000	50.5%
Hegins Township	4,433	\$685,956,000	53	1.2%	\$10,835,000	1.6%	53	1.2%	\$10,835,000	1.6%

Municipality	Total Number of Buildings	Total RCV (Structure and Contents)	Total (All Occupancies)							
			1-Percent Annual Chance Event				0.2-Percent Annual Chance Event			
			Number of Buildings	Percent (%) of Total	Total RCV (Structure and Contents)	Percent (%) of Total	Number of Buildings	Percent (%) of Total	Total RCV (Structure and Contents)	Percent (%) of Total
Hubley Township	1,574	\$105,069,000	12	0.8%	\$2,324,000	2.2%	12	0.8%	\$2,324,000	2.2%
Kline Township	1,184	\$240,993,000	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
Landingville Borough	168	\$27,592,000	22	13.1%	\$4,969,000	18.0%	30	17.9%	\$11,147,000	40.4%
Mahanoy City Borough	904	\$659,011,000	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
Mahanoy Township	1,079	\$184,548,000	64	5.9%	\$675,000	<1%	64	5.9%	\$675,000	<1%
McAdoo Borough	1,262	\$319,053,000	63	5.0%	\$15,419,000	4.8%	111	8.8%	\$15,419,000	4.8%
Mechanicsville Borough	297	\$59,144,000	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
Middleport Borough	304	\$60,507,000	57	18.8%	\$12,145,000	20.1%	57	18.8%	\$12,145,000	20.1%
Minersville Borough	1,705	\$740,701,000	102	6.0%	\$48,844,000	6.6%	102	6.0%	\$48,844,000	6.6%
Mount Carbon Borough	65	\$17,094,000	2	3.1%	\$0	0.0%	2	3.1%	\$0	0.0%
New Castle Township	337	\$74,575,000	3	0.9%	\$225,000	<1%	3	0.9%	\$225,000	<1%
New Philadelphia Borough	609	\$162,575,000	55	9.0%	\$14,344,000	8.8%	72	11.8%	\$14,344,000	8.8%
New Ringgold Borough	267	\$37,501,000	23	8.6%	\$9,696,000	25.9%	23	8.6%	\$9,696,000	25.9%
North Manheim Township	3,235	\$729,771,000	103	3.2%	\$7,892,000	1.1%	121	3.7%	\$7,892,000	1.1%
North Union Township	1,571	\$263,112,000	36	2.3%	\$5,479,000	2.1%	36	2.3%	\$5,479,000	2.1%
Norwegian Township	1,569	\$504,898,000	16	1.0%	\$1,833,000	<1%	16	1.0%	\$1,833,000	<1%
Orwigsburg Borough	1,611	\$650,863,000	59	3.7%	\$8,873,000	1.4%	59	3.7%	\$8,873,000	1.4%
Palo Alto Borough	590	\$166,890,000	2	0.3%	\$9,674,000	5.8%	3	0.5%	\$10,178,000	6.1%
Pine Grove Borough	1,278	\$488,857,000	398	31.1%	\$129,928,000	26.6%	488	38.2%	\$152,831,000	31.3%
Pine Grove Township	4,729	\$572,921,000	258	5.5%	\$62,947,000	11.0%	424	9.0%	\$101,258,000	17.7%
Port Carbon Borough	1,040	\$248,182,000	283	27.2%	\$92,020,000	37.1%	328	31.5%	\$104,598,000	42.1%
Port Clinton Borough	251	\$53,248,000	91	36.3%	\$19,020,000	35.7%	124	49.4%	\$23,627,000	44.4%
Porter Township	2,522	\$322,132,000	0	0.0%	\$7,174,000	2.2%	0	0.0%	\$7,174,000	2.2%
Pottsville City	5,667	\$2,835,912,000	26	0.5%	\$36,065,000	1.3%	26	0.5%	\$36,065,000	1.3%

Municipality	Total Number of Buildings	Total RCV (Structure and Contents)	Total (All Occupancies)							
			1-Percent Annual Chance Event				0.2-Percent Annual Chance Event			
			Number of Buildings	Percent (%) of Total	Total RCV (Structure and Contents)	Percent (%) of Total	Number of Buildings	Percent (%) of Total	Total RCV (Structure and Contents)	Percent (%) of Total
Reilly Township	615	\$87,148,000	47	7.6%	\$7,198,000	8.3%	47	7.6%	\$7,198,000	8.3%
Ringtown Borough	591	\$196,315,000	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
Rush Township	3,358	\$638,207,000	45	1.3%	\$1,404,000	<1%	45	1.3%	\$1,404,000	<1%
Ryan Township	1,552	\$258,861,000	1	0.1%	\$2,303,000	0.9%	1	0.1%	\$2,303,000	<1%
Schuylkill Haven Borough	1,571	\$1,167,905,000	302	19.2%	\$119,109,000	10.2%	416	26.5%	\$269,951,000	23.1%
Schuylkill Township	2,672	\$148,930,000	2	0.1%	\$1,125,000	<1%	2	0.1%	\$1,125,000	<1%
Shenandoah Borough	909	\$1,114,064,000	2	0.2%	\$0	0.0%	2	0.2%	\$0	0.0%
South Manheim Township	1,652	\$472,442,000	97	5.9%	\$3,873,000	<1%	104	6.3%	\$3,873,000	<1%
St. Clair Borough	2,543	\$641,674,000	257	10.1%	\$195,193,000	30.4%	521	20.5%	\$292,509,000	45.6%
Tamaqua Borough	3,027	\$1,146,438,000	129	4.3%	\$90,641,000	7.9%	280	9.3%	\$235,217,000	20.5%
Tower City Borough	952	\$275,734,000	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
Tremont Borough	954	\$261,136,000	239	25.1%	\$113,170,000	43.3%	277	29.0%	\$117,973,000	45.2%
Tremont Township	372	\$59,522,000	36	9.7%	\$2,632,000	4.4%	53	14.2%	\$2,632,000	4.4%
Union Township	1,590	\$141,163,000	15	0.9%	\$900,000	<1%	15	0.9%	\$900,000	<1%
Upper Mahantongo Township	1,203	\$134,904,000	112	9.3%	\$18,059,000	13.4%	112	9.3%	\$18,059,000	13.4%
Walker Township	1,399	\$129,306,000	28	2.0%	\$1,590,000	1.2%	28	2.0%	\$1,590,000	1.2%
Washington Township	3,784	\$378,935,000	70	1.8%	\$16,546,000	4.4%	70	1.8%	\$16,546,000	4.4%
Wayne Township	5,373	\$884,718,000	62	1.2%	\$43,209,000	4.9%	62	1.2%	\$43,209,000	4.9%
West Brunswick Township	3,297	\$656,084,000	150	4.5%	\$18,525,000	2.8%	156	4.7%	\$20,828,000	3.2%
West Mahanoy Township	2,208	\$586,962,000	1	0.0%	\$0	0.0%	1	0.0%	\$0	0.0%
West Penn Township	5,677	\$552,845,000	194	3.4%	\$25,586,000	4.6%	194	3.4%	\$25,586,000	4.6%
Schuylkill County	108,238	\$26,016,081,000	4,754	4.4%	\$2,094,108,000	8.0%	6,026	5.6%	\$2,619,545,000	10.1%

Source: HAZUS-MH 4.0; Schuylkill County; FEMA 2017

Notes:

% Percent

RCV Replacement cost value (structure and contents)

Table 4.3.4-11. Estimated General Building Stock Potential Loss to the 1-Percent Annual Chance Flood Event

Municipality	Total Replacement Cost Value	1% Annual Chance Event						Industrial, Religious, Education and Government	
		All Occupancies		Residential		Commercial		Estimated Loss	% of Total
		Estimated Loss	% of Total	Estimated Loss	% of Total	Estimated Loss	% of Total		
Ashland Borough	\$620,713,000	\$13,987,000	2.3%	\$2,963,000	<1%	\$3,181,000	<1%	\$7,843,000	1.3%
Auburn Borough	\$103,863,000	\$7,008,000	6.7%	\$200,000	<1%	\$49,000	<1%	\$6,759,000	6.5%
Barry Township	\$158,166,000	\$291,000	<1%	\$236,000	<1%	\$35,000	<1%	\$20,000	<1%
Blythe Township	\$116,013,000	\$1,242,000	1.1%	\$1,241,000	1.1%	\$1,000	<1%	\$0	0.0%
Branch Township	\$267,249,000	\$900,000	<1%	\$641,000	<1%	\$233,000	<1%	\$26,000	<1%
Butler Township	\$678,513,000	\$3,112,000	<1%	\$1,818,000	<1%	\$1,221,000	<1%	\$73,000	<1%
Cass Township	\$214,671,000	\$6,058,000	2.8%	\$2,464,000	1.1%	\$2,105,000	1.0%	\$1,489,000	<1%
Coaldale Borough	\$486,727,000	\$38,000	<1%	\$30,000	<1%	\$8,000	<1%	\$0	0.0%
Cressona Borough	\$953,030,000	\$146,169,000	15.3%	\$4,897,000	<1%	\$5,097,000	<1%	\$136,175,000	14.3%
Deer Lake Borough	\$99,765,000	\$328,000	<1%	\$156,000	<1%	\$168,000	<1%	\$4,000	<1%
Delano Township	\$83,326,000	\$63,000	<1%	\$32,000	<1%	\$0	0.0%	\$31,000	<1%
East Brunswick Township	\$324,669,000	\$2,360,000	<1%	\$1,544,000	<1%	\$736,000	<1%	\$80,000	<1%
East Norwegian Township	\$143,736,000	\$1,385,000	1.0%	\$1,059,000	<1%	\$51,000	<1%	\$275,000	<1%
East Union Township	\$204,679,000	\$435,000	<1%	\$284,000	<1%	\$46,000	<1%	\$105,000	<1%
Eldred Township	\$121,735,000	\$758,000	<1%	\$444,000	<1%	\$125,000	<1%	\$189,000	<1%
Foster Township	\$38,321,000	\$0	0.0%	\$0	0.0%	\$0	0.0%	\$0	0.0%

Municipality	Total Replacement Cost Value	1% Annual Chance Event							
		All Occupancies		Residential		Commercial		Industrial, Religious, Education and Government	
		Estimated Loss	% of Total	Estimated Loss	% of Total	Estimated Loss	% of Total	Estimated Loss	% of Total
Frackville Borough	\$752,136,000	\$485,000	<1%	\$459,000	<1%	\$26,000	<1%	\$0	0.0%
Frailey Township	\$53,438,000	\$593,000	1.1%	\$80,000	<1%	\$280,000	<1%	\$233,000	<1%
Gilberton Borough	\$128,081,000	\$47,943,000	37.4%	\$18,756,000	14.6%	\$18,866,000	14.7%	\$10,321,000	8.1%
Girardville Borough	\$222,078,000	\$71,890,000	32.4%	\$15,059,000	6.8%	\$2,025,000	<1%	\$54,806,000	24.7%
Gordon Borough	\$100,774,000	\$9,437,000	9.4%	\$5,853,000	5.8%	\$342,000	<1%	\$3,242,000	3.2%
Hegins Township	\$685,956,000	\$5,541,000	<1%	\$1,170,000	<1%	\$1,051,000	<1%	\$3,320,000	<1%
Hubley Township	\$105,069,000	\$2,047,000	1.9%	\$844,000	<1%	\$1,007,000	1.0%	\$196,000	<1%
Kline Township	\$240,993,000	\$215,000	<1%	\$5,000	<1%	\$26,000	<1%	\$184,000	<1%
Landingville Borough	\$27,592,000	\$1,994,000	7.2%	\$321,000	1.2%	\$936,000	3.4%	\$737,000	2.7%
Mahanoy City Borough	\$659,011,000	\$0	0.0%	\$0	0.0%	\$0	0.0%	\$0	0.0%
Mahanoy Township	\$184,548,000	\$1,208,000	<1%	\$1,185,000	<1%	\$8,000	<1%	\$15,000	<1%
McAdoo Borough	\$319,053,000	\$3,731,000	1.2%	\$1,878,000	<1%	\$1,624,000	<1%	\$229,000	<1%
Mechanicsville Borough	\$59,144,000	\$0	0.0%	\$0	0.0%	\$0	0.0%	\$0	0.0%
Middleport Borough	\$60,507,000	\$2,212,000	3.7%	\$2,048,000	3.4%	\$164,000	<1%	\$0	0.0%
Minersville Borough	\$740,701,000	\$89,751,000	12.1%	\$3,141,000	<1%	\$6,782,000	<1%	\$79,828,000	10.8%
Mount Carbon Borough	\$17,094,000	\$48,000	<1%	\$40,000	<1%	\$8,000	<1%	\$0	0.0%
New Castle Township	\$74,575,000	\$92,000	<1%	\$92,000	<1%	\$0	0.0%	\$0	0.0%
New Philadelphia Borough	\$162,575,000	\$4,923,000	3.0%	\$1,454,000	<1%	\$2,627,000	1.6%	\$842,000	<1%
New Ringgold Borough	\$37,501,000	\$690,000	<1%	\$678,000	1.8%	\$12,000	<1%	\$0	0.0%
North Manheim Township	\$729,771,000	\$7,314,000	1.0%	\$2,415,000	<1%	\$4,449,000	<1%	\$450,000	<1%
North Union Township	\$263,112,000	\$1,309,000	<1%	\$678,000	<1%	\$542,000	<1%	\$89,000	<1%



Municipality	Total Replacement Cost Value	1% Annual Chance Event							
		All Occupancies		Residential		Commercial		Industrial, Religious, Education and Government	
		Estimated Loss	% of Total	Estimated Loss	% of Total	Estimated Loss	% of Total	Estimated Loss	% of Total
Norwegian Township	\$504,898,000	\$770,000	<1%	\$342,000	<1%	\$346,000	<1%	\$82,000	<1%
Orwigsburg Borough	\$650,863,000	\$2,688,000	<1%	\$1,483,000	<1%	\$782,000	<1%	\$423,000	<1%
Palo Alto Borough	\$166,890,000	\$9,433,000	5.7%	\$524,000	<1%	\$3,071,000	1.8%	\$5,838,000	3.5%
Pine Grove Borough	\$488,857,000	\$2,069,000	<1%	\$1,427,000	<1%	\$359,000	<1%	\$283,000	<1%
Pine Grove Township	\$572,921,000	\$30,634,000	5.3%	\$8,394,000	1.5%	\$7,659,000	1.3%	\$14,581,000	2.5%
Port Carbon Borough	\$248,182,000	\$37,888,000	15.3%	\$13,815,000	5.6%	\$13,348,000	5.4%	\$10,725,000	4.3%
Port Clinton Borough	\$53,248,000	\$10,177,000	19.1%	\$3,817,000	7.2%	\$1,795,000	3.4%	\$4,565,000	8.6%
Porter Township	\$322,132,000	\$588,000	<1%	\$298,000	<1%	\$84,000	<1%	\$206,000	<1%
Pottsville City	\$2,835,912,000	\$11,034,000	<1%	\$2,018,000	<1%	\$8,993,000	<1%	\$23,000	<1%
Reilly Township	\$87,148,000	\$977,000	1.1%	\$924,000	1.1%	\$5,000	<1%	\$48,000	<1%
Ringtown Borough	\$196,315,000	\$27,000	0.0%	\$16,000	<1%	\$5,000	<1%	\$6,000	<1%
Rush Township	\$638,207,000	\$996,000	<1%	\$443,000	<1%	\$346,000	<1%	\$207,000	<1%
Ryan Township	\$258,861,000	\$133,000	<1%	\$73,000	<1%	\$31,000	<1%	\$29,000	<1%
Schuylkill Haven Borough	\$1,167,905,000	\$41,872,000	3.6%	\$14,334,000	1.2%	\$18,392,000	1.6%	\$9,146,000	<1%
Schuylkill Township	\$148,930,000	\$239,000	<1%	\$166,000	<1%	\$0	0.0%	\$73,000	<1%
Shenandoah Borough	\$1,114,064,000	\$64,000	<1%	\$62,000	<1%	\$0	0.0%	\$2,000	<1%
South Manheim Township	\$472,442,000	\$3,405,000	<1%	\$1,952,000	<1%	\$912,000	<1%	\$541,000	<1%
St. Clair Borough	\$641,674,000	\$71,480,000	11.1%	\$9,446,000	1.5%	\$15,208,000	2.4%	\$46,826,000	7.3%
Tamaqua Borough	\$1,146,438,000	\$1,633,000	<1%	\$21,000	<1%	\$1,538,000	<1%	\$74,000	<1%
Tower City Borough	\$275,734,000	\$36,000	<1%	\$36,000	<1%	\$0	0.0%	\$0	0.0%
Tremont Borough	\$261,136,000	\$26,087,000	10.0%	\$11,025,000	4.2%	\$4,459,000	1.7%	\$10,603,000	4.1%
Tremont Township	\$59,522,000	\$218,000	0.4%	\$91,000	<1%	\$127,000	<1%	\$0	0.0%

Municipality	Total Replacement Cost Value	1% Annual Chance Event							
		All Occupancies		Residential		Commercial		Industrial, Religious, Education and Government	
		Estimated Loss	% of Total	Estimated Loss	% of Total	Estimated Loss	% of Total	Estimated Loss	% of Total
Union Township	\$141,163,000	\$86,000	<1%	\$83,000	<1%	\$1,000	<1%	\$2,000	<1%
Upper Mahantongo Township	\$134,904,000	\$7,604,000	5.6%	\$4,657,000	3.5%	\$1,632,000	1.2%	\$1,315,000	1.0%
Walker Township	\$129,306,000	\$481,000	<1%	\$427,000	<1%	\$0	0.0%	\$54,000	0.0%
Washington Township	\$378,935,000	\$4,605,000	1.2%	\$2,999,000	<1%	\$1,138,000	<1%	\$468,000	<1%
Wayne Township	\$884,718,000	\$3,753,000	<1%	\$2,244,000	<1%	\$518,000	<1%	\$991,000	<1%
West Brunswick Township	\$656,084,000	\$16,479,000	2.5%	\$7,024,000	1.1%	\$7,969,000	1.2%	\$1,486,000	<1%
West Mahanoy Township	\$586,962,000	\$2,000	<1%	\$2,000	<1%	\$0	0.0%	\$0	0.0%
West Penn Township	\$552,845,000	\$20,707,000	3.7%	\$3,240,000	<1%	\$4,239,000	<1%	\$13,228,000	<1%
Schuylkill County	\$26,016,081,000	\$741,722,000	2.9%	\$165,548,000	<1%	\$146,788,000	<1%	\$429,386,000	1.7%

Source: HAZUS-MH 4.0

Note: % Percent

NFIP Statistics

Individual data available regarding NFIP flood policies, claims, repetitive loss (RL) properties, and severe repetitive loss (SRL) properties were analyzed. 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 these claims payments exceeding \$20,000
- At least two separate claims payments (building payments only), with the cumulative amount of the building portion of these claims payments exceeding the market value of the building.
- Moreover, for both of the 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 10 days apart.

An RL property is defined by FEMA 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.

Schuylkill County has four (4) RL (one non-residential, two single family, and one 2-4 family) and four (4) SRL (one non-residential, two single family, and one 2-4 family) properties. Table 4.3.4-12 lists the RL and SRL properties by municipality and by occupancy class (non-residential or residential). The general location of the RL and SRL properties are also displayed on Figure 4.3.4-5.

Table 4.3.4-12. Summary of Repetitive Loss Properties by Municipality

Municipality	Repetitive Loss Properties					Severe Repetitive Loss Properties				
	2-4 Family	Assumed Condo	Non-Residential	Other Residential	Single Family	2-4 Family	Assumed Condo	Non-Residential	Other Residential	Single Family
Pine Grove Borough	1	0	0	0	1	1	0	1	0	2
Schuylkill Haven Borough	0	0	1	0	0	0	0	0	0	0
Tremont Borough	0	0	0	0	1	0	0	0	0	0
Schuylkill County (Total)	1	0	1	0	2	1	0	1	0	2

Source: PEMA 2018

Note: Repetitive loss property totals do not include severe repetitive loss properties.

Table 4.3.4-13 summaries the NFIP policies and claims in Schuylkill County as of February 2018.

Table 4.3.4-13. NFIP Policies, Claims, and Repetitive Loss Statistics

Municipality	# Policies (1)	# Claims (Losses) (1)	# Repetitive Loss Properties (1)	Total Loss Payments Since 1978
Ashland Borough	5	5	0	\$9,503
Auburn Borough	5	8	0	\$136,609
Barry Township	5	5	0	\$19,765
Blythe Township	3	4	0	\$1,905
Branch Township	2	4	0	\$5,215
Butler Township	12	1	0	\$0
Cass Township	4	6	0	\$130,183
Coaldale Borough	0	0	0	\$0
Cressona Borough	16	13	0	\$47,398
Deer Lake Borough	5	1	0	\$1,628
Delano Township	0	0	0	\$0
East Brunswick Township	5	2	0	\$20,357
East Norwegian Township	3	0	0	\$0
East Union Township	2	3	0	\$51,390
Eldred Township	0	0	0	\$0
Foster Township	0	0	0	\$0
Frackville Borough	5	8	0	\$59,935
Frailey Township	2	0	0	\$0
Gilberton Borough	10	12	0	\$184,784
Girardville Borough	31	27	0	\$120,943
Gordon Borough	30	21	0	\$228,218
Hegins Township	1	2	0	\$1,202
Hubley Township	2	4	0	\$96,950
Kline Township	0	0	0	\$0
Landingville Borough	4	9	0	\$128,051
Mahanoy City Borough	2	1	0	\$3,692
Mahanoy Township	2	1	0	\$1,091
McAdoo Borough	10	11	0	\$56,575
Mechanicsville Borough	0	3	0	\$1,139
Middleport Borough	11	12	0	\$57,959
Minersville Borough	19	21	0	\$127,379
Mount Carbon Borough	0	1	0	\$0
New Castle Township	1	1	0	\$14,296
New Philadelphia Borough	9	6	0	\$25,676
New Ringgold Borough	6	4	0	\$44,457
North Manheim Township	20	11	0	\$95,043

Municipality	# Policies (1)	# Claims (Losses) (1)	# Repetitive Loss Properties (1)	Total Loss Payments Since 1978
North Union Township	1	1	0	\$215
Norwegian Township	0	0	0	\$0
Orwigsburg Borough	35	19	0	\$80,632
Palo Alto Borough	0	0	0	\$0
Pine Grove Borough	71	217	2 RL / 4 SRL	\$8,490,748
Pine Grove Township	47	50	0	\$4,981,980
Port Carbon Borough	84	83	0	\$1,286,358
Port Clinton Borough	17	12	0	\$288,973
Porter Township	3	0	0	\$0
Pottsville City	7	4	0	\$489,171
Reilly Township	2	1	0	\$0
Ringtown Borough	1	0	0	\$0
Rush Township	2	0	0	\$0
Ryan Township	2	0	0	\$0
Schuylkill Haven Borough	80	79	1 RL	\$2,112,995
Schuylkill Township	1	4	0	\$104,388
Shenandoah Borough	19	8	0	\$5,722
South Manheim Township	12	5	0	\$101,093
St. Clair Borough	68	35	0	\$196,408
Tamaqua Borough	90	42	0	\$289,632
Tower City Borough	1	3	0	\$5,128
Tremont Borough	27	26	1 RL	\$258,430
Tremont Township	2	0	0	\$0
Union Township	2	6	0	\$36,492
Upper Mahantongo Township	21	43	0	\$945,065
Walker Township	15	1	0	\$0
Washington Township	6	2	0	\$164,302
Wayne Township	13	3	0	\$38,223
West Brunswick Township	23	11	0	\$72,099
West Mahanoy Township	0	2	0	\$394
West Penn Township	36	3	0	\$7,732
Schuylkill County (Total)	775	849	4 RL / 4 SRL	\$21,627,549

Source: FEMA 2018

Notes:

(1) Policies, claims, RL, and SRL statistics provided by FEMA, and are current as of February 28, 2018. Communities with SRL properties are noted in the column. The number of claims represents claims closed by February 28, 2018.

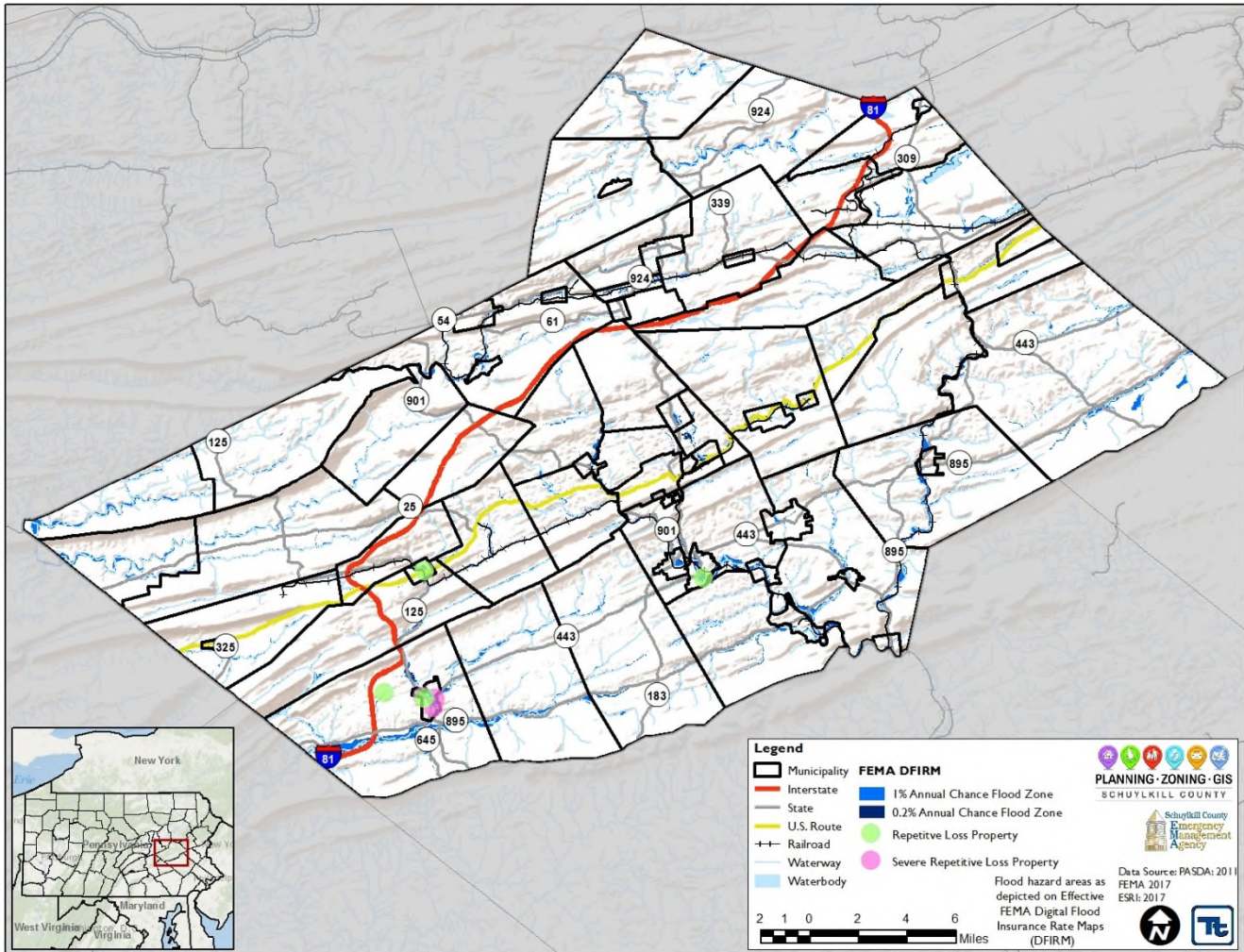
FEMA Federal Emergency Management Agency

PEMA Pennsylvania Emergency Management Agency

RL Repetitive loss SRL Severe repetitive loss



Figure 4.3.4-5. NFIP Repetitive and Severe Repetitive Loss Properties in Schuykill County



Impact on Critical Facilities

Critical services during and after a flood event may not be available if critical facility structures 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, including for emergency service providers needing to get to vulnerable populations or to make repairs. Major roadways that may be impacted by the 1-percent annual chance flood event include I-81, US-209, SR-25, SR-54, SR-61, SR-125, SR-183, SR-309, SR-339, SR-443, SR-645, SR-895, R-901 and SR-924. Bridges washed out or blocked by floods or debris also can cause isolation. Water and sewer systems can be flooded or backed up, causing health problems. Floodwaters can get into drinking water supplies, causing contamination. Culverts can be blocked by debris from flood events, also causing localized urban flooding. Sewer systems can be backed up, causing wastewater to spill into homes, neighborhoods, rivers and streams.

Critical facility exposure to the flood hazard was examined. Table 4.3.4-14 lists critical facilities and utilities located in the 1-percent annual chance flood boundary. Table 4.3.4-15 lists critical facilities and utilities within the 0.2 percent annual chance flood boundary.

Table 4.3.4-14. Critical Facilities and Utilities Located in the 1-Percent Annual Chance Flood Boundary

Municipality	Bridge	Children/Youth Services	Dam	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Hazmat	Hospital	Hydrant	Mental Health	Nursing Home	Police	Polling	Potable Water Treatment	Wastewater Treatment
Ashland Borough	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Auburn Borough	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barry Township	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blythe Township	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Branch Township	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Butler Township	6	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Cass Township	1	0	2	0	0	0	1	0	0	0	0	0	0	1	0	0	0
Coaldale Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cressona Borough	3	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Deer Lake Borough	2	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Delano Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Brunswick Township	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Norwegian Township	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
East Union Township	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eldred Township	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Foster Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Frackville Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Frailey Township	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gilberton Borough	5	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
Girardville Borough	6	0	0	0	0	0	1	1	1	0	11	0	0	1	0	0	0
Gordon Borough	2	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0
Hegins Township	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hubley Township	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kline Township	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landingville Borough	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Municipality	Bridge	Children/Youth Services	Dam	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Hazmat	Hospital	Hydrant	Mental Health	Nursing Home	Police	Polling	Potable Water Treatment	Wastewater Treatment
Mahanoy City Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mahanoy Township	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
McAdoo Borough	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Mechanicsville Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleport Borough	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minersville Borough	1	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0
Mount Carbon Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Castle Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Philadelphia Borough	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Ringgold Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Manheim Township	11	0	2	0	0	0	0	0	1	0	0	0	0	0	0	1	0
North Union Township	7	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Norwegian Township	0	1	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0
Orwigsburg Borough	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Palo Alto Borough	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pine Grove Borough	4	0	0	0	0	1	0	1	3	0	0	0	0	0	0	0	0
Pine Grove Township	16	0	2	1	0	0	0	1	2	0	0	0	0	0	0	0	1
Port Carbon Borough	5	0	0	1	0	0	0	1	1	0	0	0	0	0	1	0	0
Port Clinton Borough	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Porter Township	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pottsville City	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Reilly Township	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ringtown Borough	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rush Township	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ryan Township	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Municipality	Bridge	Children/Youth Services	Dam	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Hazmat	Hospital	Hydrant	Mental Health	Nursing Home	Police	Polling	Potable Water Treatment	Wastewater Treatment
Schuykill Haven Borough	5	0	0	1	0	1	0	1	1	0	0	0	0	0	0	0	1
Schuykill Township	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shenandoah Borough	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Manheim Township	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
St. Clair Borough	6	0	0	1	0	0	1	2	1	0	0	0	0	1	1	0	0
Tamaqua Borough	7	0	2	1	1	0	0	1	1	0	0	0	0	0	0	0	0
Tower City Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tremont Borough	7	0	0	0	1	0	0	1	1	0	0	0	1	0	0	0	0
Tremont Township	3	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Union Township	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Mahantongo Township	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walker Township	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Washington Township	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wayne Township	1	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0
West Brunswick Township	12	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
West Mahanoy Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
West Penn Township	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schuykill County (Total)	230	1	25	8	3	2	4	14	19	1	17	1	2	4	4	1	5

Table 4.3.4-15. Critical Facilities and Utilities Located in the 0.2-Percent Annual Chance Flood Boundary

Municipality	Bridge	Children/Youth Services	Dam	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Hazmat	Hospital	Hydrant	Mental Health	Nursing Home	Police	Polling	Potable Water Treatment	Wastewater Treatment
Ashland Borough	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Auburn Borough	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barry Township	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blythe Township	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Branch Township	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Butler Township	6	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Cass Township	1	0	2	0	0	0	1	0	0	0	0	0	0	1	0	0	0
Coaldale Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cressona Borough	4	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0
Deer Lake Borough	2	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Delano Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Brunswick Township	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Norwegian Township	2	0	0	0	0	0	1	0	4	0	0	0	0	0	0	0	1
East Union Township	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eldred Township	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Foster Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Frackville Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Frailey Township	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gilberton Borough	5	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
Girardville Borough	6	0	0	0	0	0	1	1	1	0	12	0	0	1	2	0	0
Gordon Borough	2	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0
Hegins Township	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hubley Township	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kline Township	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landingville Borough	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mahanoy City Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mahanoy Township	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
McAdoo Borough	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Mechanicsville Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleport Borough	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Municipality	Bridge	Children/Youth Services	Dam	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Hazmat	Hospital	Hydrant	Mental Health	Nursing Home	Police	Polling	Potable Water Treatment	Wastewater Treatment
Minersville Borough	1	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0
Mount Carbon Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Castle Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Philadelphia Borough	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Ringgold Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Manheim Township	11	0	2	0	0	0	0	0	1	0	0	0	0	0	0	1	0
North Union Township	7	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Norwegian Township	0	1	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0
Orwigsburg Borough	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Palo Alto Borough	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pine Grove Borough	4	0	0	0	0	1	1	2	3	0	0	0	0	0	1	0	0
Pine Grove Township	16	0	2	1	0	0	0	1	3	0	0	0	0	0	0	0	1
Port Carbon Borough	5	0	0	1	0	0	0	1	1	0	0	0	0	0	1	0	0
Port Clinton Borough	1	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0
Porter Township	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pottsville City	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Reilly Township	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ringtown Borough	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rush Township	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ryan Township	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schuykill Haven Borough	5	0	0	1	0	1	0	2	1	0	0	0	0	0	0	0	1
Schuykill Township	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shenandoah Borough	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Manheim Township	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
St. Clair Borough	7	0	0	1	1	1	1	2	1	1	0	0	0	1	3	0	0
Tamaqua Borough	7	0	2	1	3	0	0	2	1	0	0	0	0	0	0	0	0
Tower City Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tremont Borough	7	0	0	0	1	1	0	1	1	0	0	0	1	0	0	0	0
Tremont Township	3	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Union Township	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Mahantongo Township	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Municipality	Bridge	Children/Youth Services	Dam	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Hazmat	Hospital	Hydrant	Mental Health	Nursing Home	Police	Polling	Potable Water Treatment	Wastewater Treatment
Walker Township	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Washington Township	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wayne Township	1	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0
West Brunswick Township	12	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
West Mahanoy Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
West Penn Township	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schuykill Count (total)	232	1	25	8	6	4	6	17	23	2	18	1	2	5	10	1	7

Source: Schuykill County 2018, FEMA 2017

Impact on the Economy

Flood events can significantly impact the local and regional economy. This includes but is not limited to building damages and associated tax loss, impacts to utilities and infrastructure, agricultural losses, business interruption and effects on tourism. In areas that are directly flooded, commercial and industrial building repairs/renovations may be necessary, disrupting associated services.

Flooding can cause extensive damage to public utilities and disruptions to delivery of services. Loss of power and communications may occur and drinking water and wastewater treatment facilities may be temporarily out of operation. As presented above, several critical facilities and utilities are exposed and potentially vulnerable to the 1- and 0.2 percent annual chance flood events.

Debris management may also be a large expense after a flood event. HAZUS-MH estimates the amount of debris generated during a flood event. The model breaks down debris into three categories: (1) finishes (dry wall, insulation, etc.), (2) structural (wood, brick, etc.), and (3) foundations (concrete slab and block, rebar, etc.). These distinctions are necessary because of the different types of equipment needed to handle debris. Table 4.3.4-16 summarizes the debris estimates to result from a 1-percent annual chance flood event. Notably, this table lists estimated debris generated by riverine flooding only and does not include additional potential damage and debris possibly generated by force of wind that may be associated with storm events that cause flooding.

Table 4.3.4-16. Estimated Debris Generated from the 1-Percent Annual Chance Flood Event

Municipality	1% Annual Chance Flood Event			
	Total (tons)	Finish (tons)	Structure (tons)	Foundation (tons)
Ashland Borough	206	191	9	6
Auburn Borough	20	19	0	1



Municipality	1% Annual Chance Flood Event			
	Total (tons)	Finish (tons)	Structure (tons)	Foundation (tons)
Barry Township	14	10	2	2
Blythe Township	84	60	13	11
Branch Township	53	36	10	7
Butler Township	93	84	4	4
Cass Township	389	169	124	97
Coaldale Borough	2	2	0	0
Cressona Borough	298	278	12	9
Deer Lake Borough	6	6	0	0
Delano Township	1	1	0	0
East Brunswick Township	102	60	25	17
East Norwegian Township	78	58	9	11
East Union Township	20	16	2	3
Eldred Township	19	16	1	2
Foster Township	0	0	0	0
Frackville Borough	19	19	0	0
Frailey Township	7	7	0	0
Gilberton Borough	6,836	1,142	3,202	2,493
Girardville Borough	1,293	1,093	85	115
Gordon Borough	564	387	107	71
Hegins Township	90	79	4	7
Hubley Township	87	70	7	10
Kline Township	2	2	0	0
Landingville Borough	25	19	3	2
Mahanoy City Borough	0	0	0	0
Mahanoy Township	113	62	26	24
McAdoo Borough	57	56	1	1
Mechanicsville Borough	0	0	0	0
Middleport Borough	144	125	11	7
Minersville Borough	201	158	26	17
Mount Carbon Borough	0	0	0	0
New Castle Township	23	8	9	6
New Philadelphia Borough	97	92	3	2
New Ringgold Borough	17	14	1	2
North Manheim Township	284	122	94	68
North Union Township	37	31	3	3
Norwegian Township	22	16	4	2
Orwigsburg Borough	101	88	7	6
Palo Alto Borough	508	47	257	204
Pine Grove Borough	90	71	7	12
Pine Grove Township	920	444	271	205
Port Carbon Borough	1,553	1,125	230	198



Municipality	1% Annual Chance Flood Event			
	Total (tons)	Finish (tons)	Structure (tons)	Foundation (tons)
Port Clinton Borough	271	146	65	61
Porter Township	22	18	1	3
Pottsville City	687	147	298	242
Reilly Township	31	23	2	5
Ringtown Borough	1	1	0	0
Rush Township	68	29	22	17
Ryan Township	4	3	0	1
Schuykill Haven Borough	2,112	783	754	575
Schuykill Township	14	12	1	1
Shenandoah Borough	4	4	0	0
South Manheim Township	95	53	22	20
St. Clair Borough	503	485	5	12
Tamaqua Borough	5	3	2	1
Tower City Borough	1	1	0	0
Tremont Borough	866	723	72	70
Tremont Township	7	5	1	1
Union Township	6	4	1	1
Upper Mahantongo Township	386	296	48	42
Walker Township	32	23	5	4
Washington Township	351	186	82	83
Wayne Township	117	40	43	34
West Brunswick Township	398	274	63	60
West Mahanoy Township	1	1	0	0
West Penn Township	257	173	34	49
Schuykill County	20,713	9,716	6,091	4,906

Source: HAZUS-MH v.4.0

Impact on the Environment

As discussed, floodplains serve beneficial and natural functions on ecological/environmental, social and economic levels. Areas in the floodplain that typically provide these natural functions and benefits are wetlands, riparian areas, sensitive areas and habitats for rare and endangered species. To determine exposure of natural and beneficial land in Schuykill County to the flood hazard, the acreage of wetlands and forested land were calculated; refer to Table 4.3.4-17.

Table 4.3.4-17. Acreage of Natural and Beneficial Land Within the Floodplain

Natural Land	Area in the 1-Percent Annual Chance Floodplain (acres)	Area in the 0.2-Percent Annual Chance Floodplain (acres)
Wetlands	28	28
Forest	12,700	13,366

Sources: USGS National Land Cover Data (NLCD) 2014, FEMA 2017

Flooding can cause a wide range of environmental impacts including but not limited to erosion and loss of vegetation and habitats. These impacts in turn may lead to decreased protection of the waterbody from adjacent land uses, and to degraded water quality. Moreover, floods may generate large amounts of tree and construction debris, disperse household hazardous waste into the fluvial system, and contaminate water supplies and wildlife habitats with extremely toxic substances. Long-duration floods could exacerbate environmental problems because cleanup likely would be delayed and contaminants could remain in the environment for a longer period of time. Cleanup after a flood raises additional environmental concerns. The volume of debris to be collected, the extent to which public utilities (water supply systems and sewer operations) have been damaged, and the quantity of agricultural and industrial pollutants entering water bodies might present additional issues (Montz and Tobin 1997, Rubin 2013).

Future Growth and Development

As discussed in Section 2.4, areas targeted for future growth and development have been identified across the County. Any areas of growth could be impacted by the flood hazard if located in identified flood hazard areas. The County intends to discourage development within vulnerable areas and to encourage higher regulatory standards on the local level.

Effect of Climate Change on Vulnerability

As discussed earlier, annual precipitation amounts in the region are projected to increase, primarily in the form of heavy rainfalls, which have the potential to affect drinking water, increase the risk to flash flooding and riverine flooding, and flood critical transportation corridors and infrastructure. Increases in precipitation may alter and expand the floodplain boundaries and runoff patterns, resulting in populations, buildings, and critical facilities and infrastructure that were previously outside the floodplain. This increase in exposure would result in an increased risk to life and health, an increase in structural losses, a diversion of additional resources to response and recovery efforts, and an increase in business closures affected by future flooding events due to loss of service or access.

Additional Data and Next Steps

The HAZUS-MH riverine flood analysis for Schuylkill County was based on the most current and best available data, including updated critical facility inventories, and 2017 effective FEMA DFIRM. For future plan updates, more accurate exposure and loss estimates may be produced by updating the default general building stock inventory in HAZUS-MH with a countywide inventory based on building footprints and associated building attributes, and conducting the loss estimates at the structure level. In addition, the flood analysis may be updated as the preliminary 2018 FEMA DFIRM maps are approved and adopted.

Figure 4.3.4-5. Ashland Borough

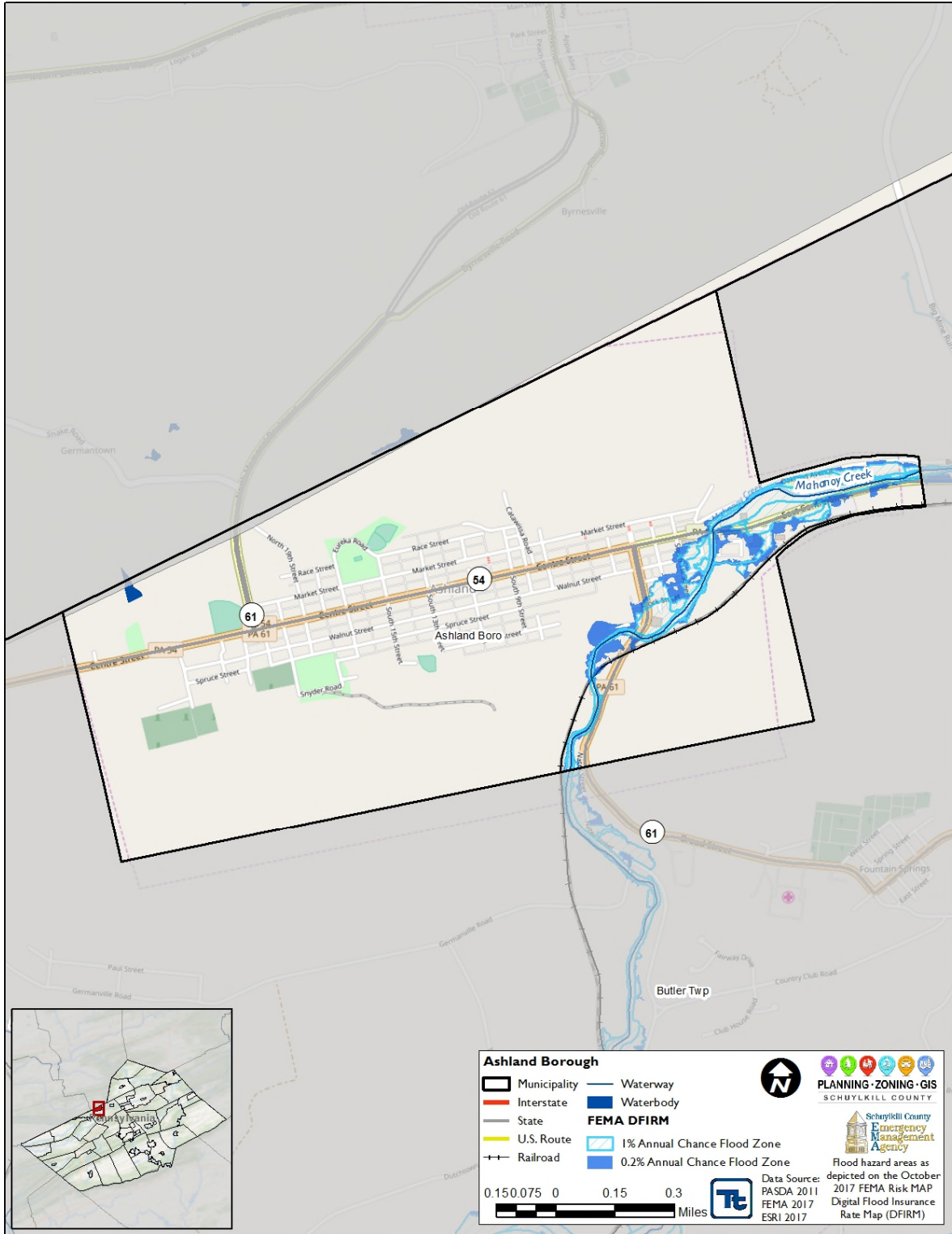


Figure 4.3.4-6. Auburn Borough

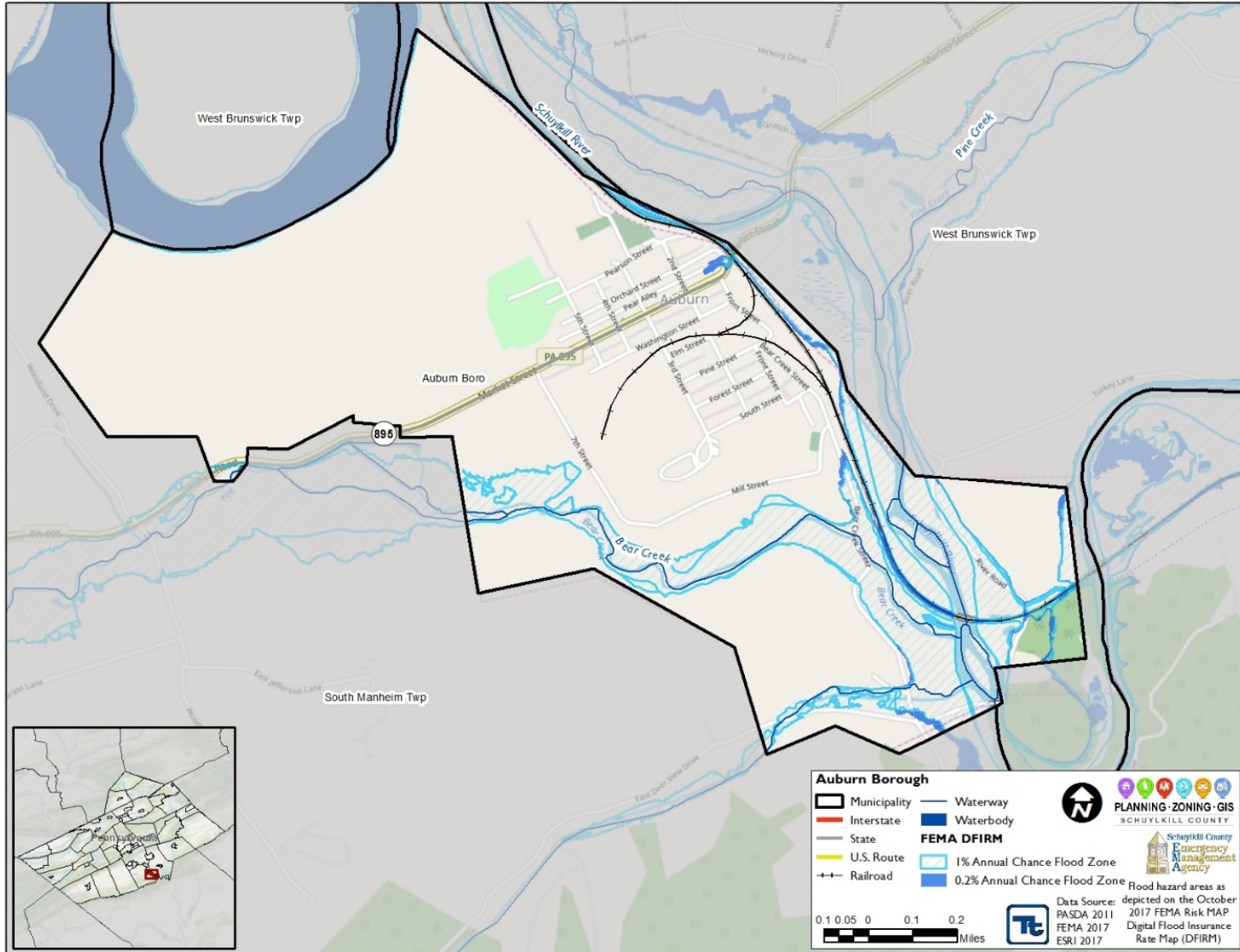


Figure 4.3.4-7. Barry Township

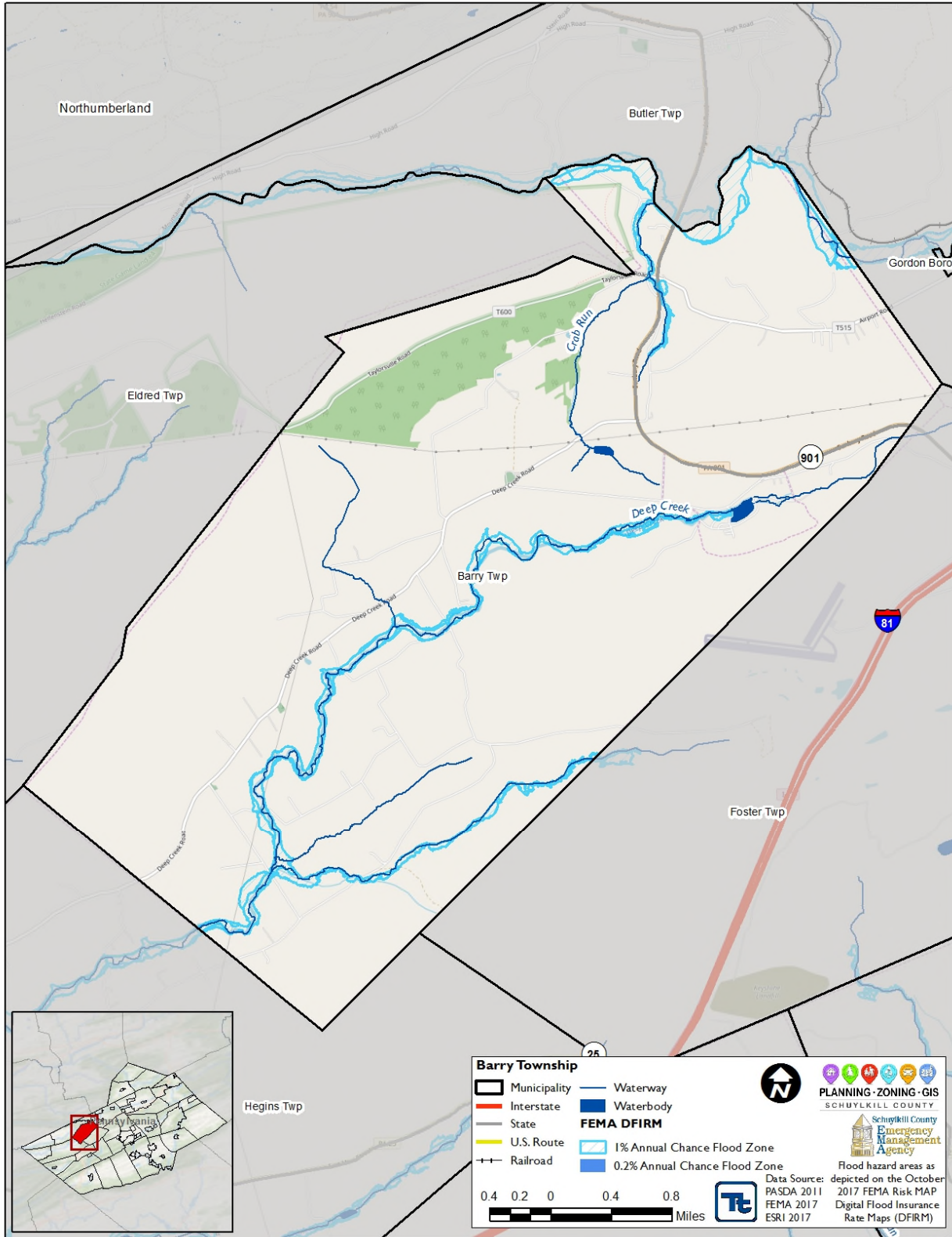


Figure 4.3.4-8. Blythe Township

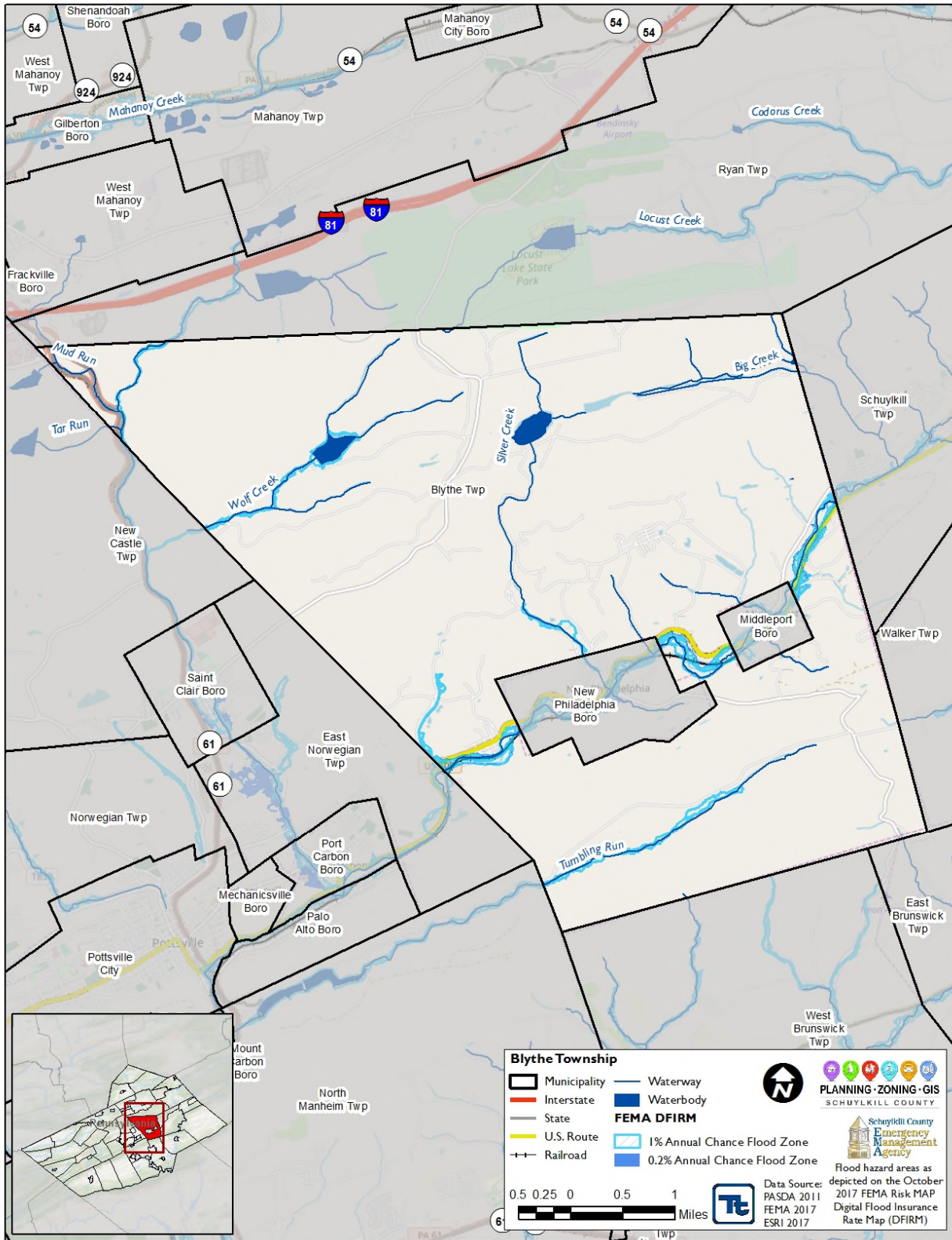


Figure 4.3.4-9. Branch Township

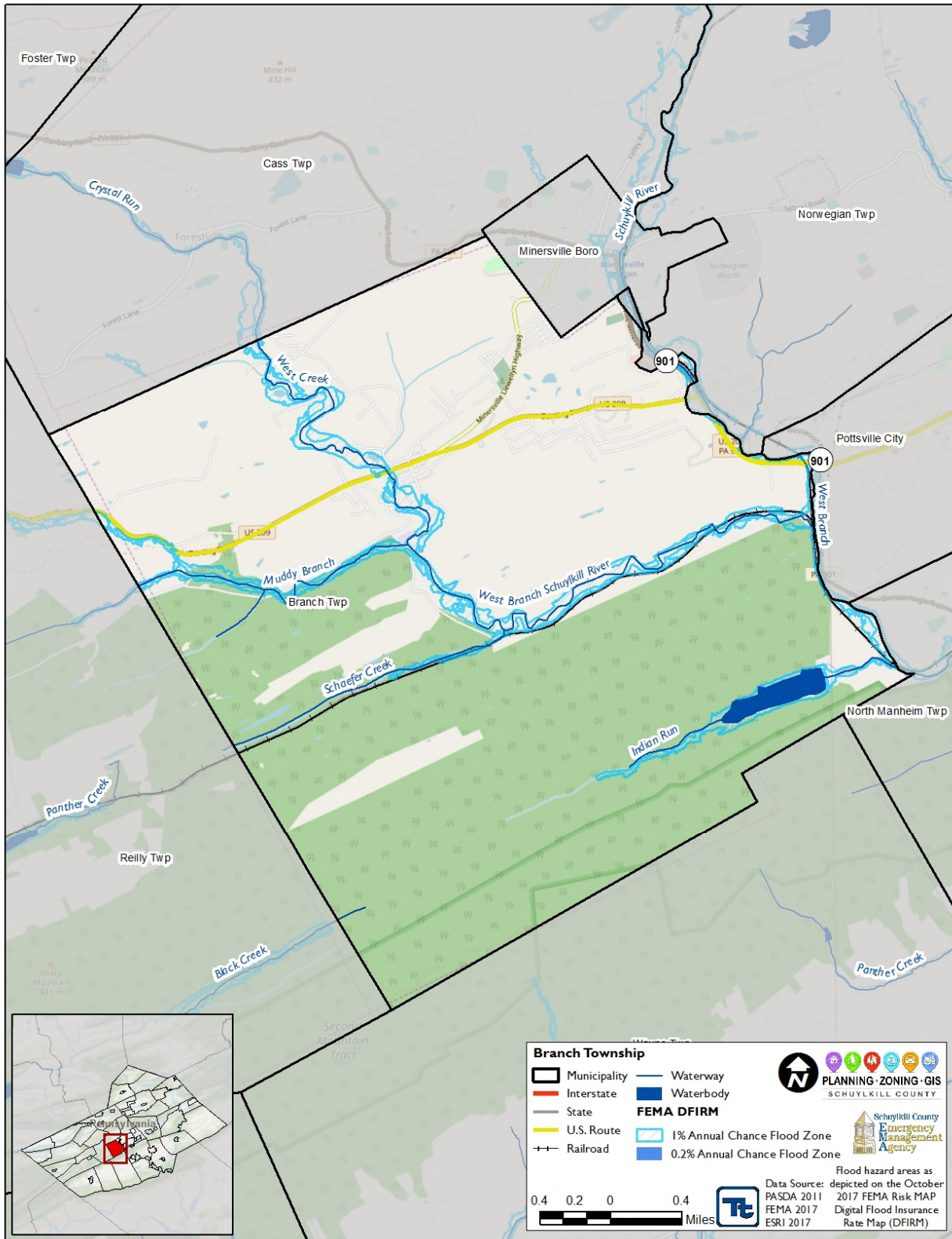


Figure 4.3.4-10. Butler Township

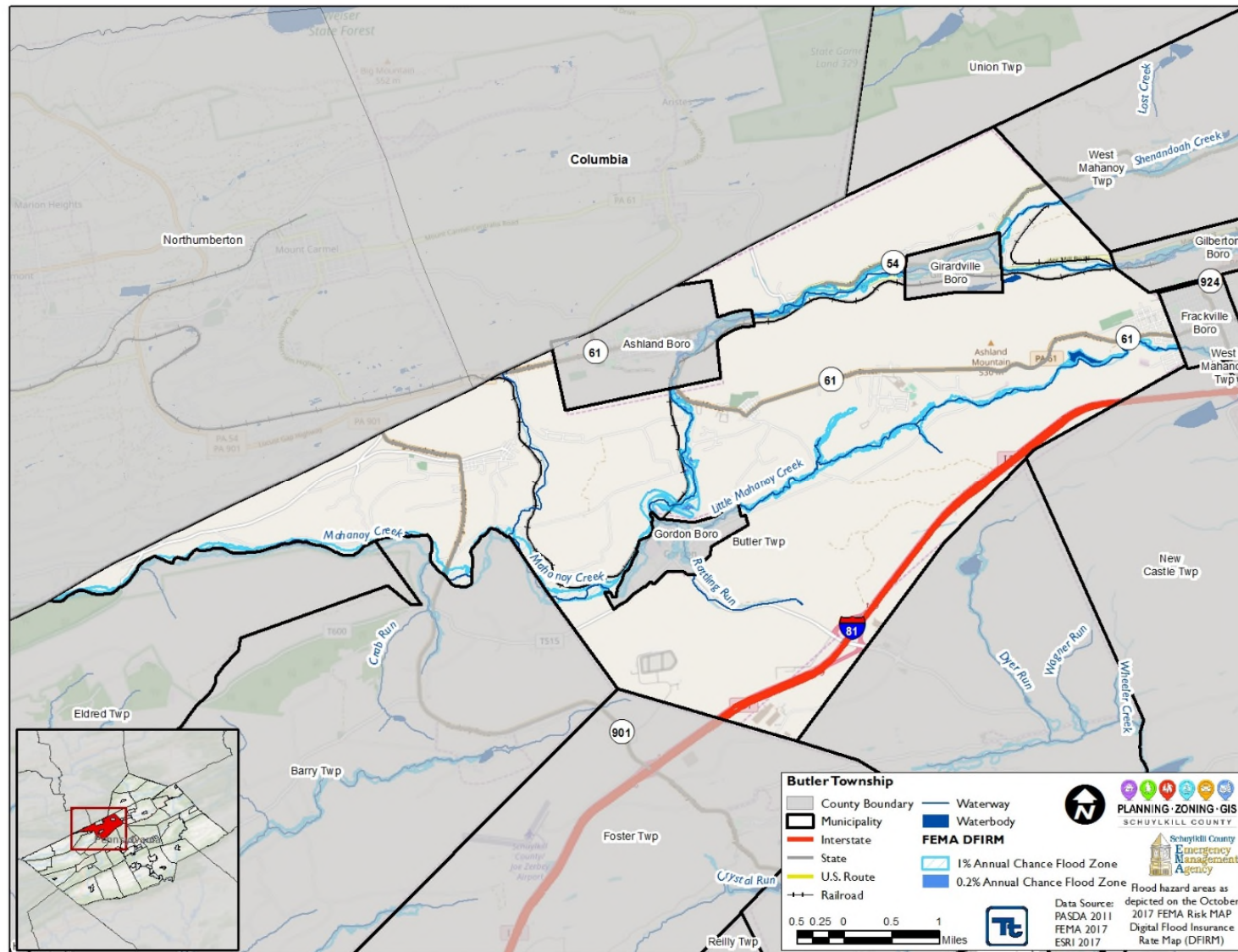


Figure 4.3.4-11. Cass Township

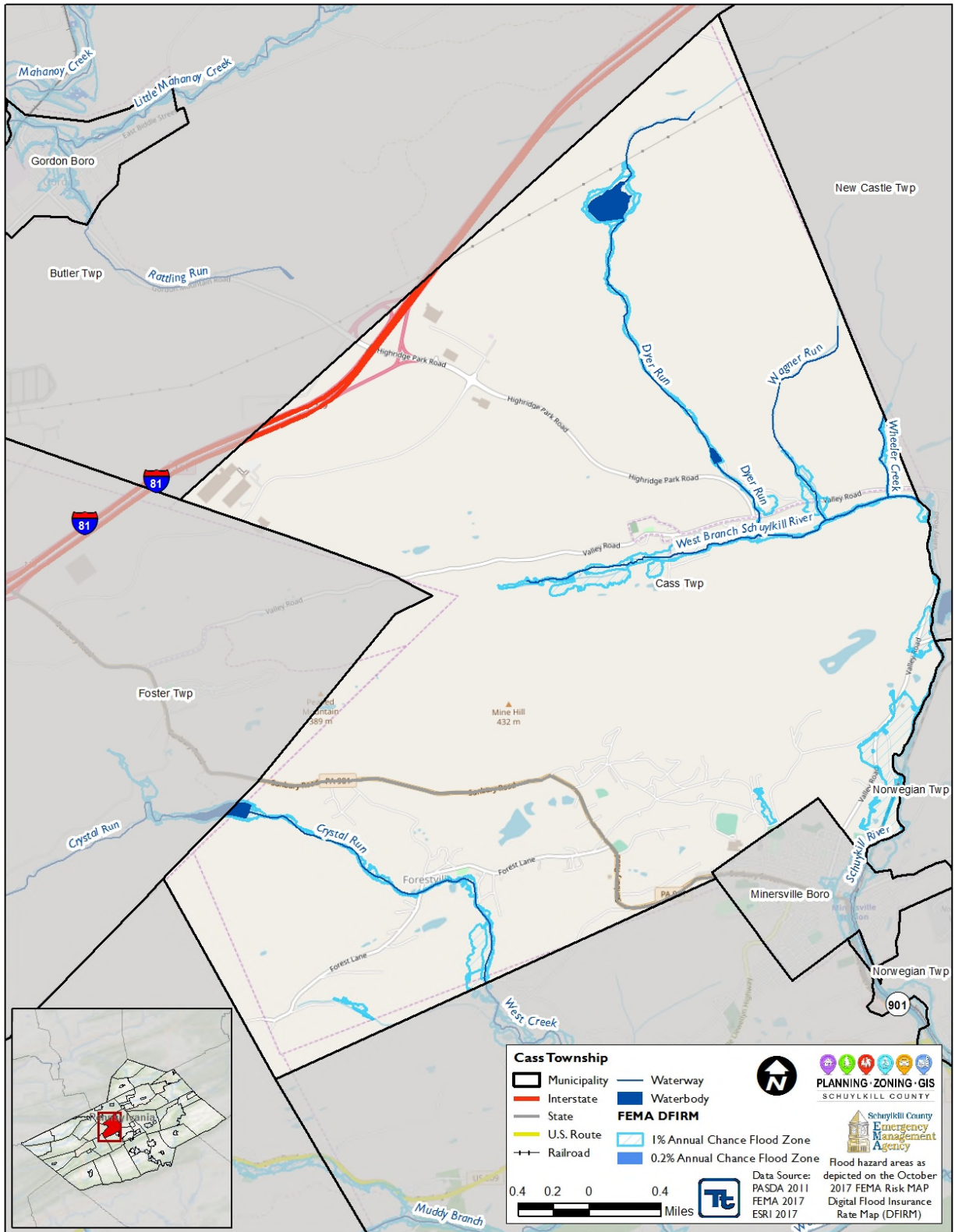


Figure 4.3.4-12. Coaldale Township

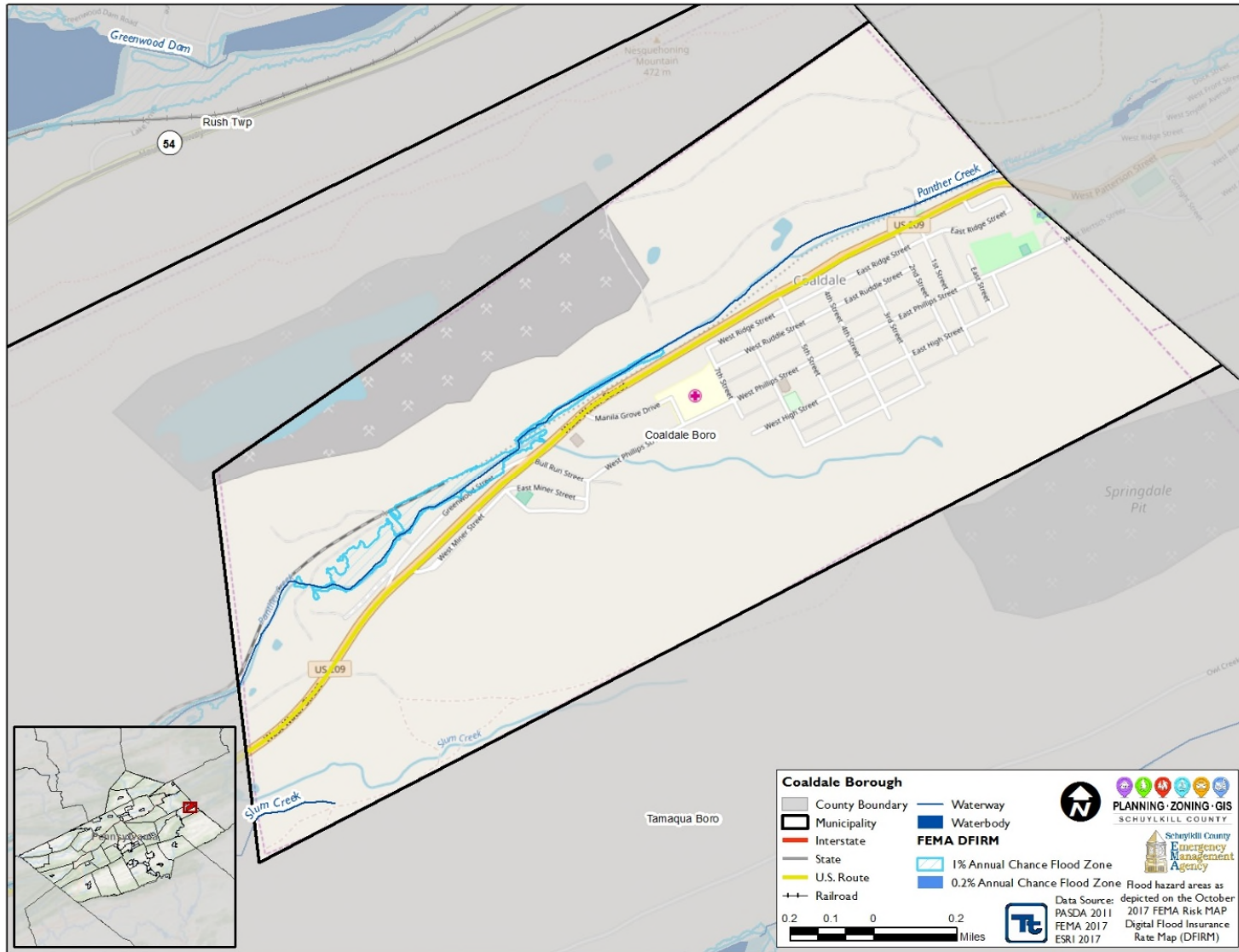


Figure 4.3.4-13. Cressona Borough

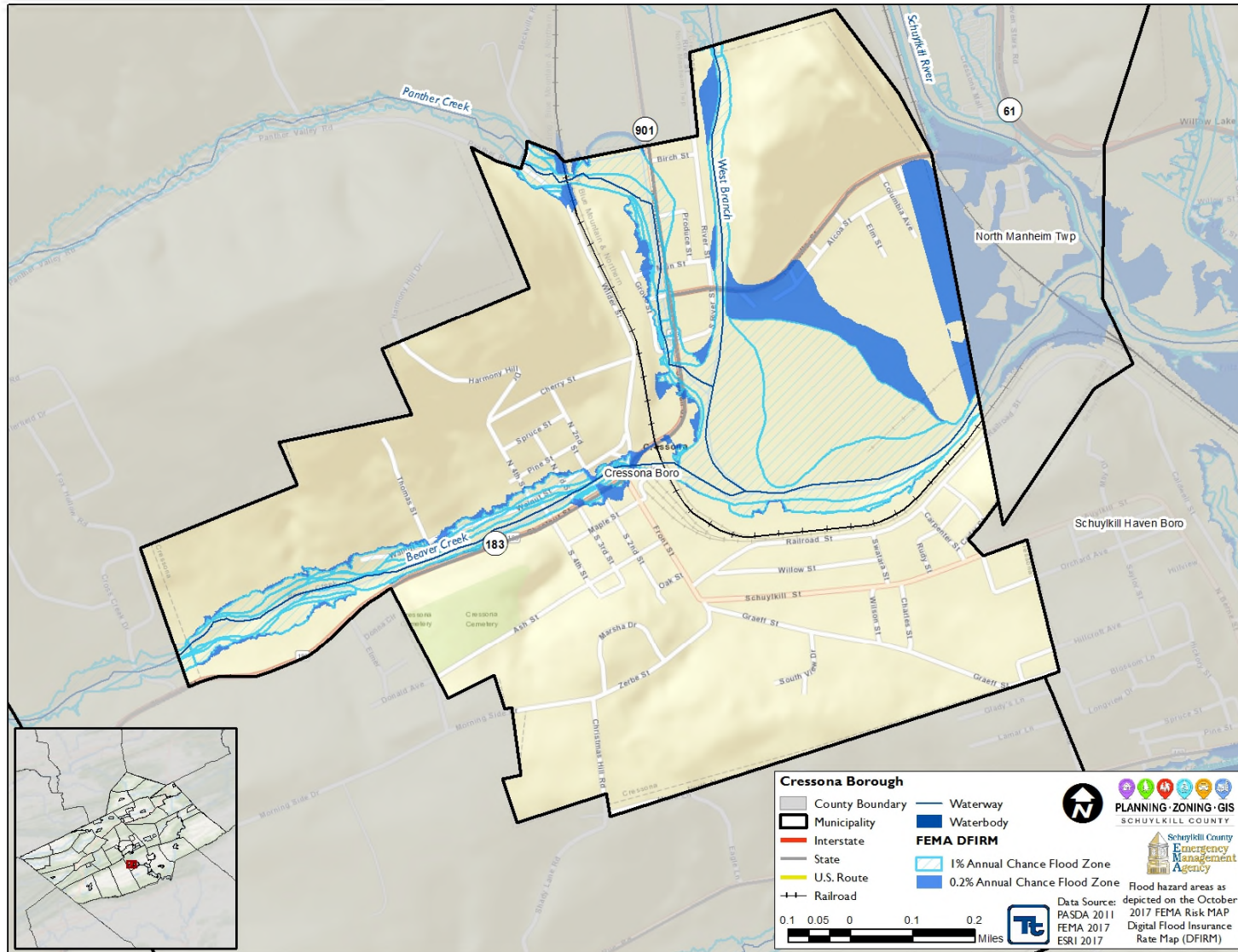


Figure 4.3.4-14. Deer Lake Borough

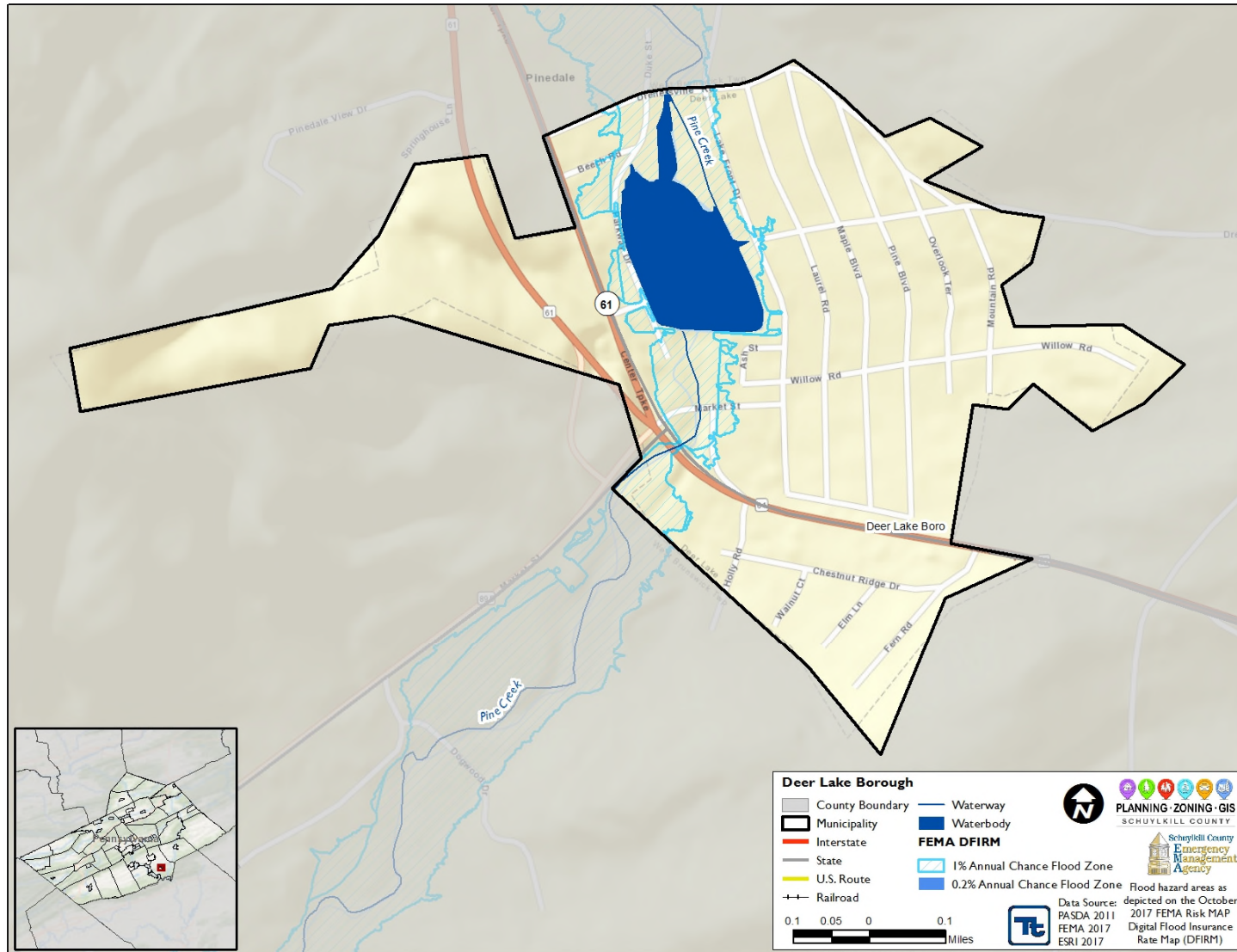


Figure 4.3.4-15. Delano Township

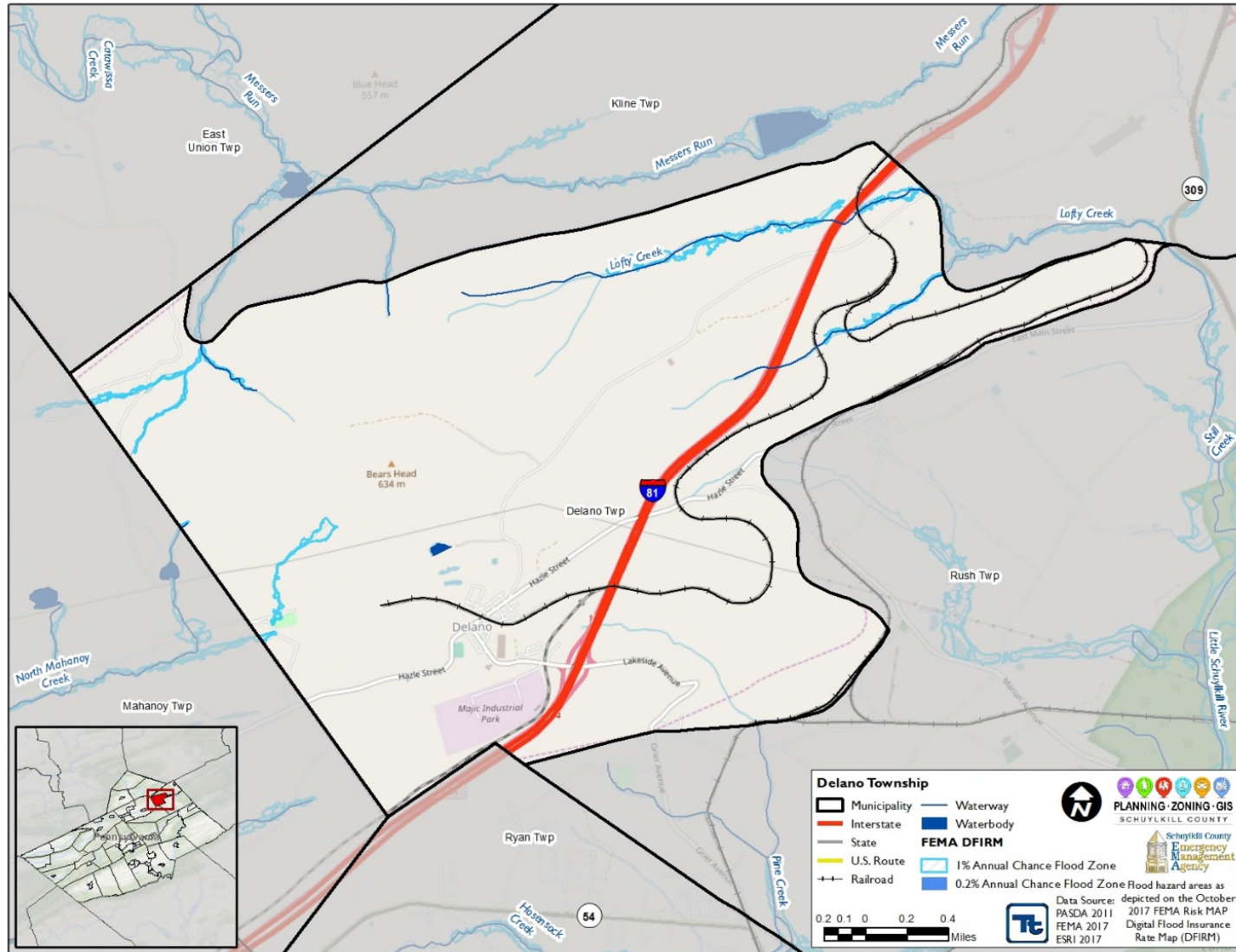


Figure 4.3.4-16. East Brunswick Township

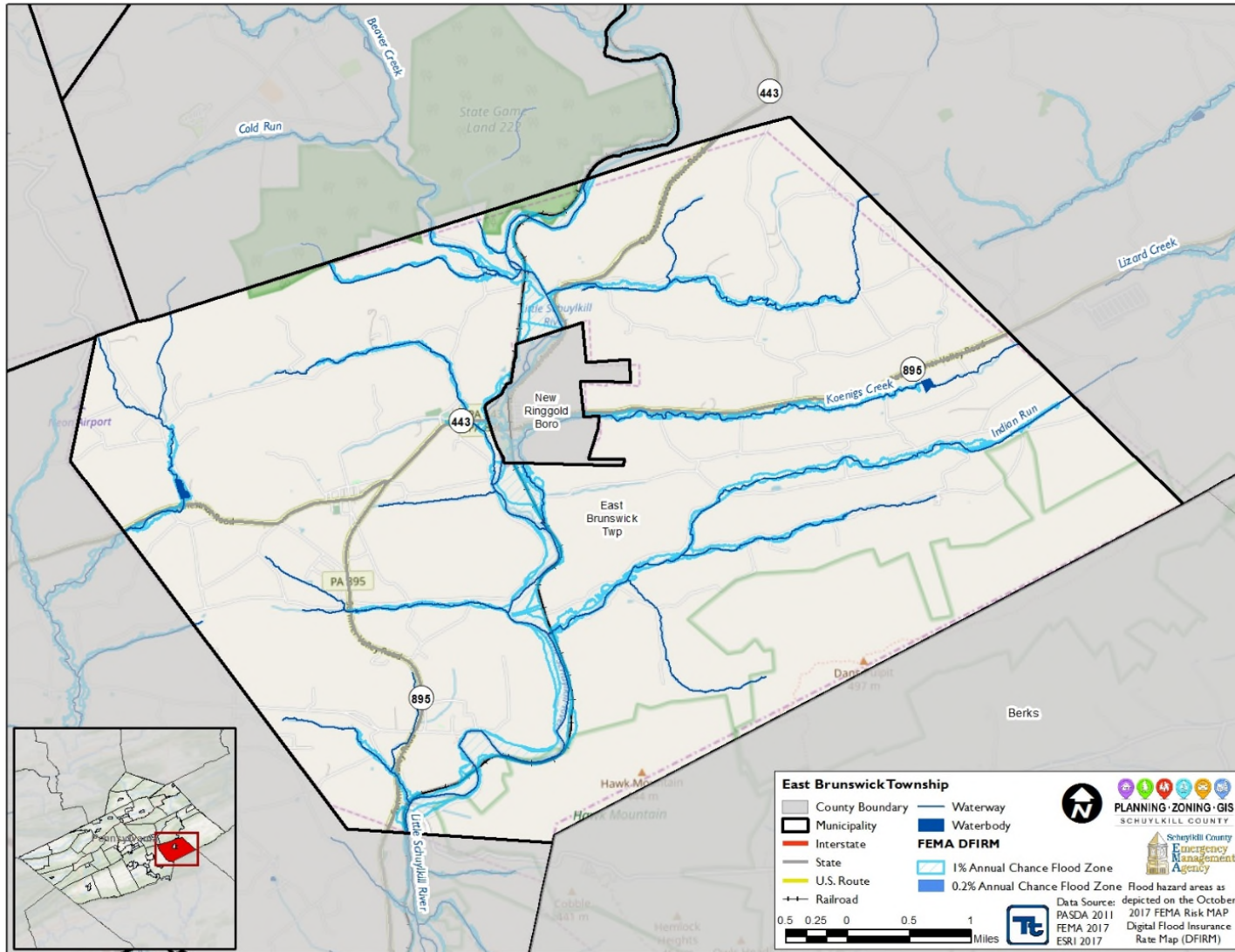


Figure 4.3.4-17. East Norwegian Township

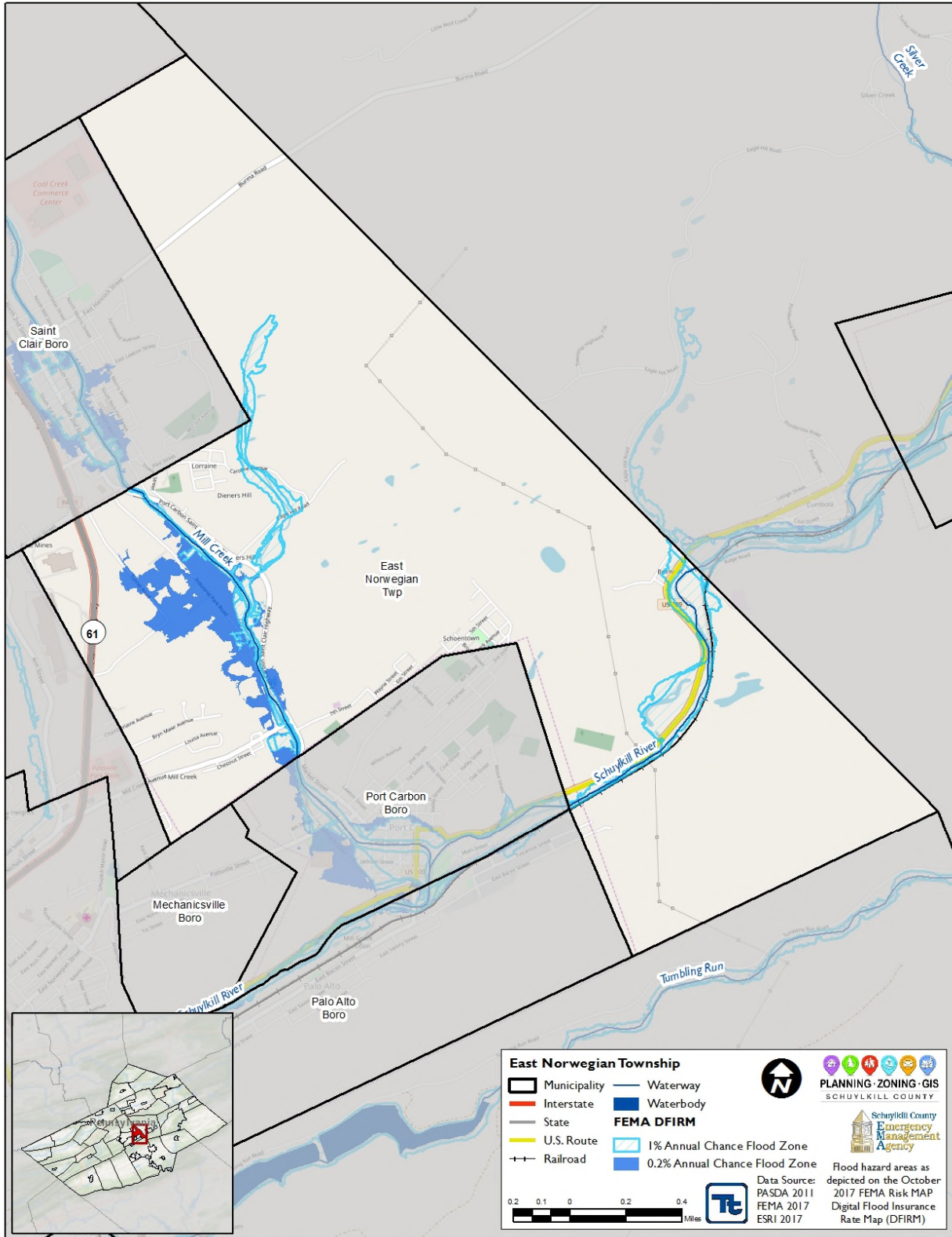


Figure 4.3.4-18. East Union Township

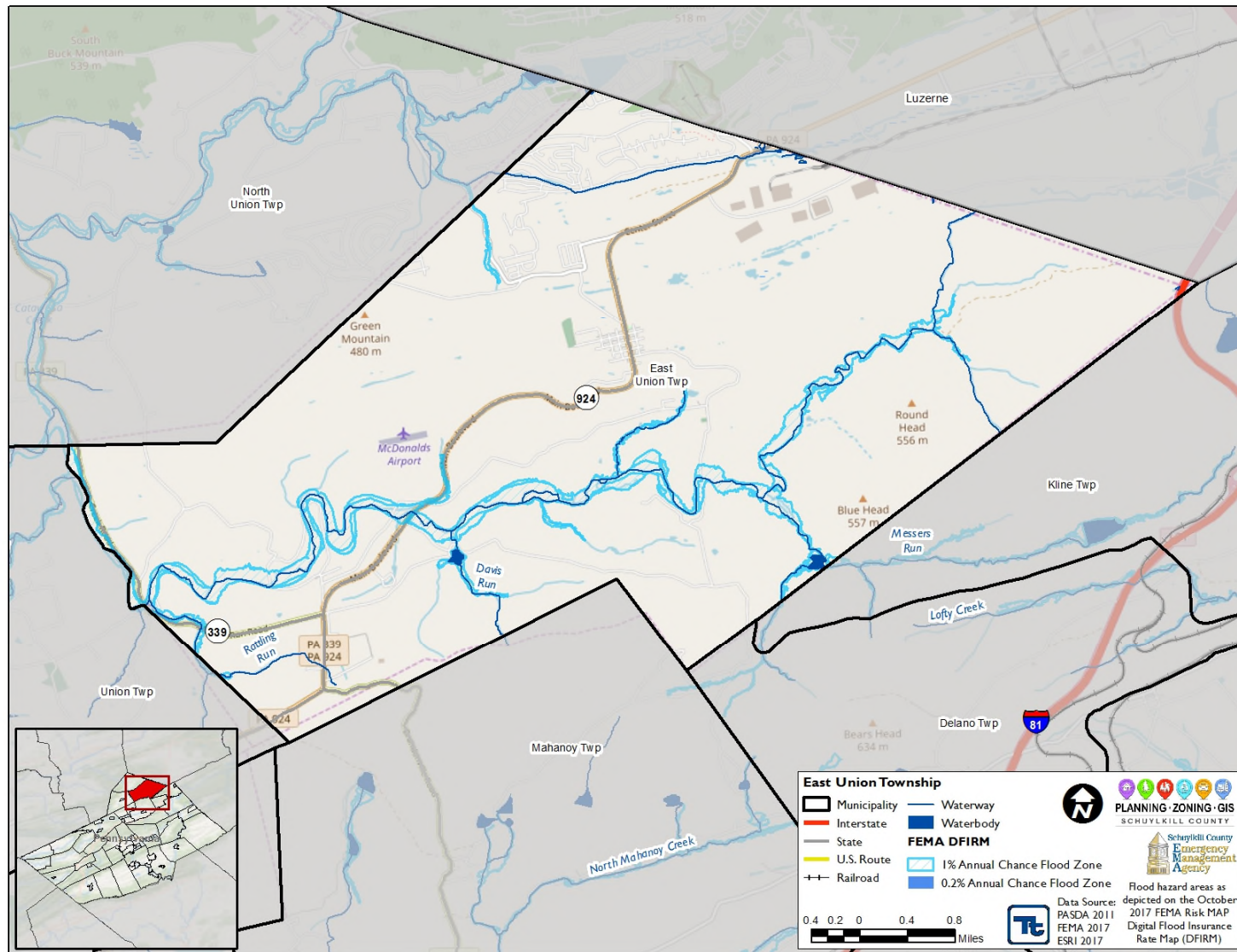


Figure 4.3.4-19. Eldred Township

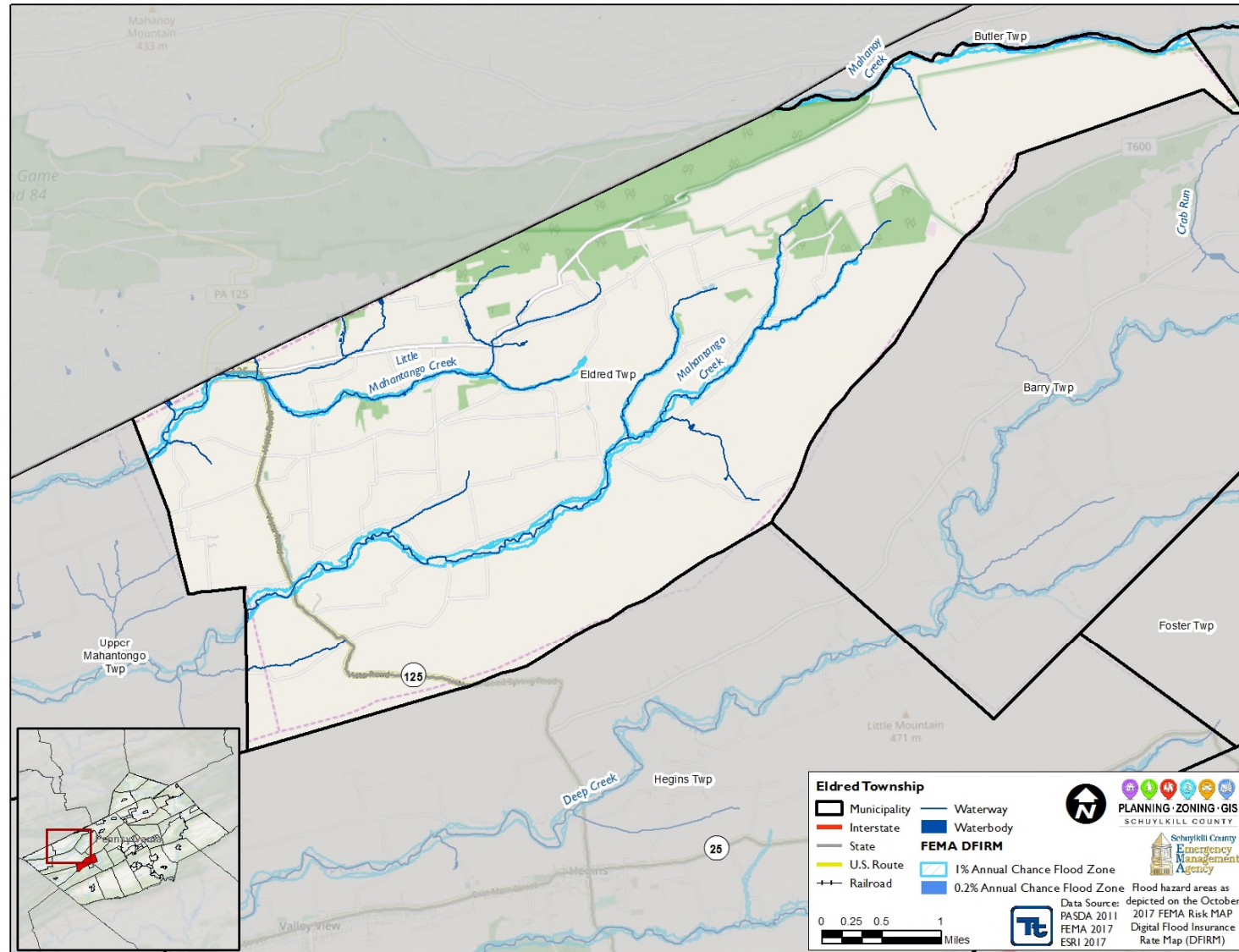


Figure 4.3.4-20. Foster Township

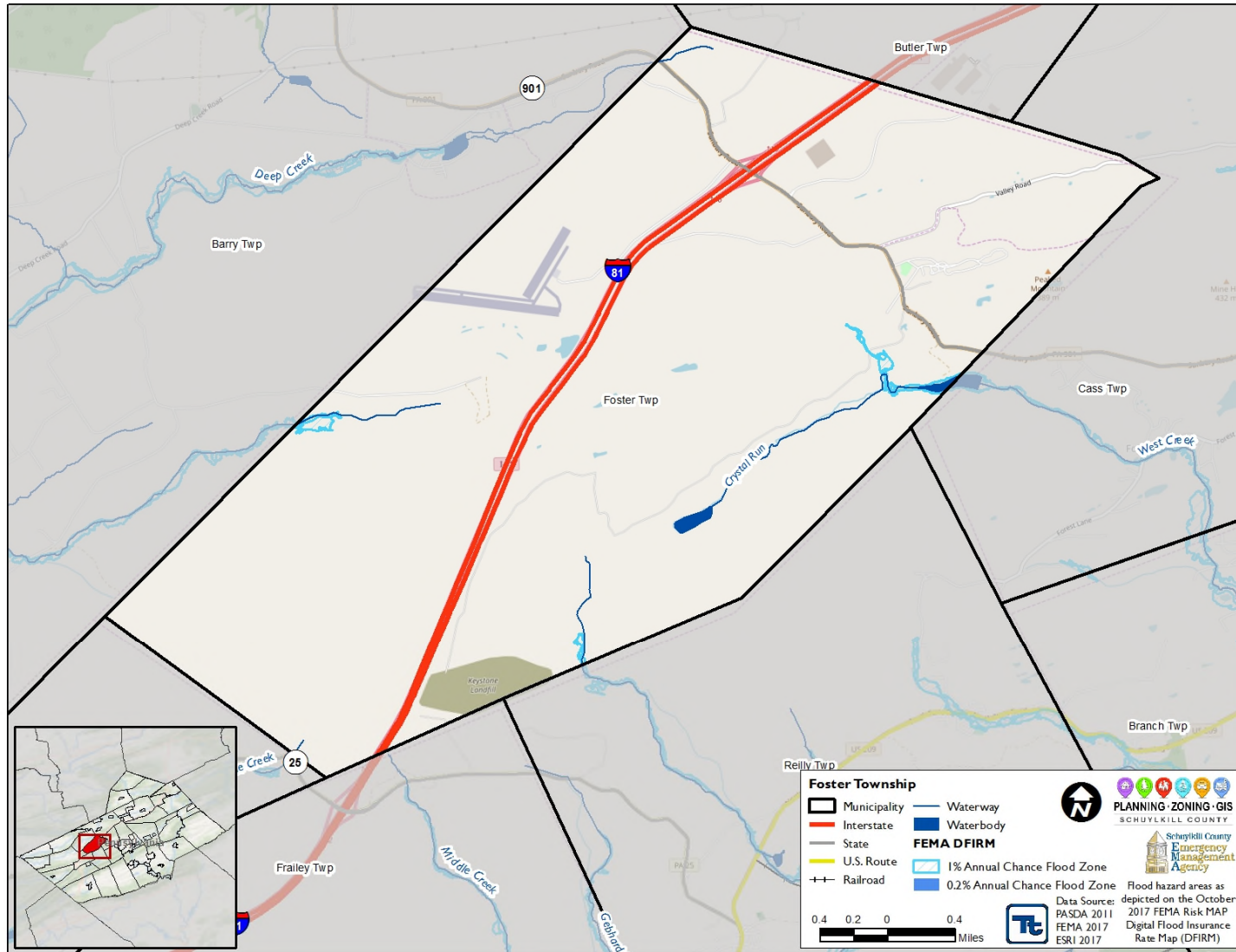


Figure 4.3.4-21. Frackville Borough

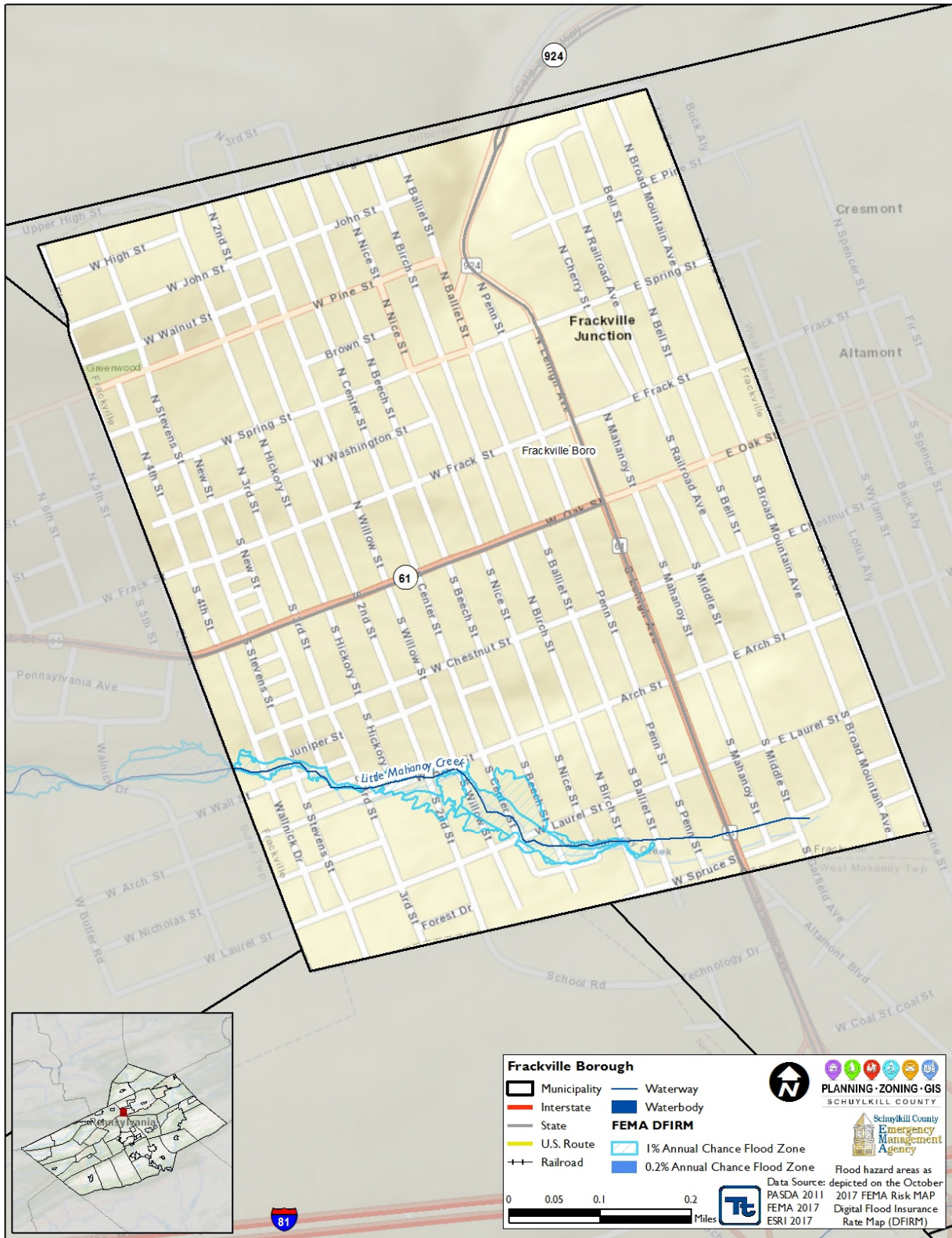


Figure 4.3.4-22. Frailey Township

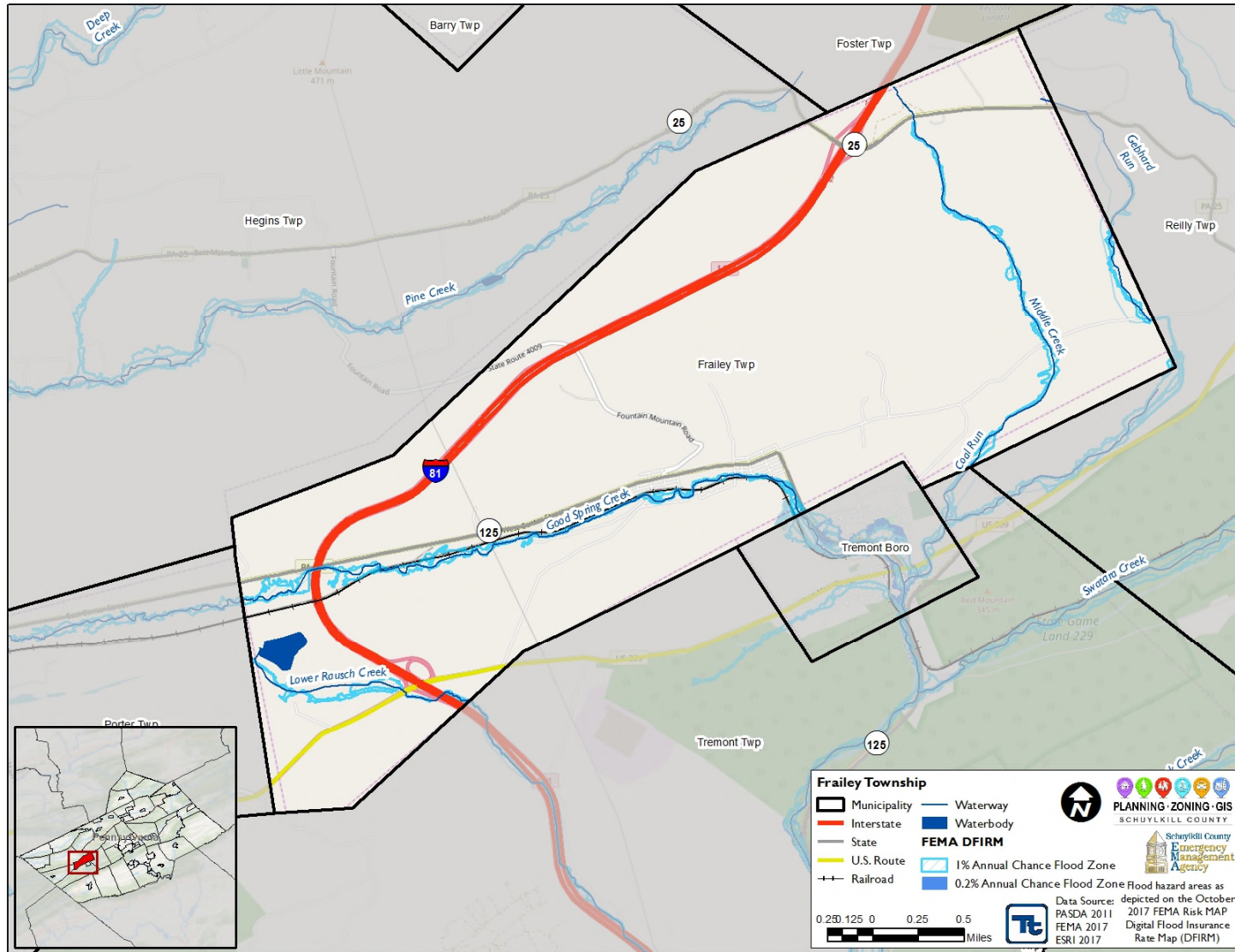


Figure 4.3.4-23. Gilberton Borough

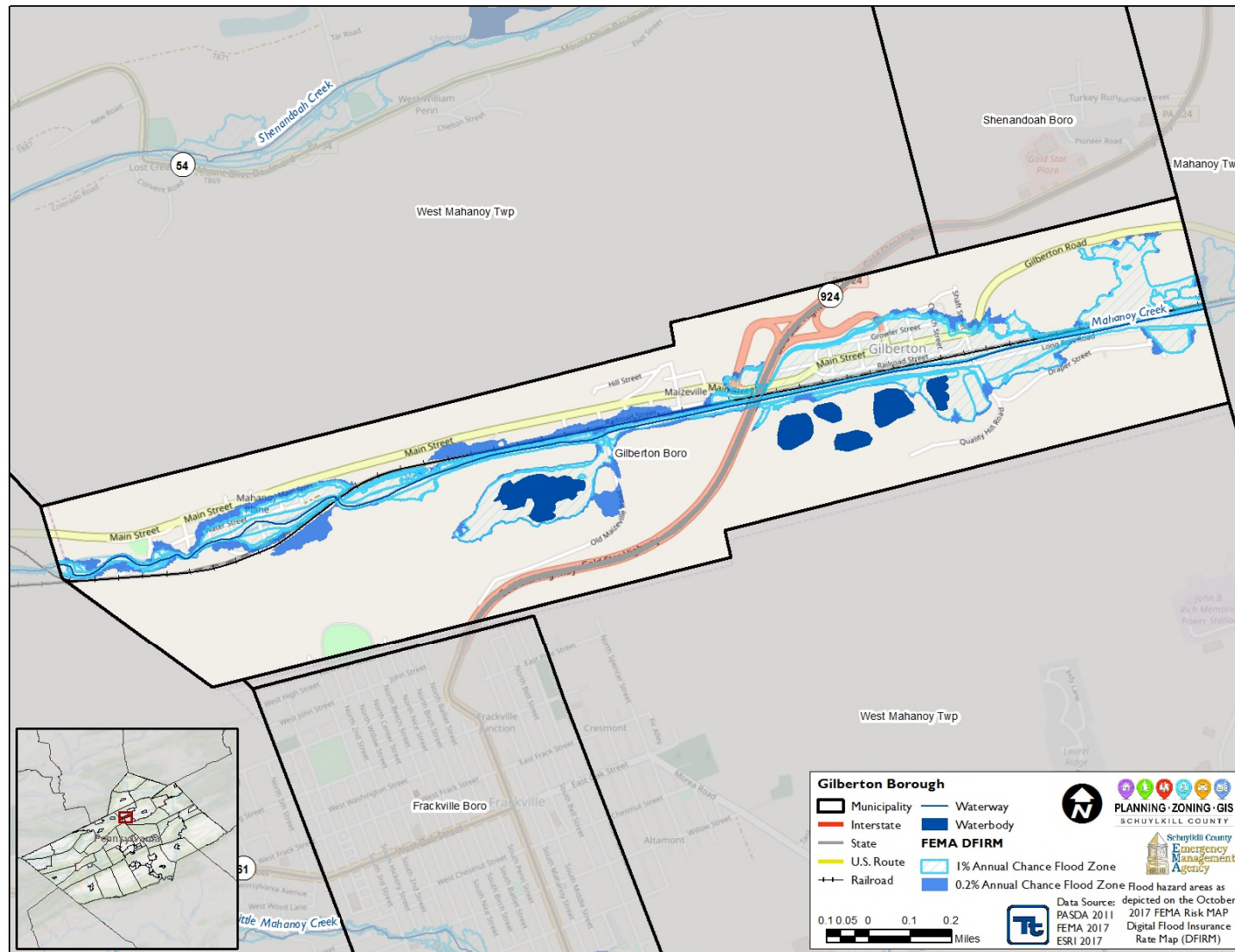


Figure 4.3.4-24. Girardville Borough

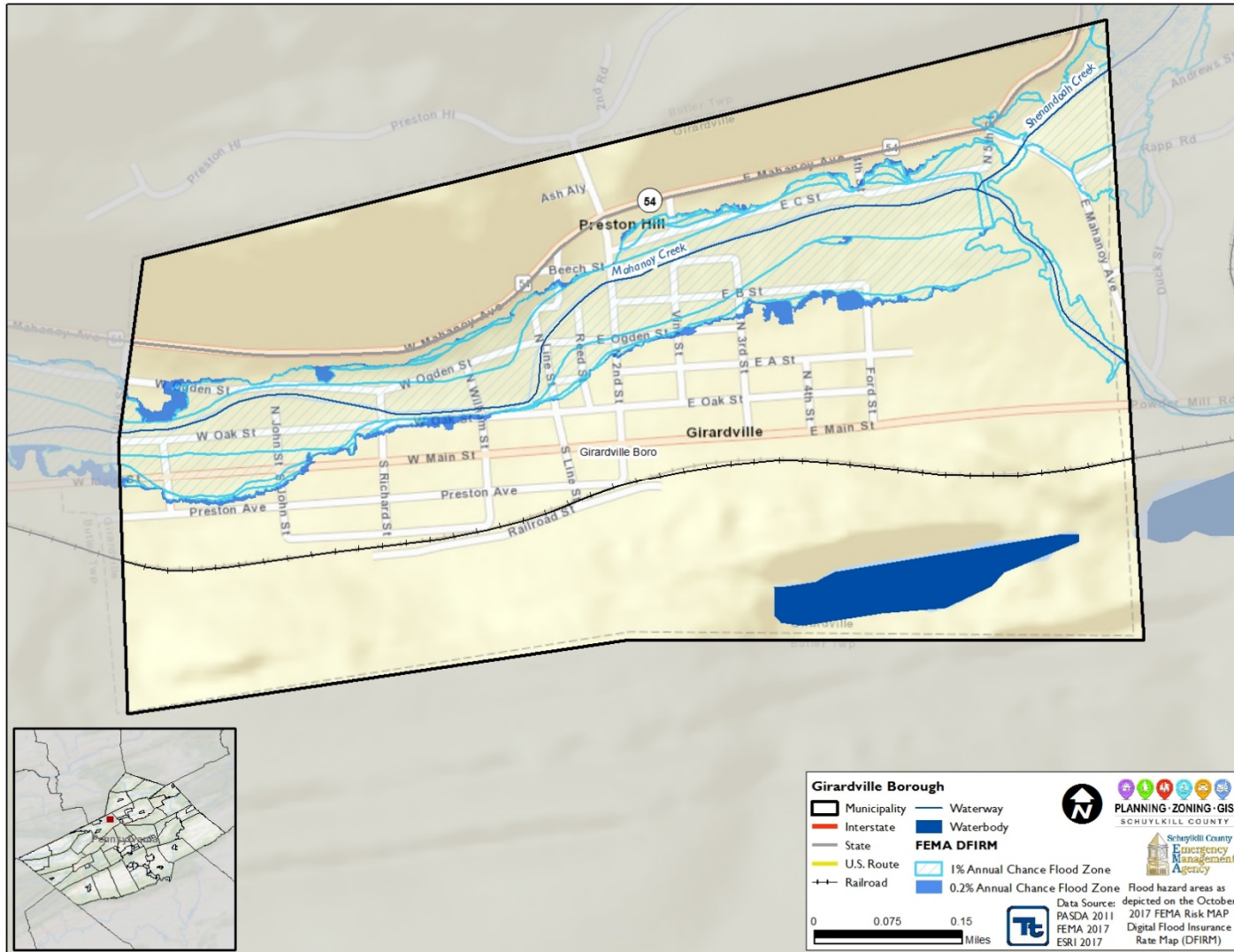


Figure 4.3.4-25. Gordon Borough

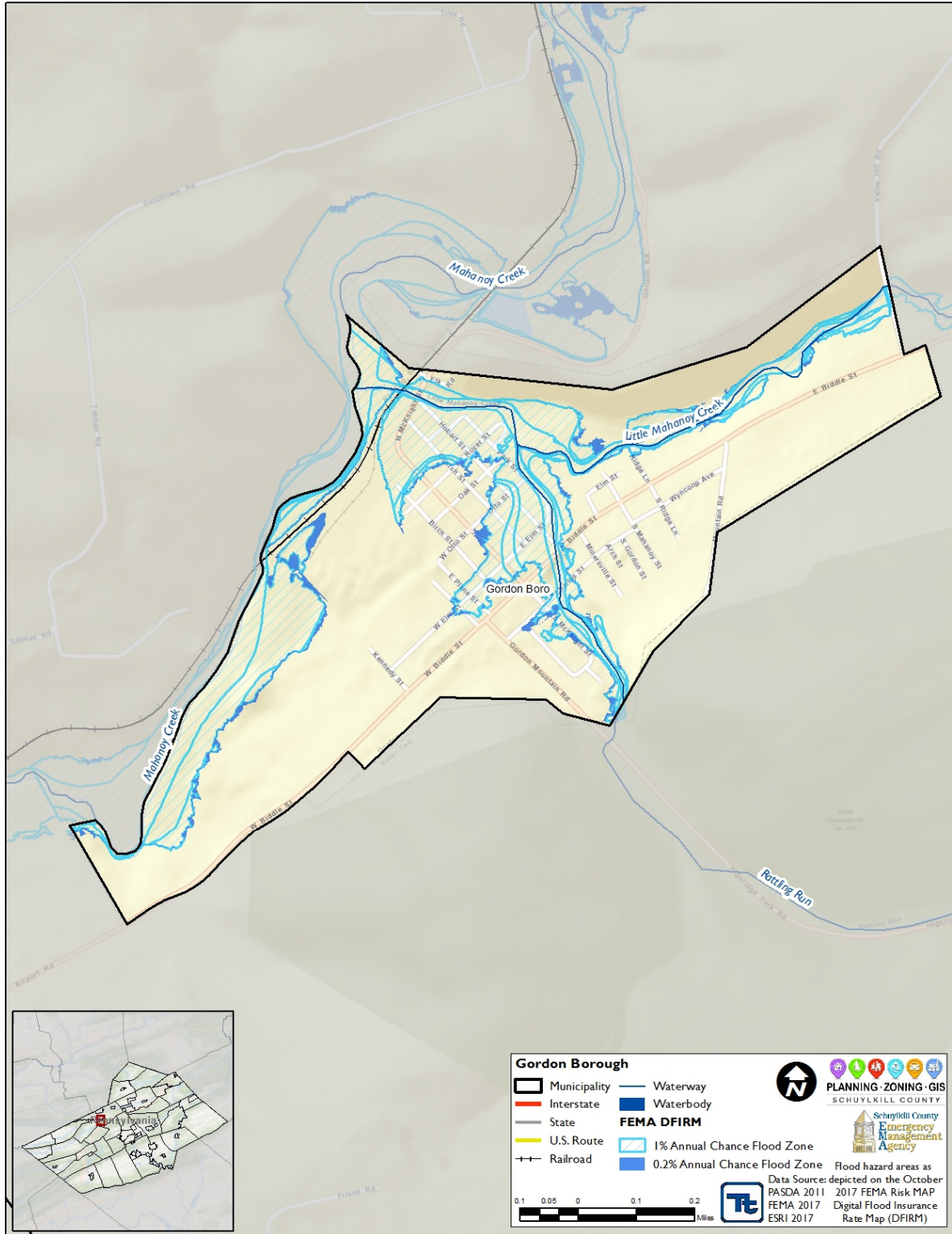


Figure 4.3.4-26. Hegin's Township

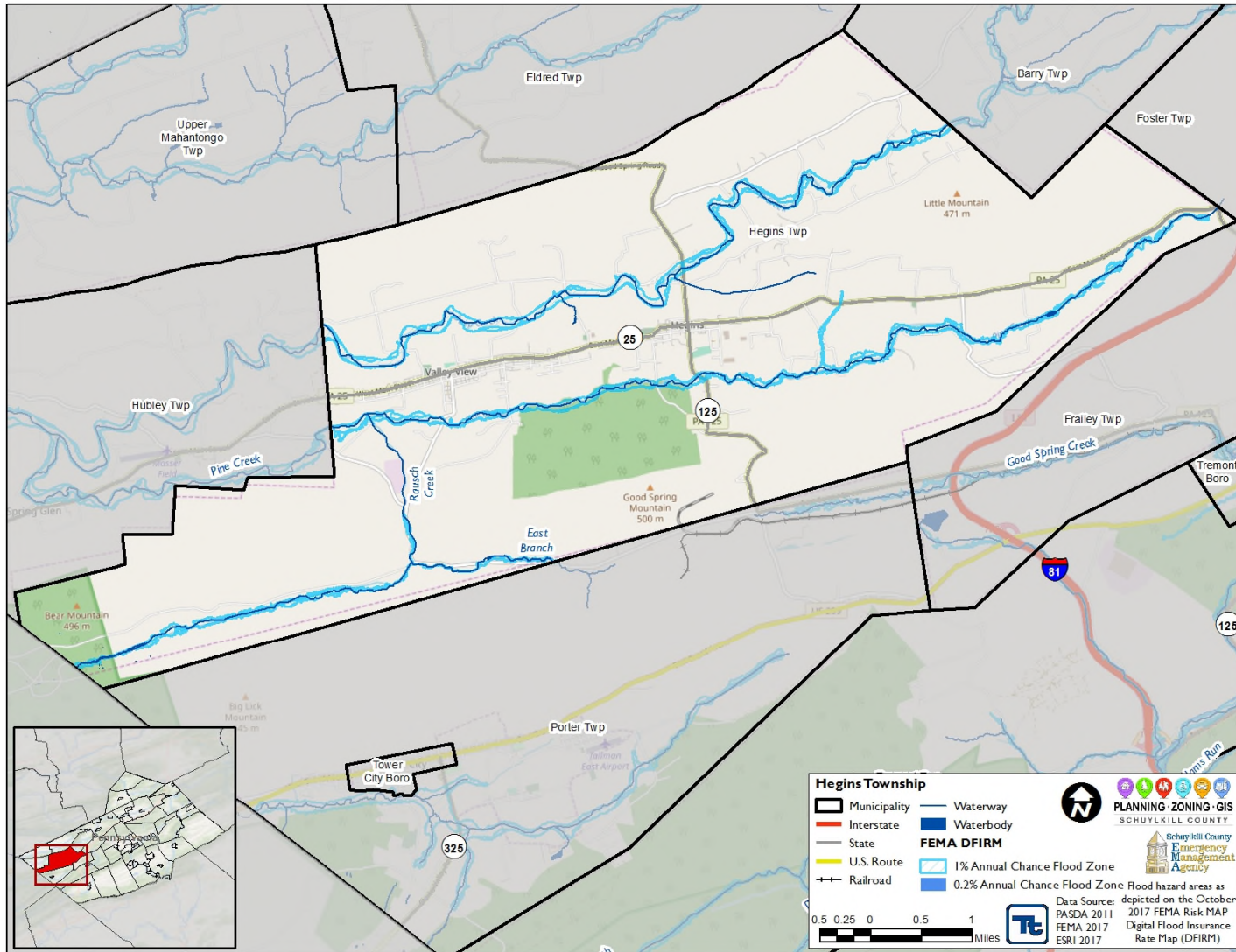


Figure 4.3.4-27. Hubley Township

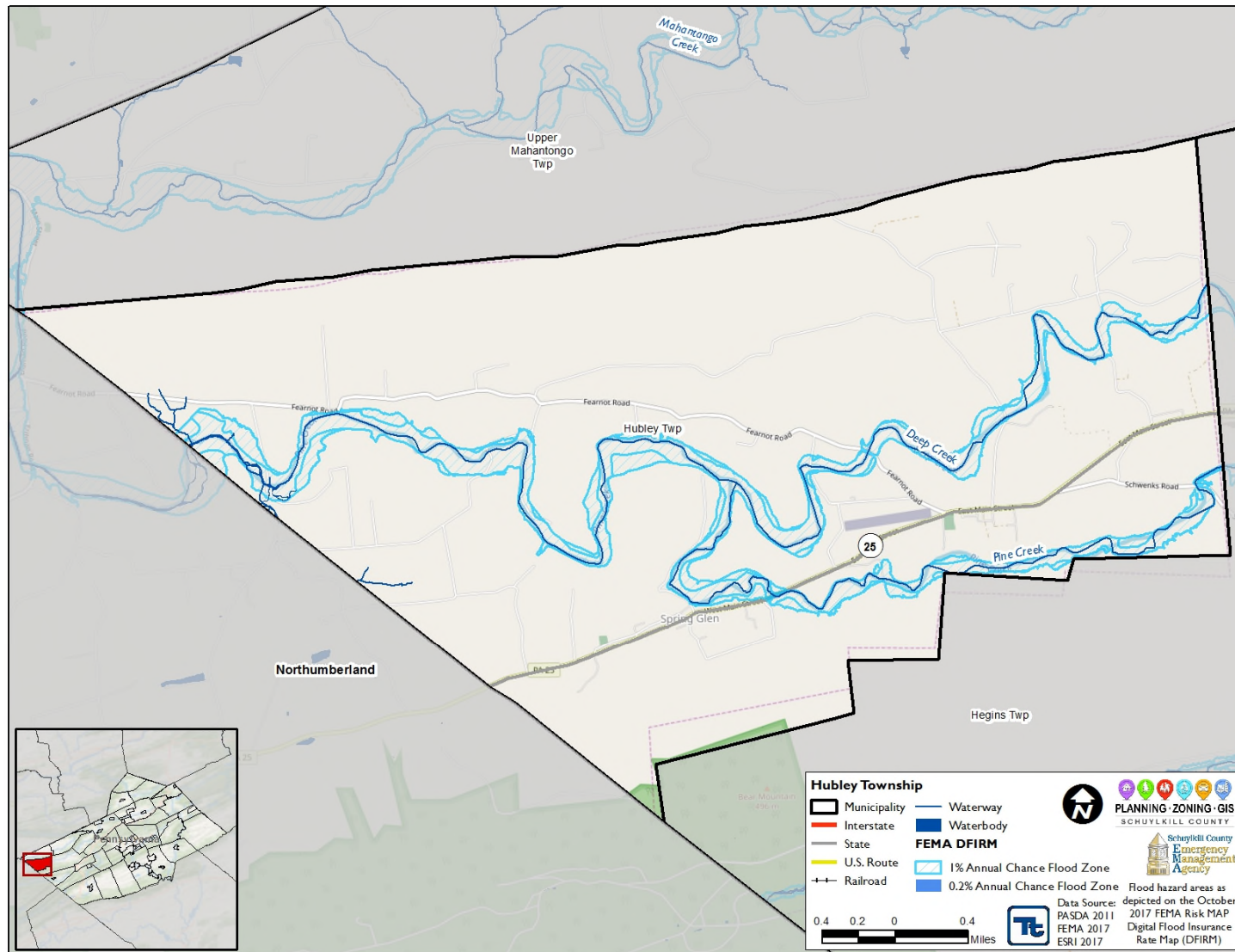


Figure 4.3.4-28. Kline Township

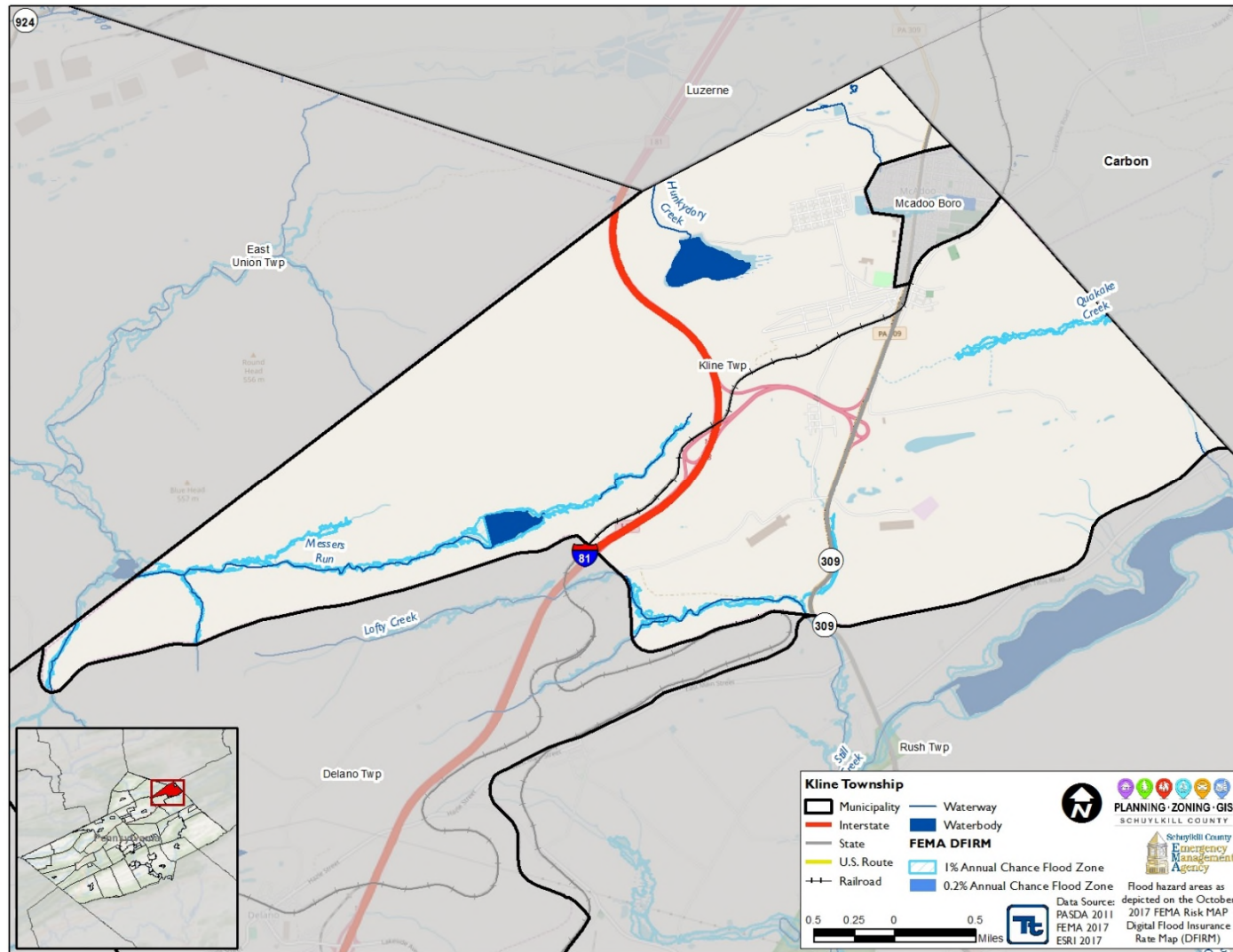


Figure 4.3.4-29. Landingville Borough

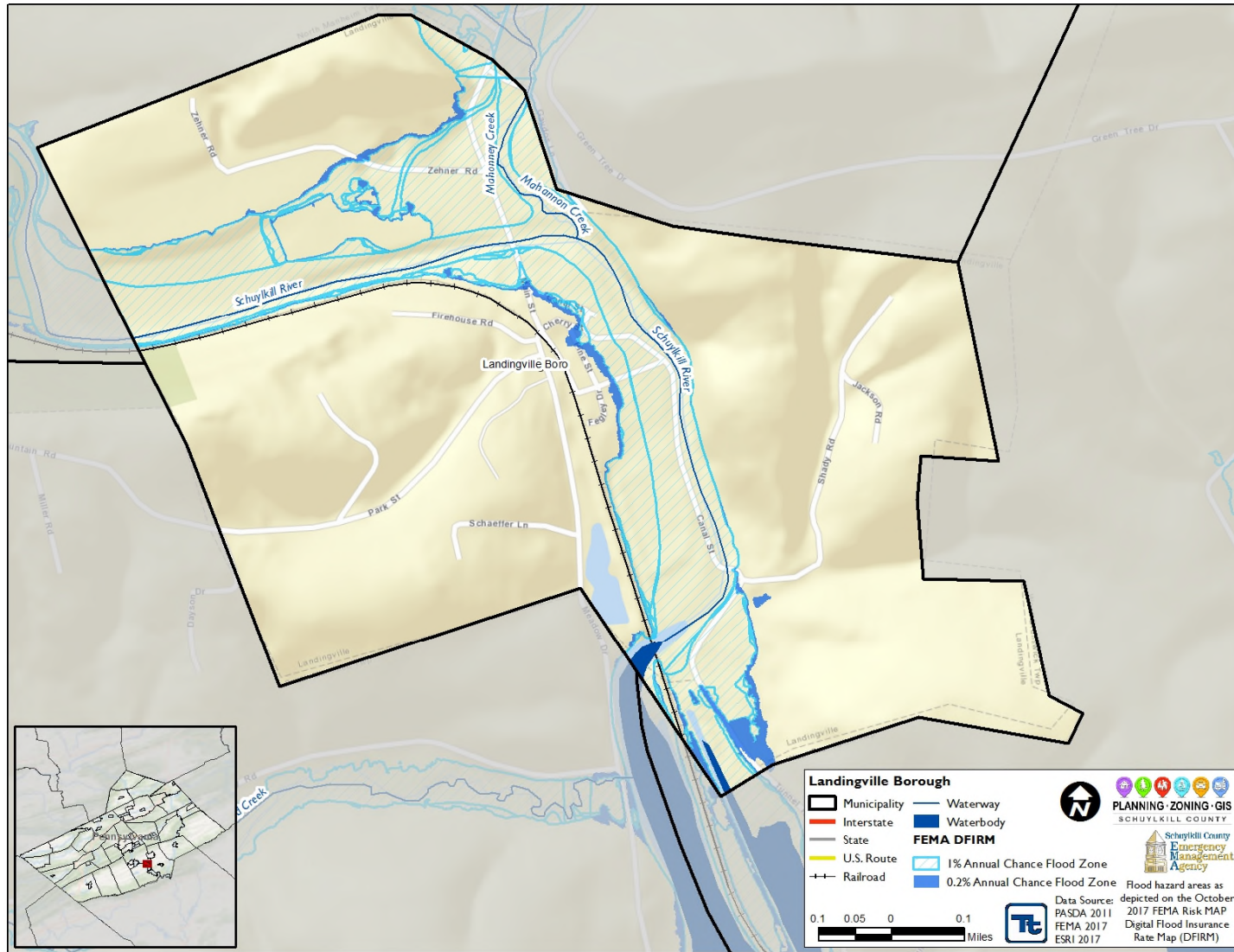


Figure 4.3.4-30. Mahanoy City Borough

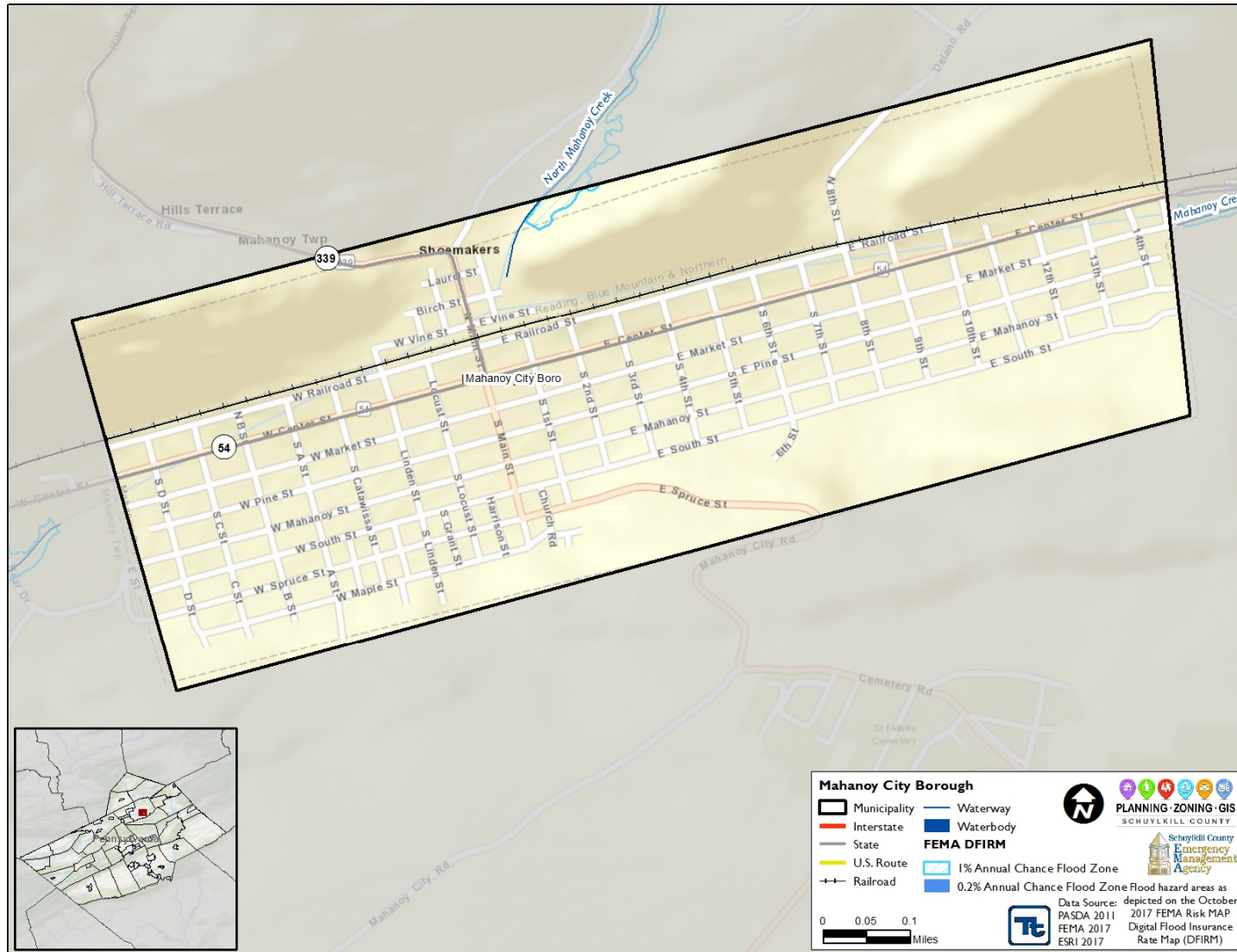


Figure 4.3.4-31. Mahanoy Township

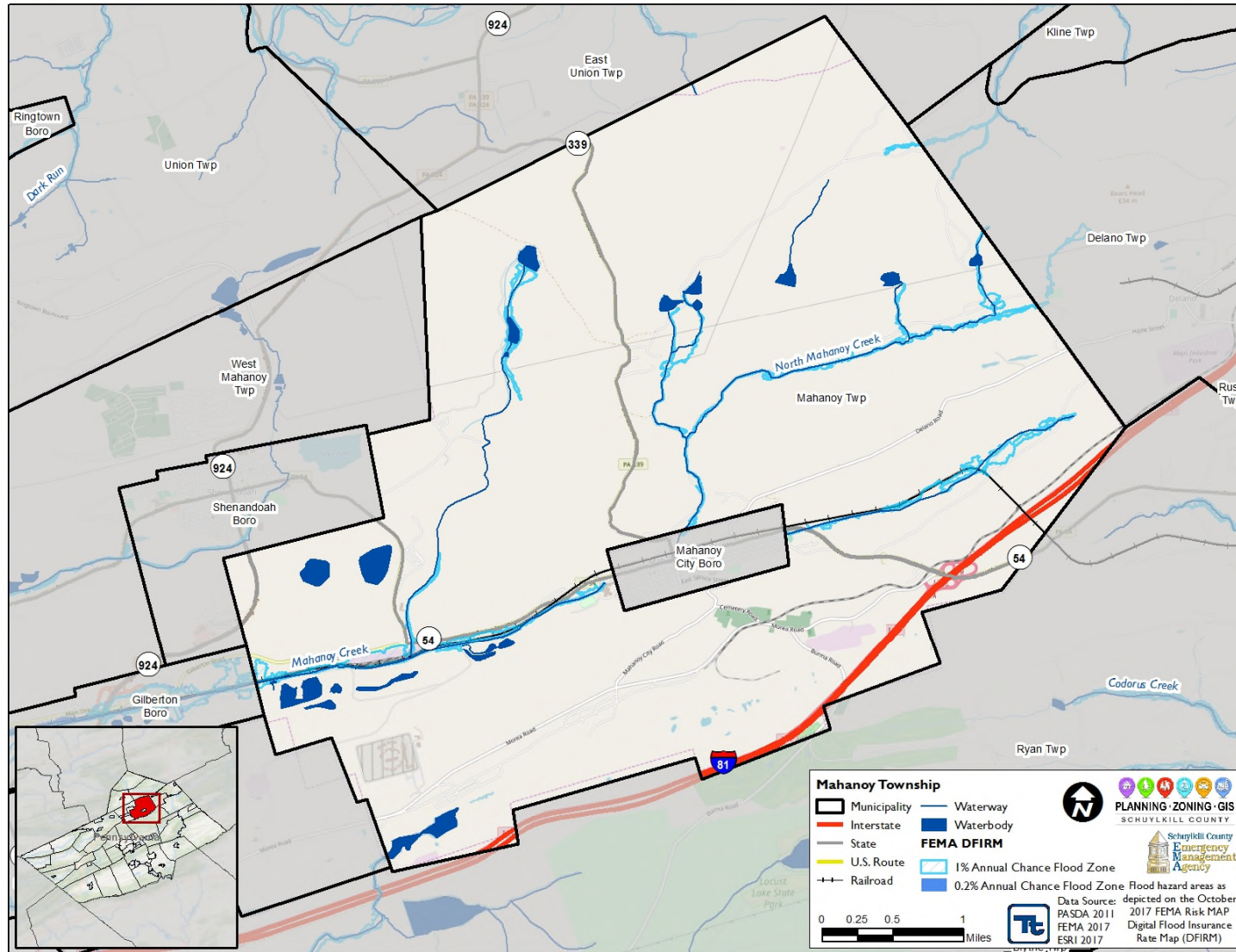


Figure 4.3.4-32. McAdoo Borough

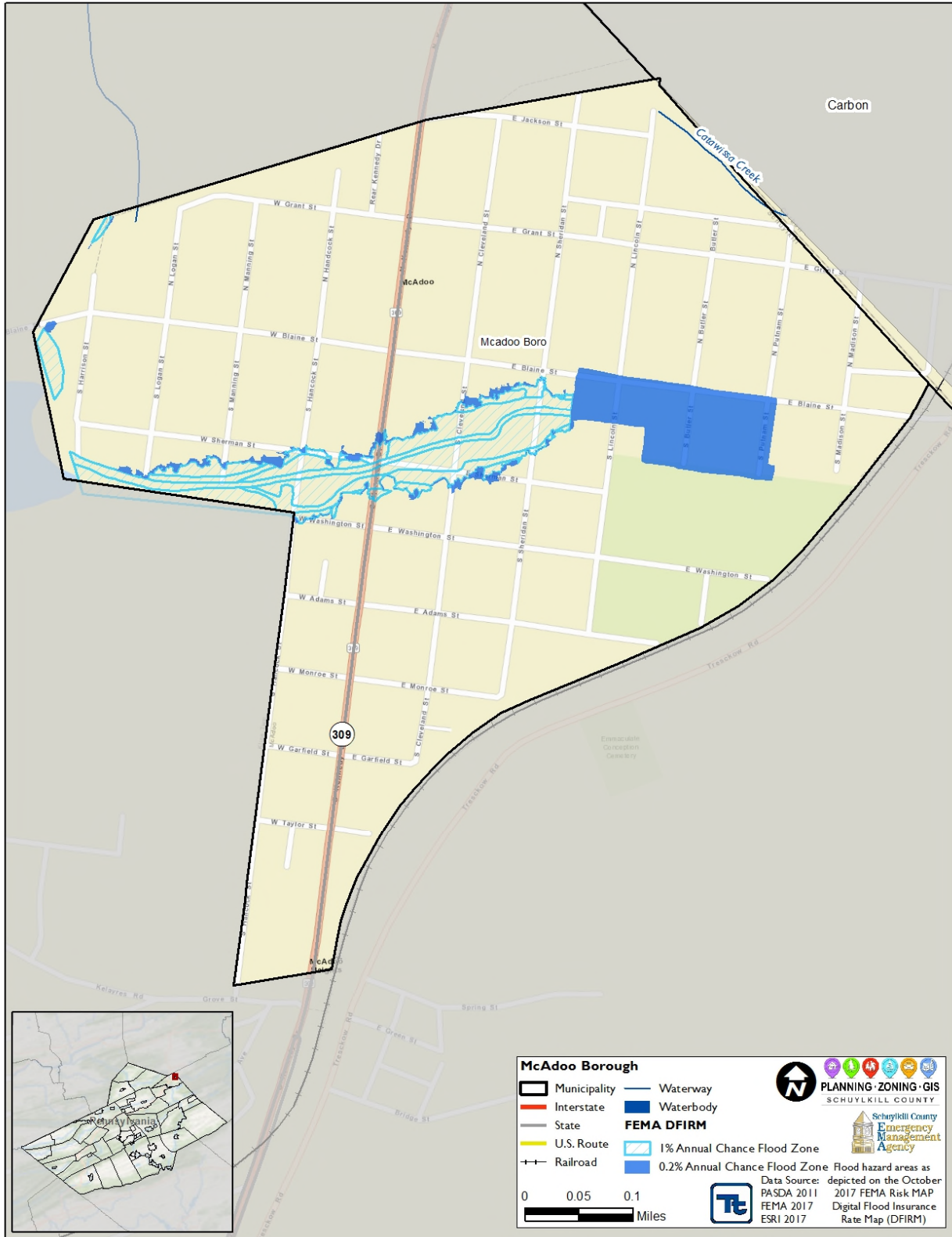


Figure 4.3.4-33. Mechanicsville Borough

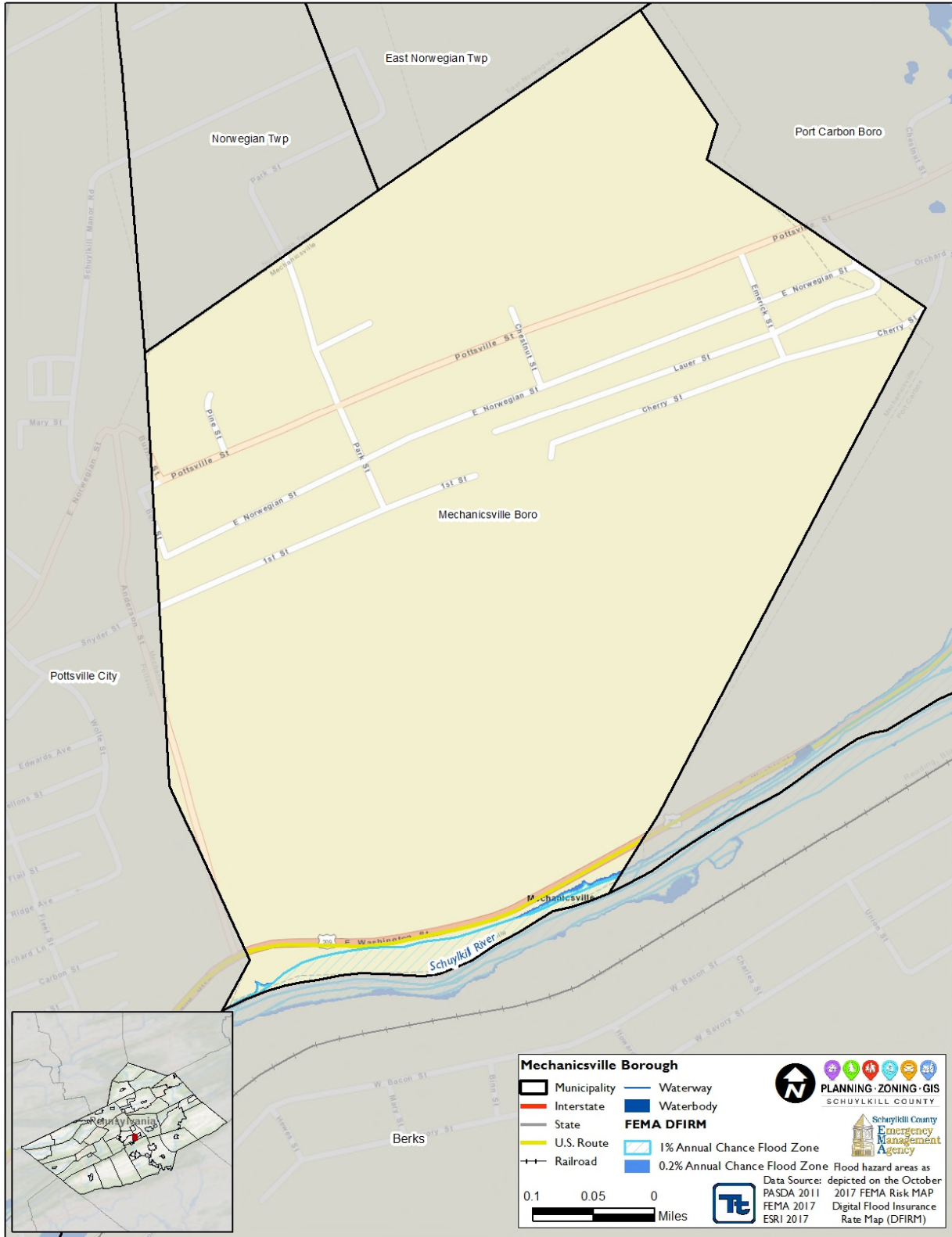


Figure 4.3.4-34. Middleport Borough

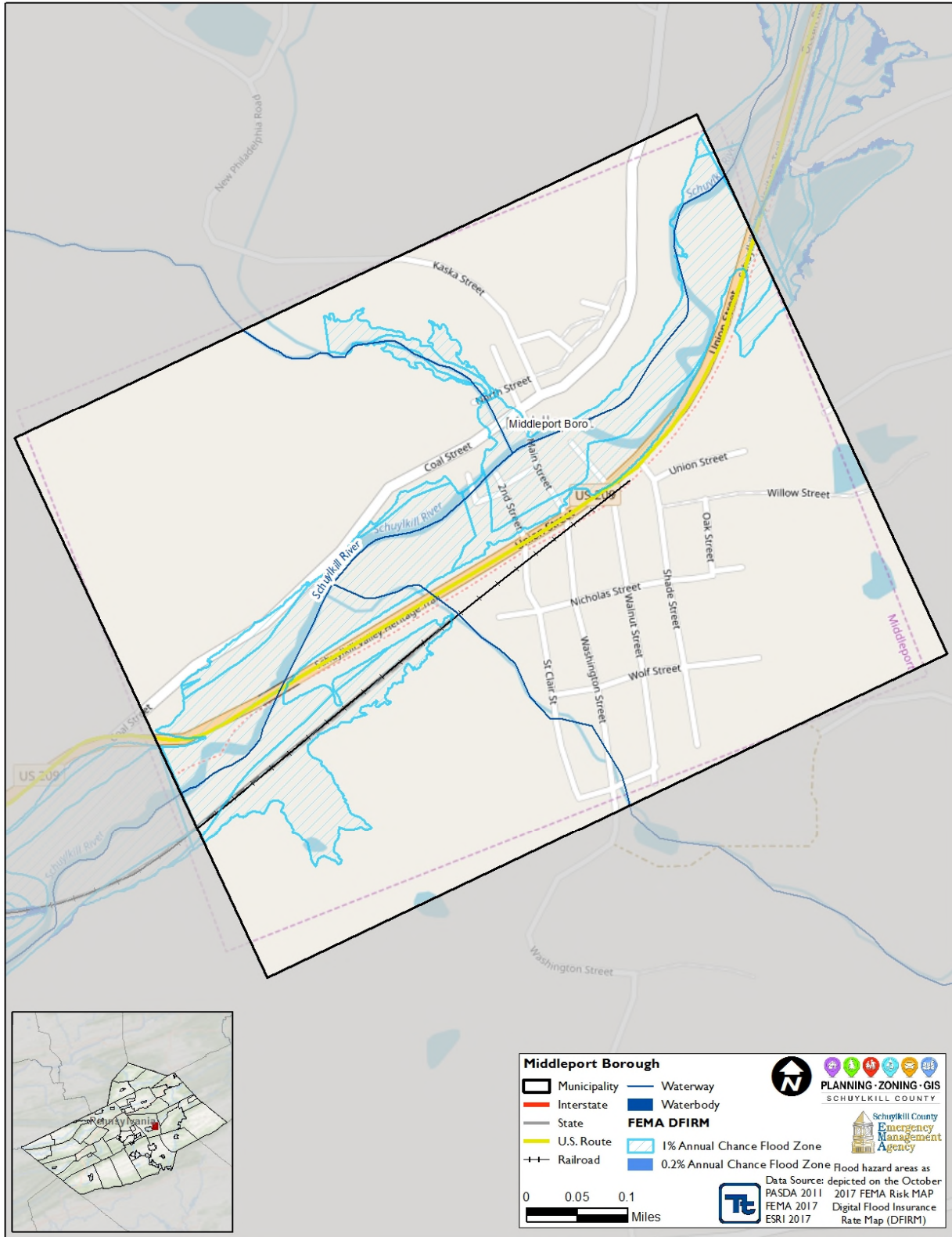


Figure 4.3.4-35. Minersville Borough

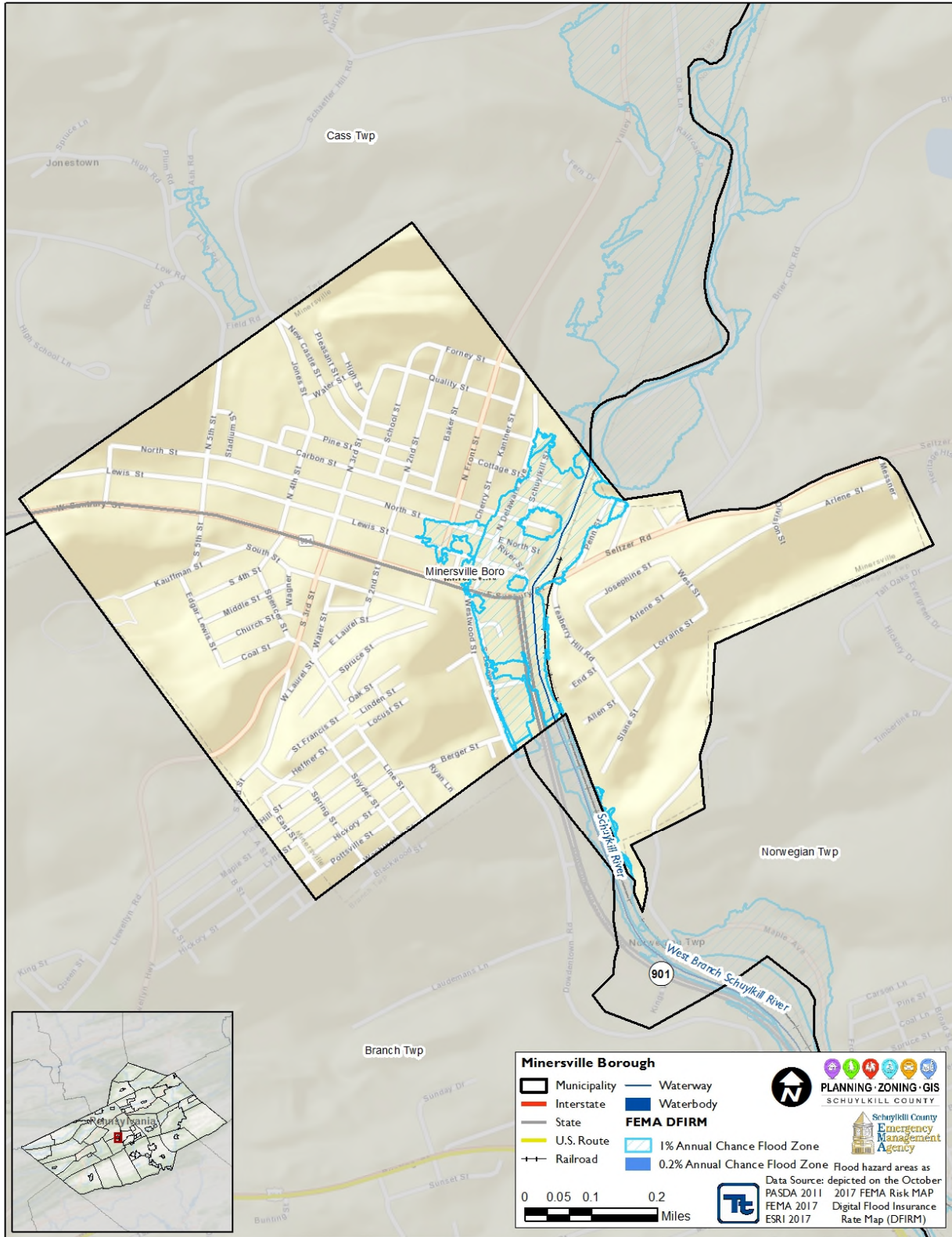


Figure 4.3.4-36. Mount Carbon Borough

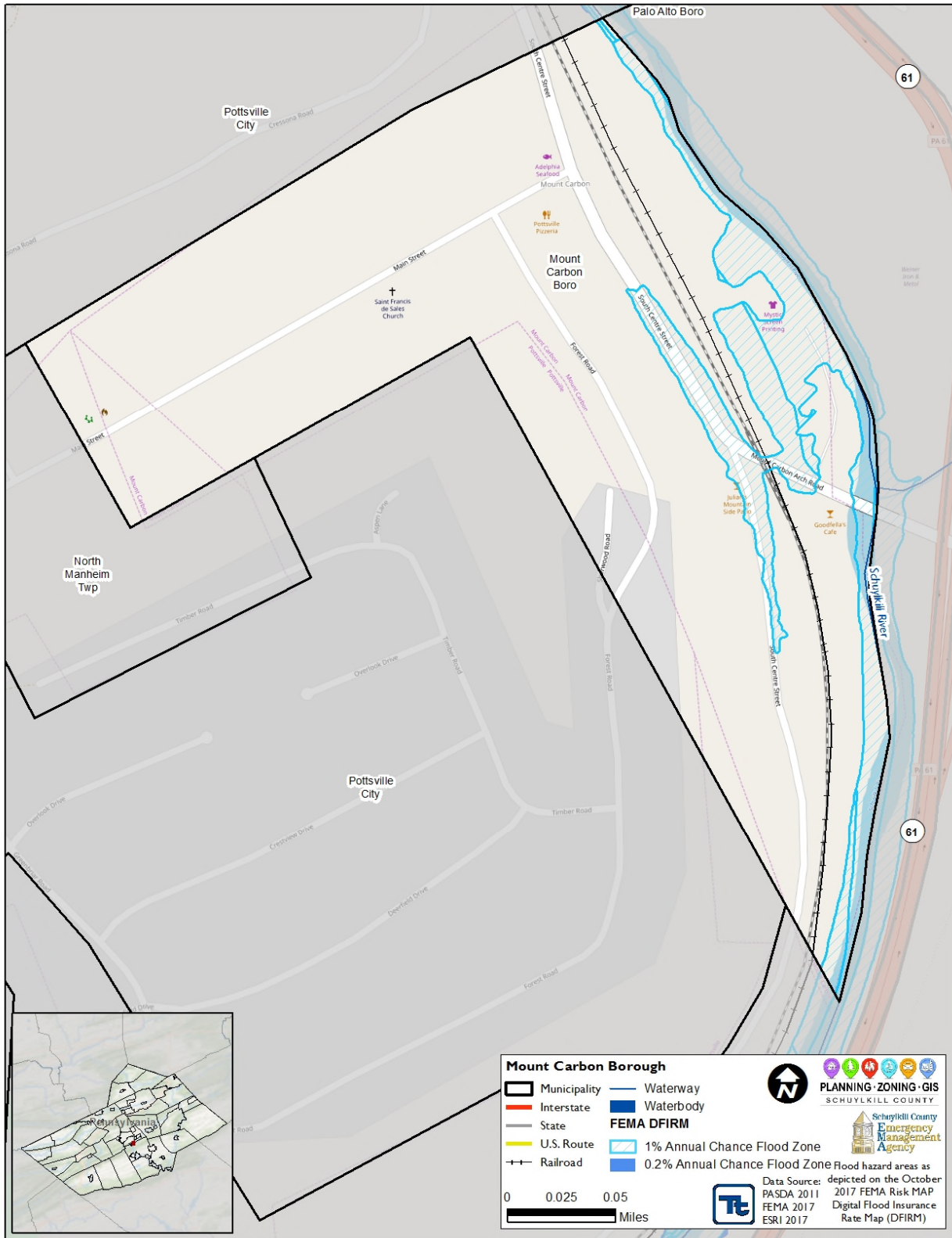


Figure 4.3.4-37. New Castle Borough

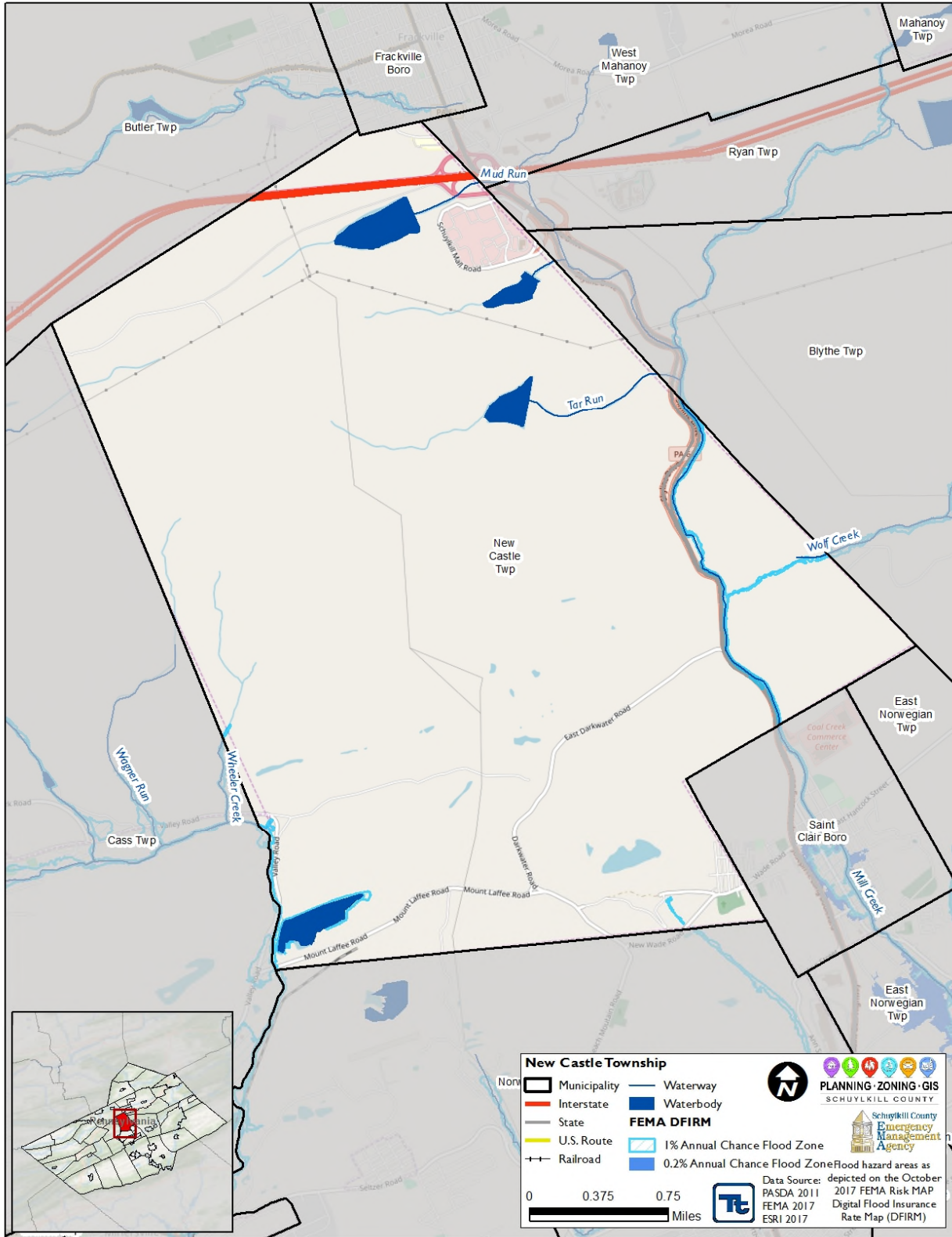


Figure 4.3.4-38. New Philadelphia Borough

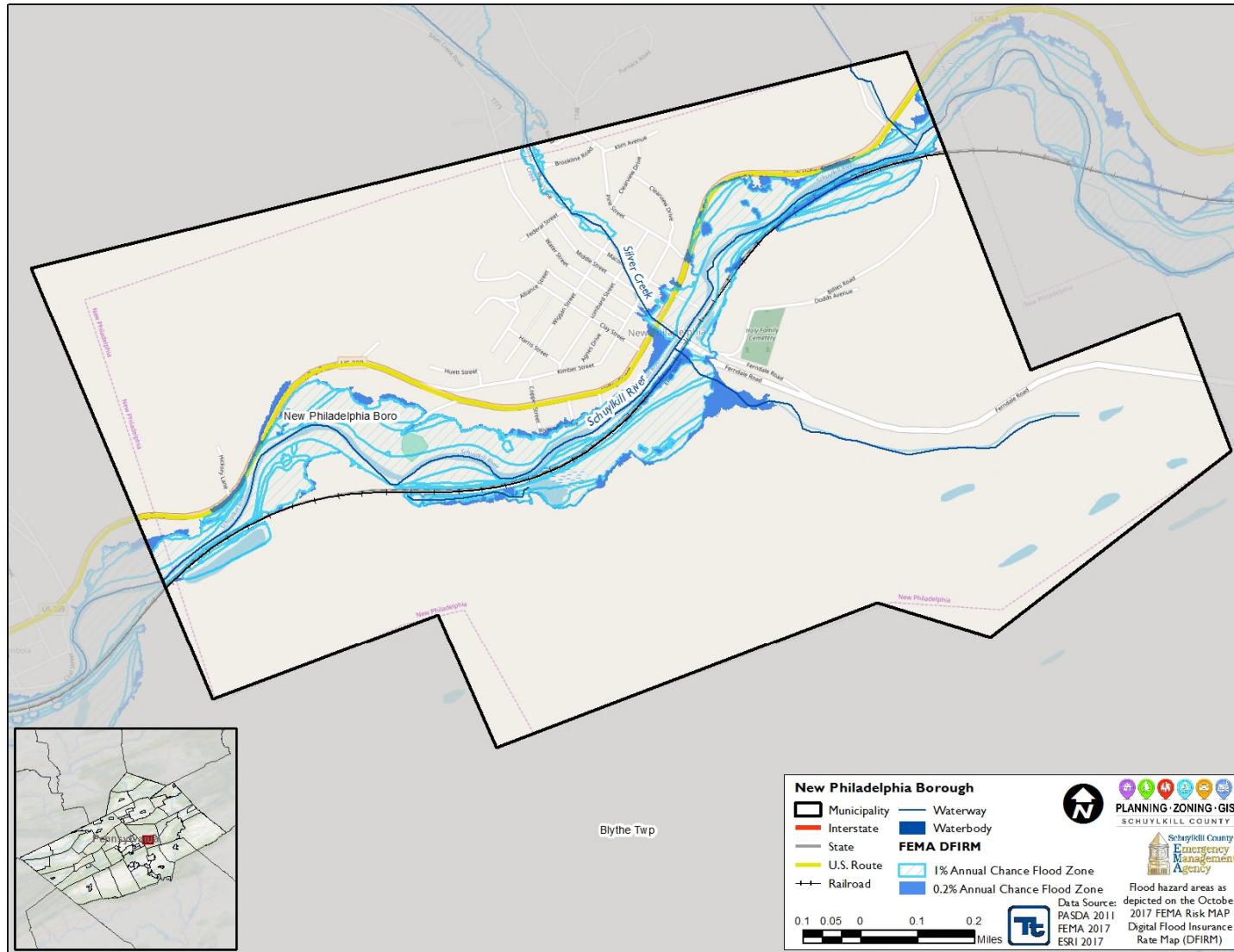


Figure 4.3.4-39. New Ringgold Borough

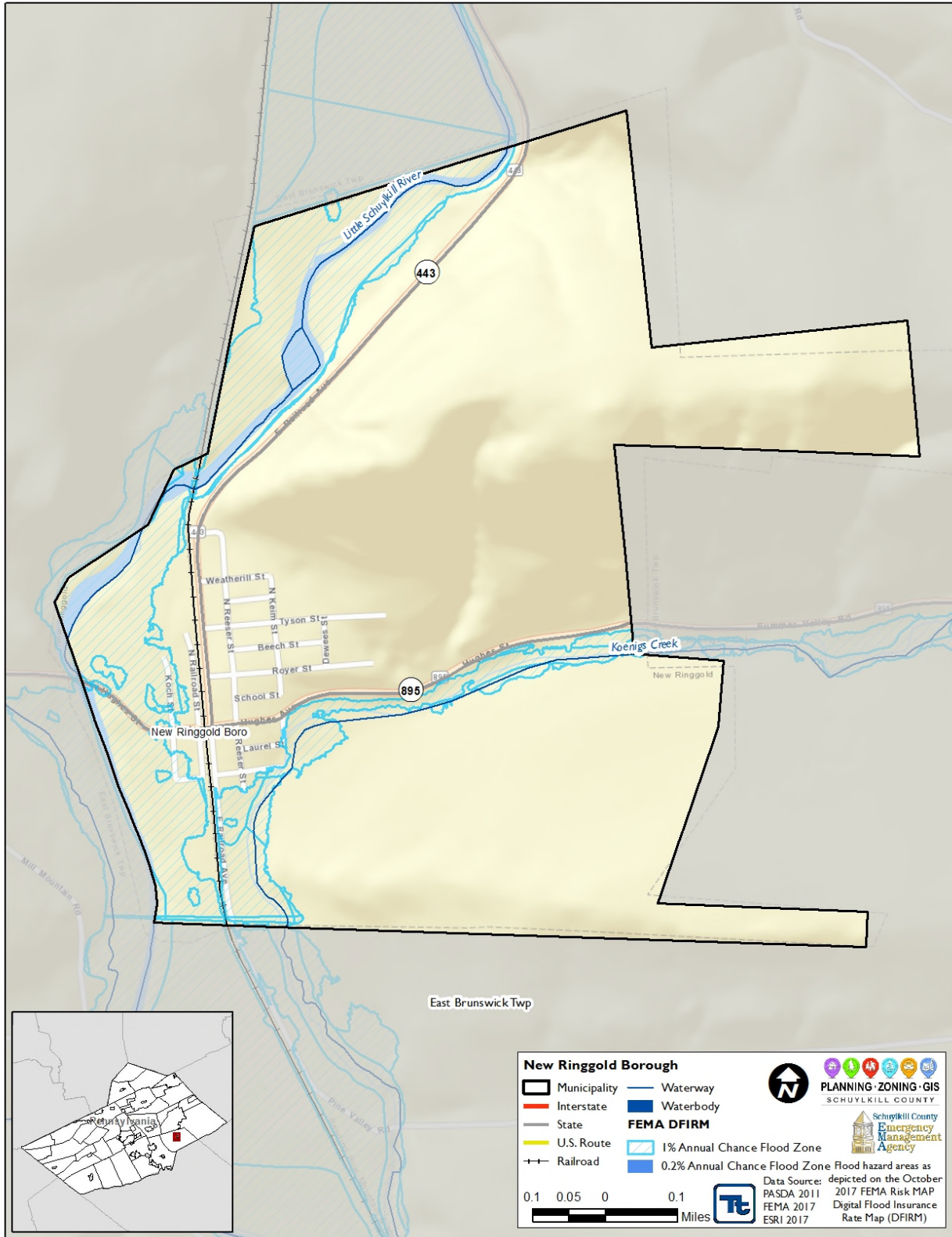


Figure 4.3.4-40. North Manheim Borough

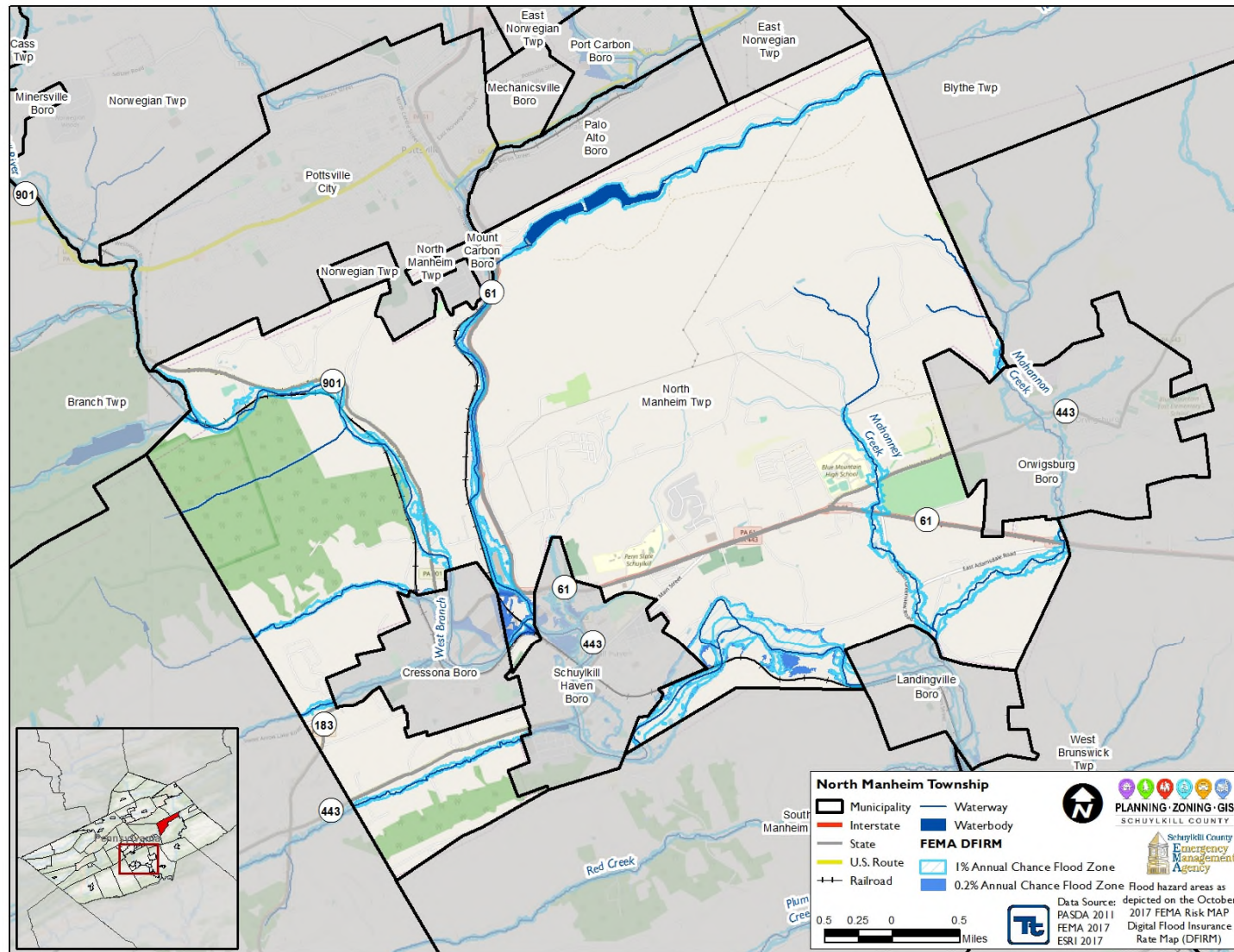


Figure 4.3.4-41. North Union Borough

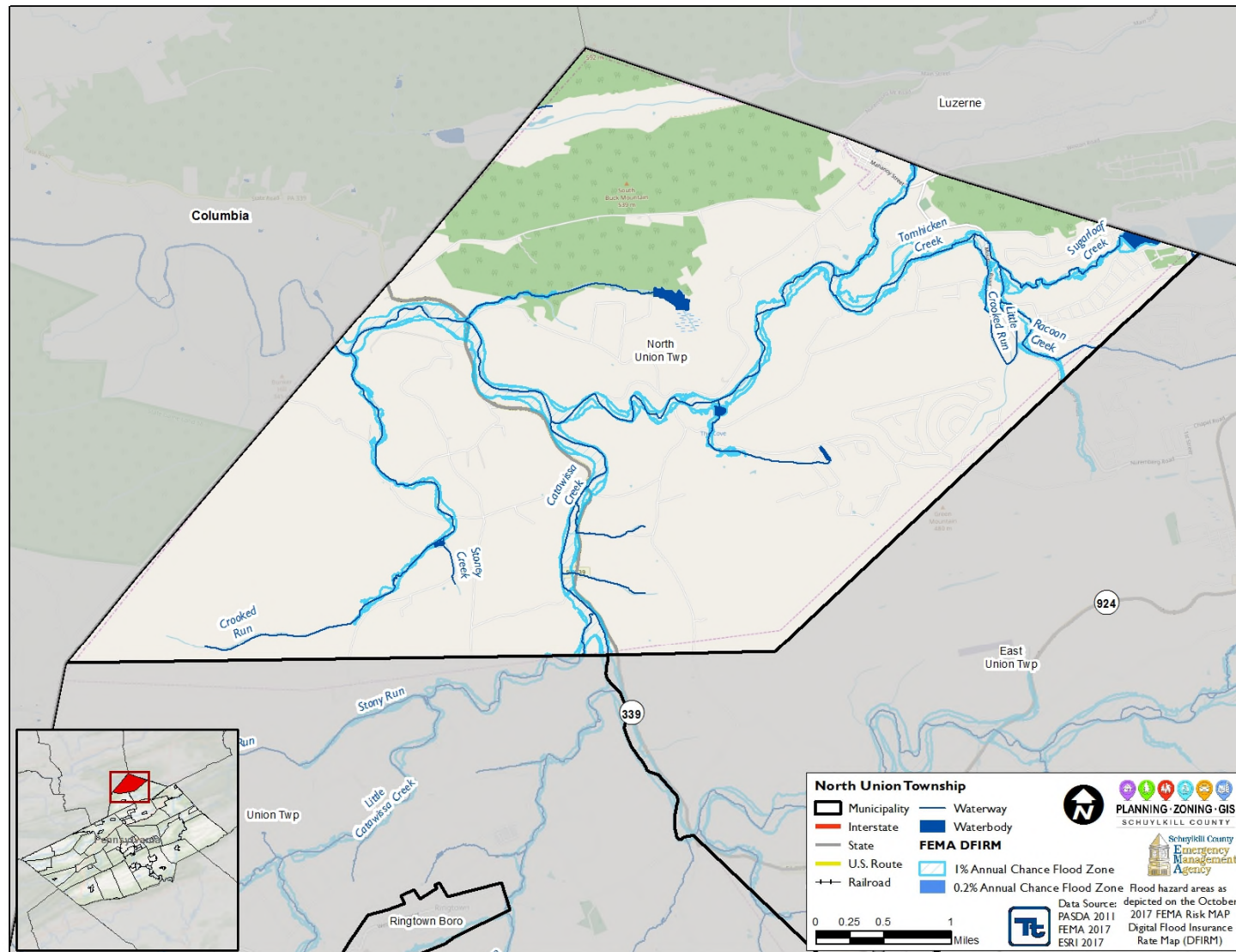


Figure 4.3.4-42. Norwegian Township

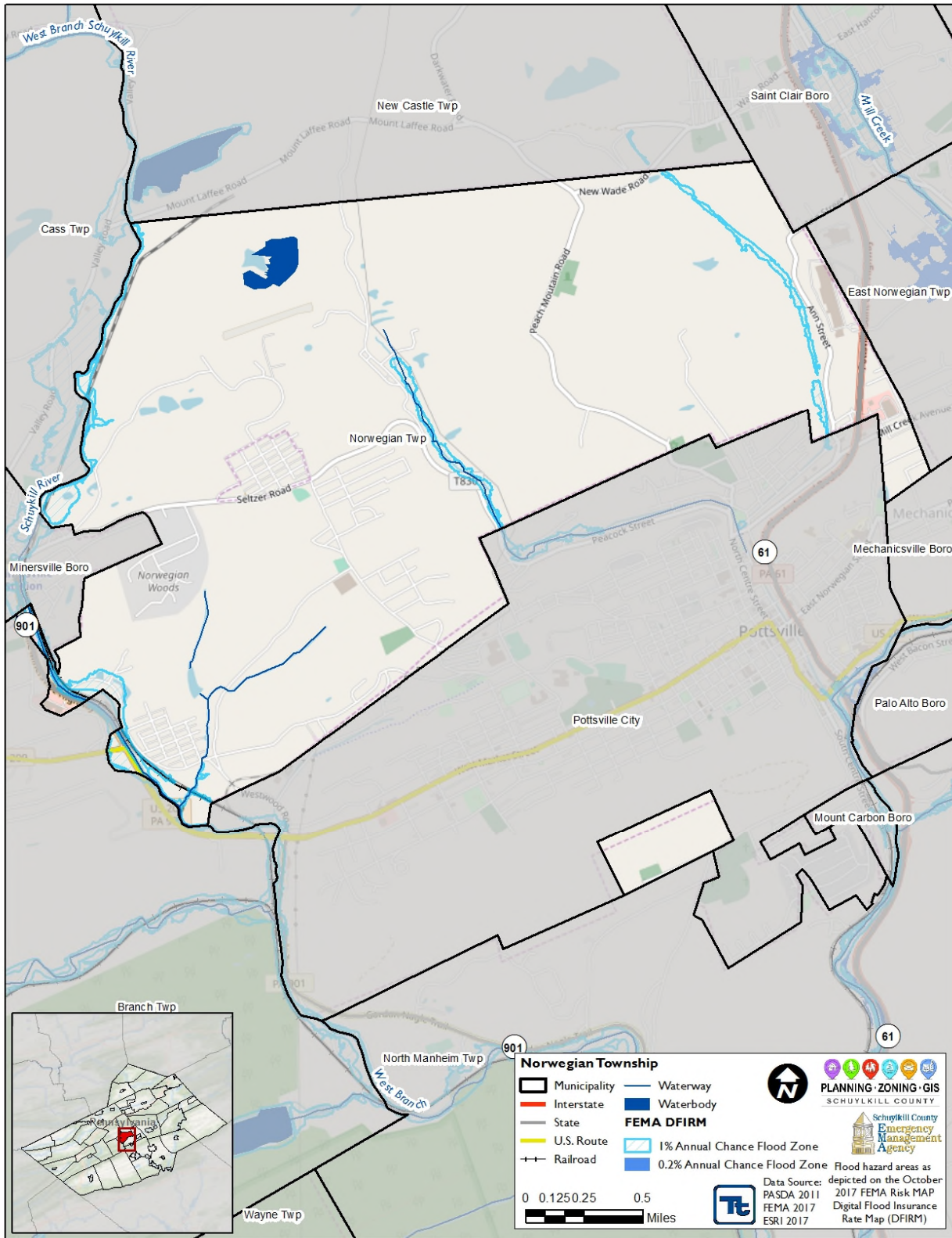


Figure 4.3.4-43. Orwigsburg Borough

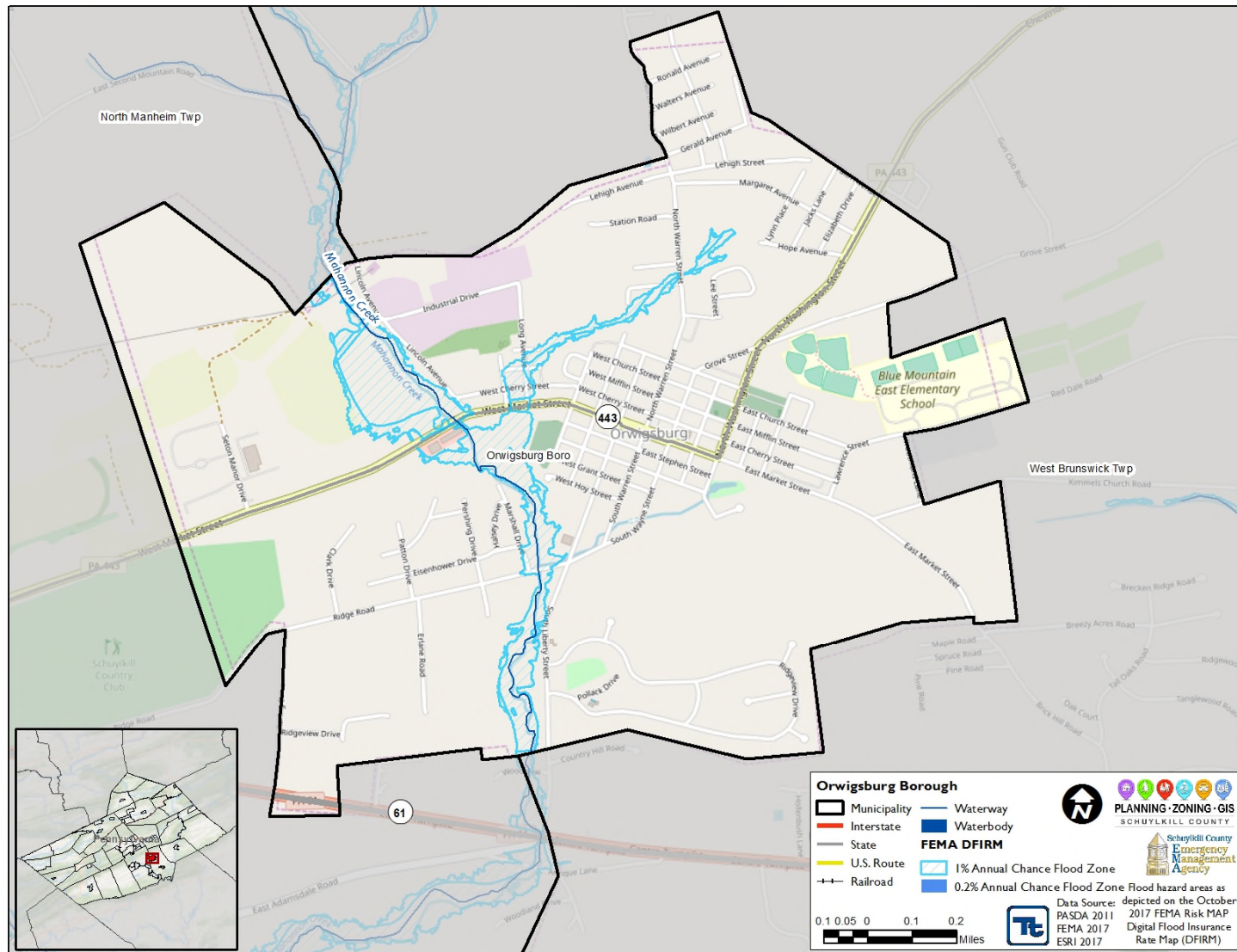


Figure 4.3.4-44. Palo Alto Borough

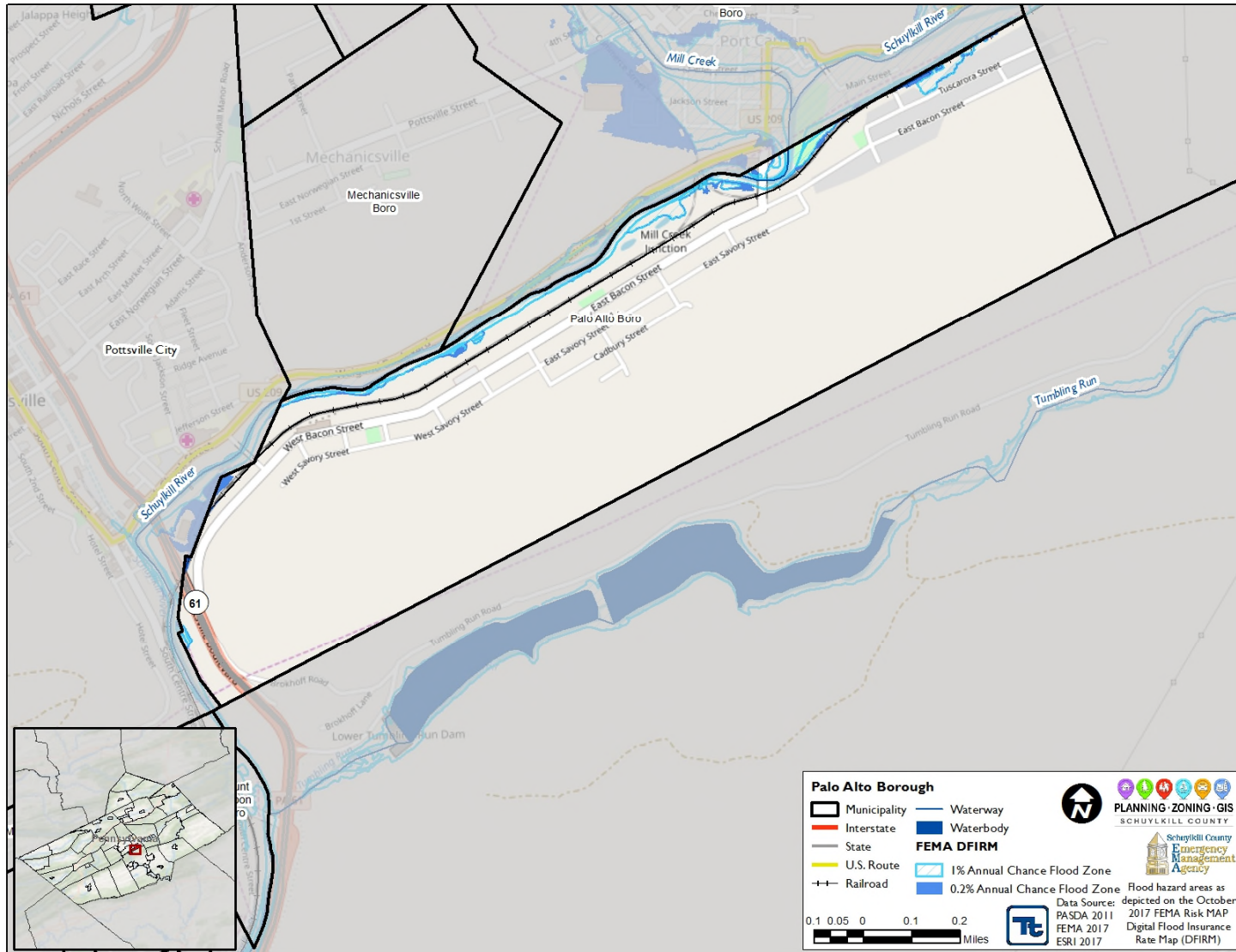


Figure 4.3.4-45. Pine Grove Borough

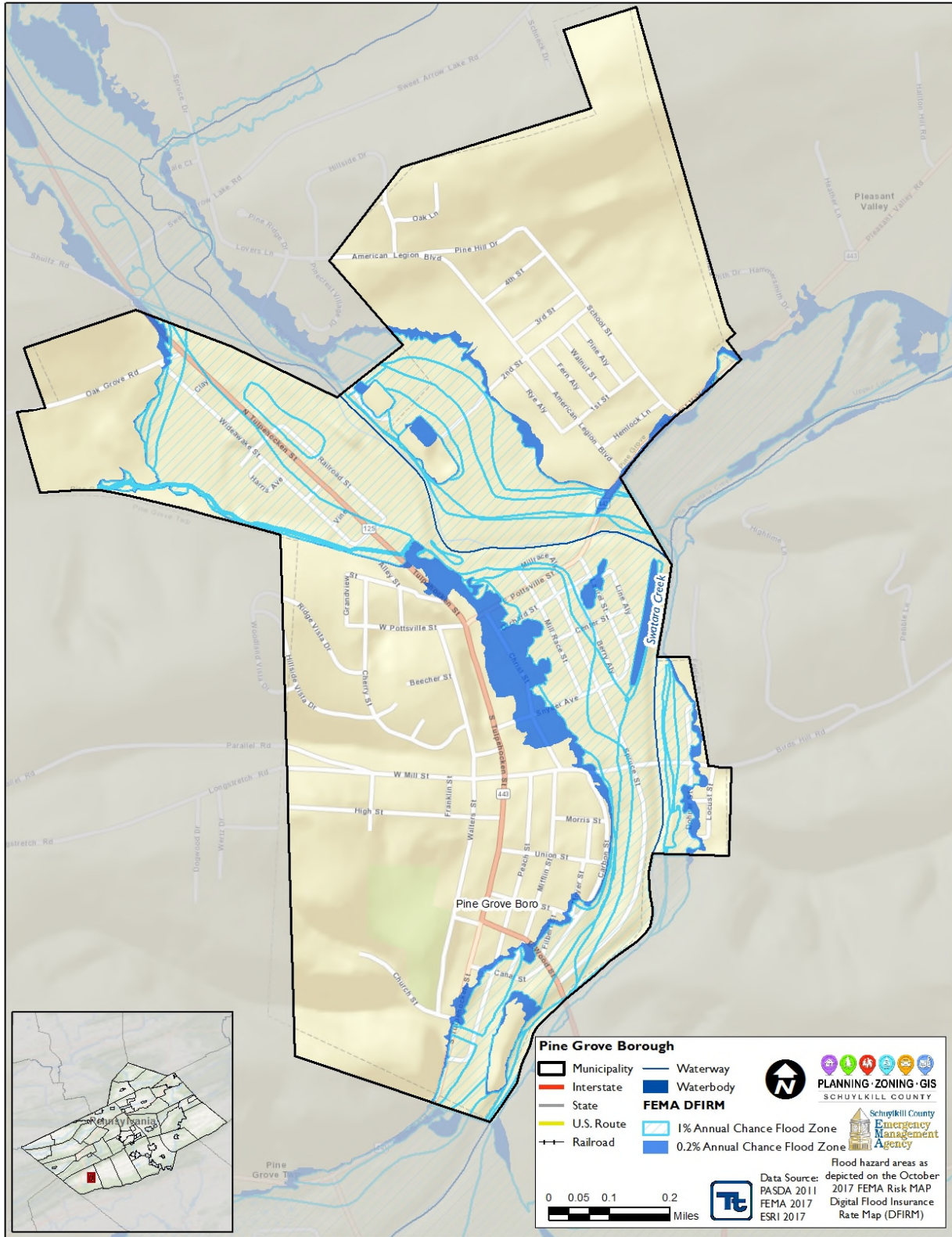


Figure 4.3.4-46. Pine Grove Township

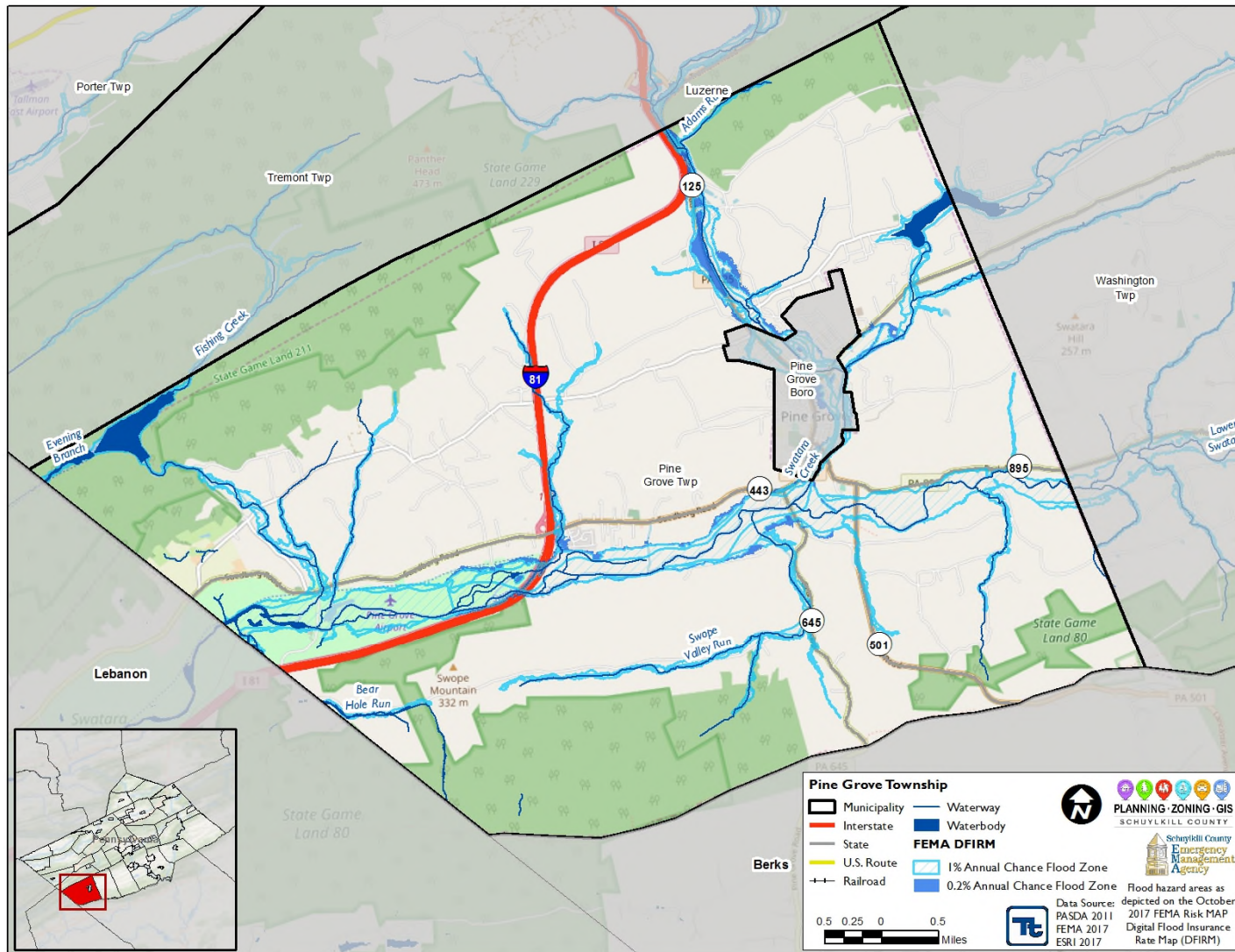


Figure 4.3.4-47. Port Carbon Borough

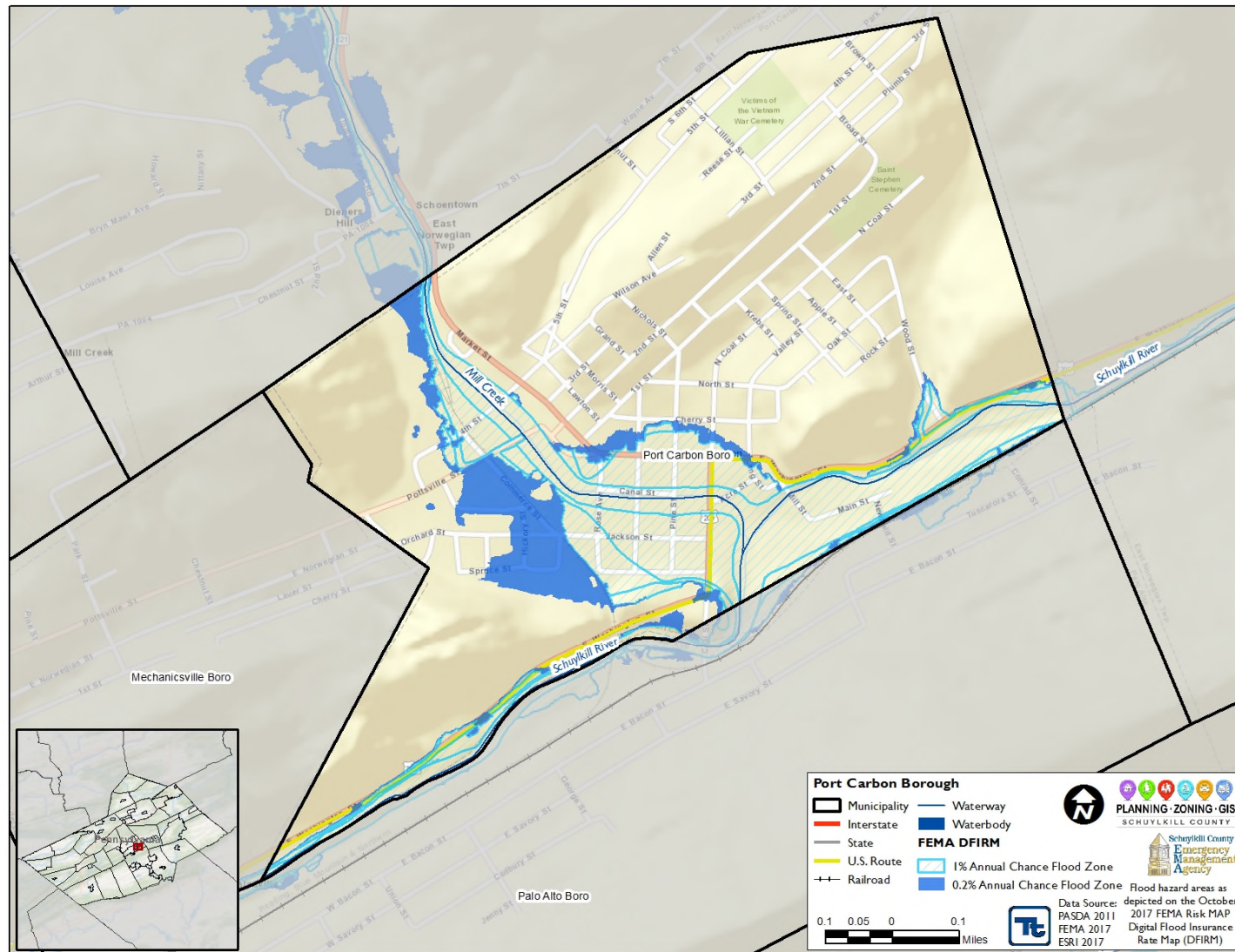


Figure 4.3.4-48. Port Clinton Borough

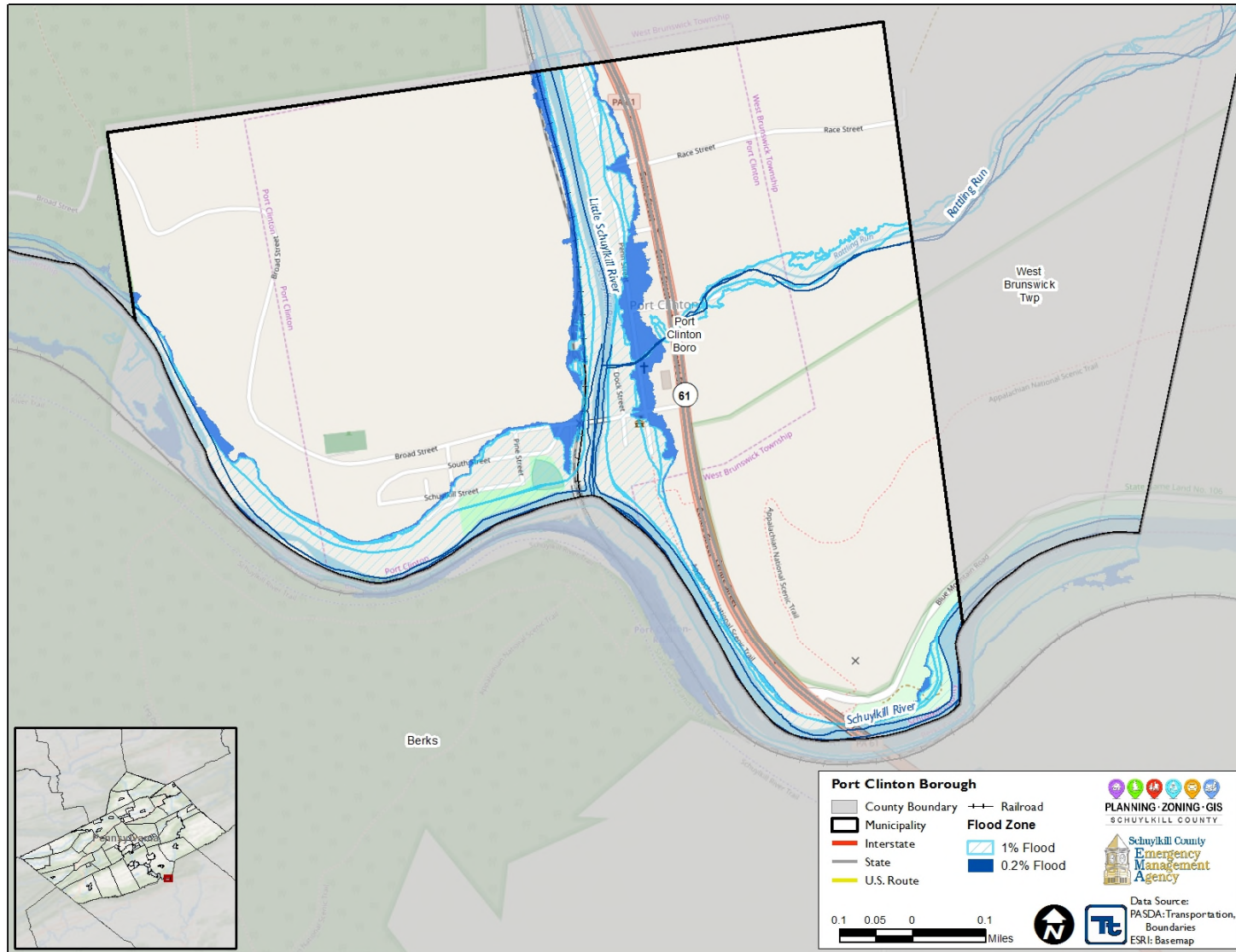


Figure 4.3.4-49. Porter Township

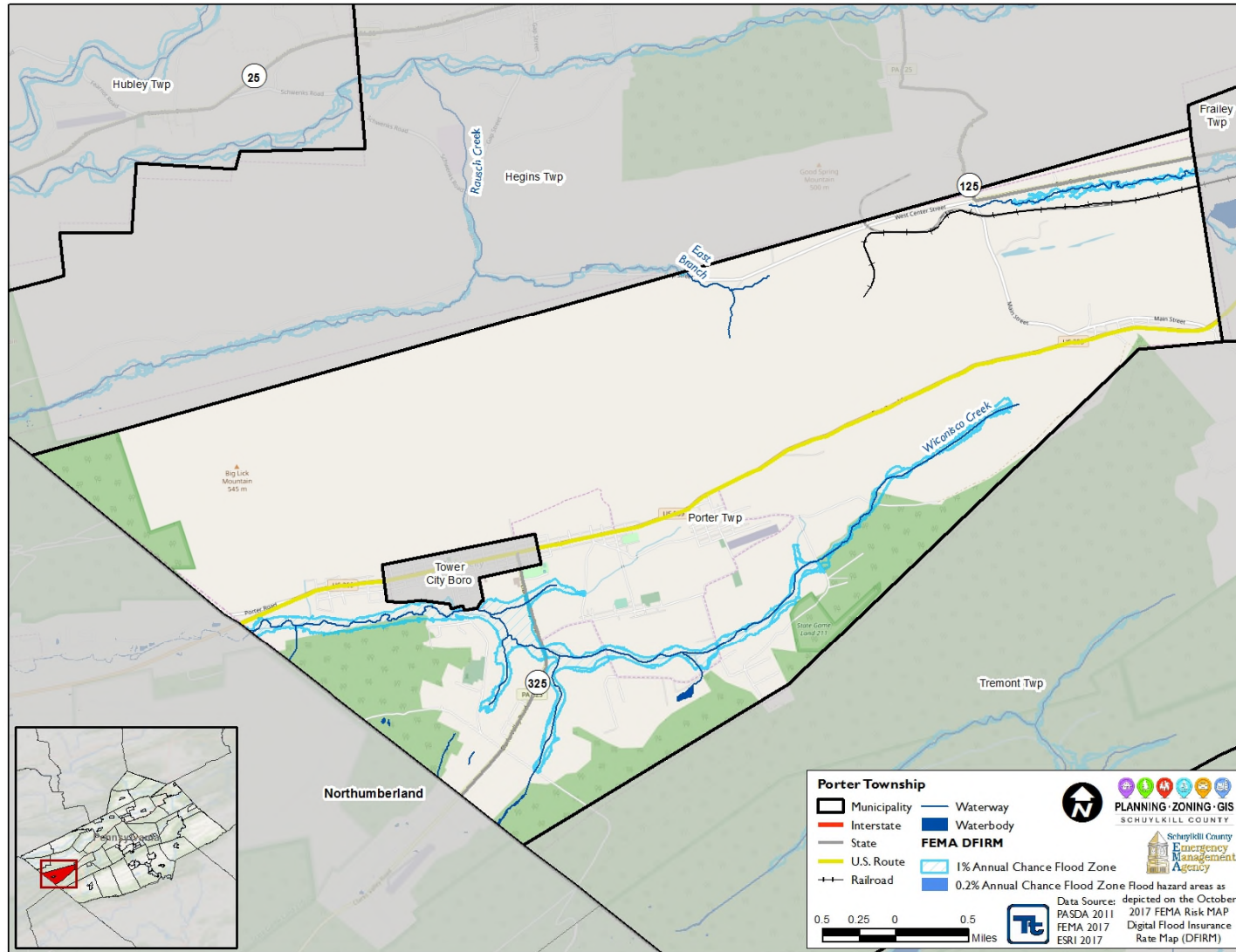


Figure 4.3.4-50. Pottsville City

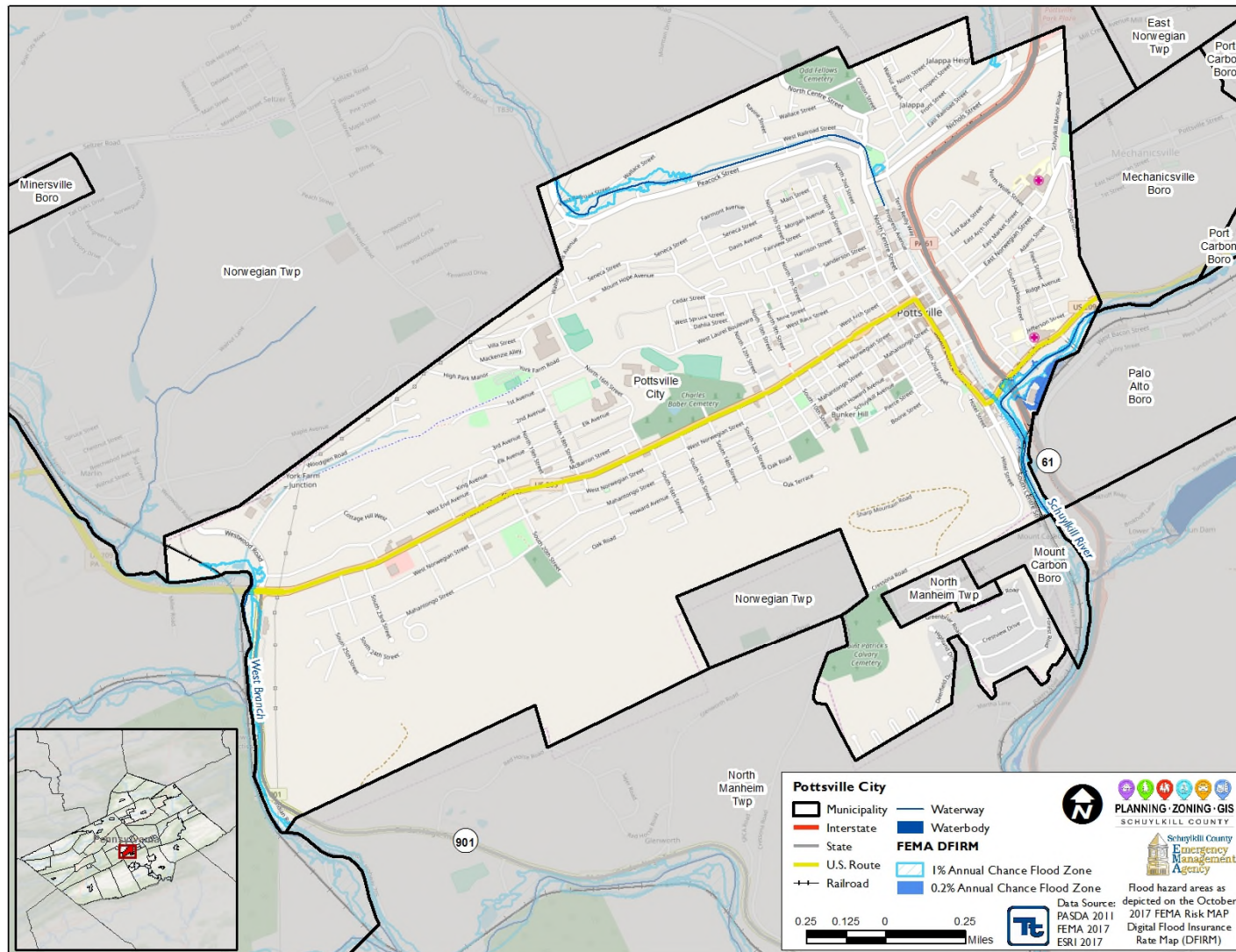


Figure 4.3.4-51. Reilly Township

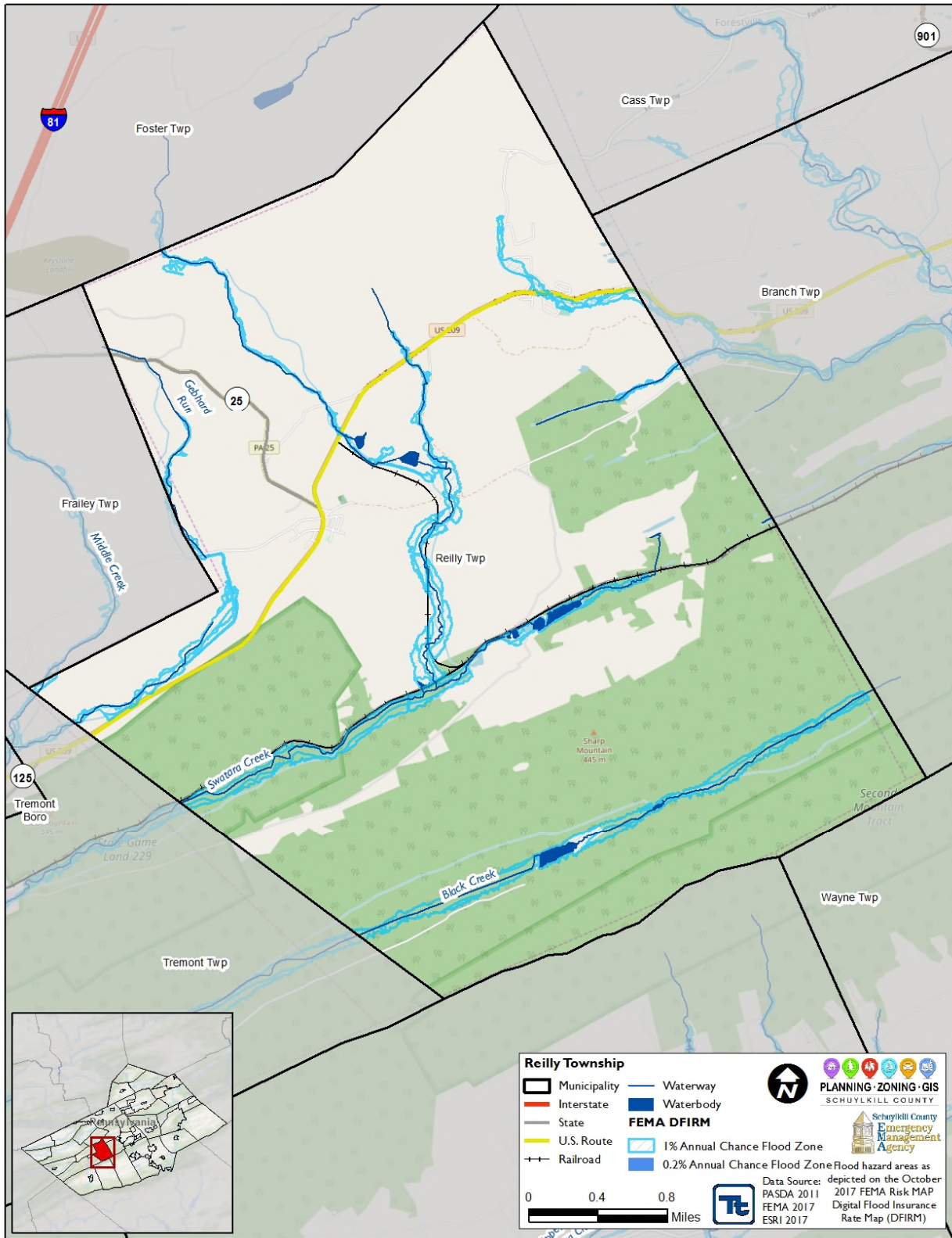


Figure 4.3.4-52. Ringtown Borough

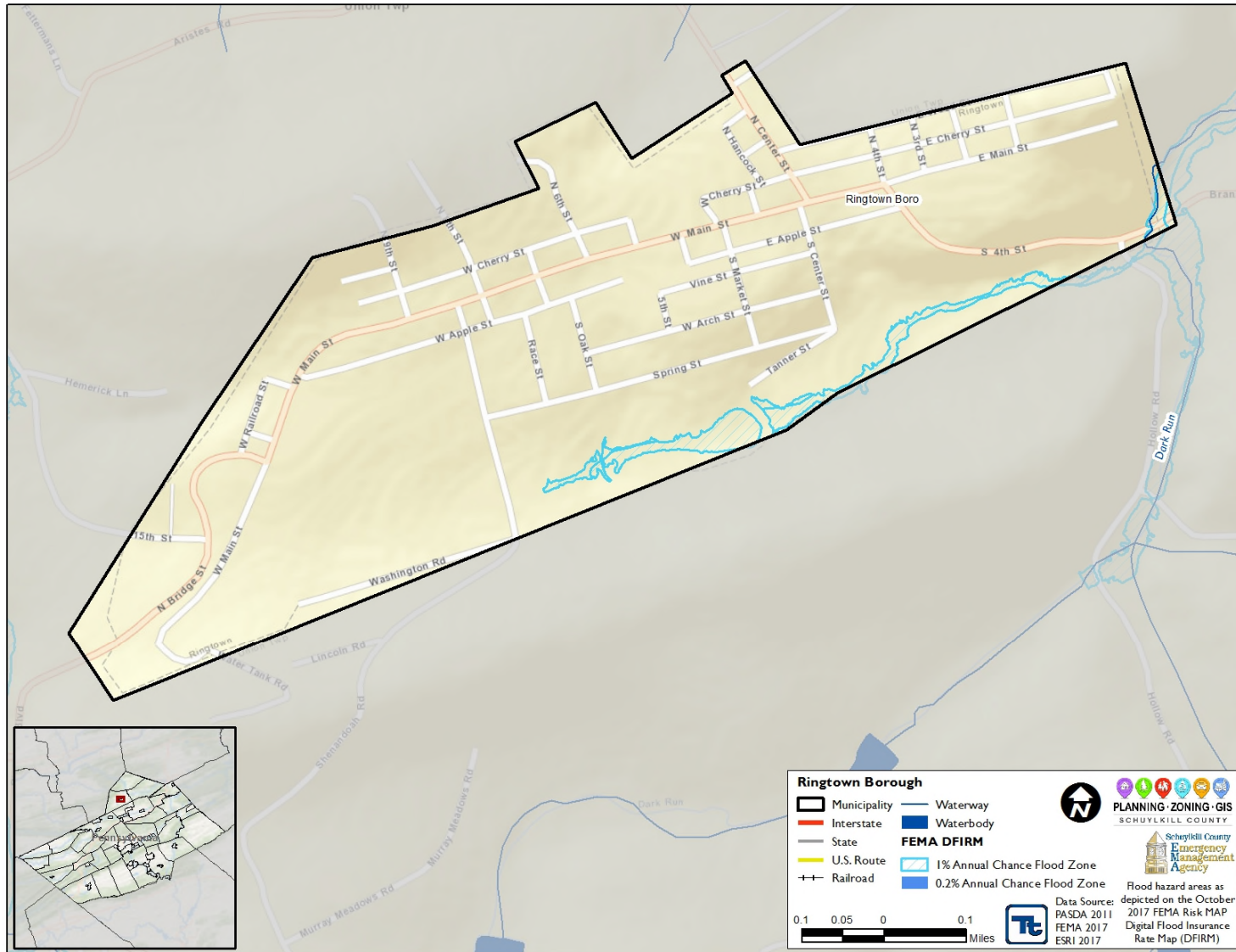


Figure 4.3.4-53. Rush Township

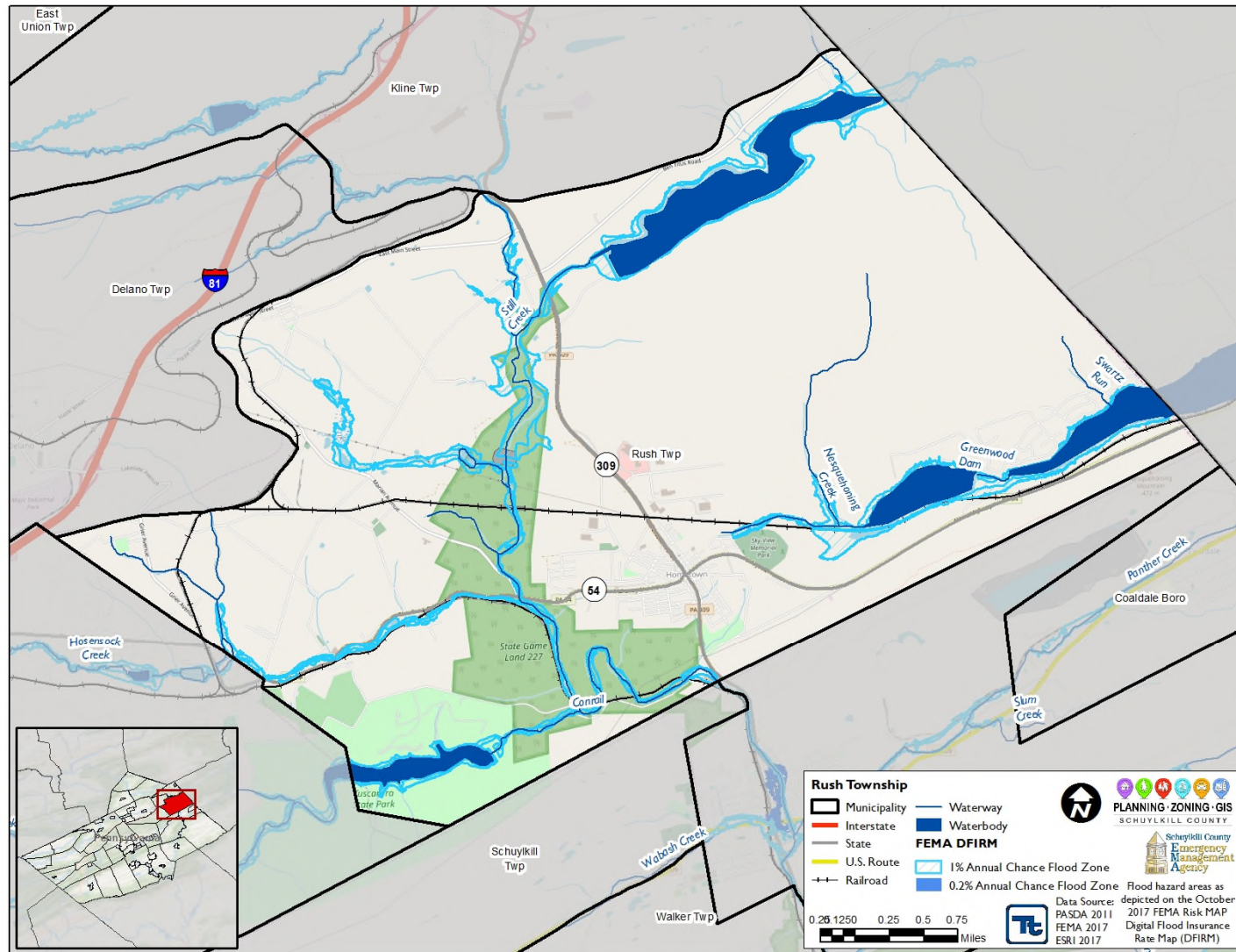


Figure 4.3.4-54. Ryan Township

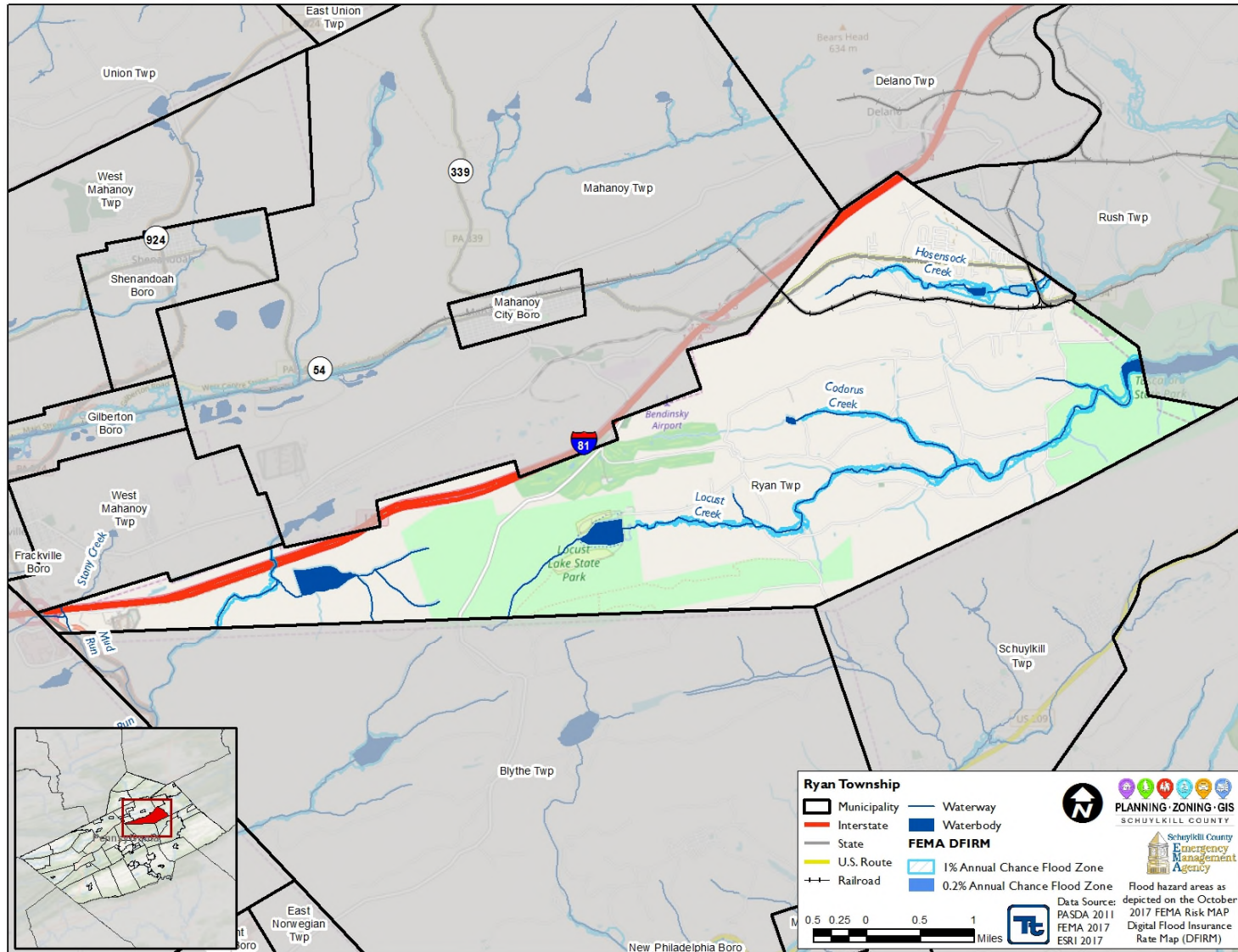


Figure 4.3.4-55. Saint Clair Borough

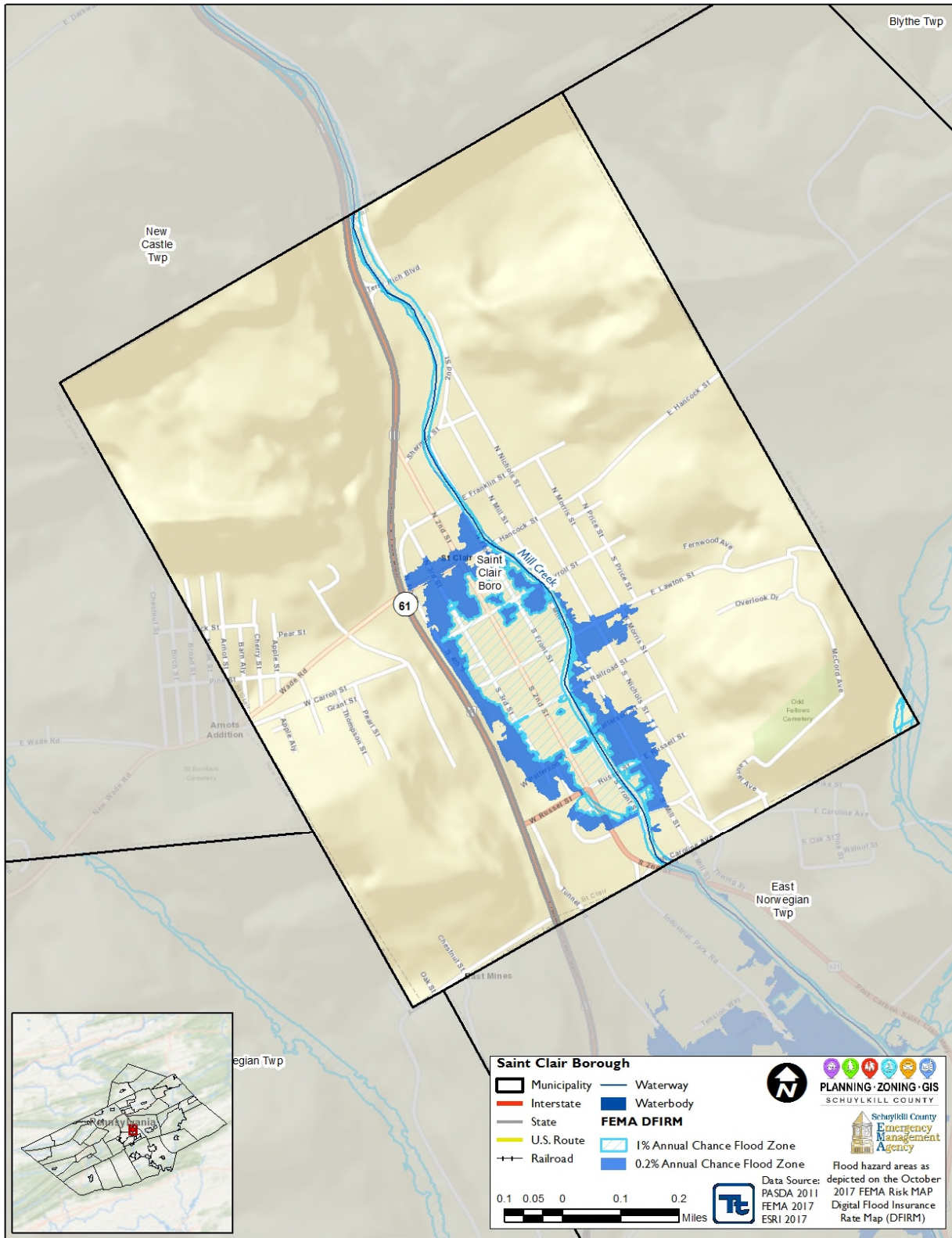


Figure 4.3.4-56. Schuykill Haven Borough

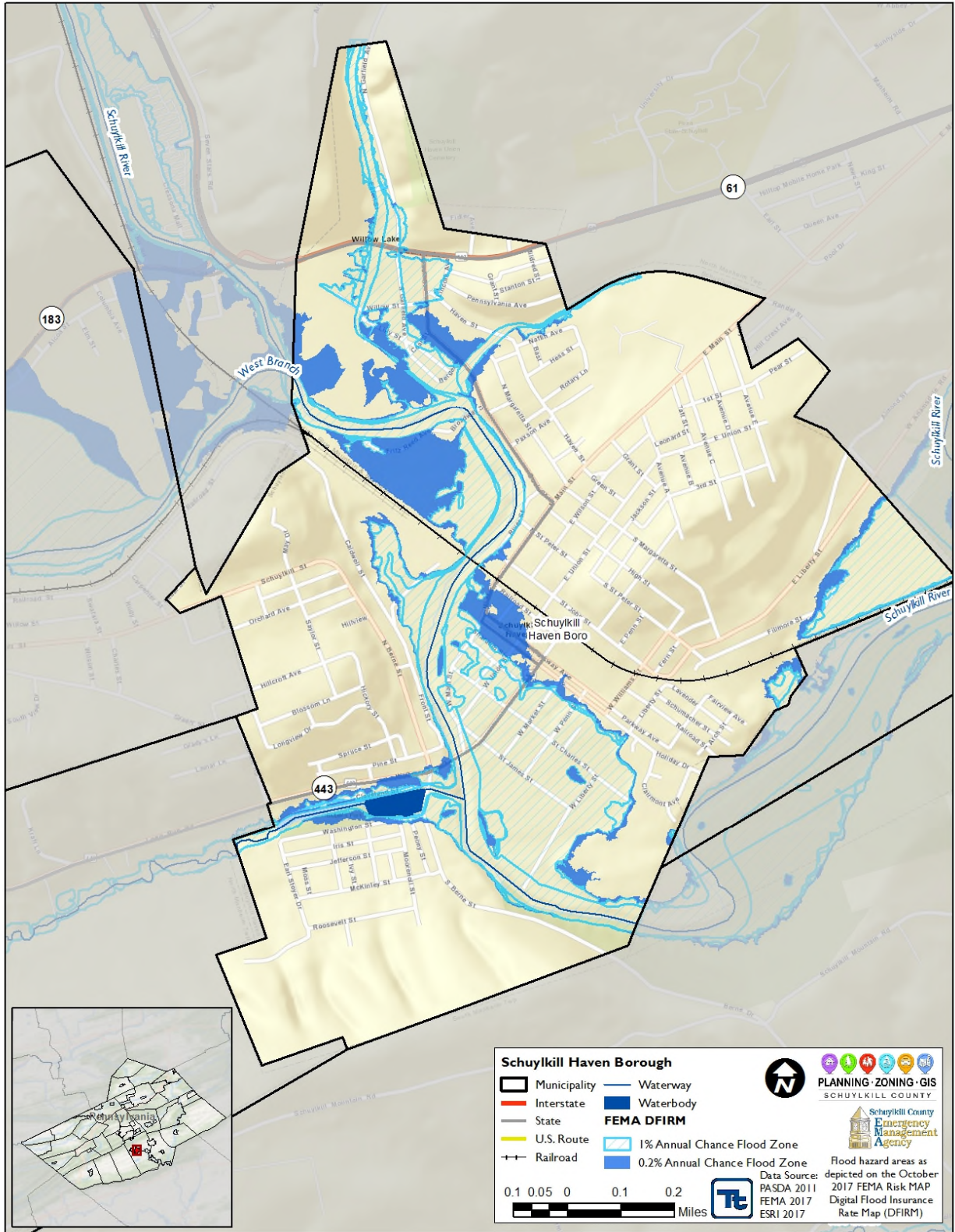


Figure 4.3.4-57. Schuylkill Township

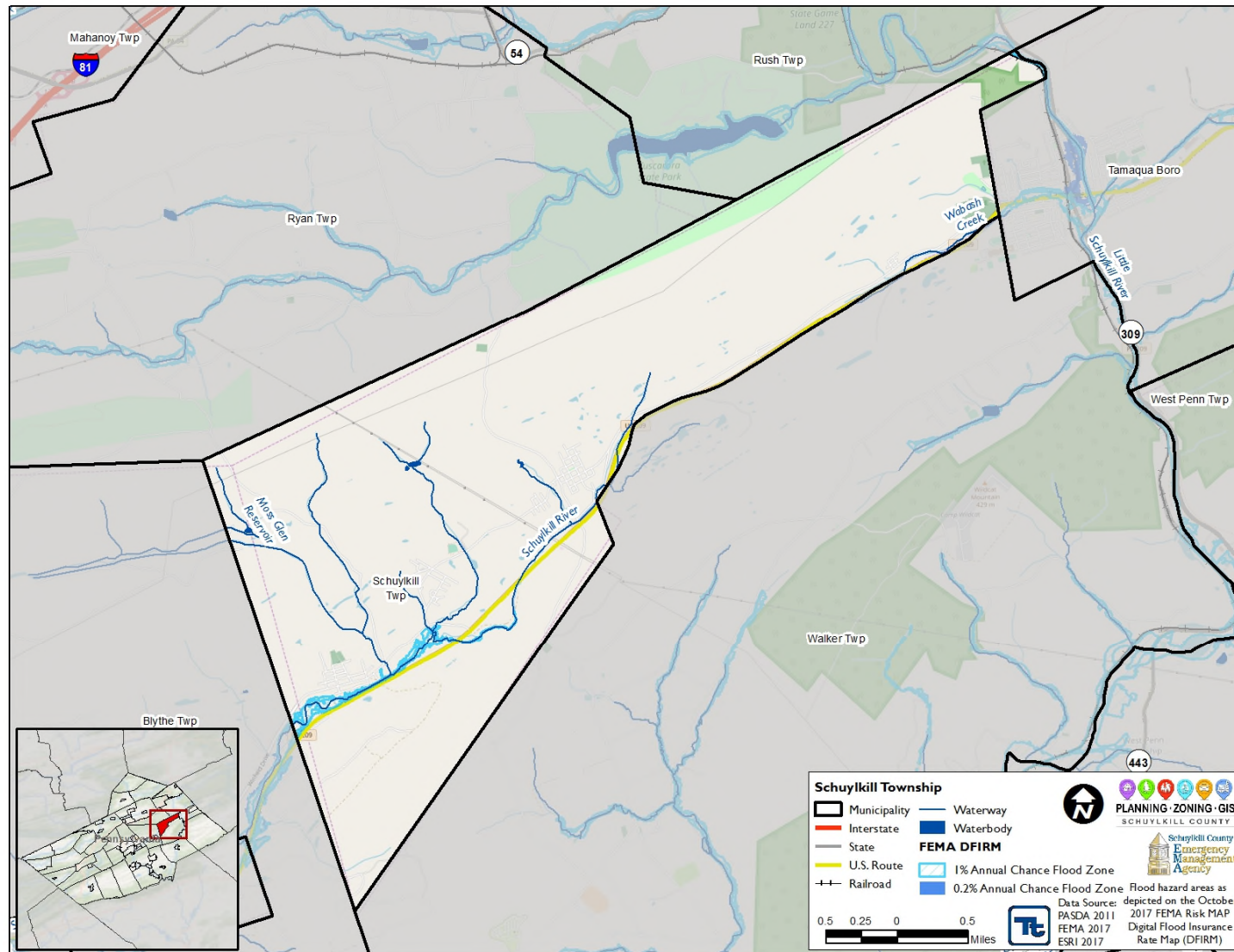


Figure 4.3.4-58. Shenandoah Borough

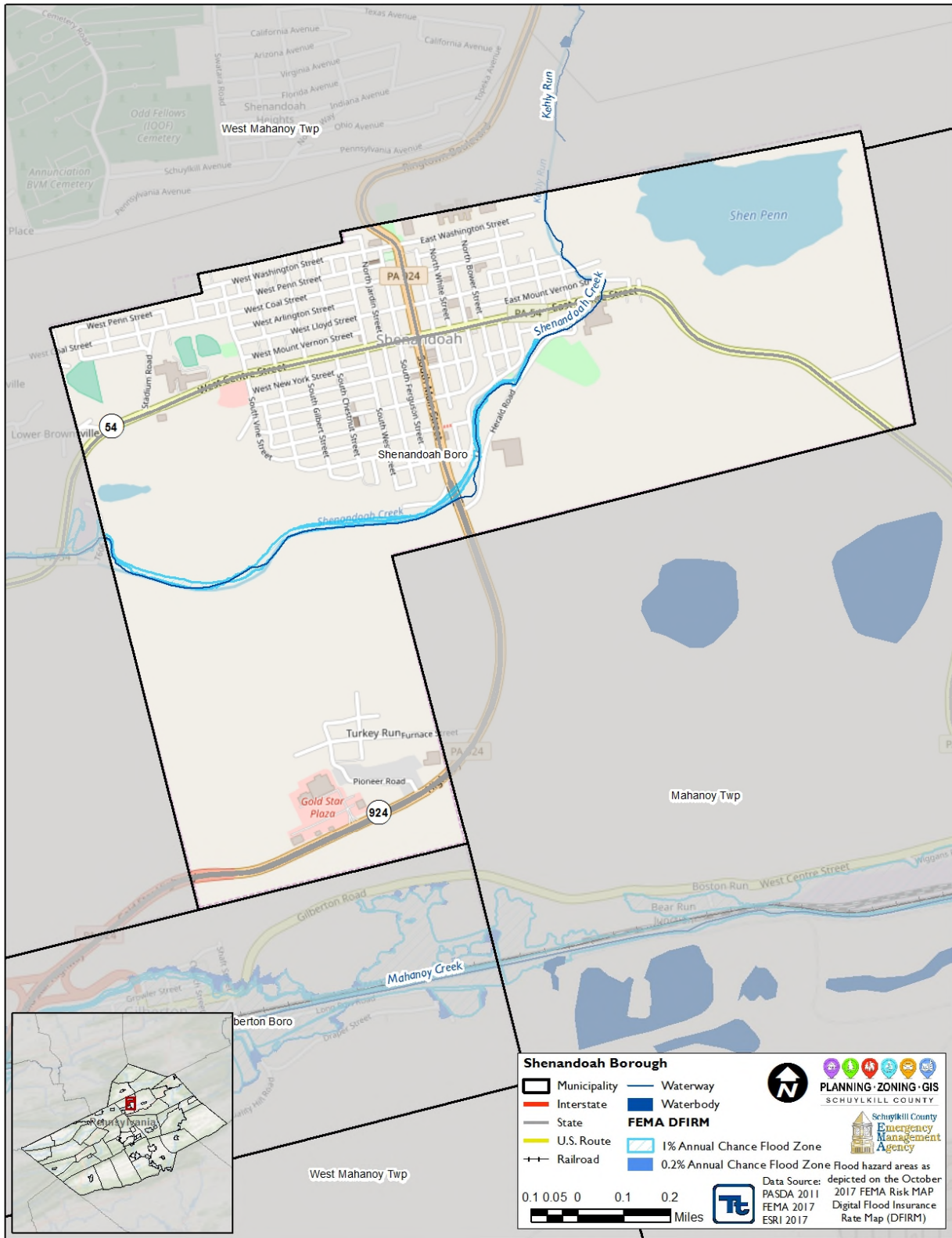


Figure 4.3.4-59. South Manheim Township

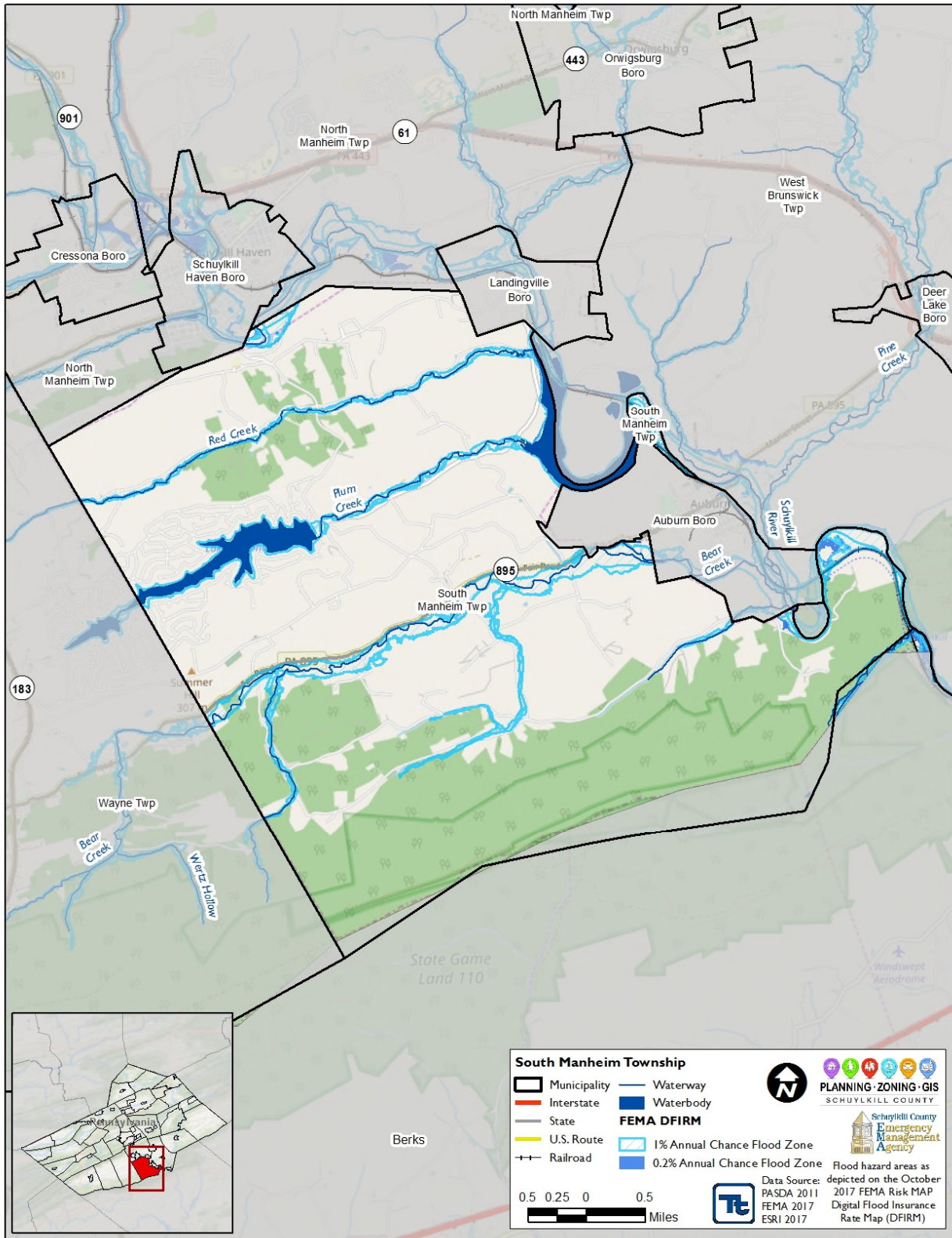


Figure 4.3.4-60. Tamaqua Borough

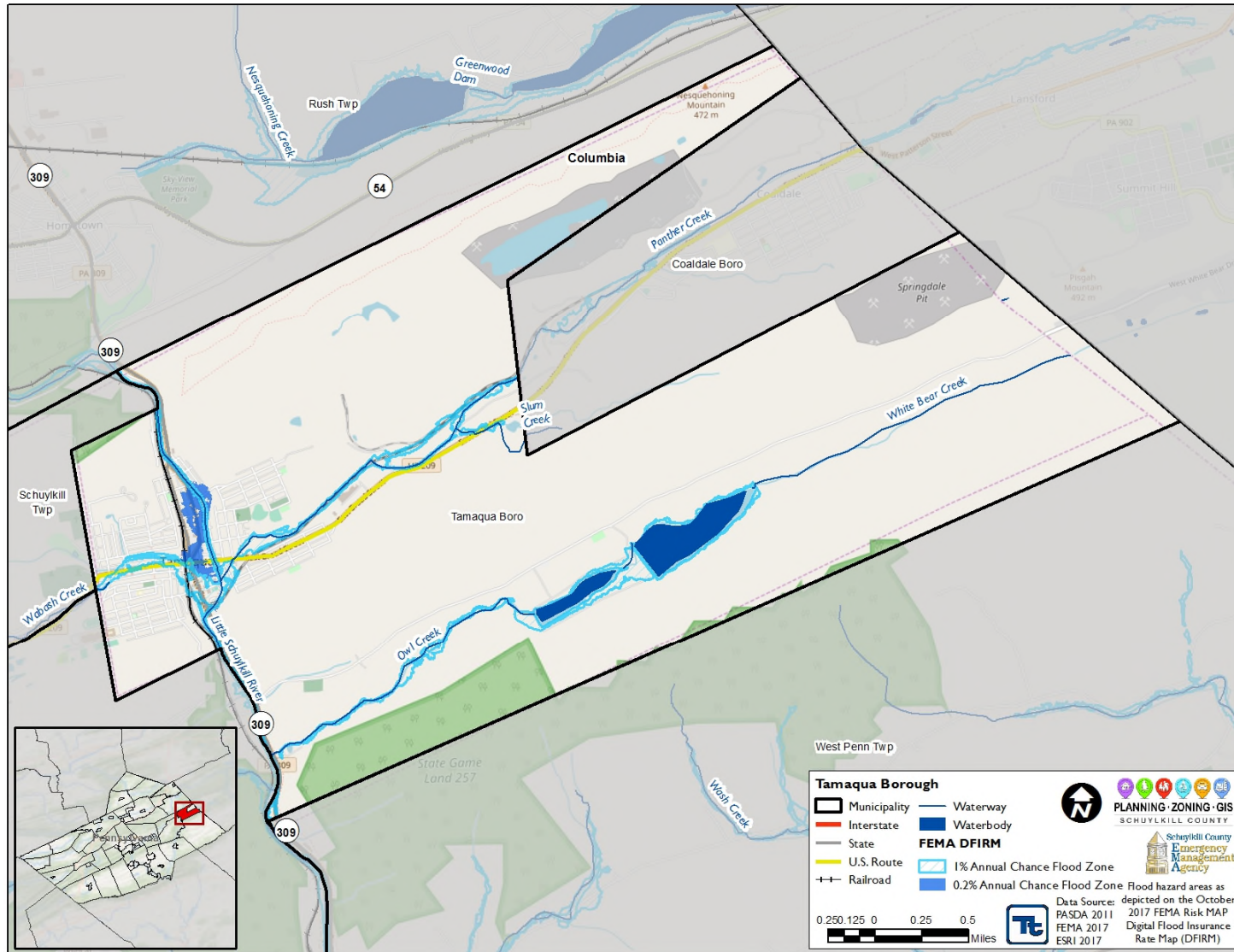


Figure 4.3.4-61. Tower City Borough

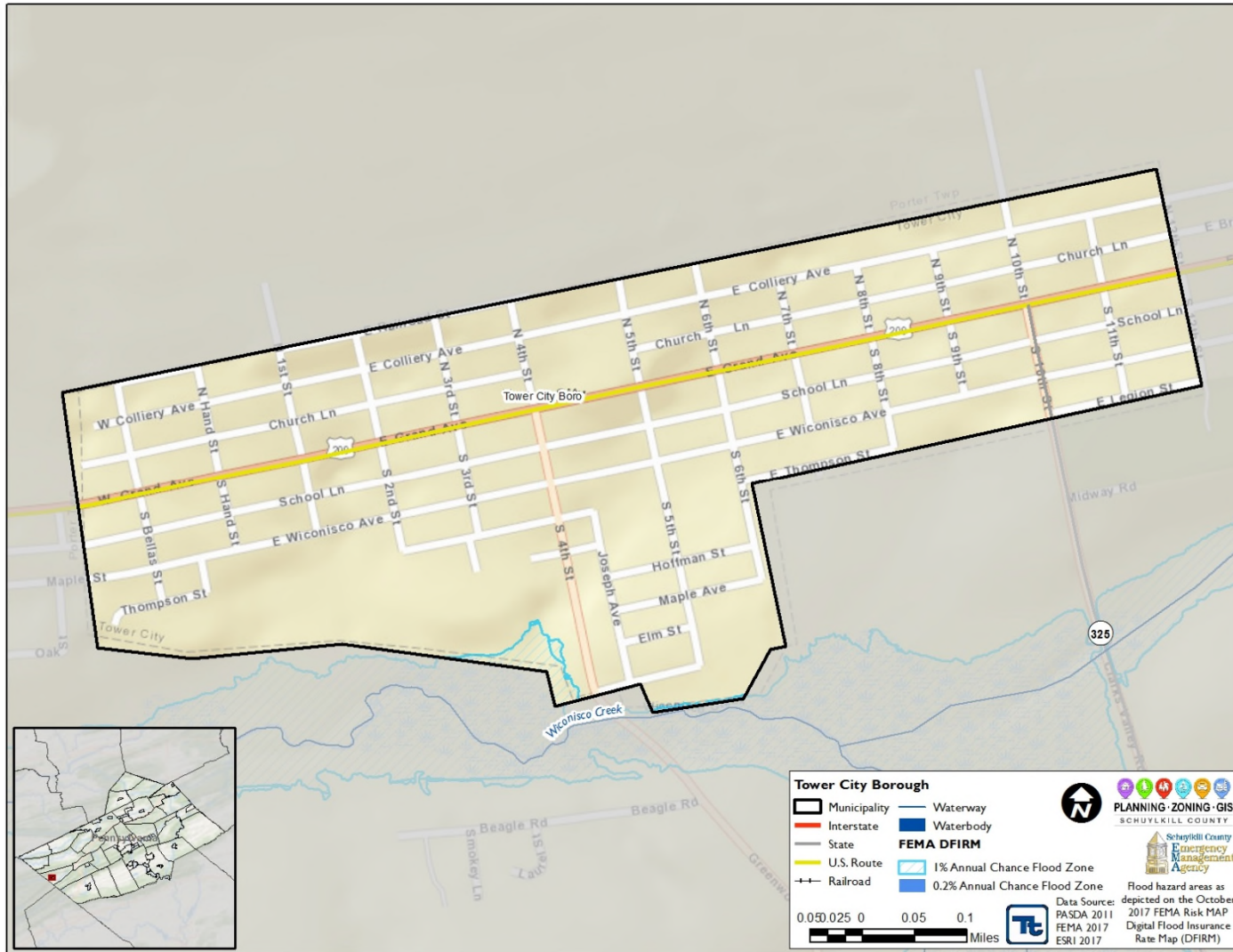


Figure 4.3.4-62. Tremont Borough

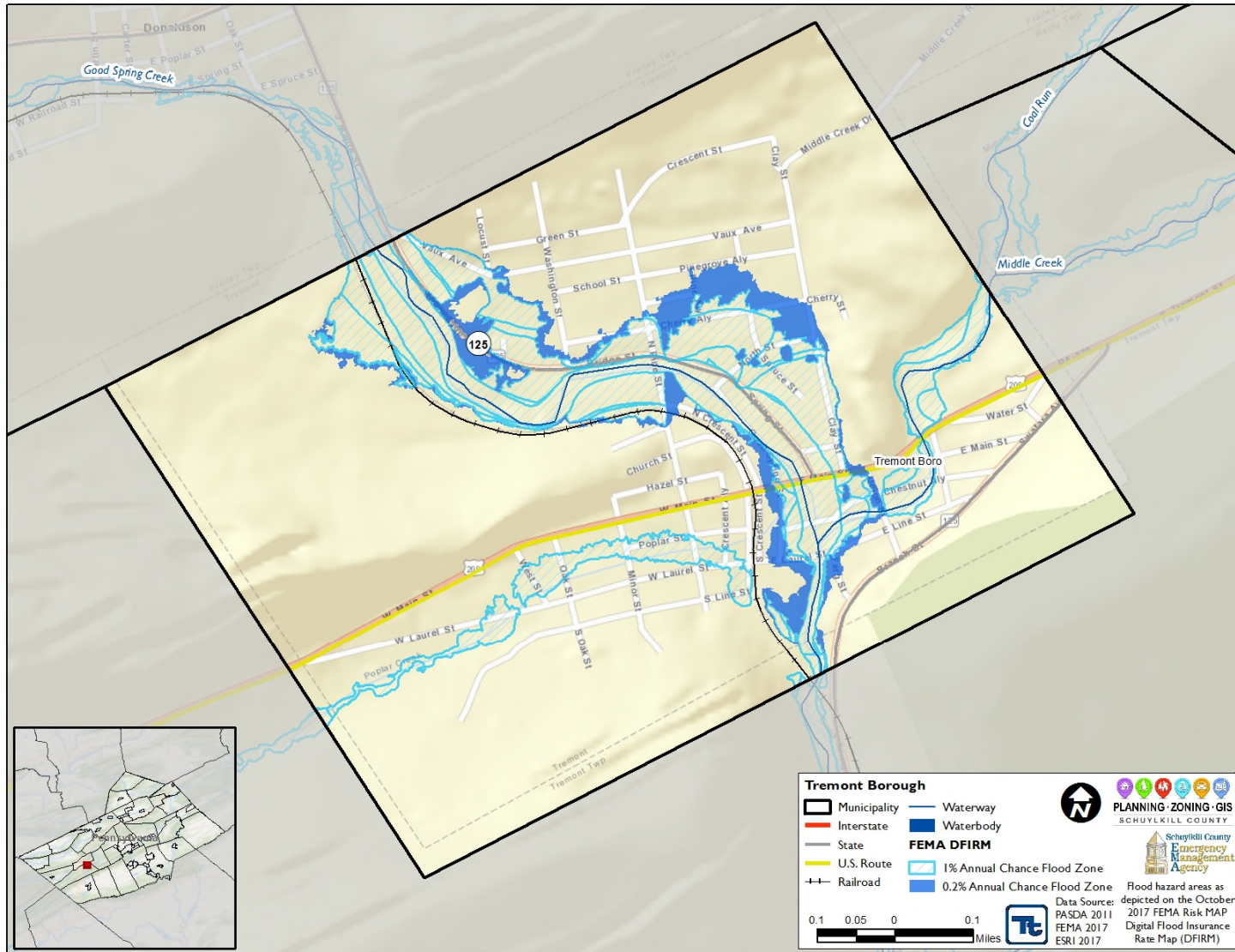


Figure 4.3.4-63. Tremont Township

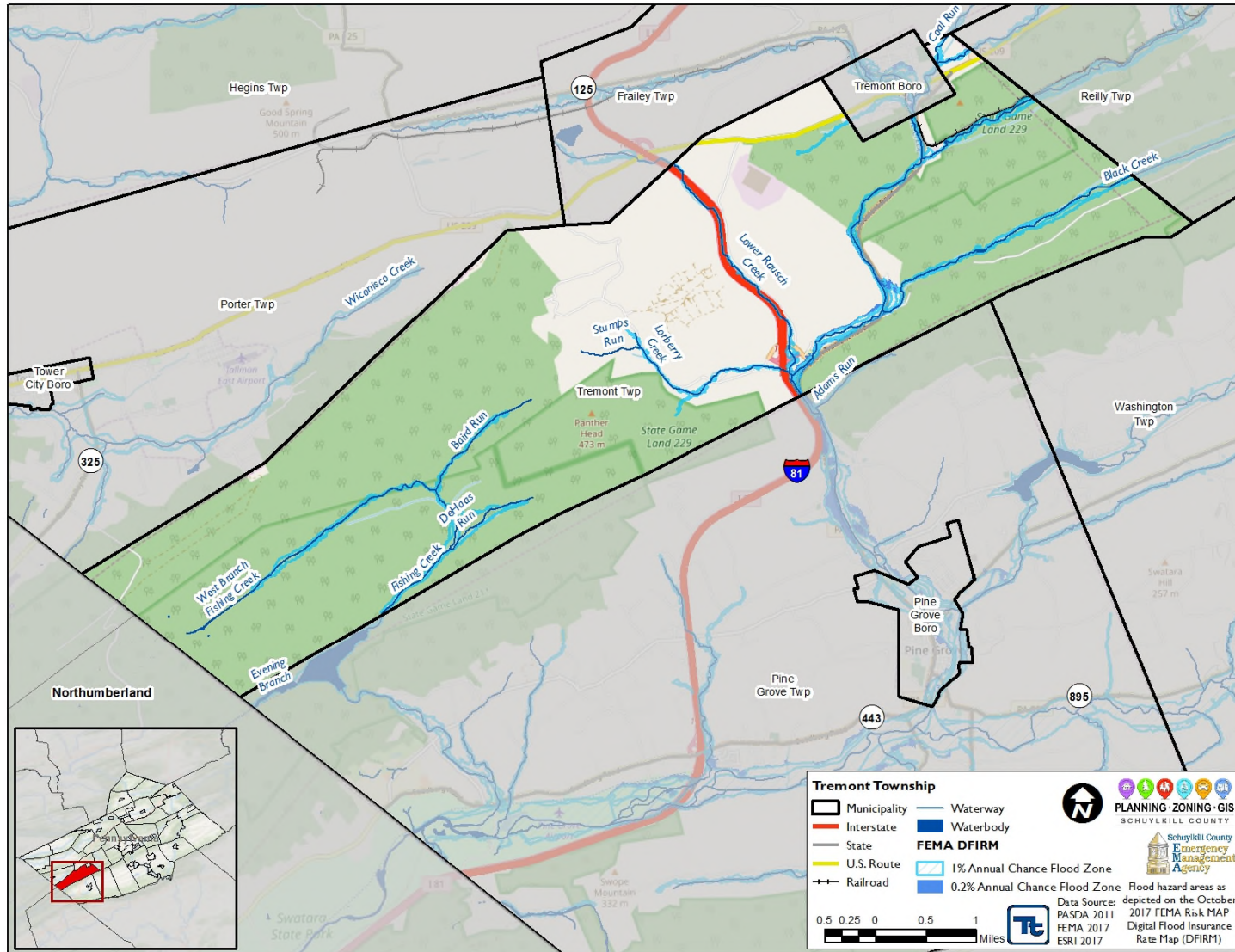


Figure 4.3.4-64. Union Township

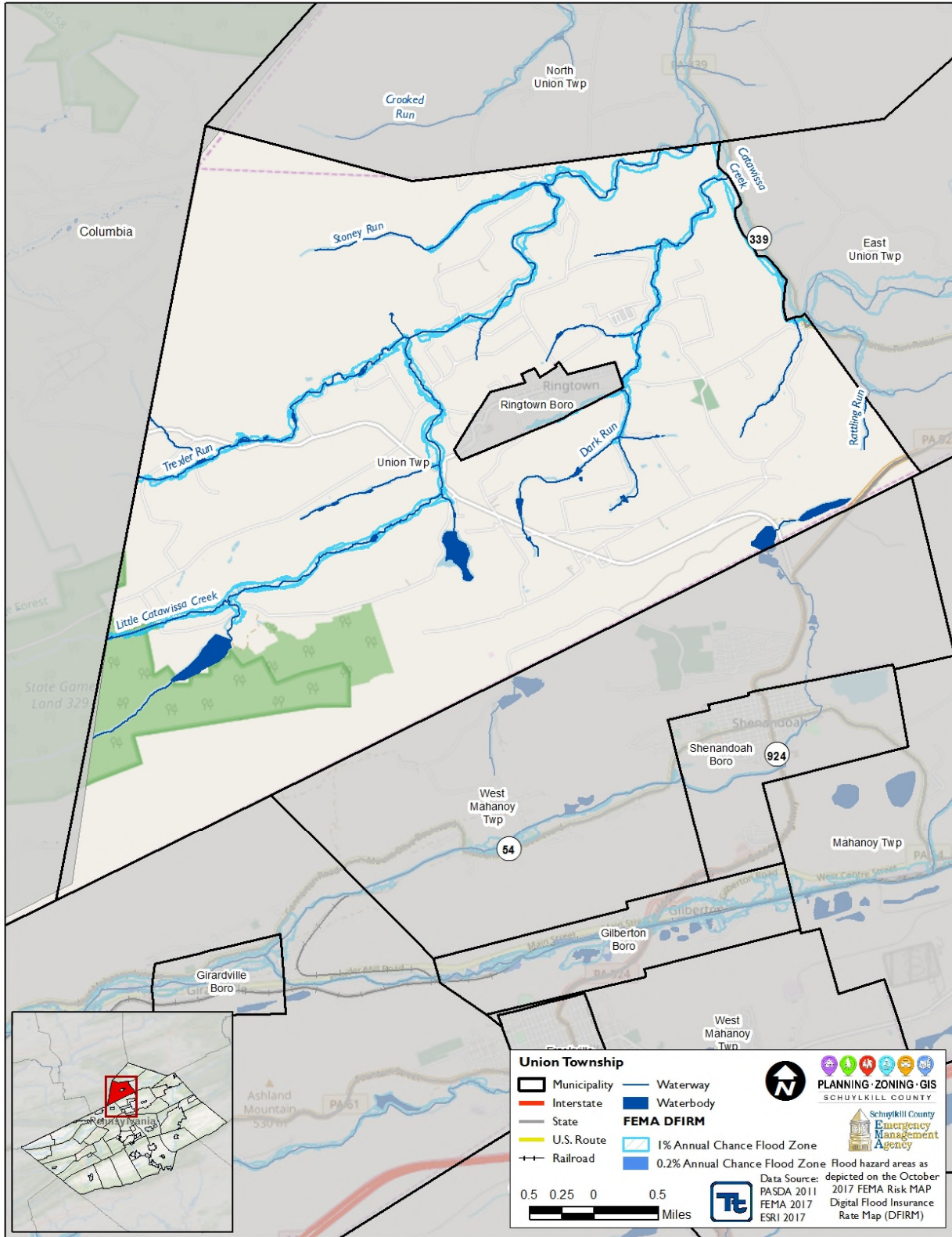


Figure 4.3.4-65. Upper Mahantongo Township

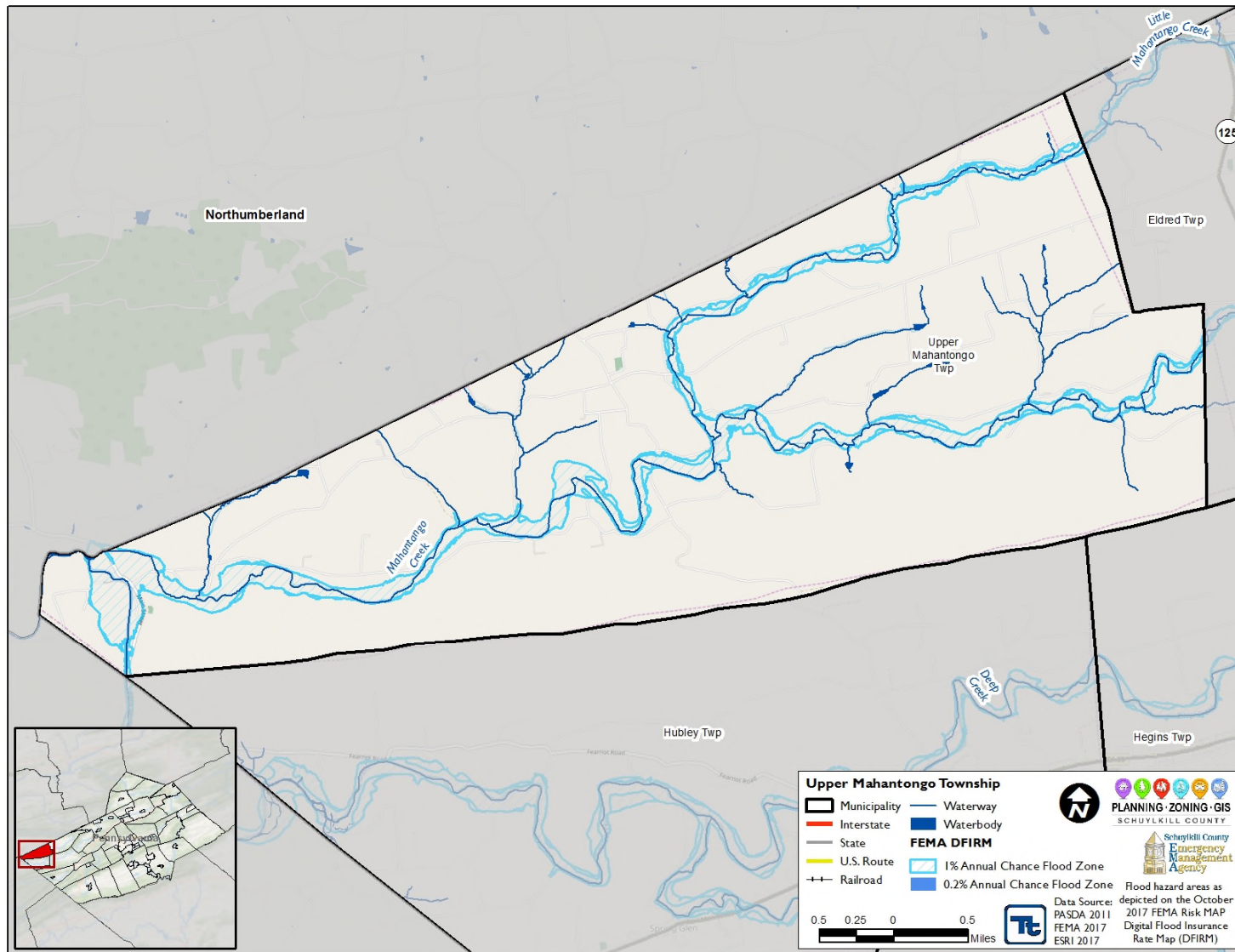


Figure 4.3.4-66. Walker Township

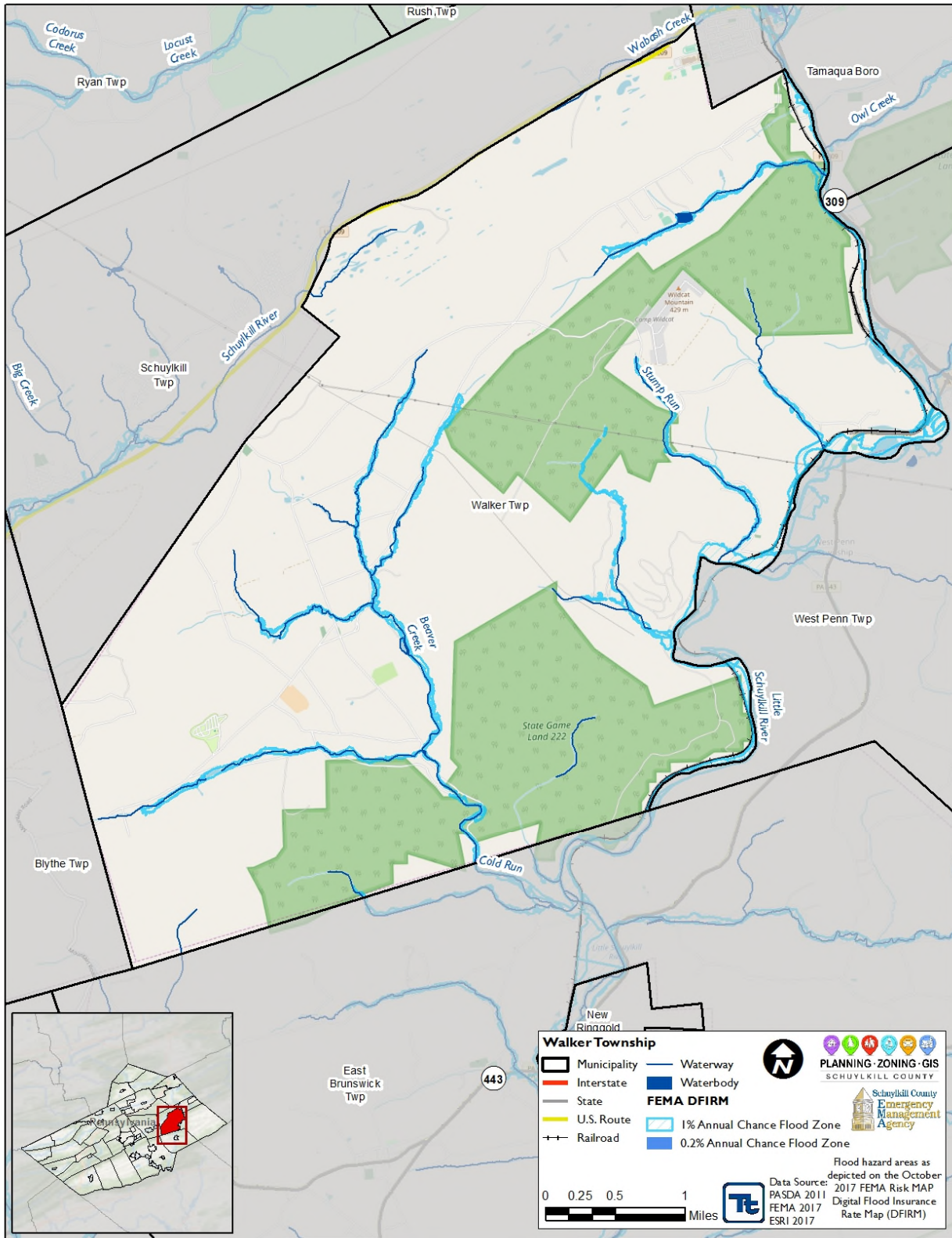


Figure 4.3.4-67. Washington Township

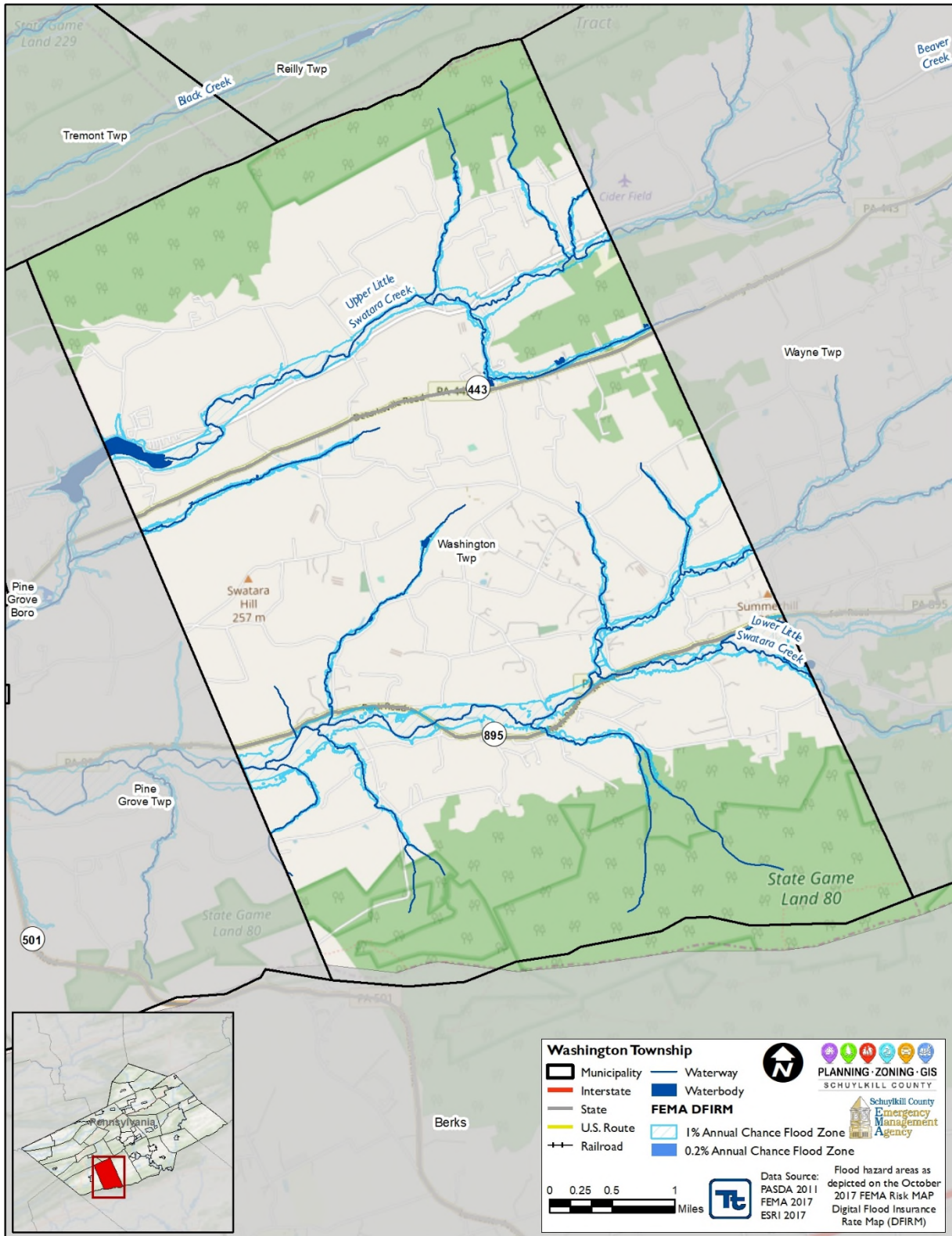


Figure 4.3.4-68. Wayne Township

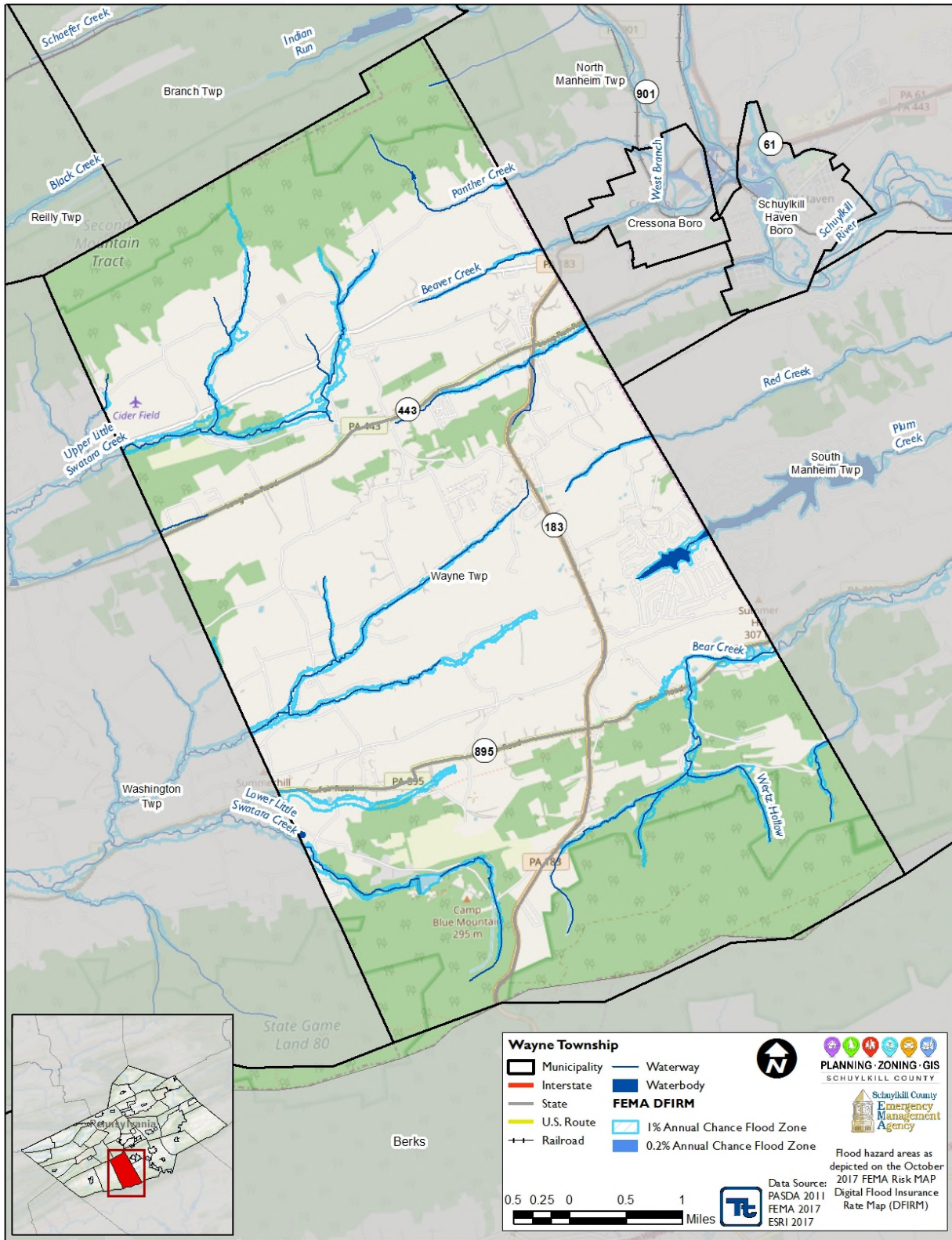


Figure 4.3.4-69. West Brunswick Township

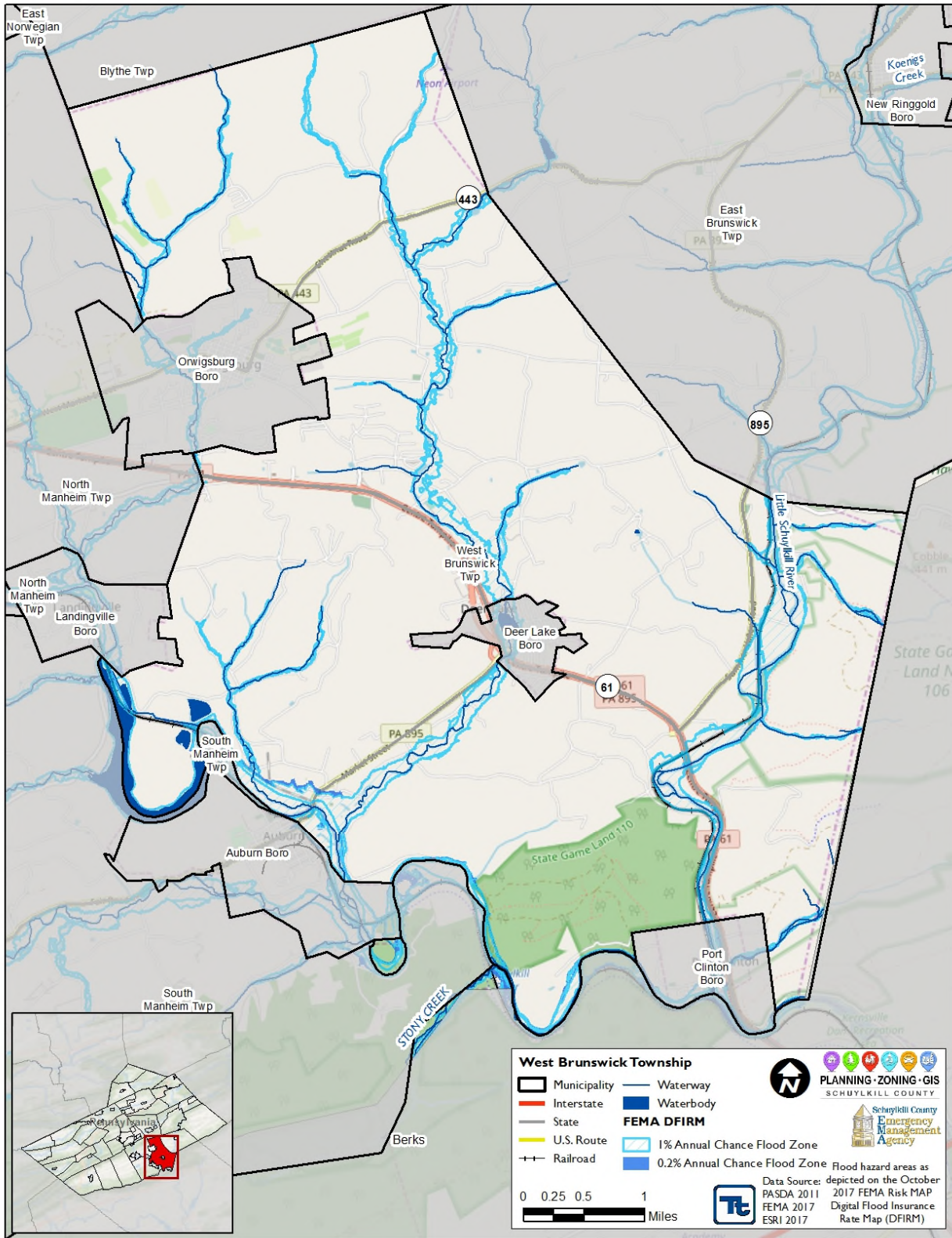


Figure 4.3.4-70. West Manahoy Township

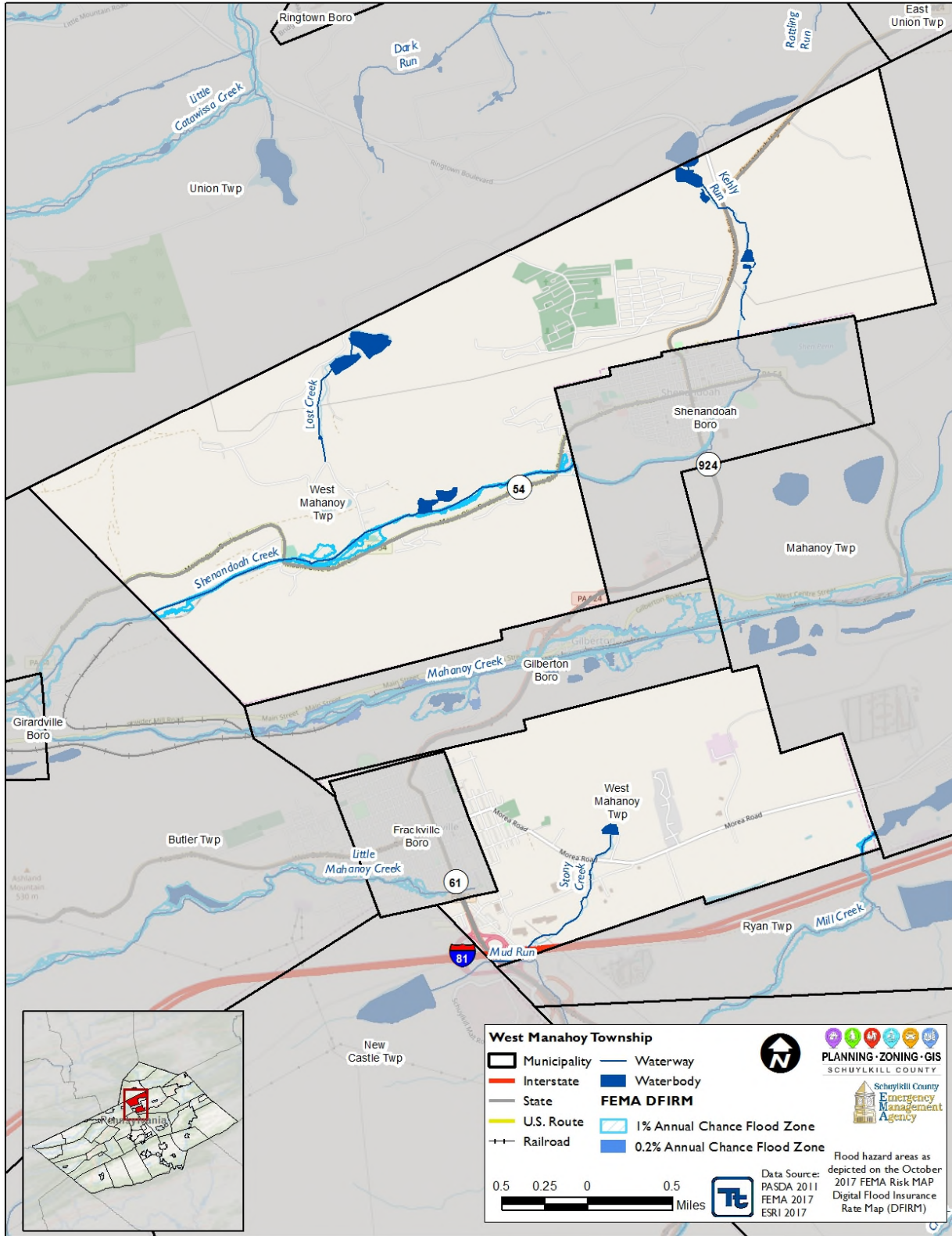
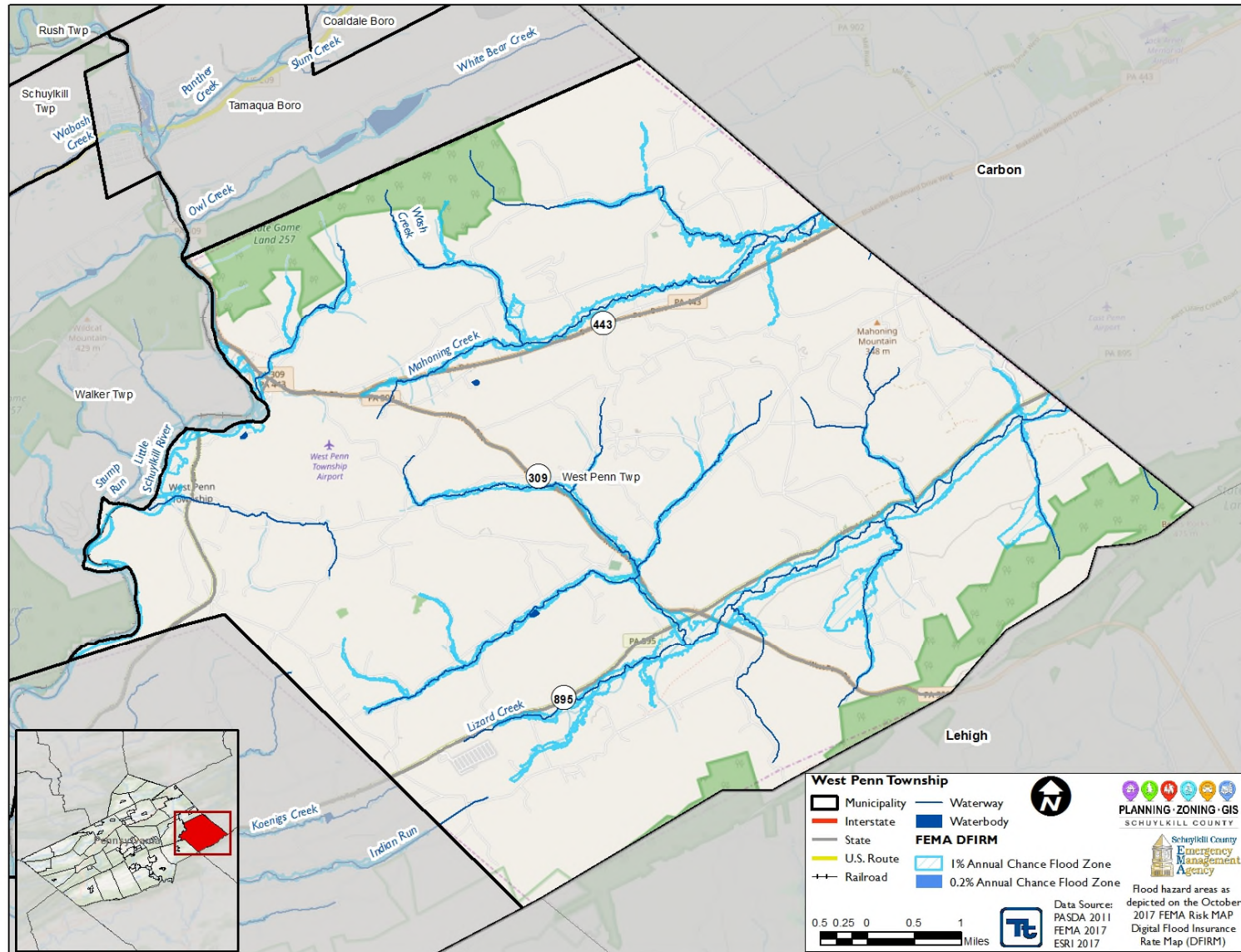


Figure 4.3.4-71. West Penn Township



4.3.5 HAZARDOUS MATERIALS AND TRANSPORTATION INCIDENTS

PROFILE

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.

Schuylkill County is home to 190 identified facilities that utilize, ship, or house chemicals considered hazardous. These facilities have been identified under the Superfund Amendment and Reauthorization Act (SARA) as exceeding the quantity threshold for reporting.

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. Volatility of products stored or transported, along with potential impact on a local community, may increase the risk of intentional acts against a facility or transport vehicle. 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.

Transportation hazards include hazardous materials in transit, vehicular accidents, aviation accidents, at-grade railroad crossings, and roadways vulnerable to floods. A transportation hazard may be defined as a condition created by movement of anything by common carrier. Transportation hazards can be divided into two categories: hazards created by the material being transported, and hazards created by the transportation medium. Transportation systems available in Schuylkill County include roadways, railways, and airports. A major road accident in the County is probable; however, aviation or rail accidents are unlikely. All County systems and supporting transportation resources provide services locally, regionally, and nationally. Transportation accidents defined below include incidents involving road, air, and rail travel.

- Vehicular Accidents: A vehicular accident is an 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 is an occurrence during operation of an aircraft from 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: a person

is fatally or seriously injured; the aircraft sustains damage or structural failure; or the aircraft is missing or inaccessible. An aviation incident is an occurrence, other than an accident, associated with operation of an aircraft that affects or could affect the safety of operation (International Civil Aviation Organization 2015).

Schuylkill County has one airport with a Federal Aviation Administration (FAA) tower, Schuylkill County (Joe Zerbey) Airport.

- **Hazardous Materials (HazMat) in Transit:** A HazMat is defined as a substance or material determined capable of posing an unreasonable risk to health, safety, or property when transported. “Unreasonable risk” covers a broad range of health, fire, and environmental considerations. HazMats come in various forms, some of which can cause death; serious injury; long-lasting health effects; and damage to buildings, homes, and other property. HazMat substances include explosives, flammable solids, substances that become dangerous when wet, oxidizing substances, and toxic liquids. An accident involving a vehicle carrying HazMats becomes a HazMat incident if the HazMat leaks; is involved in a fire; or if the potential for release, fire, or other hazard exists. Hazards can occur during production, storage, transportation, use, or disposal of HazMats (Illinois Emergency Management Agency 2012).
- **Railway Accidents:** Railway accidents involve one or more trains. They can involve a train derailment or one train impacting another train, vehicle, or pedestrian. Presently, a total of 80 miles of active rail lines are located within Schuylkill County (Schuylkill 2013).
- The privately-owned Reading Blue Mountain and Northern Railroad (RBMNR) railroads operate freight and occasional passenger excursion track within the County. Active rail lines within the County run north from Berks County along the Schuylkill River and along the northern tier of the County. From the southern border of the County near Port Clinton, the Pottsville Secondary Line, the Good Spring Secondary Line, and the Minersville Branch west to Porter Township and also branch northwest, terminating in Pottsville and Middleport. The Greenwood Industrial Track and the Lansford Industrial Track head northeast to Coaldale and into Carbon County. The lines formerly belonging to the Carbon and Schuylkill, New Boston Secondary and Shamokin Secondary Railroads and the Shenandoah Industrial Track run along the northern part of the county from Butler Township at the Columbia County border east to Rush Township at the Carbon County border (Schuylkill 2006).

Location and Extent

Vehicular Accidents

Schuylkill County has approximately 2,230 miles of roadways, divided as listed in Table 4.3.5-1, and illustrated on Figure 4.3.5-1. Transportation accidents can occur at any point along these roadways, with many occurring at an intersection of two or more roadways.

Table 4.3.5-1. Schuylkill County Transportation Network

Category	Miles
Interstate Highway	85.5
State Highway	294.9
U.S. Highway	44.7

Category	Miles
Other Roadways	309.2
Local Roads	1,495.6
Total	2,229.9

Source: PennDOT 2018

In summary, Schuylkill County is home to two main north-south highways and an Interstate that runs northeast to southwest through the County. PA Route 61 and PA Route 309 serve as significant transportation corridors in the County. Route 61 runs from Reading to the Susquehanna River at Sunbury, passing through the center of Schuylkill County and its largest community, the City of Pottsville. PA Route 61 is the historic main spine of the County, providing access to numerous commercial and industrial businesses along its path. Route 61 enters Schuylkill County from Berks County to the south in the community of Port Clinton and leaves via Ashland heading northwest into Northumberland County. PA Route 309 is a well-traveled and historic highway on the eastern side of Schuylkill County. Route 309 connects Allentown to Hazleton, passing through Tamaqua Borough in Schuylkill County. Route 309 enters Schuylkill County from Lehigh County to the south, intersecting with PA Route 895 before heading north through Tamaqua and Rush Township and exiting the County into Luzerne County parallel with Interstate 81. Interstate Highway 81 crosses the northern tier of the County between Lebanon County and Luzerne County. Schuylkill County residents use Interstate 81 heavily as a transportation link to employment centers and businesses (Schuylkill 2006). In addition to the above, the following State Routes are key roadways in Schuylkill County: PA Route 25, 54, 61, 125, 183, 309, 339, 443, 501, 645, 895, 901, and 924 (Schuylkill 2013).

Structurally deficient bridges pose a risk for transportation accidents. In response to the collapse of the I-35W Bridge in Minneapolis in August 2007, PennDOT assessed the structural integrity of all bridges in the Commonwealth. Table 4.3.5-2 lists the total number of bridges in Schuylkill County, as well as the number of those that are categorized as structurally deficient (in parentheses).

Table 4.3.5-2. Bridges in Schuylkill County

On State Roads	On Local Roads
344 (50)	156 (74)

Source: PennDOT 2018

Note: The number in parentheses notes the number categorized as structurally deficient.

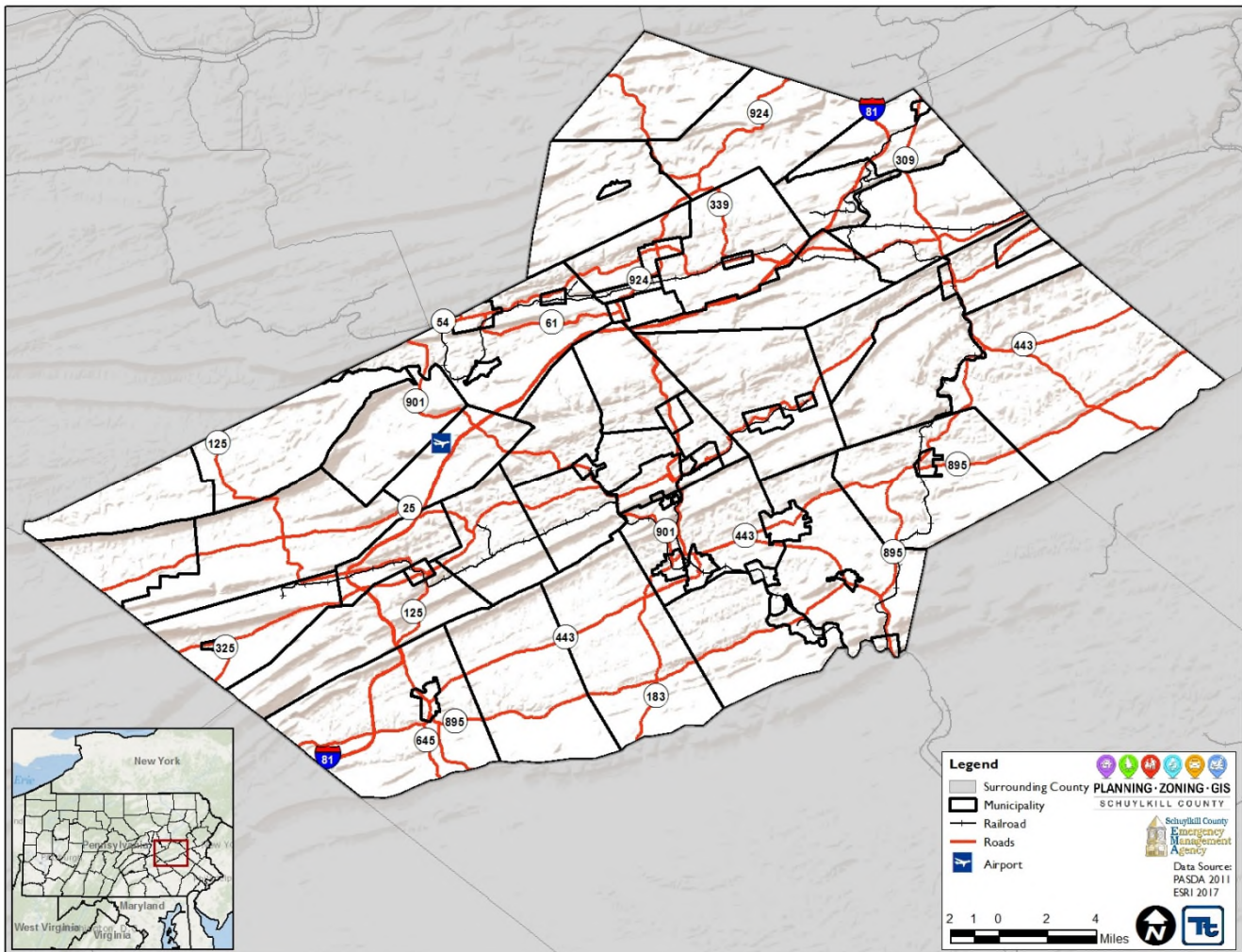
There is no warning time for vehicular accidents. Factors contributing to these accidents are typically associated with the driver, vehicle, and the environment. Factors associated with the driver include error, speeding, lack of experience, and blood-alcohol level. Factors associated with the vehicle include type, condition, and center of gravity. Environmental factors include quality of the 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).

County and local officials identified the following areas as especially problematic for transportation accidents:

- SR 183 in the Borough of Cressona, due to a low underpass (11' 8") and an exceptionally narrow truck route around the bridge.

- The detour route for I-81 from Exit 107 SB to Exit 104 is not appropriate for commercial vehicles. The proper detour for southbound commercial vehicles should be to take I-81 NB to Exit 112 to SR 25 East, to US 209 South, to SR 125 South to re-enter I-81 at the Ravine interchange (MM 104).
- I-81 has long stretches subject to thick fog conditions and unexpected changes in weather. Due to the higher elevation, temperature changes can easily change a light mist into an ice condition on this heavily traveled roadway.
- SR 309 which travels through the Borough of Tamaqua

Figure 4.3.5-1. Major Transportation Routes in Schuykill County



Railway Accidents

Pennsylvania offers freight, passenger, and commuter rail services. In its 2035 Intercity Passenger and Freight Rail Plan, the Pennsylvania Bureau of Rail Freight, Ports, and Waterways cites that the freight rail network totals 5,095 miles of track with over 60 railroads, making Pennsylvania the fifth-largest rail network in the nation and the state with the greatest number of railroads. Three railroad systems offer Pennsylvania passenger service: (1) Southeastern Pennsylvania Transportation Authority (SEPTA) – Rapid Transit, Trolley and Light Rail, and Commuter Rail; the Port Authority of Allegheny County (PAAC) – Light Rail; and Amtrak – Intercity Passenger Rail. Amtrak is the only rail service

that crosses the entire Commonwealth. Schuylkill County has approximately 80 miles of active freight rail systems (Cocciardi 2017).

Rail accidents generally fit into one of three categories:

- Derailment – the train leaves the rails
- Collision – a train strikes another train or a vehicle
- Other – including objects on the rails, fires, or explosions (PEMA 2013).

Aviation Accidents

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 – 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 equipment – Faulty aircraft equipment is another common cause of aviation accidents.
- Aircraft design flaws – The manufacturer of an aircraft is responsible for an aviation accident if the structural design is flawed and results in an accident.
- Failure to properly fuel or maintain the aircraft – If any regulations and safety standards set by the FAA or NTSB are violated, an accident may occur.
- Negligence of Federal Air Traffic Controllers – Failure of air traffic controllers to properly monitor the airways is another cause of aviation accidents (*Aviation Law News* n.d.).

Hazardous Material

Based on past occurrences, HazMat releases within Schuylkill 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. With over 2,000 miles of roadways linking more-populated areas with rural communities, the grid work of roadways facilitates free movement of HazMat throughout the region (Schuylkill 2013). Overall there are approximately 80 miles of rail lines that potentially transport hazardous materials through the County.

While permitted, identified HazMat travel routes are not maintained by the County or regional planning entities. The primary roadways in Schuylkill County are listed as follows:

- Interstate 81
- PA Route 61
- PA Route 309

According to the Schuylkill County Hazardous Materials Commodity Flow Study, there are over 7 miles of gas transmission pipelines that service the County. When compared to other options, pipelines are one of the safest and most economical means of transporting hazardous materials. Pipeline incidents are relatively rare considering the total mileage of pipelines and the volume of products transported. Primary causes of pipeline incidents include material, weld or equipment failure; or an external force such as a natural hazard event (e.g., earthquake) or man-made cause (e.g., excavation damage or vehicle collision) (Cocciardi 2017).

In addition to the major routes of transportation and pipelines, each fixed facility that uses and/or stores HazMat identified within Schuylkill County poses a potential threat to the surrounding community. The U.S. Environmental Protection Agency (EPA) tracks management of over 650 toxic chemicals that pose a threat to human health and the environment through the Toxic Release Inventory (TRI). Facilities in certain industries that use or house these chemicals in amounts exceeding specified levels must submit annual reports on how each chemical is managed through recycling, energy recovery, treatment, and releases to the environment. A “release” of a chemical means emission to the air or water, or placement in some type of land disposal. EPA publishes all TRI data in a publicly accessible database in Envirofacts. In 2016, 21 TRI facilities in Schuylkill County reported to the EPA (EPA 2017).

Range of Magnitude

Roadway accidents in Schuylkill County range from minor crashes to more serious incidents that involve injuries or fatalities, or result in a release of HazMats. 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.

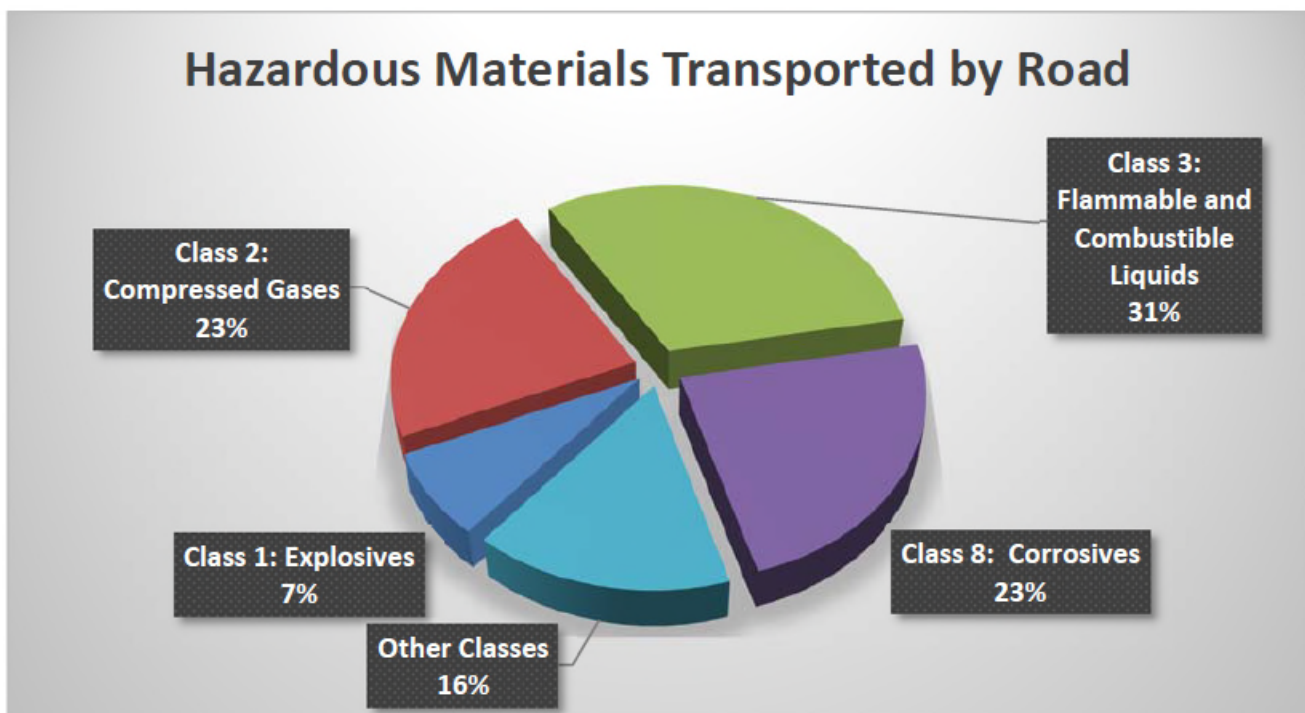
Aircraft accidents can vary from a single-engine aircraft having a “hard landing” causing damage to the aircraft, to a crash of a small turboprop or jet aircraft, to a crash of a large jet (such as a Boeing 727). Other aircraft accidents could include helicopter or experimental aircraft crashes. Aviation 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 with and for the public that could arise if one of these devices crashes. Although transportation incidents are rare, the most recent occurred on October 22, 2017, when a plane crashed into a ditch adjacent to the landing runway at the Schuylkill County airport. Fortunately, there were no fatalities, but both passengers were injured (NTSB 2017).

Hazardous materials incidents within Schuylkill 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.

According to the Schuykill County Hazardous Materials Commodity Flow Study there are an estimated 906 motor vehicle movements carrying HazMat per day through the County; approximately 14-percent of these HazMat shipments appear to be locally transported. The following HazMats were recorded as being shipped via highway and rail through the County. They are listed in relative quantity order (highest to lowest). Figure 4.3.5-2 illustrates the hazardous materials transported by road; of which almost one-third are flammable and combustible liquids (Class 3).

- Class 3: Flammable and Combustible Liquids
- Class 8: Corrosives
- Class 2: Compressed Gases
- Class 1: Explosives
- Class 5: Oxidizers and Organic Peroxides
- Class 4: Flammable Solids
- Class 9: Other Regulated Materials
- Class 6: Poisons (Cocciardi 2017).

Figure 4.3.5-2. Hazardous Materials Transported by Road in Schuykill County



Source: Cocciardi 2017

According to the Schuykill County Hazardous Materials Commodity Flow Study, Class 3 shipments (flammable and combustible liquids) account for approximately 64-percent of the in-transit accidents with release, and 52-percent of the non-release accidents (Cocciardi 2017).

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 effects of a hazard and

mitigating conditions are characteristics of the target and its physical environment that can reduce effects of a hazard. These conditions are described below.

- Non-compliance 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 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.

A worst-case transportation accident scenario within the County would be the overturn of a tractor-trailer carrying an extremely hazardous substance resulting in a massive release of its cargo on a major roadway. This incident would block traffic on Schuylkill County’s major transportation routes, and could threaten the health and safety of individuals on the roadways and in surrounding neighborhoods. In addition, a release could necessitate closure of County critical facilities near the accident. The most likely transportation accident in the County would involve a single vehicle hitting an object and sustaining minimal damage.

Past Occurrence

Major roadway accidents (such as multi-vehicle accidents, those that close roads or bridges, or those involving school buses) are reported by Schuylkill County to PennDOT. Table 4.3.5-3 summarizes these accidents from 2012 to 2018, where data is available. While this table lists accidents reported for the County, minor accidents may not be reported. Further, the release of hazardous materials is not available with these datasets.

Table 4.3.5-3. Summary of Major Accidents in Schuylkill County, 2012 to 2018

Year	Vehicle Accidents	Railroad Incidents	Aircraft Accidents	Traffic Accident Fatalities
2012	1,464	4	0	33
2013	1,425	4	0	23
2014	1,373	6	0	29
2015	1,381	7	1	15
2016	1,349	8	0	14
2017	1,367	Not available	1	21
2018	Not available	3	1	Not available
Total	6,992	29	3	114

Source: PennDOT 2017; FRA 2017; NTSB 2018

Future Occurrence

Transportation hazards are impossible to predict accurately; however, areas prone to these hazards can be located, quantified through analysis of historical records, and plotted on county-wide and municipality base maps. Areas with certain characteristics that contribute to these hazards or increase vulnerability to these hazards can be identified. According to the Schuylkill County Hazardous Materials Commodity Flow Study, six (6) hazardous materials incidents of reportable quantity releases can be expected to occur along the major and secondary routes in Schuylkill County per year (Cocciardi 2017).

Because of the wide scope of definition of environmental hazards, ranging from a small spill to a large release of a highly volatile or toxic HazMat, incidents can and will happen at any time. Based on the Risk Factor Methodology Probability Criteria, likelihood of future occurrences of this hazard *likely* (refer to Section 4.4).

VULNERABILITY ASSESSMENT

To understand risk, a community must evaluate assets exposed and vulnerable within the identified hazard area. The following section discusses potential impacts of the hazardous materials and transportation incidents hazard on Schuylkill County, including:

- Impacts 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 collections that will assist in understanding this hazard over time.

To determine potential impacts on the County, a vulnerability analysis was performed using ArcGIS. A 0.25-mile buffer was placed around the identified major roadways, railroads, and pipelines, and the County-provided designated vulnerability radius of each SARA Type III facility to determine which assets may be exposed. The vulnerability radius for each hazard facility is determined by the County LEPC.

Impact on Life, Health, and Safety

Transportation hazards could lead to potential losses in 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 day or night, and proportions of the population located indoors and outdoors.

The County and its municipalities are prepared to manage and respond to transportation and HazMat releases. The County maintains five atmospheric monitoring teams, one decontamination team and a rescue task force as supplemental resources to normal emergency services response to Hazmat incidents. Additionally, Schuylkill County maintains an agreement with Datom Products, a private firm which provide a state certified Hazmat team should their services be needed to respond to an incident. Through mutual aid, county-level Hazmat teams are also available from Berks and Northumberland Counties.

The estimated population vulnerable to a HazMat release in transit is outlined below utilizing the noted radius and 2010 U.S. Census block population data (Table 4.3.5-4 below). Please note that the U.S. Census blocks are not consistent

with these boundaries; therefore, blocks with their centroids within the hazard area were identified and population within that block totaled.

Table 4.3.5-4. Estimated Schuylkill County Population Vulnerable to Hazardous Materials and Transportation Incidents

Municipality	Total Population	Population within ¼ mile of railroads	% Population	Population within ¼ mile of major roadways	% Population	Population within vulnerability radii of SARA Facility	% Population	Population within ¼ mile of pipelines	% Population
Ashland Borough	2,817	673	23.9%	2,775	98.5%	381	13.5%	0	0.0%
Auburn Borough	739	651	88.1%	527	71.3%	0	0.0%	0	0.0%
Barry Township	932	0	0.0%	165	17.7%	0	0.0%	0	0.0%
Blythe Township	924	375	40.6%	397	43.0%	0	0.0%	0	0.0%
Branch Township	1,840	18	1.0%	978	53.2%	312	17.0%	0	0.0%
Butler Township	5,224	657	12.6%	1,898	36.3%	1,541	29.5%	0	0.0%
Cass Township	1,957	0	0.0%	503	25.7%	10	0.5%	0	0.0%
Coaldale Borough	2,281	0	0.0%	1,600	70.1%	2,281	100.0%	0	0.0%
Cressona Borough	1,651	1,218	73.8%	1,074	65.1%	809	49.0%	0	0.0%
Deer Lake Borough	687	0	0.0%	406	59.1%	0	0.0%	0	0.0%
Delano Township	445	393	88.3%	53	11.9%	0	0.0%	0	0.0%
East Brunswick Township	1,793	130	7.3%	578	32.2%	0	0.0%	0	0.0%
East Norwegian Township	863	14	1.6%	24	2.8%	516	59.8%	0	0.0%
East Union Township	1,605	0	0.0%	527	32.8%	0	0.0%	0	0.0%
Eldred Township	758	0	0.0%	87	11.5%	0	0.0%	40	5.3%
Foster Township	251	0	0.0%	39	15.5%	11	4.4%	0	0.0%
Frackville Borough	3,805	0	0.0%	3,455	90.8%	2,564	67.4%	0	0.0%
Frailey Township	429	330	76.9%	342	79.7%	10	2.3%	10	2.3%
Gilberton Borough	773	769	99.5%	229	29.6%	0	0.0%	0	0.0%
Girardville Borough	1,519	1,309	86.2%	1,453	95.7%	223	14.7%	0	0.0%
Gordon Borough	763	240	31.5%	0	0.0%	109	14.3%	0	0.0%
Hegins Township	3,516	0	0.0%	2,315	65.8%	0	0.0%	84	2.4%

Municipality	Total Population	Population within ¼ mile of railroads	% Population	Population within ¼ mile of major roadways	% Population	Population within vulnerability radii of SARA Facility	% Population	Population within ¼ mile of pipelines	% Population
Hubley Township	854	0	0.0%	326	38.2%	0	0.0%	0	0.0%
Kline Township	1,438	609	42.4%	430	29.9%	0	0.0%	0	0.0%
Landingville Borough	159	156	98.1%	0	0.0%	0	0.0%	0	0.0%
Mahanoy City Borough	4,162	4,089	98.2%	4,162	100.0%	3,568	85.7%	0	0.0%
Mahanoy Township	3,152	133	4.2%	135	4.3%	75	2.4%	0	0.0%
McAdoo Borough	2,300	988	43.0%	2,057	89.4%	275	12.0%	0	0.0%
Mechanicsville Borough	455	0	0.0%	63	13.8%	47	10.3%	0	0.0%
Middleport Borough	405	405	100.0%	405	100.0%	0	0.0%	0	0.0%
Minersville Borough	4,397	1,210	27.5%	3,442	78.3%	2,386	54.3%	0	0.0%
Mount Carbon Borough	91	91	100.0%	4	4.4%	91	100.0%	0	0.0%
New Castle Township	415	0	0.0%	0	0.0%	0	0.0%	0	0.0%
New Philadelphia Borough	1,085	709	65.3%	952	87.7%	0	0.0%	0	0.0%
New Ringgold Borough	276	211	76.4%	276	100.0%	0	0.0%	0	0.0%
North Manheim Township	3,766	169	4.5%	1,290	34.3%	731	19.4%	0	0.0%
North Union Township	1,476	0	0.0%	35	2.4%	0	0.0%	0	0.0%
Norwegian Township	2,310	327	14.2%	472	20.4%	555	24.0%	0	0.0%
Orwigsburg Borough	3,099	0	0.0%	2,202	71.1%	630	20.3%	0	0.0%
Palo Alto Borough	1,032	681	66.0%	681	66.0%	182	17.6%	0	0.0%
Pine Grove Borough	2,186	0	0.0%	1,952	89.3%	229	10.5%	0	0.0%
Pine Grove Township	4,123	0	0.0%	1,312	31.8%	51	1.2%	101	2.4%
Port Carbon Borough	1,889	432	22.9%	1,209	64.0%	728	38.5%	0	0.0%
Port Clinton Borough	326	322	98.8%	248	76.1%	0	0.0%	0	0.0%
Porter Township	2,176	16	0.7%	1,475	67.8%	20	0.9%	0	0.0%

Municipality	Total Population	Population within ¼ mile of railroads	% Population	Population within ¼ mile of major roadways	% Population	Population within vulnerability radii of SARA Facility	% Population	Population within ¼ mile of pipelines	% Population
Pottsville City	14,330	773	5.4%	10,279	71.7%	5,924	41.3%	0	0.0%
Reilly Township	726	69	9.5%	473	65.2%	0	0.0%	0	0.0%
Ringtown Borough	818	0	0.0%	0	0.0%	67	8.2%	0	0.0%
Rush Township	3,412	826	24.2%	1,459	42.8%	2,203	64.6%	0	0.0%
Ryan Township	2,459	284	11.5%	1,725	70.2%	0	0.0%	0	0.0%
Saint Clair Borough	3,004	0	0.0%	2,096	69.8%	0	0.0%	0	0.0%
Schuylkill Haven Borough	5,437	2,548	46.9%	4,213	77.5%	2,920	53.7%	0	0.0%
Schuylkill Township	1,129	0	0.0%	628	55.6%	34	3.0%	0	0.0%
Shenandoah Borough	5,071	0	0.0%	4,972	98.0%	2,295	45.3%	0	0.0%
South Manheim Township	2,504	9	0.4%	68	2.7%	0	0.0%	0	0.0%
Tamaqua Borough	7,107	3,633	51.1%	5,815	81.8%	7,107	100.0%	0	0.0%
Tower City Borough	1,346	0	0.0%	1,340	99.6%	0	0.0%	0	0.0%
Tremont Borough	1,752	1,390	79.3%	1,703	97.2%	65	3.7%	0	0.0%
Tremont Township	280	4	1.4%	19	6.8%	0	0.0%	69	24.6%
Union Township	1,273	0	0.0%	0	0.0%	48	3.8%	0	0.0%
Upper Mahantongo Township	655	0	0.0%	0	0.0%	99	15.1%	0	0.0%
Walker Township	1,054	58	5.5%	6	0.6%	395	37.5%	0	0.0%
Washington Township	3,033	0	0.0%	500	16.5%	0	0.0%	0	0.0%
Wayne Township	5,113	0	0.0%	1,389	27.2%	0	0.0%	0	0.0%
West Brunswick Township	3,332	118	3.5%	774	23.2%	0	0.0%	0	0.0%
West Mahanoy Township	2,868	0	0.0%	721	25.1%	232	8.1%	0	0.0%
West Penn Township	4,442	116	2.6%	1,152	25.9%	484	10.9%	0	0.0%
Schuylkill County	148,289	27,153	18.3%	81,885	55.2%	40,208	27.1%	304	<1%

Sources: U.S. Census 2010, Schuylkill County 2018

Notes: % Percent SARA Superfund Amendments and Reauthorization Act

Impact on General Building Stock, Critical Facilities and Economy

Because of insufficient data, a full loss estimate was not completed for this 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.

Jurisdictions that are home to EPA-identified hazardous material facilities should be considered vulnerable to releases from these fixed sites. While buildings and critical facilities may be present within the hazard area of a hazardous materials release, estimating direct damage to these structures and facilities is difficult without additional information regarding the specific event (e.g., type of material, concentration, duration of release, etc.). However, damages to the surrounding environment can result in indirect impacts, such as temporary loss of function due to hazard response or damage in the area. A spatial assessment was conducted to determine the number of critical facilities located within the 0.25-mile buffer surrounding major roadways, railroads, pipelines, and within specified vulnerability radii of SARA facilities (Table 4.3.5-2).

Transportation of hazardous materials also increases risk of hazardous material releases to those jurisdictions through which carriers pass. Transportation carriers must have response plans in place to address accidents, otherwise the local emergency response team will step in to secure and restore the area. Quick response minimizes the volume and concentration of hazardous materials that disperse through air, water and soil. Economic loss from environmental hazards and explosion incidents ranges from non-recordable to losses exceeding millions of dollars. Impact on the local economy from a single incident is almost impossible to measure because of complexities of predicting losses of work, revenue, and future business.

Impact on the Environment

As discussed above, transportation and HazMat release incidents can profoundly affect the surrounding environment. Contamination of soil, and surface water and groundwater supplies, can result in many direct impacts on surrounding populations and ecosystems. Local flora and fauna within hazard areas are also at risk. The application of salt to de-ice roads may impact groundwater and contaminate potable drinking water sources near major highway corridors and state highway routes in the County.

Future Growth and Development

As discussed in Section 2 (County Profile), areas targeted for future growth and development have been identified across Schuylkill County. The Schuylkill County Comprehensive Plan discusses current and expected development trends (refer to Figure 3.3.1 in the Comprehensive Plan) and indicates the southern tier, near the Interstate 81 corridor (referred to as Interchange Activity Centers) and areas in the northeast portion of the County will continue to be primary growth areas. The Interchange Activity Centers are experiencing major growth in part due to their location along a regional road network. Increased development, especially commercial and industrial development near major roadways, may cause an increase in hazardous materials and transportation incidents due to changes in traffic loads for these existing roadways.

Table 4.3.5-2 Critical Facilities Vulnerable to Hazardous Materials and Transportation Incidents

Municipality	Type of Facility																							
	Bridge	Children/Youth Services	Communication	Correctional Facility	County Building	Dam	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Gas	Hazmat	Hospital	Hydrant	Mental Health	Military	Nursing Home	Police	Polling	Potable Water	School	Senior	Wastewater Treatment
Ashland Borough	3	0	0	0	0	0	0	1	1	1	3	0	4	0	0	0	0	0	1	5	0	0	0	1
Auburn Borough	2	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0
Barry Township	4	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blythe Township	7	1	0	0	0	1	0	0	0	0	1	0	2	0	0	0	0	0	0	1	1	0	0	0
Branch Township	5	0	0	0	0	2	0	1	0	1	1	0	6	0	0	1	0	0	2	1	1	1	0	2
Butler Township	18	0	0	1	0	1	1	2	0	1	3	0	5	1	27	1	0	0	1	3	1	2	0	0
Cass Township	4	0	0	0	0	3	0	0	0	1	2	0	3	0	0	1	0	0	1	2	2	1	0	0
Coaldale Borough	0	0	0	0	0	0	2	0	0	1	1	0	2	1	0	0	0	0	1	3	0	0	0	1
Cressona Borough	4	0	0	0	0	0	0	1	0	1	3	0	2	0	0	1	0	0	0	2	0	1	0	1
Deer Lake Borough	3	0	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0
Delano Township	11	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0
East Brunswick Township	15	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
East Norwegian Township	3	0	0	0	0	0	0	1	0	1	1	0	7	0	0	0	0	0	0	1	0	0	0	1
East Union Township	10	0	0	0	0	0	0	0	0	0	1	0	2	0	6	0	0	0	1	1	1	0	0	0
Eldred Township	4	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Foster Township	4	0	0	0	0	0	1	0	0	1	1	0	5	0	0	0	0	0	1	1	0	0	0	0
Frackville Borough	0	0	0	0	0	0	2	3	1	1	1	0	4	0	0	0	0	2	1	2	2	1	0	0
Frailey Township	13	0	0	0	0	0	0	0	0	1	1	0	3	0	0	0	0	0	0	1	0	0	0	0
Gilberton Borough	5	0	0	0	0	0	0	0	0	1	2	0	2	0	0	0	0	0	1	2	0	0	0	0
Girardville Borough	7	0	0	0	0	0	2	0	1	1	2	0	1	0	30	0	0	0	1	4	0	0	0	0

Municipality	Type of Facility																							
	Bridge	Children/Youth Services	Communication	Correctional Facility	County Building	Dam	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Gas	Hazmat	Hospital	Hydrant	Mental Health	Military	Nursing Home	Police	Polling	Potable Water	School	Senior	Wastewater Treatment
Gordon Borough	2	0	0	0	0	0	0	0	0	1	1	0	2	0	12	0	0	0	0	0	0	0	0	0
Hegins Township	6	0	0	0	0	1	4	1	0	0	2	0	4	0	0	2	0	0	0	2	0	2	0	0
Hubley Township	2	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	1	0	0	0	0
Kline Township	9	0	0	0	0	1	0	0	0	1	0	0	2	0	0	0	0	0	1	2	0	0	0	0
Landingville Borough	2	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0
Mahanoy City Borough	5	0	0	0	0	0	1	2	1	1	5	0	2	0	0	1	0	0	1	7	0	1	0	0
Mahanoy Township	12	0	0	0	0	1	0	0	0	1	0	0	6	0	0	1	0	1	1	2	1	2	0	1
McAdoo Borough	0	0	0	0	0	0	0	0	1	1	2	0	2	0	0	0	0	1	1	1	0	1	1	0
Mechanicsville Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middleport Borough	4	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0
Minersville Borough	1	0	0	0	0	0	3	3	1	1	4	0	2	0	0	0	0	0	1	4	0	3	0	0
Mount Carbon Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Castle Township	7	0	0	0	0	3	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	1	0	0
New Philadelphia Borough	4	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	1	1	0	1	0	0
New Ringgold Borough	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0
North Manheim Township	15	0	0	0	1	1	2	3	0	1	0	0	13	0	0	1	1	0	1	2	2	4	1	1
North Union Township	4	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Norwegian Township	0	2	1	0	0	1	1	0	0	1	1	0	5	0	0	2	0	1	0	1	0	1	0	0
Orwigsburg Borough	1	0	0	0	0	0	1	3	1	1	1	0	2	0	0	0	0	0	1	2	1	0	0	0
Palo Alto Borough	2	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	1	2	0	0	0	0
Pine Grove Borough	4	1	0	0	0	0	1	3	1	1	2	0	6	0	0	2	1	0	1	2	0	2	1	0
Pine Grove Township	24	0	0	0	0	2	2	2	0	1	2	0	6	0	0	0	0	0	0	2	1	0	1	1

Municipality	Type of Facility																							
	Bridge	Children/Youth Services	Communication	Correctional Facility	County Building	Dam	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Gas	Hazmat	Hospital	Hydrant	Mental Health	Military	Nursing Home	Police	Polling	Potable Water	School	Senior	Wastewater Treatment
Port Carbon Borough	7	0	0	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	1	2	0	1	0	0
Port Clinton Borough	3	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0
Porter Township	2	0	0	0	0	0	0	0	0	1	3	1	3	0	0	1	0	0	0	2	0	1	0	0
Pottsville City	6	9	1	1	6	0	5	13	1	2	10	0	4	4	0	18	0	3	3	21	0	9	2	1
Reilly Township	2	0	0	0	0	0	0	0	0	1	2	0	0	2	0	0	0	0	0	1	0	0	0	0
Ringtown Borough	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Rush Township	13	0	0	0	0	2	1	0	0	1	2	0	13	0	0	0	1	1	1	2	1	2	0	0
Ryan Township	10	0	0	1	0	3	0	2	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0
Schuylkill Haven Borough	5	0	0	0	0	0	6	2	1	1	4	0	4	0	0	3	0	0	1	4	0	3	0	1
Schuylkill Township	5	0	0	0	0	0	0	0	0	1	2	0	2	0	0	0	0	0	1	1	1	0	0	0
Shenandoah Borough	3	0	0	0	0	0	2	2	1	1	6	0	3	0	0	1	0	1	1	11	0	3	1	0
South Manheim Township	5	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
St. Clair Borough	10	0	0	0	0	0	2	1	1	1	5	0	1	1	0	1	0	0	1	4	0	1	0	0
Tamaqua Borough	12	0	0	0	0	2	7	7	1	1	6	0	8	0	0	3	0	0	1	6	0	3	0	0
Tower City Borough	0	0	0	0	0	0	2	0	1	1	1	0	0	0	0	0	0	0	1	2	0	0	1	0
Tremont Borough	9	0	0	0	0	0	0	3	1	1	2	0	1	0	0	0	0	1	1	1	0	0	0	0
Tremont Township	13	0	0	0	0	0	3	1	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1
Union Township	4	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Upper Mahantongo Township	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0
Walker Township	3	0	0	0	0	1	0	1	0	0	1	0	5	0	0	0	0	0	0	0	0	2	0	1
Washington Township	9	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wayne Township	5	0	0	0	0	1	2	2	0	1	2	0	2	0	0	1	0	0	1	2	0	1	0	0

Municipality	Type of Facility																								
	Bridge	Children/Youth Services	Communication	Correctional Facility	County Building	Dam	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Gas	Hazmat	Hospital	Hydrant	Mental Health	Military	Nursing Home	Police	Polling	Potable Water	School	Senior	Wastewater Treatment	
West Brunswick Township	16	0	0	0	0	1	1	2	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	1
West Mahanoy Township	4	0	0	0	0	4	0	1	1	1	0	0	7	0	0	1	0	2	1	2	1	0	0	0	1
West Penn Township	20	0	0	0	0	0	2	3	1	1	1	0	1	0	0	0	0	0	1	2	0	0	0	0	0
Schuylkill County	395	13	2	3	7	36	58	69	20	52	104	1	174	9	75	42	3	13	39	134	19	50	8	15	

Source: Schuylkill County 2018

Effect of Climate Change on Vulnerability

Hazardous materials and transportation incidents are human-caused hazards; however, as noted, these events may be the result from natural hazard events. Climate change may potentially increase the frequency and magnitude of flood and severe weather events which may lead to an increased release of hazardous materials at both fixed sites and in-transit.

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 work with appropriate agencies to collect additional data to support mitigation planning, consideration of potential risks, and prioritization of mitigation measures for this hazard.

Schuylkill 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 accident patterns could provide information on vulnerability of specific road segments and nearby populations. Maintaining a record of frequently transported materials can facilitate development of preparatory measures to respond to a release. Predicting costs needed to respond to a release, remediate the environment, or repair damaged infrastructure would be useful for developing mitigation options.

4.3.6 HURRICANE AND WINDSTORM

PROFILE

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 (Federal Emergency Management Agency [FEMA] 1997). Types of damaging winds include straight-line winds, downdrafts, downbursts, microbursts, gust fronts, derechos, bow echoes, and hook echoes, described as follows:

- Straight-line Wind is generally any wind that is not associated with rotation, used mainly to differentiate them from 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 or damaging winds on or near the ground. It is usually associated with thunderstorms, but can occur with rain storms 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 (National Severe Storms Laboratory [NSSL] Date Unknown).
- A Derecho is a widespread and long-lived windstorm associated with thunderstorms that are often curved (Johns and others 2011). The two major influences on the atmospheric circulation are differential heating between the equator and the poles, and rotation of the planet (FEMA 1997).
- 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 at the ground (NSSL Date Unknown).
- 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 (NSSL 2016).

Windstorms occur on a region-wide scale (PEMA 2013). Damaging winds are often called “straight-line” winds to differentiate the damage they cause from tornado damage. 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. They occur in all parts of the United States. Table 4.3.6-1 lists wind classifications used by the National Weather Service (NWS).

Table 4.3.6-1. NWS Wind Descriptions

Descriptive Term	Sustained Wind Speed (mph)
Strong, dangerous, or damaging	≥40
Very windy	30-40
Windy	20-30
Breezy, brisk, or blustery	15-25

Descriptive Term	Sustained Wind Speed (mph)
Light, or light and variable wind	5-15 or 10-20
None	0-5

Source: NWS 2011

Notes:

mph Miles per hour

NWS National Weather Service

Extreme windstorm events are associated with extra-tropical and tropical cyclones, winter cyclones, severe thunderstorms, and accompanying mesoscale offspring such as tornados and downbursts. Winds vary from 0 mph at ground level to 200 mph in the upper atmospheric jet stream at 6 to 8 miles above the Earth’s surface (FEMA 1997).

A *tropical cyclone* is a rotating, organized system of clouds and thunderstorms that originates over tropical or sub-tropical waters and has a closed low-level circulation. Tropical depressions, tropical storms, and hurricanes are all considered tropical cyclones. These storms rotate counterclockwise around the center in the northern hemisphere and are accompanied by heavy rain and strong winds (NWS 2013a). Almost all tropical storms and hurricanes in the Atlantic basin (which includes the Gulf of Mexico and Caribbean Sea) form between June 1 and November 30 (hurricane season). August and September are peak months for hurricane development (NOAA 2013a). Over a two-year period, the U.S. coastline is struck by an average of three hurricanes, one of which is classified as a major hurricane. Hurricanes, tropical storms, and tropical depressions pose a threat to life and property. These storms bring heavy rain, storm surge, and flooding (NOAA 2013).

A *tropical storm* system is characterized by a low-pressure center and numerous thunderstorms that produce strong winds and heavy rain (winds are at a lower speed than hurricane-force winds, therefore categorized as a tropical storm instead of a hurricane). Tropical storms strengthen when water evaporated from the ocean is released as the saturated air rises, resulting in condensation of water vapor contained in the moist air. They are fueled by a different heat mechanism than other cyclonic windstorms such as Nor’Easters and polar lows. The characteristic that separates tropical cyclones from other cyclonic systems is that at any height in the atmosphere, the center of a tropical cyclone will be warmer than its surroundings; a phenomenon called “warm core” storm systems (NOAA 2013).

A *hurricane* is a tropical storm that attains hurricane status when its wind speed reaches 74 or more miles per hour (mph). Tropical systems may develop in the Atlantic between the Lesser Antilles and the African coast, or may develop in the warm tropical waters of the Caribbean and Gulf of Mexico. These storms may move up the Atlantic Coast of the United States and impact 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 offshore and heading east.

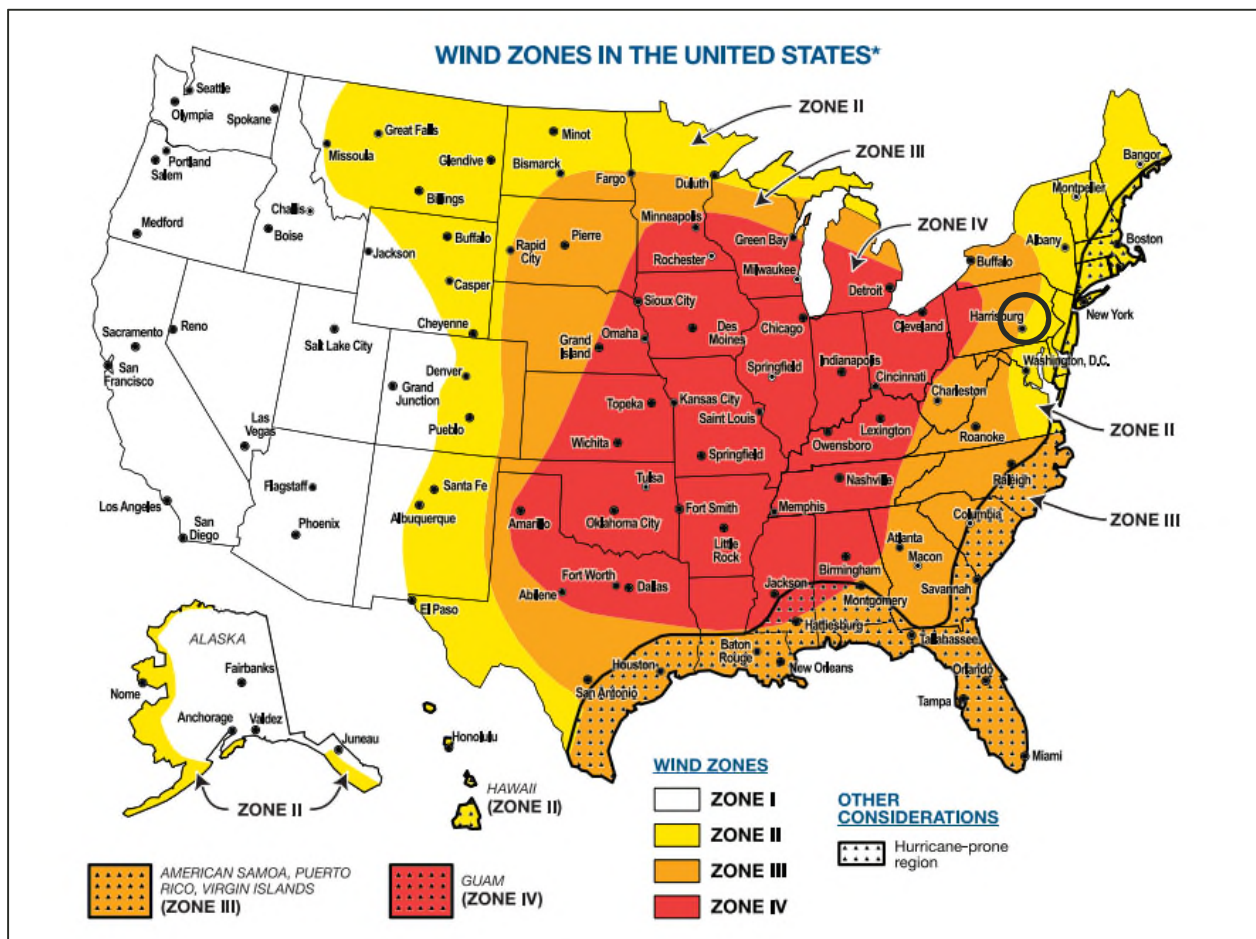
By the time most tropical hurricanes reach Pennsylvania, they do not satisfy the definition of a tropical hurricane (75 mph winds). However, the residuals of tropical hurricanes such as riverine flooding can be extensive. Likewise, high winds can have two significant effects: widespread debris due to damaged and downed trees and power outages. Typically, the worst wind events are associated with summer thunderstorms and as a result of hurricanes.

Location and Extent

Straight-line winds and windstorms are experienced on a region-wide scale. 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.

Figure 4.3.6-1 indicates how the frequency and strength of windstorms impacts the United States and the general location of the most wind activity. This figure is based on 60 years of tornado history and more than 150 years of hurricane history. It divides the United States into four zones that geographically reflect the number and strength of recorded extreme windstorms. Zone IV has experienced the most and strongest tornado activity. Zone III has experienced significant tornado activity and includes most coastal areas that are susceptible to hurricanes. Zones II and I represent areas with relatively lower historical tornado activity that correlate with a lower risk of tornadoes in those areas. Zone II includes some areas east of the Rocky Mountains that are not covered in Zone III and parts of the northeast. Zone I primarily consists of areas west of the Rocky Mountains, where there are relatively few tornado occurrences. The hurricane prone region on the figure, seen along the Gulf Coast and Atlantic Coast, indicates substantial risk to hurricanes (FEMA 2014). The figure shows that Schuykill County is approximately located in Zones II and III, having moderate risk to wind events.

Figure 4.3.6-1. Wind Zones in the United States



Source: FEMA 2014

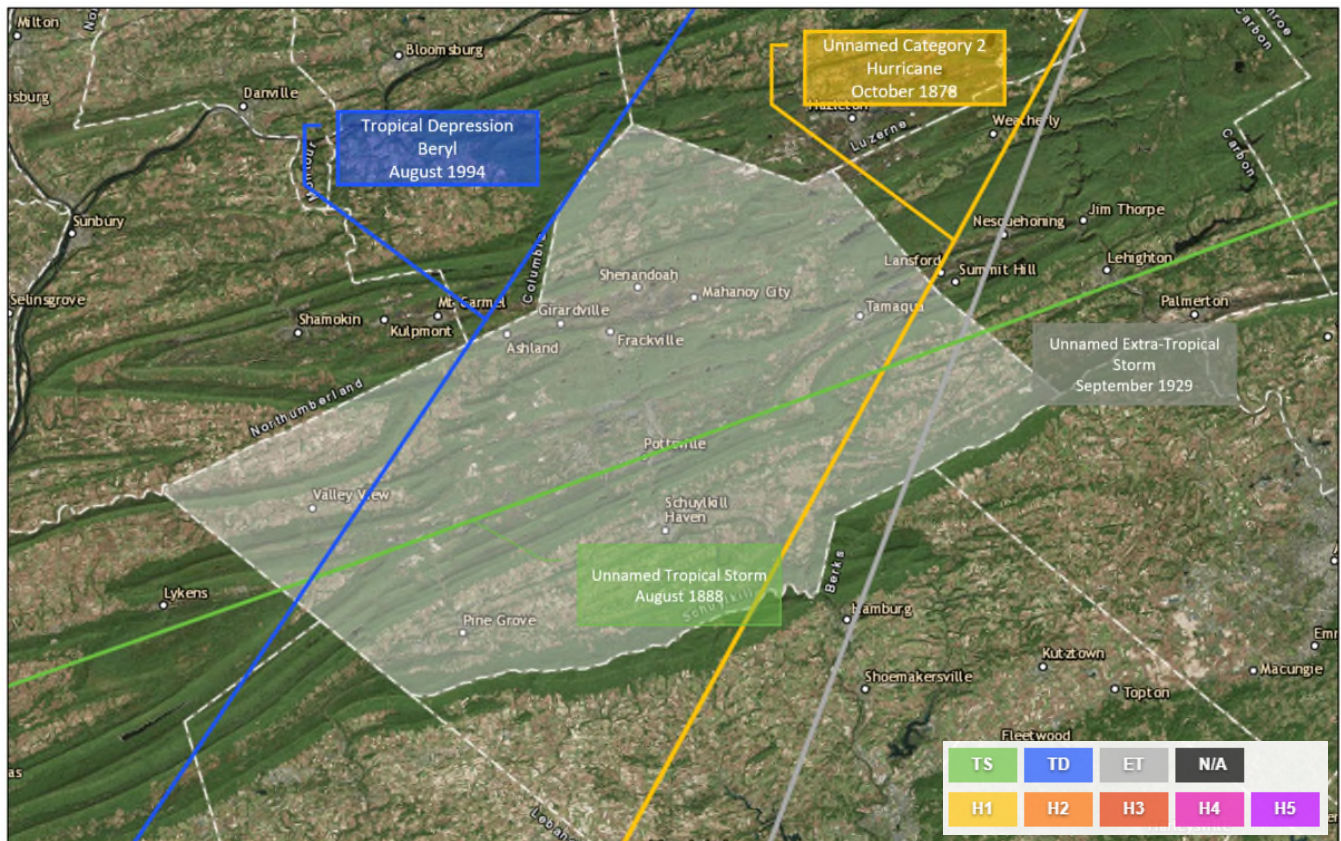
Note: The black circle indicates the approximate location of Schuykill County.

Although Schuykill County is not located along the Atlantic coastline, 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 Schuylkill County are equally subject to the impacts of hurricanes, tropical storms and wind storms.

The NOAA 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 2016 (latest date available from data source). Between 1842 and 2016, four events classified as either a hurricane, tropical storm, tropical depression, or extra tropical depression tracked within 65 nautical miles of Schuylkill County. Figure 4.3.6-2 displays tropical cyclone tracks for Schuylkill County that tracked with 65 nautical miles between 1842 and 2016. Please note that this figure does not show Tropical Storm Irene or Lee or Hurricane Sandy because those storms did not pass within 65 nautical miles of Schuylkill County. However, these and other wind/storm events have impacted the County with strong winds, power outages, and other damage. Refer to the “Past Events” section for further information regarding hurricane and tropical storm events that impacted Schuylkill County.

Figure 4.3.6-2. Historical Tropical Storm and Hurricane Tracks, 1842 to 2016



The 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 National Hurricane Center (NHC) to issue advisories during the post-tropical stage. The following are the definitions of the watches and warnings:

- *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 combination of dangerously high water and waves continue, even though winds may be less than hurricane force.

- *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.
- *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.
- *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, sub-tropical, or post-tropical storm (NWS 2013).

Range of Magnitude

Windstorms are generally defined as sustained wind speeds of 40 mph or greater lasting for one hour or longer, or winds of 58 mph or greater for any duration. As for hurricanes and tropical storms, they are categorized in accordance with the Saffir-Simpson Hurricane Scale. The Saffir-Simpson Hurricane Wind Scale is a 1-to-5 rating based on a hurricane’s 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. Category 1 and 2 storms are still dangerous and require preventative measures (NOAA 2018). Table 4.3.6-2 represents this scale, which is used to estimate the potential property damage and flooding expected when a hurricane makes landfall.

Table 4.3.6-2. Saffir-Simpson Hurricane Wind Scale

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110 mph	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (major)	111-129 mph	Devastating damage will occur: Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (major)	130-156 mph	Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (major)	157 mph or higher	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Source: National Hurricane Center (NHC) 2018
 mph Miles per hour

Mean Return Period

In evaluating the potential for hazard events of a given magnitude, a mean return period (MRP) is often used. The MRP provides an estimate of the magnitude of an event that may occur within any given year based on past recorded events. The MRP is the average period of time, in years, between occurrences of a particular hazard event, equal to the inverse of the annual frequency of exceedance (Dinicola 2009).

Figure 4.3.6-3 and Figure 4.3.6-4 display the estimated maximum 3-second gust wind speeds that can be anticipated in the County associated with the 100- and 500-year MRP events. These peak wind speed projections were generated using the HAZUS-MH wind model. The estimated maximum 3-second gust wind speeds for Schuykill County associated with a 100-year MRP event are 46 to 58 mph (Tropical Storm). The estimated maximum 3-second gust wind speeds for Schuykill County associated with a 500-year MRP event are 60 to 77 mph (Tropical Storm to Category 1). The storm tracks for the 100- and 500-year event were not available in HAZUS-MH 4.0; a HAZUS-acknowledged error in this version that will be addressed in the future. The associated impacts and losses from these 100-year and 500-year MRP hurricane events are discussed later in the Vulnerability Assessment subsection.

Figure 4.3.6-3. Wind Speeds for the 100-Year Mean Return Period Event

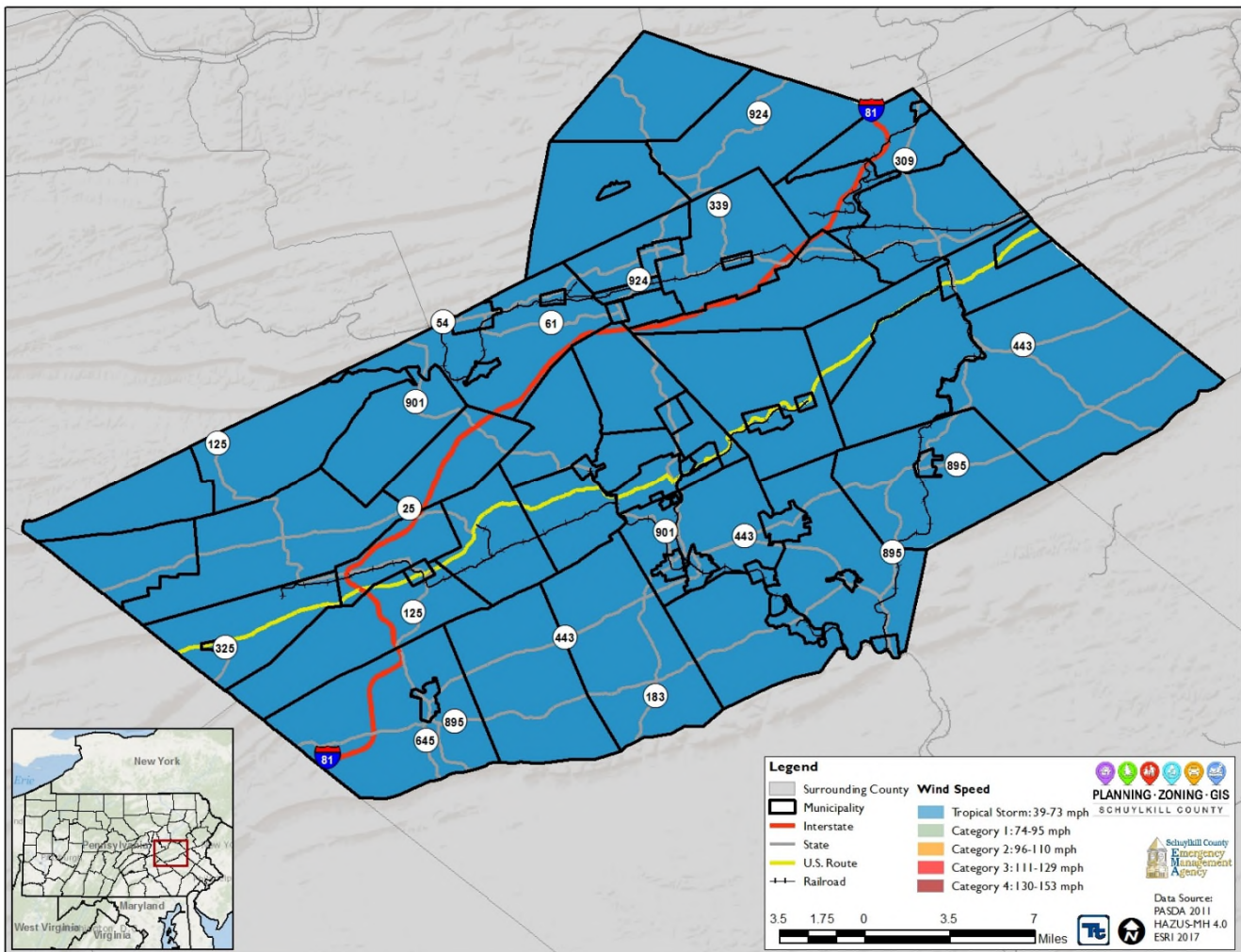
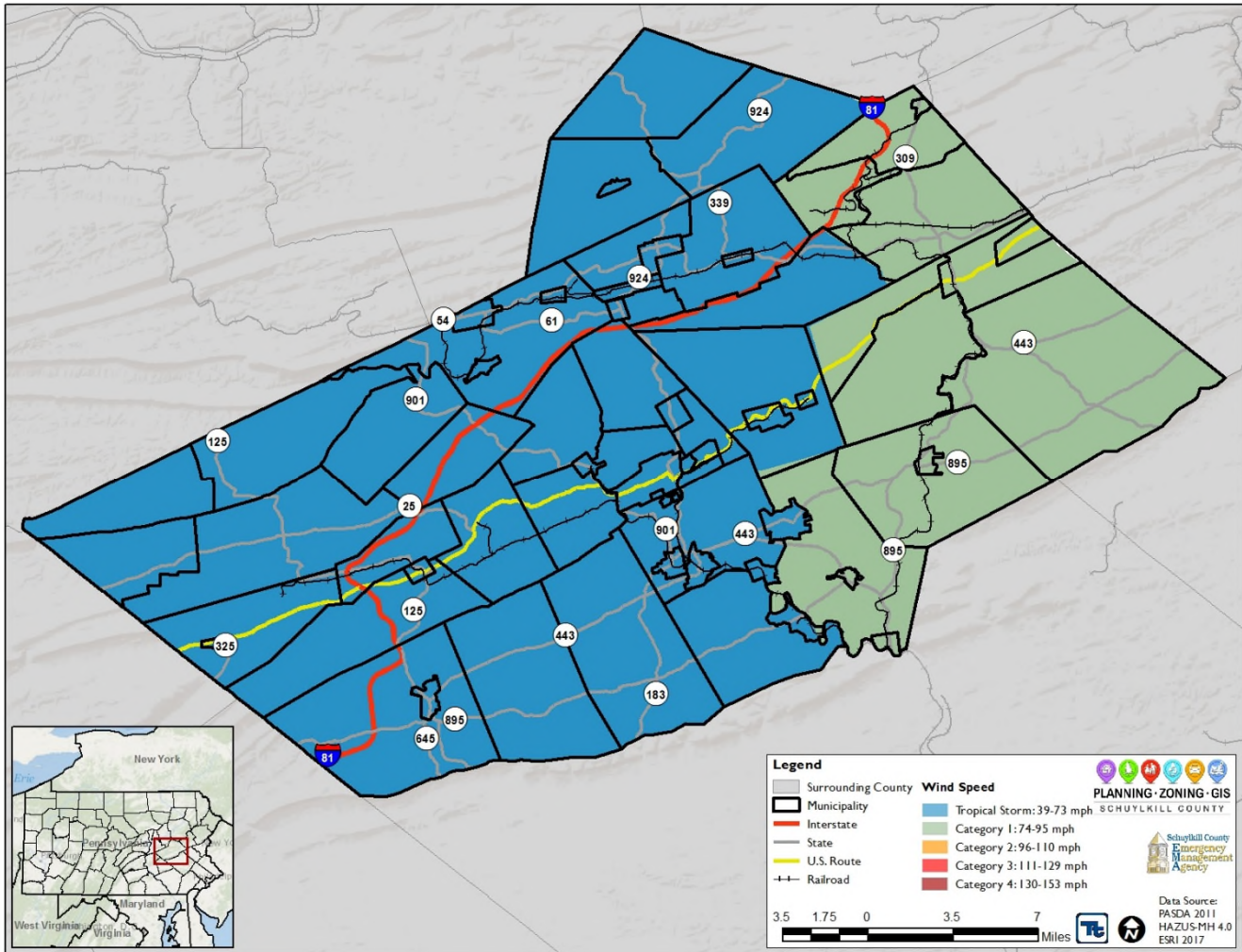


Figure 4.3.6-4. Wind Speeds for the 500-Year Mean Return Period Event



Past Occurrence

According to NOAA’s National Centers for Environmental Information (NCEI) storm events database, Schuykill County experienced 201 hurricane and windstorm events between January 1, 1950 and December 31, 2017. Total property damages, as a result of these hurricane and windstorm events, were estimated at \$495,000. Overall, there was one fatality and two injuries associated with these events. These totals may also include damages to other counties (NOAA NCEI 2018). The estimated impacts reported are based on a query for wind-specific events and considered low as it does not include other losses associated with hurricane and windstorms (e.g., rain, flooding, etc.).

Between 1954 and 2017, the Commonwealth of Pennsylvania experienced 15 FEMA-declared wind-related major disasters (DR) or emergencies (EM) classified as one or a combination of the following disaster types: tropical storm, high winds, flash floods, severe storms, tornadoes, hurricane, or tropical depression. Generally, these disasters cover a wide region of the State; therefore, they may have impacted many counties. However, not all counties were included in the disaster declarations. Of the events since 1954, Schuykill County was included in five of the declarations; one of which was Hurricane Sandy (FEMA 2018).

Many sources provided historical information regarding previous occurrences and losses associated with hurricane and windstorm events throughout the State and Schuylkill County. The 2013 HMP discussed specific hurricane and windstorm events that occurred in Schuylkill County through 2011. For this 2019 HMP update, hurricane and windstorm events were summarized between January 1, 2012 and December 31, 2017. For events prior to 2012, please refer to Appendix G.

Loss and impact information can vary depending on the source. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP. Additionally, due to the extent of hurricane and windstorm documentation, it is possible that not all sources have been identified or consulted. Table 4.3.6-3 summarizes the hurricane and windstorm events that have occurred in Schuylkill County.

Table 4.3.6-3. Hurricane and Windstorm Events in Schuylkill County, 2012 to 2017

Date of Event	Event Type	Location	FEMA Declaration Number (if applicable)	County Designated?	Losses/Impacts
May 26, 2012	Thunderstorms, Heavy Rains and Flash Flooding	McAdoo Borough, East Union Township, Schuylkill Township	N/A	N/A	Widespread thunderstorms developed across central Pennsylvania, with several producing damaging winds and flash flooding. In Schuylkill County, heavy rain produced flash flooding over the northeastern-third of the county (along and east of Routes 209/309). The McAdoo area experienced some of the worst flooding, impacting 31 homes. A railroad crossing was washed out. Widespread flooding was reported in Schuylkill Township in and around the Tuscarora area. Little Schuylkill River at Tamaqua crested at 5.05 feet (2.5-foot flood stage). Winds were estimated near 60 mph in East Union Township, damaging the roof of an industrial complex. Estimated damages from this event totaled \$5,000.
July 7, 2012	Thunderstorms and Wind	Ryan, Pine Grove, and Rush Townships	N/A	N/A	A cold front moved over central Pennsylvania, triggering numerous severe thunderstorms during the afternoon and evening of July 7 th . In Schuylkill County, thunderstorm winds estimated near 60 mph knocked down numerous trees in Ryan, Pine Grove, and Rush Townships. Estimated damages from this event totaled \$10,000.
October 29-30, 2012	Hurricane Sandy	Countywide	EM-3356	Yes	<p>Pennsylvania Governor declared a disaster emergency on October 26, 2012 that was followed by a Presidential Emergency Declaration on October 29, 2012 for the entire State of Pennsylvania.</p> <p>In Schuylkill County, heavy rainfall caused minor flooding (mainly basements) throughout the county. State route 202 at Mill Street in Riley Township was closed due to flooding. Schuylkill River at Landingville crested at 6.83 feet (8-foot flood stage) on October 30, 2012. Little Schuylkill River at Tamaqua crested at 3.96 feet (2.5-foot flood stage) on October 31, 2012. Additionally, the storm brought high winds to the county. The winds downed trees and utility wires, causing widespread power outages across the county. Many roads were closed due to falling trees and wires.</p>
April 19, 2013	Thunderstorms and Wind	Tremont Borough	N/A	N/A	A squall line produced numerous areas of wind damage across the mid-lower Susquehanna Valley. In Schuylkill County, a NWS storm survey was conducted in Tremont Borough. It was determined that a microburst or straight-line thunderstorm winds, estimated near 85 mph, created a swath of damage along a one-mile long stretch from East Line Street near Good Spring Creek to near the intersection of State Route 125/209. The damage included about 20 homes with roof and siding damage and approximately 15 downed trees. Damages from this event were estimated at \$50,000.
June 25, 2013	Thunderstorms and Wind	Schuylkill Haven and Pine Grove	N/A	N/A	A line of thunderstorms moved southeast across central Pennsylvania, producing widespread damaging winds across the area. In Schuylkill

Date of Event	Event Type	Location	FEMA Declaration Number (if applicable)	County Designated?	Losses/Impacts
					County, winds estimated at 60 mph downed trees in Schuylkill Haven and Pine Grove. Damages from this event were estimated at \$10,000.
September 12, 2013	Thunderstorms and Wind	Pottsville City	N/A	N/A	A line of severe thunderstorms produced severe straight-line winds in central Pennsylvania. In Schuylkill County, wind speeds were estimated at 57 mph. The winds downed trees in Pottsville. Damages from this event were estimated at \$6,000.
July 3, 2014	Thunderstorms and Wind	Keffers, Hegins, Bulter and Mahanoy	N/A	N/A	Clusters of thunderstorms moved across the area, bringing damaging winds and severe hail. In Schuylkill County, wind speeds were estimated at 57 mph. The winds downed trees and power lines in Keffers and a roof was blown off a commercial building in Hegins Township. The wind downed trees in Butler and Mahanoy Townships. Damages from this event were estimated at \$4,000.
August 4, 2017	Thunderstorms and Wind	Shenandoah	N/A	N/A	A line of storms produced numerous reports of wind damage, and a brief EF1 tornado formed with a cell on the southern portion of this line in Fulton County, PA. Heavy rainfall also accompanied the storms. Flash flooding occurred across Cumberland County on the evening of the 4th. In Schuylkill County, 60 mph winds were reported in Shenandoah. The wind blew off a portion of a roof on a structure on West Arlington Street. Damages from this event were estimated at \$10,000.
August 19, 2017	Thunderstorms and Wind	Frailey Township, Pine Grove Borough, Gilberton Borough, Butler Township, Schuylkill Haven Borough, Rush Township, and Hegins Township	N/A	N/A	A line of showers and thunderstorms produced wind damage along its path in central Pennsylvania. In Schuylkill County, winds were estimated at 60 mph and knocked down trees in Frailey Township, Pine Grove Borough, Gilberton Borough, Butler Township, Schuylkill Haven Borough, Rush Township, and Hegins Township. Damages from this event were estimated at \$16,000.

Sources: FEMA 2018; USGS 2018; NOAA-NCEI 2018; SPC 2018
EM Emergency Declaration (FEMA)
FEMA Federal Emergency Management Agency
NCEI National Centers for Environmental Information
NOAA National Oceanic and Atmospheric Administration
SPC Storm Prediction Center

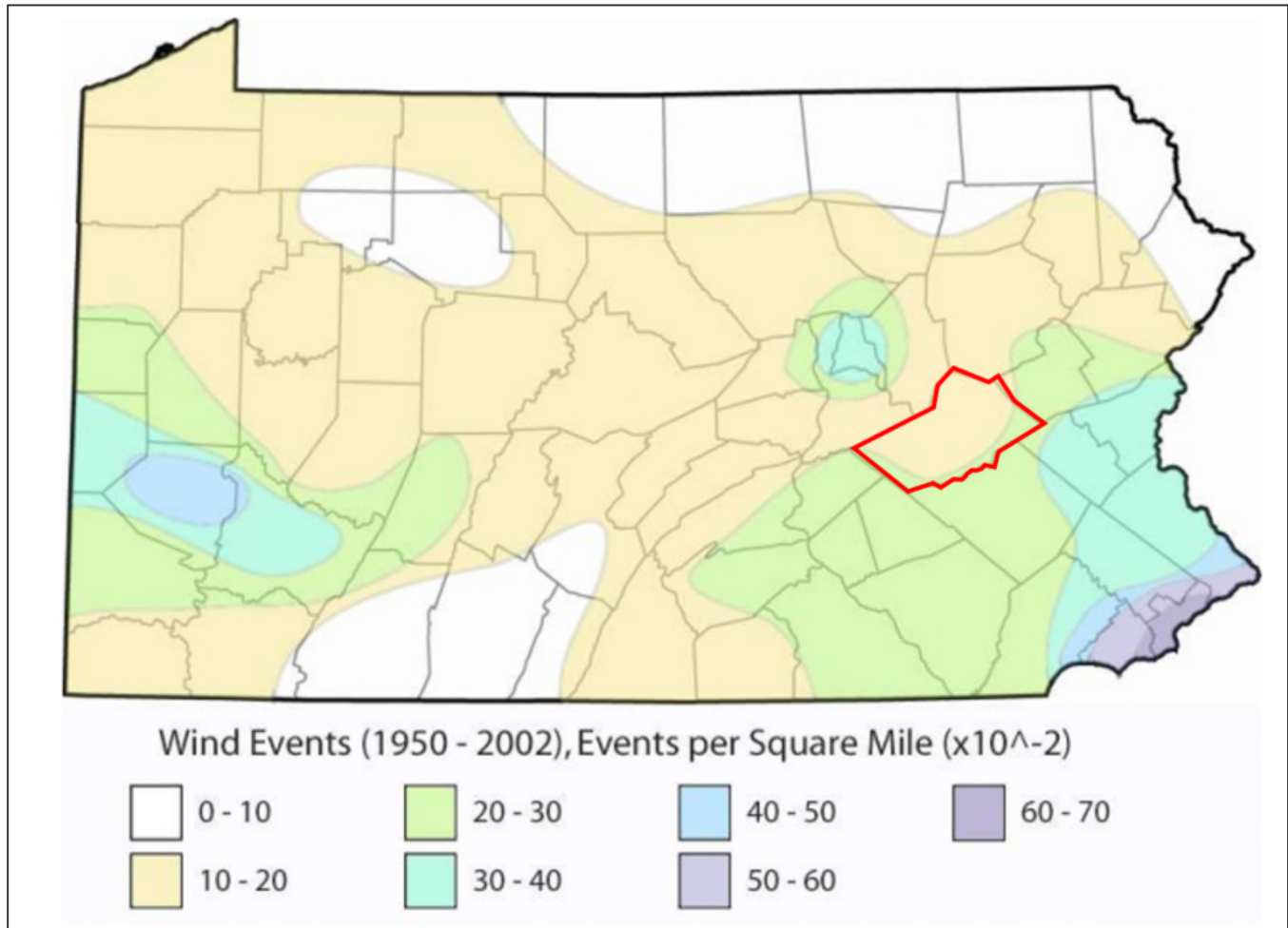
Future Occurrence

Schuylkill County experiences strong winds frequently, which can result in significant property damage, downed trees, and utility outages. While hurricanes do not occur as frequent as windstorms, the County will still experience the direct and indirect impacts from hurricanes. Hurricanes and windstorms 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.

Climate change may increase the probability of future occurrences of hurricanes and windstorms. National Aeronautics and Space Administration (NASA) scientists suggest that the United States will face more severe thunderstorms in the future, with deadly lightning, damaging hail, and the potential for tornadoes in the event of climate change. Smaller storm events like thunderstorms may also be more dangerous due to climate change (NASA 2007). According to the U.S. EPA, Pennsylvania has warmed more than half a degree (°F) in the last century and heavy rainstorms are more frequent. Rising temperatures and shifting rainfall patterns are likely to increase in the intensity of natural hazards, such as hurricanes (EPA 2016). The increase in thunderstorms and intensity of storms may lead to an increase in the number of and the intensity of windstorms and hurricanes.

According to the 2013 State HMP, the southeast and extreme western sections of the State experience a higher frequency of events compared to other areas of Pennsylvania. This data is based on events that occurred between 1950 and 2002. As seen in the figure below, Schuylkill County experienced between 10 and 30 wind events per square mile.

Figure 4.3.6-5. Wind Events Per Square Mile in Pennsylvania



Source: PEMA 2013

Note: The red outline indicates the location of Schuykill County

For the 2019 HMP update, the most up-to-date historic data was collected to calculate the probability of future occurrence of hurricane and windstorms events, of all magnitudes, for Schuykill County. Information from NOAA-NCEI storm events database, the 2013 Schuykill County HMP, and the Storm Prediction Center damaging wind database were used to identify the number of events that occurred between 1950 and 2017. Table 4.3.6-4 presents the probability of future occurrence of hurricane and windstorm events in Schuykill County.

Table 4.3.6-4. Probability of Future Hurricane and Windstorm Events in Schuykill County

Hazard Type	Number of Occurrences Between 1950 and 2017	Rate of Occurrence or Annual Number of Events (average)	Recurrence Interval (in years) (# Years/Number of Events)	Probability of Event in any given year	Percent chance of occurrence in any given year
Windstorms	176	2.63	0.39	2.59	100%
Hurricanes/Tropical Storms	3	0.04	22.7	0.04	4.4%

Sources: NOAA-NCEI 2018; SPC 2018; NHC 2018; Schuylkill County HMP 2013

In Section 4.4, the identified hazards of concern for Schuylkill County were ranked according to relative risk. The probability of occurrence for hurricane and windstorm events impacting Schuylkill County is considered ‘possible’ (between 1 and 49.9% annual probability) as defined by the Risk Factor Methodology probability criteria (Section 4.4).

VULNERABILITY ASSESSMENT

To understand risk, a community must evaluate assets exposed and vulnerable within the identified hazard area. The following section discusses potential impacts of the hurricane and windstorm hazard on Schuylkill County, including:

- Impacts 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 collections that will assist in understanding this hazard over time.

High winds and heavy rainfalls associated with hurricanes and windstorms can result in similar impacts on the population, structures and the economy. The high winds and air speeds often result in power outages, disruptions to transportation corridors and equipment, loss of workplace access, significant property damage, injuries and loss of life, and the need to shelter and care for individuals impacted by the events. A large amount of damage can be inflicted by trees, branches, and other objects that fall onto power lines, buildings, roads, vehicles, and, in some cases, people.

To assess vulnerability, the HAZUS-MH wind model was used to analyze the wind hazard for Schuylkill County. A probabilistic scenario was run for Schuylkill County for annualized losses and the 100- and 500-year MRPs. Maximum peak gust wind speeds for these MRPs are displayed on Figures 4.3.6-3 and 4.3.6-4.

Impact on Life, Health, and Safety

The entire population of Schuylkill County is exposed to hurricanes and tropical storm events. 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. The HAZUS-MH wind model estimates no households will be displaced and temporary shelter will not be required as a result of the 100- and 500-year MRP events.

Socially vulnerable populations are most susceptible to the hurricane and windstorm hazard based on a number of factors including their physical and financial ability to react or respond during a hazard and the location 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 to 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 require extra time or outside assistance during evacuations and are more likely to seek or need medical attention which may not be available due to isolation during a storm event. Please refer to Section 2 (County Profile) for the statistics of these populations.

Impact on General Building Stock

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. As discussed in Section 4.3.10 (Tornado), there are nearly 2,500 manufactured homes located in Schuylkill County considered highly vulnerable to wind events.

The HAZUS-MH 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 total destruction; refer to Table 4.3.6-7 for the definition of these damage categories. Tables 4.3.6-8 and 4.3.6-9 summarize the building value (structure only) damage estimated as a result of the 100- and 500-year MRP hurricane wind-only events. Overall, the majority of estimated damage occurs to residential buildings in the County.

Table 4.3.6-7. 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 over, 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 entering the building. Marks or dents on walls requiring 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, moderate window breakage. Minor roof sheathing failure. Some resulting damage to interior of 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 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 4.3.6-8. Estimated Building Value (Structure Only) Damaged by the 100-Year and 500-Year MRP Hurricane-Related Winds

Municipality	Total Replacement Cost (Structure Only)	Estimated Total Damages*			Percent of Total Building Improvement Value		
		Annualized Loss	100-Year MRP Event	500-Year MRP Event	Annualized Loss	100-Year MRP Event	500-Year MRP Event
Ashland Borough	\$359,283,000	\$1,488	\$0	\$78,784	<1%	0.0%	<1%
Auburn Borough	\$62,489,000	\$418	\$1,294	\$60,021	<1%	<1%	<1%
Barry Township	\$102,889,000	\$795	\$0	\$21,581	<1%	0.0%	<1%
Blythe Township	\$73,528,000	\$402	\$550	\$60,663	<1%	<1%	<1%
Branch Township	\$171,135,000	\$1,130	\$435	\$95,937	<1%	<1%	<1%
Butler Township	\$432,409,000	\$2,140	\$567	\$156,385	<1%	<1%	<1%
Cass Township	\$139,196,000	\$755	\$0	\$65,149	<1%	0.0%	<1%
Coaldale Borough	\$267,571,000	\$1,179	\$15,479	\$284,752	<1%	<1%	<1%
Cressona Borough	\$447,810,000	\$1,561	\$10	\$177,465	<1%	<1%	<1%
Deer Lake Borough	\$63,156,000	\$522	\$7,583	\$97,469	<1%	<1%	<1%
Delano Township	\$46,717,000	\$184	\$50	\$36,324	<1%	<1%	<1%
East Brunswick Township	\$202,201,000	\$1,560	\$20,915	\$310,277	<1%	<1%	<1%
East Norwegian Township	\$90,440,000	\$546	\$74	\$70,509	<1%	<1%	<1%
East Union Township	\$131,856,000	\$651	\$1,120	\$79,518	<1%	<1%	<1%
Eldred Township	\$72,617,000	\$661	\$0	\$20,962	<1%	0.0%	<1%
Foster Township	\$23,319,000	\$112	\$0	\$7,367	<1%	0.0%	<1%
Frackville Borough	\$445,012,000	\$2,054	\$0	\$191,054	<1%	0.0%	<1%
Frailey Township	\$32,579,000	\$168	\$0	\$10,958	<1%	0.0%	<1%
Gilberton Borough	\$78,456,000	\$402	\$10	\$39,288	<1%	<1%	<1%
Girardville Borough	\$140,684,000	\$680	\$0	\$47,720	<1%	0.0%	<1%
Gordon Borough	\$62,410,000	\$306	\$15	\$20,716	<1%	<1%	<1%
Hegins Township	\$405,804,000	\$3,161	\$0	\$67,454	<1%	0.0%	<1%
Hubley Township	\$65,770,000	\$556	\$0	\$13,269	<1%	0.0%	<1%
Kline Township	\$138,660,000	\$595	\$0	\$114,814	<1%	0.0%	<1%
Landingville Borough	\$17,203,000	\$110	\$243	\$15,981	<1%	<1%	<1%
Mahanoy City Borough	\$414,997,000	\$1,902	\$0	\$266,966	<1%	0.0%	<1%

Municipality	Total Replacement Cost (Structure Only)	Estimated Total Damages*			Percent of Total Building Improvement Value		
		Annualized Loss	100-Year MRP Event	500-Year MRP Event	Annualized Loss	100-Year MRP Event	500-Year MRP Event
Mahanoy Township	\$120,417,000	\$500	\$0	\$68,539	<1%	0.0%	<1%
McAdoo Borough	\$203,826,000	\$1,011	\$1,878	\$214,406	<1%	<1%	<1%
Mechanicsville Borough	\$37,555,000	\$229	\$180	\$26,439	<1%	<1%	<1%
Middleport Borough	\$39,001,000	\$215	\$315	\$31,686	<1%	<1%	<1%
Minersville Borough	\$446,379,000	\$2,428	\$210	\$206,289	<1%	<1%	<1%
Mount Carbon Borough	\$10,831,000	\$63	\$0	\$7,984	<1%	0.0%	<1%
New Castle Township	\$45,079,000	\$203	\$0	\$18,721	<1%	0.0%	<1%
New Philadelphia Borough	\$101,864,000	\$555	\$460	\$84,181	<1%	<1%	<1%
New Ringgold Borough	\$24,626,000	\$166	\$2,658	\$42,373	<1%	<1%	<1%
North Manheim Township	\$434,559,000	\$2,356	\$120	\$281,726	<1%	<1%	<1%
North Union Township	\$171,028,000	\$963	\$2,680	\$120,265	<1%	<1%	<1%
Norwegian Township	\$279,019,000	\$1,104	\$15	\$90,210	<1%	<1%	<1%
Orwigsburg Borough	\$385,843,000	\$2,195	\$14,159	\$324,479	<1%	<1%	<1%
Palo Alto Borough	\$97,922,000	\$484	\$0	\$54,359	<1%	0.0%	<1%
Pine Grove Borough	\$284,312,000	\$1,715	\$0	\$99,916	<1%	0.0%	<1%
Pine Grove Township	\$351,482,000	\$2,653	\$0	\$131,778	<1%	0.0%	<1%
Port Carbon Borough	\$154,875,000	\$885	\$20	\$109,397	<1%	0.0%	<1%
Port Clinton Borough	\$33,660,000	\$200	\$2,906	\$37,714	<1%	<1%	<1%
Porter Township	\$200,150,000	\$1,564	\$0	\$58,391	<1%	0.0%	<1%
Pottsville City	\$1,659,500,000	\$8,061	\$2,129	\$737,780	<1%	<1%	<1%
Reilly Township	\$55,917,000	\$319	\$0	\$20,415	<1%	0.0%	<1%
Ringtown Borough	\$113,059,000	\$593	\$0	\$74,238	<1%	0.0%	<1%
Rush Township	\$379,614,000	\$1,787	\$5,547	\$348,384	<1%	<1%	<1%
Ryan Township	\$164,115,000	\$874	\$1,393	\$126,877	<1%	<1%	<1%
Schuylkill Haven Borough	\$660,503,000	\$3,683	\$317	\$419,841	<1%	<1%	<1%
Schuylkill Township	\$94,071,000	\$549	\$8,890	\$108,129	<1%	<1%	<1%
Shenandoah Borough	\$666,917,000	\$2,960	\$50	\$308,782	<1%	<1%	<1%
South Manheim Township	\$289,918,000	\$2,133	\$8,408	\$310,660	<1%	<1%	<1%

Municipality	Total Replacement Cost (Structure Only)	Estimated Total Damages*			Percent of Total Building Improvement Value		
		Annualized Loss	100-Year MRP Event	500-Year MRP Event	Annualized Loss	100-Year MRP Event	500-Year MRP Event
St. Clair Borough	\$367,582,000	\$1,683	\$5	\$186,255	<1%	<1%	<1%
Tamaqua Borough	\$684,156,000	\$3,406	\$44,334	\$772,417	<1%	<1%	<1%
Tower City Borough	\$168,700,000	\$1,010	\$0	\$38,558	<1%	0.0%	<1%
Tremont Borough	\$157,478,000	\$709	\$0	\$43,381	<1%	0.0%	<1%
Tremont Township	\$36,317,000	\$173	\$0	\$5,841	<1%	0.0%	<1%
Union Township	\$89,854,000	\$589	\$1,315	\$73,066	<1%	<1%	<1%
Upper Mahantongo Township	\$80,067,000	\$759	\$0	\$23,725	<1%	0.0%	<1%
Walker Township	\$85,298,000	\$705	\$9,408	\$130,263	<1%	<1%	<1%
Washington Township	\$248,728,000	\$2,587	\$666	\$205,046	<1%	<1%	<1%
Wayne Township	\$557,731,000	\$4,711	\$689	\$473,911	<1%	<1%	<1%
West Brunswick Township	\$394,765,000	\$3,011	\$34,871	\$530,539	<1%	<1%	<1%
West Mahanoy Township	\$345,990,000	\$1,439	\$0	\$141,214	<1%	0.0%	<1%
West Penn Township	\$347,338,000	\$2,530	\$40,315	\$617,993	<1%	<1%	<1%
Schuylkill County	\$15,558,237,000	\$87,801	\$232,280	\$10,117,547	<1%	<1%	<1%

Source: HAZUS-MH 4.0

*The Total Damages columns represent the sum of damages for all occupancy classes (residential, commercial, industrial, agricultural, educational, religious and government) based on RS Means 2016 value in HAZUS-MH.

Table 4.3.6-9. Estimated Residential and Commercial Building Value (Structure Only) Damaged by the 100-Year and 500-Year MRP Hurricane-Related Winds

Municipality	Total Replacement Cost Value (Structure Only)	Estimated Residential Damage		Estimated Commercial Damage	
		100-Year MRP Event	500-Year MRP Event	100-Year MRP Event	500-Year MRP Event
Ashland Borough	\$359,283,000	\$0	\$67,516	\$0	\$3,785
Auburn Borough	\$62,489,000	\$1,294	\$58,500	\$0	\$574
Barry Township	\$102,889,000	\$0	\$21,392	\$0	\$95
Blythe Township	\$73,528,000	\$550	\$59,461	\$0	\$961
Branch Township	\$171,135,000	\$435	\$93,821	\$0	\$1,731
Butler Township	\$432,409,000	\$567	\$150,888	\$0	\$3,352
Cass Township	\$139,196,000	\$0	\$64,042	\$0	\$850
Coaldale Borough	\$267,571,000	\$15,479	\$273,716	\$0	\$9,186
Cressona Borough	\$447,810,000	\$10	\$147,022	\$0	\$2,804
Deer Lake Borough	\$63,156,000	\$7,583	\$96,555	\$0	\$709
Delano Township	\$46,717,000	\$50	\$34,746	\$0	\$499
East Brunswick Township	\$202,201,000	\$20,819	\$302,957	\$38	\$5,726
East Norwegian Township	\$90,440,000	\$74	\$69,588	\$0	\$312
East Union Township	\$131,856,000	\$1,120	\$78,342	\$0	\$799
Eldred Township	\$72,617,000	\$0	\$19,510	\$0	\$1,180
Foster Township	\$23,319,000	\$0	\$6,787	\$0	\$523
Frackville Borough	\$445,012,000	\$0	\$177,179	\$0	\$8,118
Frailey Township	\$32,579,000	\$0	\$10,419	\$0	\$277
Gilberton Borough	\$78,456,000	\$10	\$37,570	\$0	\$1,037
Girardville Borough	\$140,684,000	\$0	\$45,720	\$0	\$1,033
Gordon Borough	\$62,410,000	\$15	\$19,789	\$0	\$299
Hegins Township	\$405,804,000	\$0	\$66,299	\$0	\$646
Hubley Township	\$65,770,000	\$0	\$13,269	\$0	\$0
Kline Township	\$138,660,000	\$0	\$110,868	\$0	\$893
Landingville Borough	\$17,203,000	\$243	\$15,482	\$0	\$320
Mahanoy City Borough	\$414,997,000	\$0	\$259,182	\$0	\$4,899

Municipality	Total Replacement Cost Value (Structure Only)	Estimated Residential Damage		Estimated Commercial Damage	
		100-Year MRP Event	500-Year MRP Event	100-Year MRP Event	500-Year MRP Event
Mahanoy Township	\$120,417,000	\$0	\$68,006	\$0	\$267
McAdoo Borough	\$203,826,000	\$1,878	\$211,012	\$0	\$2,366
Mechanicsville Borough	\$37,555,000	\$180	\$25,810	\$0	\$462
Middleport Borough	\$39,001,000	\$315	\$31,236	\$0	\$322
Minersville Borough	\$446,379,000	\$210	\$194,346	\$0	\$6,804
Mount Carbon Borough	\$10,831,000	\$0	\$7,818	\$0	\$146
New Castle Township	\$45,079,000	\$0	\$17,316	\$0	\$1,387
New Philadelphia Borough	\$101,864,000	\$460	\$82,311	\$0	\$1,108
New Ringgold Borough	\$24,626,000	\$2,658	\$42,150	\$0	\$223
North Manheim Township	\$434,559,000	\$120	\$269,339	\$0	\$7,539
North Union Township	\$171,028,000	\$2,680	\$119,042	\$0	\$834
Norwegian Township	\$279,019,000	\$15	\$77,517	\$0	\$7,855
Orwigsburg Borough	\$385,843,000	\$14,159	\$307,454	\$0	\$7,992
Palo Alto Borough	\$97,922,000	\$0	\$51,677	\$0	\$820
Pine Grove Borough	\$284,312,000	\$0	\$90,313	\$0	\$4,529
Pine Grove Township	\$351,482,000	\$0	\$124,747	\$0	\$3,894
Port Carbon Borough	\$154,875,000	\$20	\$106,469	\$0	\$1,665
Port Clinton Borough	\$33,660,000	\$2,906	\$37,261	\$0	\$345
Porter Township	\$200,150,000	\$0	\$55,435	\$0	\$1,246
Pottsville City	\$1,659,500,000	\$2,129	\$682,697	\$0	\$40,338
Reilly Township	\$55,917,000	\$0	\$19,762	\$0	\$460
Ringtown Borough	\$113,059,000	\$0	\$70,946	\$0	\$684
Rush Township	\$379,614,000	\$5,547	\$339,200	\$0	\$3,696
Ryan Township	\$164,115,000	\$1,393	\$124,927	\$0	\$698
Schuylkill Haven Borough	\$660,503,000	\$317	\$393,820	\$0	\$11,576
Schuylkill Township	\$94,071,000	\$8,890	\$107,102	\$0	\$193
Shenandoah Borough	\$666,917,000	\$50	\$286,961	\$0	\$17,493
South Manheim Township	\$289,918,000	\$8,408	\$305,411	\$0	\$1,616
St. Clair Borough	\$367,582,000	\$5	\$172,656	\$0	\$6,280

Municipality	Total Replacement Cost Value (Structure Only)	Estimated Residential Damage		Estimated Commercial Damage	
		100-Year MRP Event	500-Year MRP Event	100-Year MRP Event	500-Year MRP Event
Tamaqua Borough	\$684,156,000	\$44,334	\$744,421	\$0	\$16,118
Tower City Borough	\$168,700,000	\$0	\$34,671	\$0	\$1,527
Tremont Borough	\$157,478,000	\$0	\$39,749	\$0	\$1,572
Tremont Township	\$36,317,000	\$0	\$4,761	\$0	\$992
Union Township	\$89,854,000	\$1,315	\$72,175	\$0	\$249
Upper Mahantongo Township	\$80,067,000	\$0	\$22,158	\$0	\$523
Walker Township	\$85,298,000	\$9,395	\$129,994	\$14	\$168
Washington Township	\$248,728,000	\$666	\$203,912	\$0	\$699
Wayne Township	\$557,731,000	\$689	\$465,483	\$0	\$4,187
West Brunswick Township	\$394,765,000	\$34,713	\$515,072	\$77	\$6,601
West Mahanoy Township	\$345,990,000	\$0	\$131,839	\$0	\$3,084
West Penn Township	\$347,338,000	\$40,251	\$607,177	\$14	\$5,081
Schuylkill County	\$15,558,237,000	\$231,950	\$9,694,771	\$143	\$224,249

Source: HAZUS-MH 4.0

The total damage to buildings (structure only) for all occupancy types across Schuykill County is estimated to be \$232,000 for the 100-year MRP wind-only event, and approximately \$9.7 million for the 500-year MRP wind-only event. The majority of these losses are to the residential building category. Refer to Figures 4.3.6-4 and 4.3.6-5 that illustrate the density estimated building loss across Schuykill County for these two events.

Because of differences in building construction, residential structures are generally more susceptible to wind damage than commercial and industrial structures. The damage counts include buildings damaged at all severity levels from minor damage to total destruction. Total dollar damage reflects the overall impact to buildings at an aggregate level.

Figure 4.3.6-5. Density of Losses for Structures (All Occupancies) for the 100-Year Mean Return Period Event

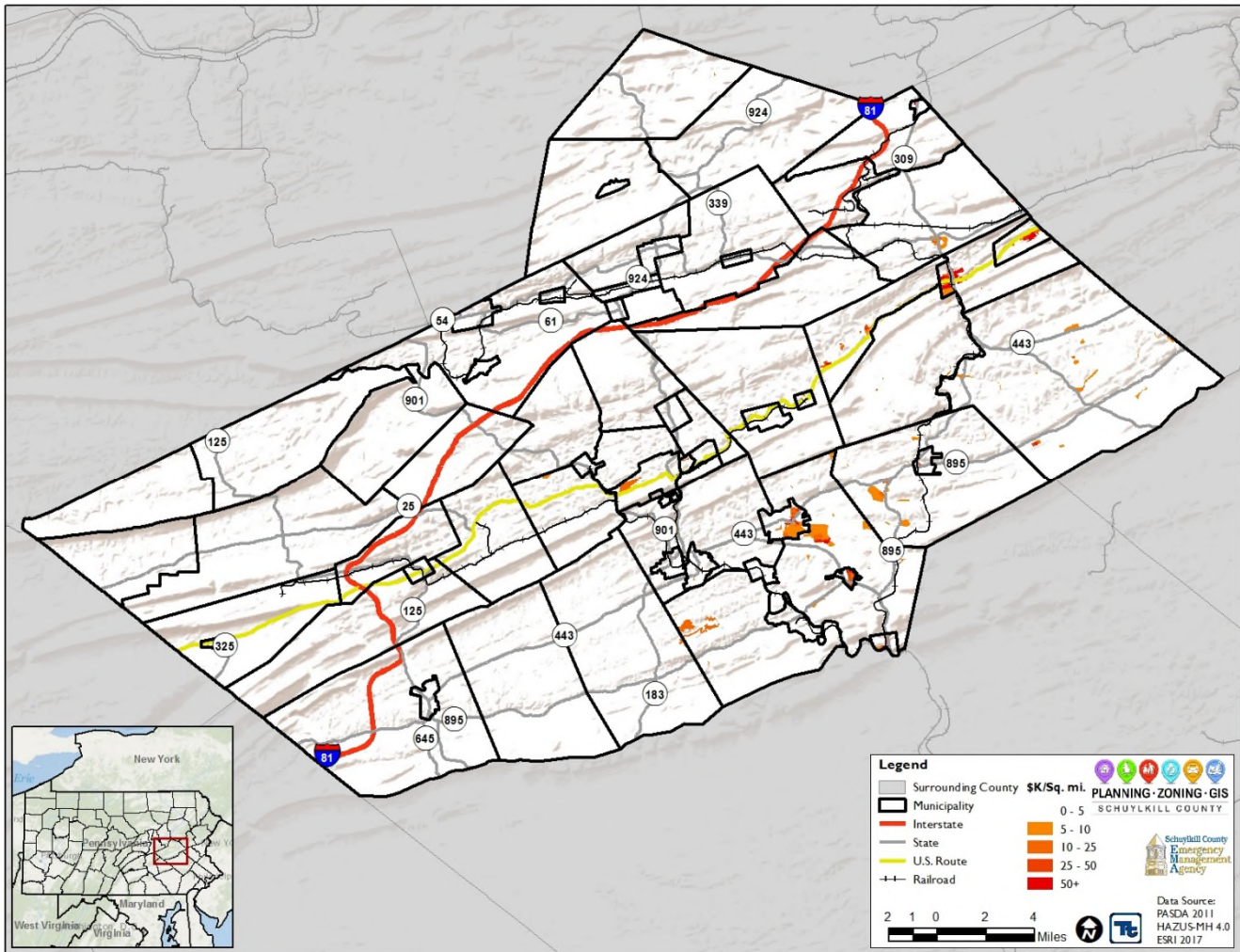
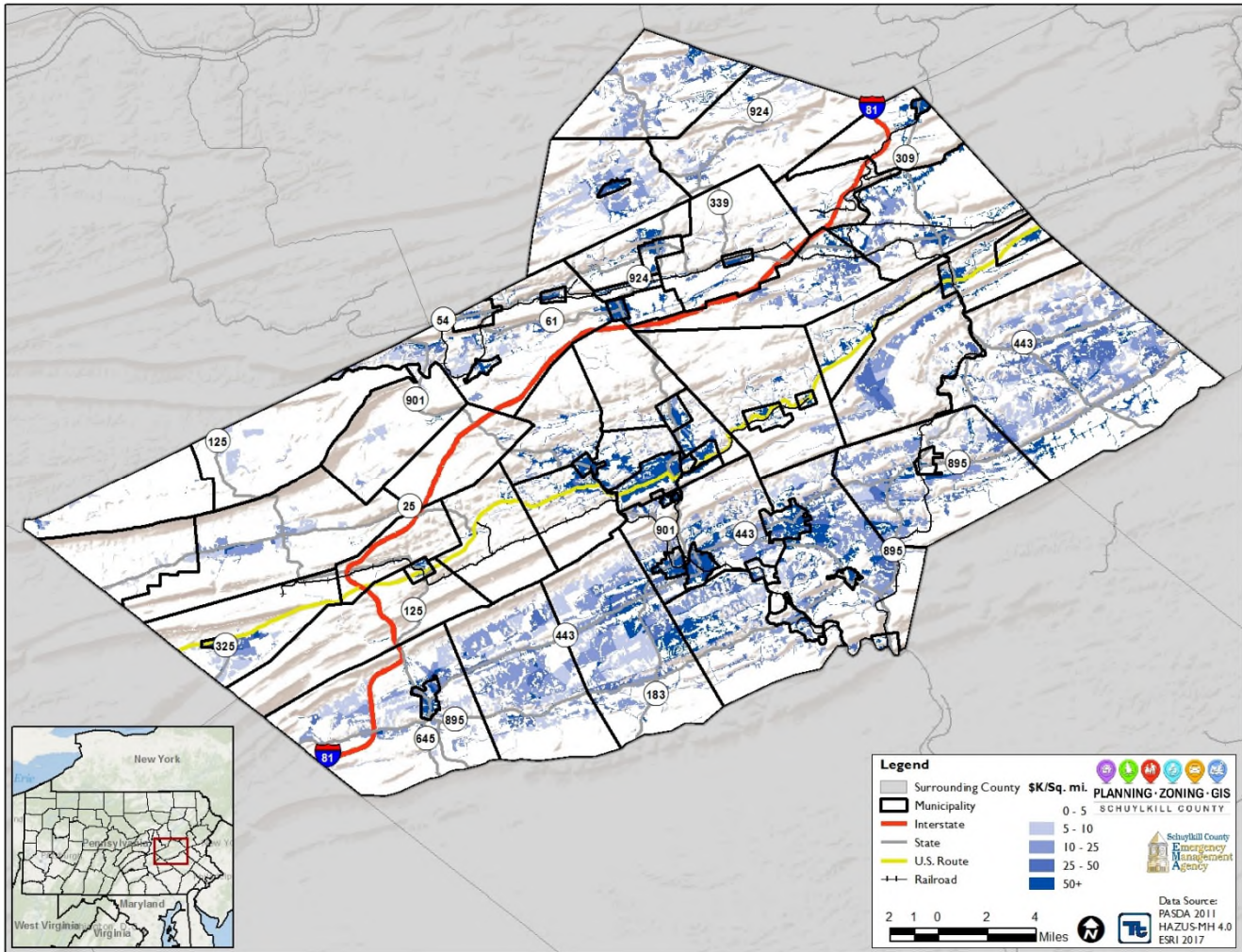


Figure 4.3.6-6. Density of Losses for Structures (All Occupancies) for the 500-Year Mean Return Period Event



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 and wastewater treatment and communications. In addition to public water services, property owners with private wells may not have access to potable water either 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 the wind hazard. HAZUS-MH 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) may sustain damage as a result of 100-year and 500-year MRP wind events. Additionally, HAZUS-MH estimates the loss of use for each facility in number of days. Due to the sensitive nature of the critical facility dataset, individual facility estimated loss is not provided.

HAZUS-MH estimates no damage to the critical facilities as a result of the 100-year event. Table 4.3.6-10 summarizes the percent probability that each facility type may experience damage as a result of the 500-year MRP event.

Table 4.3.6-10. Number of Critical Facilities to Experience Impacts from the 500-Year Mean Return Period Event

Facility Type	500-Year MRP Event				
	Loss of Days	Percent-Probability of Sustaining Damage			
		Minor	Moderate	Severe	Complete
EOC	0	0-1	0	0	0
Medical	0	0	0	0	0
Police	0	0-1	0	0	0
Fire	0	0	0	0	0
Schools	0	0-1	0	0	0

Source: HAZUS-MH 4.0
MRP = Mean Return Period

Impact on the Economy

Hurricanes and tropical storms also impact the economy. Impacts include but are not limited to loss of business function, damage to inventory, relocation costs, wage loss and rental loss due to the repair/replacement of buildings. HAZUS-MH 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.

For the 100-year MRP wind event, HAZUS-MH estimates less than \$1,000 in business interruption costs (income loss, relocation costs, rental costs and lost wages) and no inventory losses. For the 500-year MRP wind only event, HAZUS-MH estimates approximately \$51K in business interruption losses for the County, which includes loss of income, relocation costs, rental costs and lost wages, and inventory losses less than \$1,000.

Impacts to 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 can impact heating or cooling provision to the population.

Debris management can be costly and may also impact the local economy. HAZUS-MH 4.0 estimates the amount of debris that may be produced as result of the 100- and 500-year MRP wind events. Table 4.3.6-11 summarizes the estimated debris by 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 may be higher if multiple impacts occur.

According to the HAZUS-MH Hurricane User Manual: *‘The Eligible Tree Debris columns provide estimates of the weight and volume of downed trees that would likely be collected and disposed at public expense. As discussed in Chapter 12 of the HAZUS-MH Hurricane Model Technical Manual, the eligible tree debris estimates produced by the Hurricane Model tend to underestimate reported volumes of debris brought to landfills for a number of events that have occurred over the past several years. This indicates that there may be other sources of vegetative and non-vegetative debris*

that are not currently being modeled in HAZUS. For landfill estimation purposes, it is recommended that the HAZUS debris volume estimate be treated as an approximate lower bound. Based on actual reported debris volumes, it is recommended that the HAZUS results be multiplied by three to obtain an approximate upper bound estimate. It is also important to note that the Hurricane Model assumes a bulking factor of 10 cubic yards per ton of tree debris. If the debris is chipped prior to transport or disposal, a bulking factor of 4 is recommended. Thus, for chipped debris, the eligible tree debris volume should be multiplied by 0.4'. No multiplier has been applied to the data presented in Table 4.3.6-11.

Table 4.3.6-11. Debris Production for 100- and 500-Year Mean Return Period Events

Municipality	Brick and Wood (tons)		Concrete and Steel (tons)		Tree (tons)		Eligible Tree Volume (cubic yards)	
	100 Year MRP Event	500 Year MRP Event	100 Year MRP Event	500 Year MRP Event	100 Year MRP Event	500 Year MRP Event	100 Year MRP Event	500 Year MRP Event
Ashland Borough	0	1	0	0	0	0	0	0
Auburn Borough	0	0	0	0	0	1	0	1
Barry Township	0	0	0	0	0	0	0	0
Blythe Township	0	0	0	0	0	0	0	0
Branch Township	0	1	0	0	0	0	0	0
Butler Township	0	0	0	0	0	0	0	0
Cass Township	0	1	0	0	0	0	0	0
Coaldale Borough	0	13	0	0	0	0	0	0
Cressona Borough	0	10	0	0	0	0	0	0
Deer Lake Borough	0	1	0	0	0	0	0	0
Delano Township	0	0	0	0	0	0	0	0
East Brunswick Township	0	9	0	0	0	0	0	0
East Norwegian Township	0	1	0	0	0	0	0	0
East Union Township	0	0	0	0	0	0	0	0
Eldred Township	0	0	0	0	0	0	0	0
Foster Township	0	0	0	0	0	0	0	0
Frackville Borough	0	5	0	0	0	0	0	0
Frailey Township	0	0	0	0	0	5	0	2
Gilberton Borough	0	0	0	0	0	0	0	0
Girardville Borough	0	0	0	0	0	0	0	0
Gordon Borough	0	0	0	0	0	0	0	0
Hegins Township	0	0	0	0	0	67	0	10
Hublely Township	0	0	0	0	0	111	0	7
Kline Township	0	5	0	0	0	0	0	0
Landingville Borough	0	0	0	0	0	0	0	0
Mahanoy City Borough	0	6	0	0	0	0	0	0
Mahanoy Township	0	1	0	0	0	0	0	0
McAdoo Borough	0	17	0	0	0	0	0	0
Mechanicsville Borough	0	0	0	0	0	0	0	0
Middleport Borough	0	1	0	0	0	0	0	0
Minersville Borough	0	4	0	0	0	0	0	0

Table 4.3.6-11. Debris Production for 100- and 500-Year Mean Return Period Events

Municipality	Brick and Wood (tons)		Concrete and Steel (tons)		Tree (tons)		Eligible Tree Volume (cubic yards)	
	100 Year MRP Event	500 Year MRP Event	100 Year MRP Event	500 Year MRP Event	100 Year MRP Event	500 Year MRP Event	100 Year MRP Event	500 Year MRP Event
Mount Carbon Borough	0	0	0	0	0	0	0	0
New Castle Township	0	0	0	0	0	0	0	0
New Philadelphia Borough	0	3	0	0	0	0	0	0
New Ringgold Borough	0	0	0	0	0	0	0	0
North Manheim Township	0	10	0	0	0	0	0	0
North Union Township	0	2	0	0	0	0	0	0
Norwegian Township	0	4	0	0	0	0	0	0
Orwigsburg Borough	0	19	0	0	0	0	0	0
Palo Alto Borough	0	0	0	0	0	0	0	0
Pine Grove Borough	0	0	0	0	0	2	0	1
Pine Grove Township	0	0	0	0	0	139	0	22
Port Carbon Borough	0	1	0	0	0	0	0	0
Port Clinton Borough	0	0	0	0	2	12	7	6
Porter Township	0	0	0	0	0	120	0	13
Pottsville City	0	32	0	0	0	0	0	0
Reilly Township	0	0	0	0	0	0	0	0
Ringtown Borough	0	0	0	0	0	0	0	0
Rush Township	0	14	0	0	0	0	0	0
Ryan Township	0	1	0	0	0	0	0	0
Schuylkill Haven Borough	0	30	0	0	0	0	0	0
Schuylkill Township	0	4	0	0	0	0	0	0
Shenandoah Borough	0	13	0	0	0	0	0	0
South Manheim Township	0	9	0	0	2	245	5	41
St. Clair Borough	0	5	0	0	0	0	0	0
Tamaqua Borough	0	79	0	0	0	0	0	0
Tower City Borough	0	0	0	0	0	1	0	1
Tremont Borough	0	0	0	0	0	2	0	1
Tremont Township	0	0	0	0	0	17	0	2
Union Township	0	0	0	0	0	0	0	0
Upper Mahantongo Township	0	0	0	0	0	63	0	6
Walker Township	0	5	0	0	0	0	0	0
Washington Township	0	4	0	0	4	510	4	53
Wayne Township	0	12	0	0	1	414	5	57
West Brunswick Township	0	19	0	0	0	0	0	0
West Mahanoy Township	0	1	0	0	0	0	0	0
West Penn Township	0	34	0	0	0	0	0	0
Schuylkill County	0	377	0	0	9	1,709	22	223

Source: HAZUS-MH 4.0

Future Growth and Development

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. Areas targeted for potential future growth and development in the next 5 years have been identified across the County at the municipal level. It is anticipated that any new development and new residents will be exposed to the hurricane and windstorm hazard. However, due to increased standards and codes, new development may be less vulnerable to wind-related hazards compared to the aging building stock in the County.

Effect of Climate Change on Vulnerability

Since the 1970s, globally there has been an increase in ‘tropical cyclone destructiveness’ as measured by the Power Dissipation Index. This increased tropical cyclone intensity and duration correlates with sea surface temperature. This suggests that future increases of tropical sea surface temperature may lead to future increases in tropical cyclone intensity and duration. However, there is a high level of uncertainty regarding the relationship between climate change and storm events. Future improvements in modeling smaller scale climatic processes can be expected and will lead to improved understanding of how the changing climate will alter temperature, precipitation and storm events in Pennsylvania (Shortle et. al, 2009).

Major clusters of summertime thunderstorms in North America will grow larger, more intense, and more frequent later this century in a changing climate, unleashing far more rain and posing a greater threat of flooding across wide areas (UCAR 2017). An increase in storms will produce more wind events and may increase tornado activity. Additionally, an increase in temperature will provide more energy to produce storms that generate tornadoes (Climate Central 2016).

Overall, Schuylkill County will continue to remain vulnerable to the hurricane and windstorm hazard.

Additional Data and Next Steps

Over time, Schuylkill County will obtain additional data to support an enhanced analysis of this hazard. Data that will support the analysis would include additional detail on past hazard events and impacts, and an updated building inventory to include specific building information such as type of construction and details on protective features (for example, shutters or wind straps).

4.3.7 MINE SUBSIDENCE

Two common causes of subsidence in Pennsylvania are (1) dissolution of carbonate rock, such as limestone or dolomite; and (2) mining activity. Schuylkill County is not underlain by limestone or dolomite; subsidence incidents in the County are related to mining activity. Therefore, for this plan update, this section provides a profile and vulnerability assessment of subsidence related to mining activities.

PROFILE

Figure 4.3.7-1. Sinkhole in Porter Township, October 2017



Source: Andruscavage 2017

Mine subsidence is defined as the movement of the ground surface as a result of readjustments of the overburden due to collapse or failure of underground mine workings. Areas underlain by coal, or other minerals may become susceptible to subsidence. Mine subsidence features usually take the form of either sinkholes or troughs (PADEP 2017).

Sinkhole subsidence occurs in areas generally where there is less than 50 feet of overburden, or vertical distance between ground surface and the coal seam. This is commonly associated with abandoned mining activities because current mining regulations ensure that there is sufficient overburden to reduce the likelihood of

subsidence (PA DEP 2018). Sinkholes occur from the collapse of the mine roof into a mine opening, resulting in caving of the overlying strata and an abrupt depression in the ground surface (i.e. when the roof of an underground mine collapses, it causes the ground above to sink or subside). This type of subsidence is typically localized, affecting a small area on the overlying surface. However, structures and surface features affected by sinkhole subsidence can experience extensive and costly damages. Subsidence troughs can occur over active or abandoned mines. Trough subsidence induced by room-and-pillar mining occurs when the overburden sags downward due to the failure of the remnant pillars or by punching of the pillars into a soft mine floor or roof (PADEP 2017).

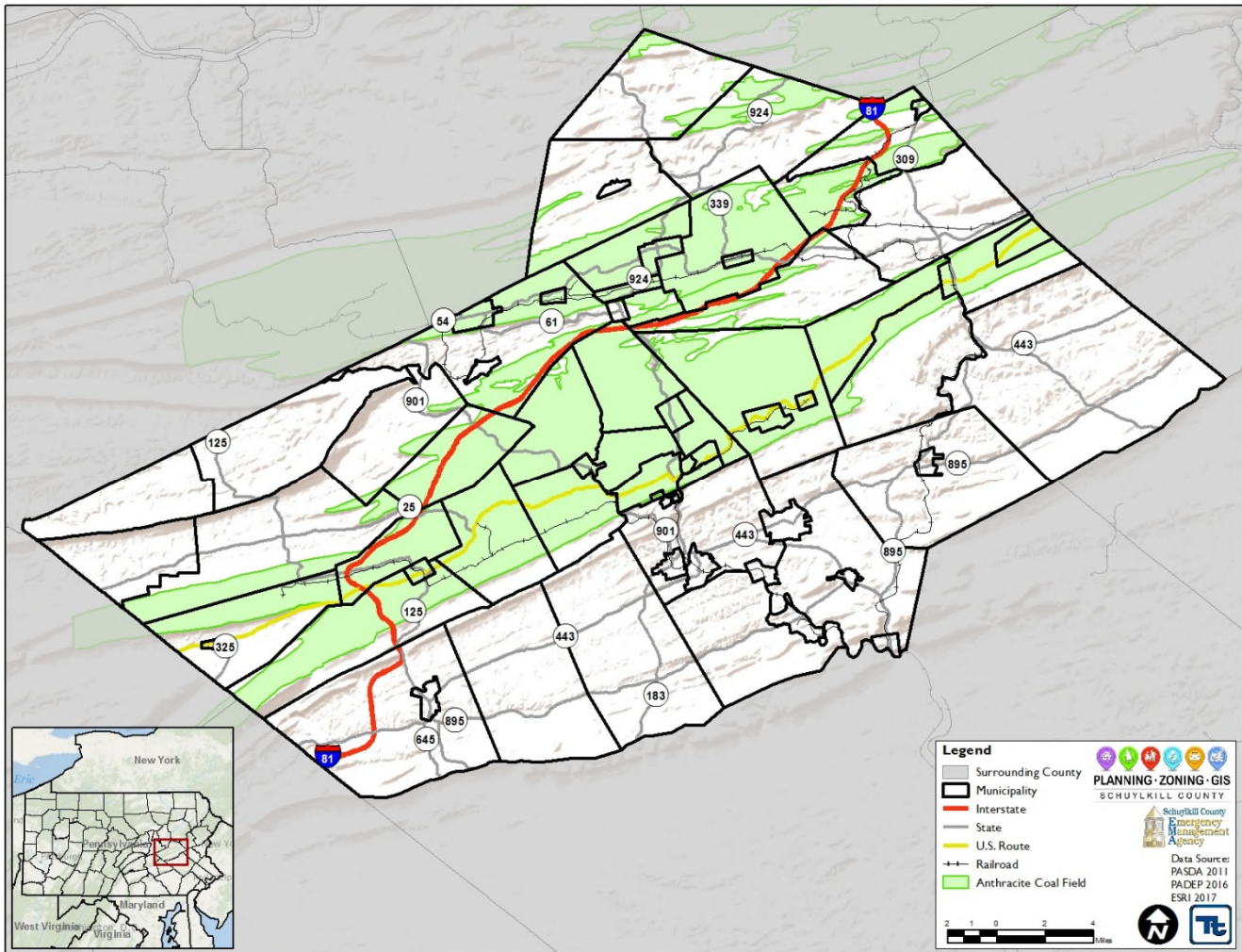
Location and Extent

Schuylkill County is a significant part of the coal region that is located in eastern Pennsylvania. The hard coal, or anthracite, beds are located in several narrow bands that run northeasterly between the Blue Mountain and the Susquehanna River. The region is divided into three fields – southern, middle, and northern. The southern field was the first to be developed and its central part is known as the Pottsville District. In the fields, the coal lies in dozens of seams, or “veins,” some only a few inches thick and unworkable and some as much as 40 feet thick. In the County, anthracite occurs in a large number of veins, one above the other, separated by thicker or thinner beds of slate and shale (Schuylkill County HMP 2013).

Areas above subsurface mines are prone to sinkholes and/or subsidence incidents. Figure 4.3.7-2 illustrates the areas of anthracite coal fields throughout Schuylkill County. In Schuylkill County, there are two predominant bands of anthracite coal. The first is located in the north central part of the County and runs west to east from Butler Township

to Kline Township. The other area is located in the central portion of the County and runs from the western county border with Dauphin County to Coaldale and Tamaqua at the border with Carbon County. A smaller third area occurs in the northern part of the County in East Union and North Union Townships. The predominance for subsidence will be in those areas of the County located on one of the three fields described above.

Figure 4.3.7-2. Anthracite Coal Field Extent in Schuykill County



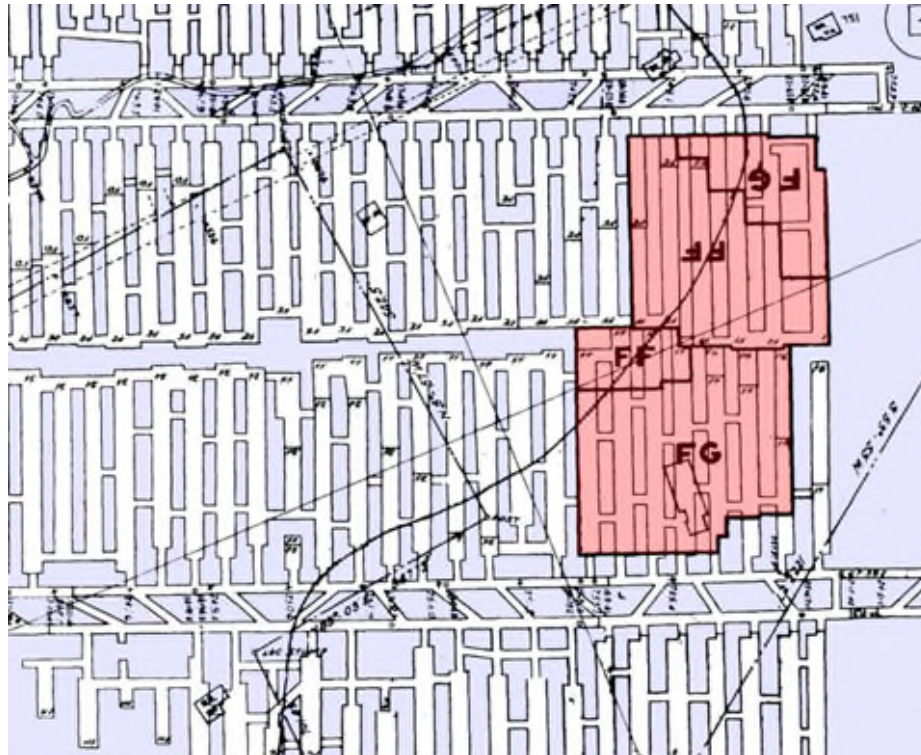
Source: PADEP 2018

Note: The green shaded area indicates coal field areas in Schuykill County; however, this may not provide a delineation of mined activities.

Room and pillar mining was the method most commonly used to mine the coal throughout the region, which leaves sections of the coal seam intact to serve as support for the mine (EMFI Coal Mining Methods). The advantage to room and pillar mining was that it could be used to follow the curvature of the anthracite coal seams. Historically, a common practice at the end of a mine’s lifespan was to retreat mine or “rob the pillars” (OSU eHstory). This process consisted of extracting additional pillars of coal to increase that mine’s yield, but that also decreased the structural stability of

the mine. Retreat mining was not always documented or reported, which means the extent of extracted coal is not always accurate.

Figure 4.3.7-3. Drawing of a Room and Pillar Mine

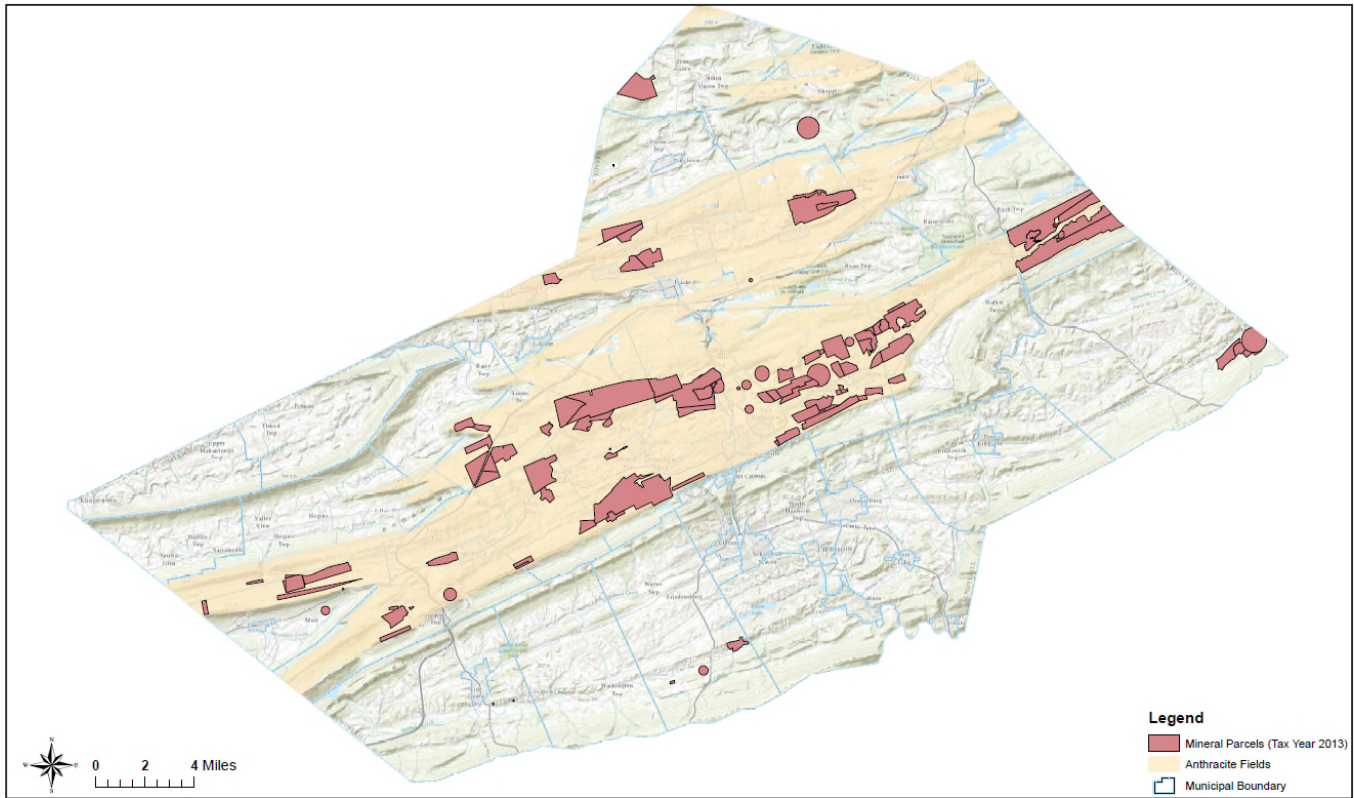


Source: *Pennsylvania Mine Map Atlas 2018*

Note: *The white shaded area indicates the mined-out areas or “rooms.” The blue shaded areas represent the existing coal or “pillars.” The pink shaded areas with a bold outline show areas that have been retreat mined.*

Figure 4.3.7- depicts Mineral Parcels for the Tax Year 2013. These “mineral parcels” represent mine operations which are taxed by the Schuylkill County Tax Assessment Office based on the permit issued by the PADEP (Schuylkill County HMP 2013).

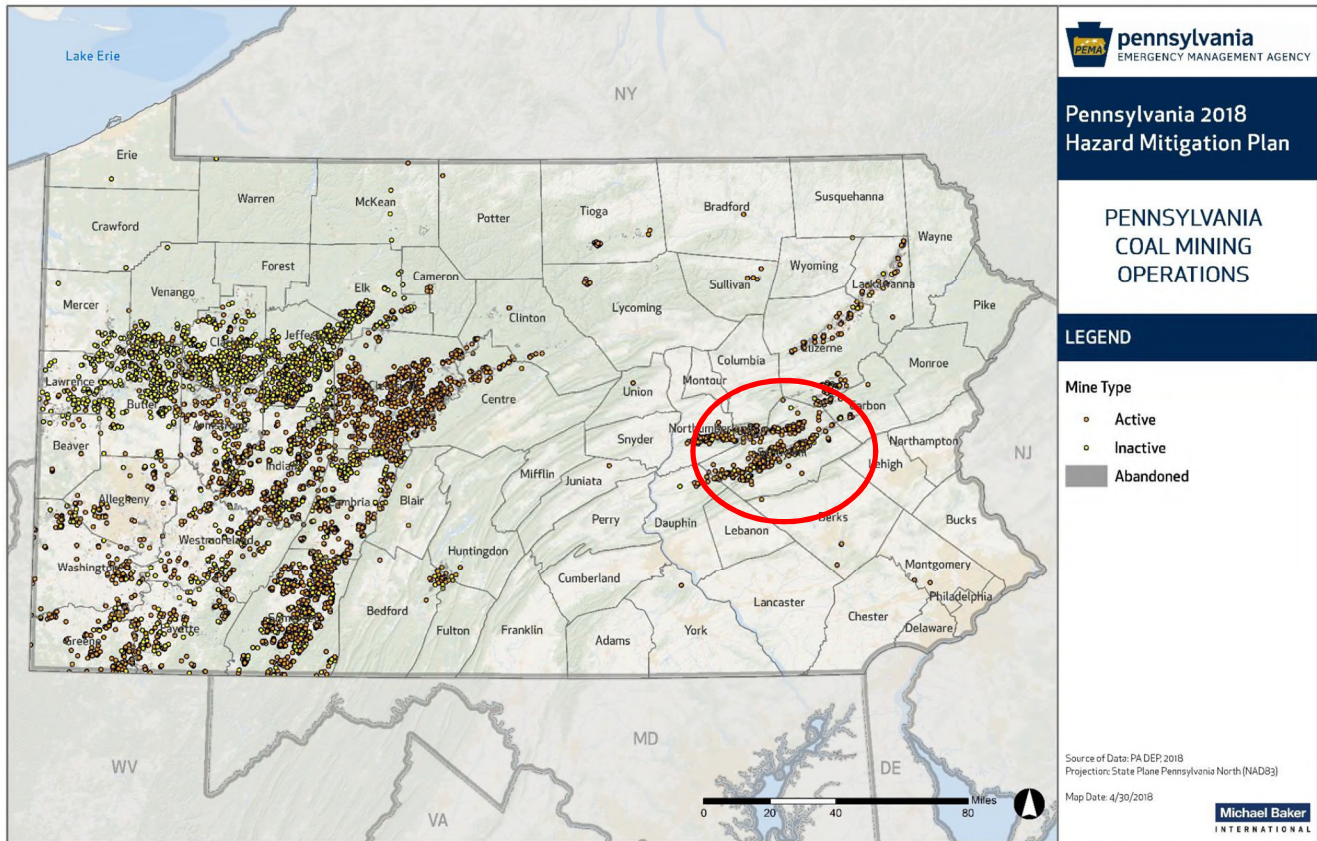
Figure 4.3.7-4. Mining Parcels in Schuylkill County



Source: Schuylkill County HMP 2013

According to the 2018 State HMP, there are 655 active/inactive/abandoned mines in Schuylkill County. Refer to Figure 4.3.7-5 which illustrates these locations which align with the location of the anthracite coal fields.

Figure 4.3.7-5. Pennsylvania Coal Mining Operations



Source: Commonwealth of Pennsylvania HMP 2018
The red circle illustrates the location of Schuykill County.

Range of Magnitude

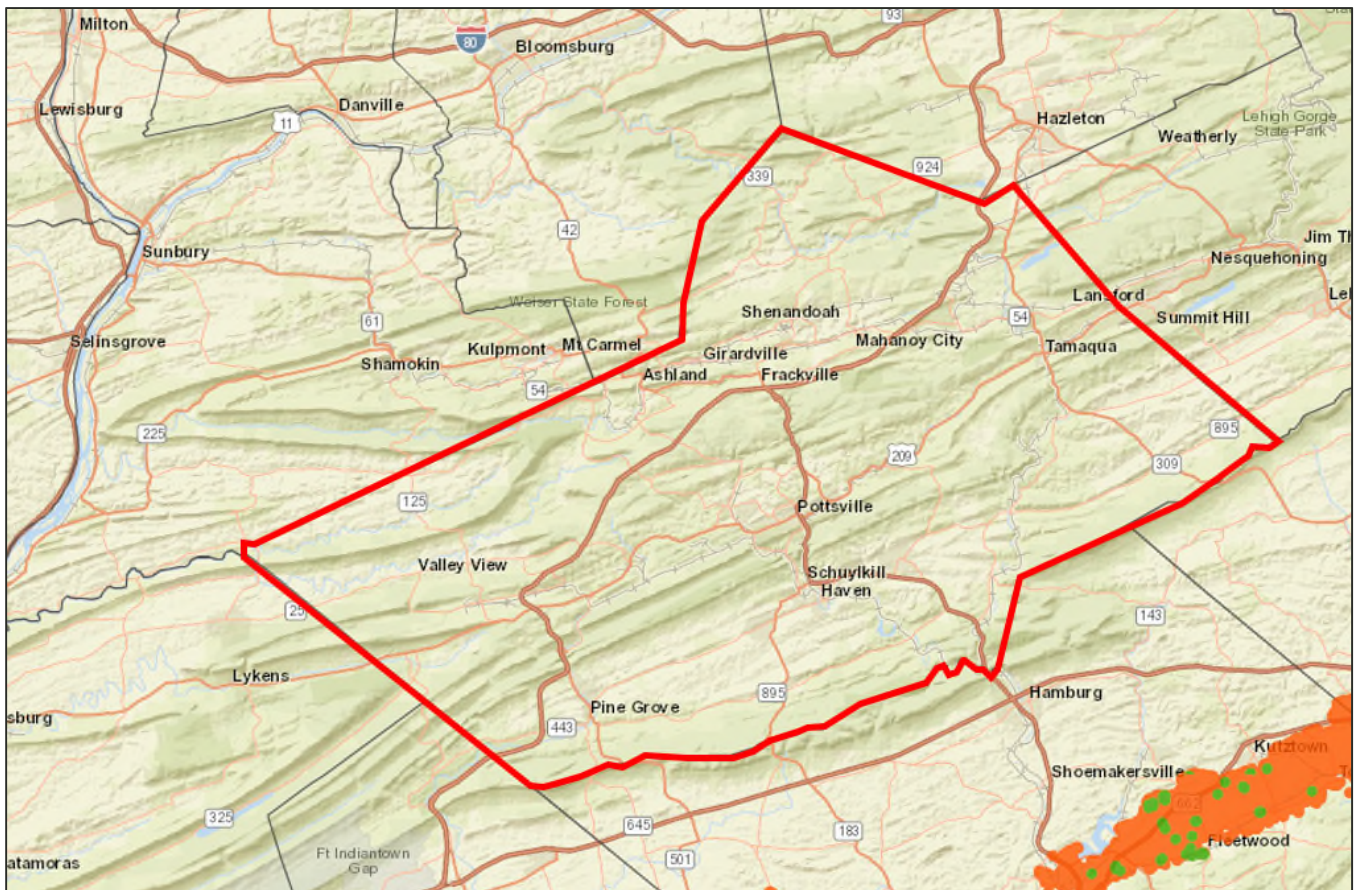
Damages from mine subsidence are generally classified as cosmetic, functional, or structural. Cosmetic damage refers to slight problems where only the physical appearance of a structure is affected. Functional damage refers to when the structure's use has been impacted. More significant damages that impact structural integrity is classified as structural damage. This includes situations where entire foundations need replacement due to severe cracking of supporting walls and footings (PADEP 2017).

No two subsidence areas or sinkholes are exactly alike. Variations in size and shape, time period under which they occur (i.e. gradually or abruptly), and their proximity to development ultimately determines the magnitude of damage incurred. Events could result in minor elevation changes or deep, gaping holes in the ground surface. Subsidence and sinkhole events can cause severe damage in urban environments, although gradual events can be addressed before significant damage occurs. Primarily, problems related to subsidence include the disruption of utility services and damages to private and public property including buildings, roads, and underground infrastructure (PEMA 2013).

Past Occurrence

The Pennsylvania Department of Conservation and Natural Resources (PA DCNR) Interactive Map (Figure 4.3.7-) does not show any sinkholes or surface depressions in Schuykill County (PADCNR 2018). Additionally, the 2013 State HMP did not identify any sinkholes or subsidence incidents for Schuykill County (PEMA 2013).

Figure 4.3.7-6. Sinkholes and Surface Depressions in Schuykill County



Source: PADCNR 2018

Note: The red outline indicates the location of Schuykill County.

While the figure above does not show historic occurrences of sinkholes or subsidence documented by PADCNR, there have been occurrences throughout the County. The 2013 HMP discussed specific subsidence events that occurred in Schuykill County through 2011. For the 2019 HMP update, mine subsidence events were summarized between January 2012 and April 2018. For events prior to 2012, please refer to Appendix G.

The impact of mine subsidence could be easily illustrated and quantified for this plan update through the number of claims and total claims issued through the Mine Subsidence Insurance Program at PADEP. However, that information is not attainable by the County from PADEP due to privacy issues (Schuykill County HMP 2013).

With numerous sources reviewed for the purpose of this HMP update, loss and impact information for many events could vary. The accuracy of event information, impacts and monetary figures discussed is based only on the available information in cited sources.

Table 4.3.7-1. Mine Subsidence Events in Schuylkill County, 2012 to 2018

Date of Event	Event Type	Location	FEMA Declaration Number (if applicable)	County Designated?	Losses/Impacts
November 12, 2016	Sinkhole	Mahanoy Township	N/A	N/A	A home on Park Place Road shifted on its foundation during the night of November 12 th . The family evacuated their house to find their home leaning as the backyard gave way. A hole approximately 40 feet wide and 30 feet deep opened up. County officials believed it was caused by mining done beneath the hole and an unfilled mine path that caved.
October 6, 2017	Sinkhole	Porter Township	N/A	N/A	PennDOT shut down a section of Route 125 after a portion of the highway collapsed. It occurred approximately 2.25 miles outside of Donaldson in Porter Township. The hole was approximately 25 feet deep and 25 feet wide and began filling up with water. It was reported that the sinkhole stretched across both lanes of the roadway and was about four feet deep. Route 125 remained closed for a couple of weeks as investigators tried to figure out what caused the collapse. Per Ron Young District 5-0 Press Officer, the cost to repair was approximately \$580,000.
April 9, 2018	Subsidence	City of Pottsville	N/A	N/A	A mine subsidence opened up on April 9 th on a North 15 th Street sidewalk in Pottsville, outside of John S. Clark Elementary Center. After an inspection by the local DEP Mining Office and Bureau of Abandoned Mine Reclamation, it was determined that this incident was located over some old mine work. The roadway was closed as a result of this incident and traffic was rerouted for several days. There were no reports of injuries.

Sources: Nieves 2014; Andruscavage 2017; 69 News 2017

Future Occurrence

It is difficult to calculate the severity and frequency of mine subsidence events. Overall, municipalities underlain by mining areas have a higher potential of sinkholes or subsidence events. For the 2019 HMP update, the most up-to-date data was collected to calculate the probability of future occurrence on mine subsidence events, of all magnitudes, for Schuylkill County. Information from the 2013 HMP and input from the County were used to identify the number of mine subsidence events that occurred between 1950 and 2017. Table 4.3.7-2 presents the probability of future occurrence of mine subsidence events in Schuylkill County.

Table 4.3.7-2. Mine Subsidence Events in Schuylkill County, 2012 to 2017

Number of Occurrences Between 1950 and 2017	Rate of Occurrence	Recurrence Interval (in years)	Probability of Event Occurring in Any Given Year	% Chance of Occurring in Any Given Year
7	0.10	9.71	0.10	10.3%

In Section 4.4, the identified hazards of concern for Schuylkill County were ranked for relative risk. The probability of occurrence, or likelihood of the event, is one parameter used for ranking hazards. Based on historical records, the probability of occurrence for mine subsidence events in Schuylkill County is considered ‘possible’. Please refer to Section 4.4 for further information on PEMA’s risk factor methodology and the risk factors used to determine each hazard’s risk rank.

VULNERABILITY ASSESSMENT

A countywide spatial assessment was conducted utilizing the anthracite coal fields to estimate the assets exposed and potentially vulnerable to the mine subsidence hazard. Approximately 32.3 percent of Schuylkill County (253.3 square miles) is underlain by anthracite coal fields. Table 4.3.7-3 summarizes the municipalities located on anthracite coal fields.

Table 4.3.8-3. Municipalities Located on Anthracite Coal Fields

Municipality	Anthracite	Municipality	Anthracite
Ashland Borough	X	New Ringgold Borough	
Auburn Borough		North Manheim Township	X
Barry Township	X	North Union Township	X
Blythe Township	X	Norwegian Township	X
Branch Township	X	Orwigsburg Borough	
Butler Township	X	Palo Alto Borough	X
Cass Township	X	Pine Grove Borough	
Coaldale Borough	X	Pine Grove Township	
Cressona Borough		Port Carbon Borough	X
Deer Lake Borough		Port Clinton Borough	
Delano Township	X	Porter Township	X
East Brunswick Township		Pottsville City	X
East Norwegian Township	X	Reilly Township	X

Municipality	Anthracite	Municipality	Anthracite
East Union Township	X	Ringtown Borough	
Eldred Township		Rush Township	X
Foster Township	X	Ryan Township	X
Frackville Borough	X	Schuylkill Haven Borough	
Frailey Township	X	Schuylkill Township	X
Gilberton Borough	X	Shenandoah Borough	X
Girardville Borough	X	South Manheim Township	
Gordon Borough		St. Clair Borough	X
Hegins Township	X	Tamaqua Borough	X
Hubley Township	X	Tower City Borough	
Kline Township	X	Tremont Borough	X
Landingville Borough		Tremont Township	X
Mahanoy City Borough	X	Union Township	X
Mahanoy Township	X	Upper Mahantongo Township	
Mcadoo Borough	x	Walker Township	X
Mechanicsville Borough	X	Washington Township	
Middleport Borough	X	Wayne Township	
Minersville Borough	X	West Brunswick Township	
Mount Carbon Borough		West Mahanoy Township	X
New Castle Township	X	West Penn Township	
New Philadelphia Borough	X		

Source: Pennsylvania Bureau of Topographic and Geologic Survey 2015
X = Presence of anthracite coal and potential for mining opportunities

Impact on Life, Health, and Safety

Table 4.3.7-4 summarizes the Schuylkill County population located on anthracite coal fields by municipality (U.S. Census 2010). It is important to note that the Census block data does not align with the hazard area and this is a coarse estimate for population exposure. Using this approach, the estimated population living on anthracite coal fields is 73,588; nearly 50-percent of the County population.

Table 4.3.7-4. Estimated Population Located on Anthracite Coal Fields in Schuylkill County

Municipality	U.S. Census 2010 Population	Estimated Population Exposed	Percent of Total
Ashland Borough	2,817	2,817	100.0%
Auburn Borough	739	0	0.0%
Barry Township	932	12	1.3%
Blythe Township	924	865	93.6%
Branch Township	1,840	1,840	100.0%
Butler Township	5,224	2,240	42.9%

Municipality	U.S. Census 2010 Population	Estimated Population Exposed	Percent of Total
Cass Township	1,957	1,957	100.0%
Coaldale Borough	2,281	2,281	100.0%
Cressona Borough	1,651	0	0.0%
Deer Lake Borough	687	0	0.0%
Delano Township	445	438	98.4%
East Brunswick Township	1,793	0	0.0%
East Norwegian Township	863	863	100.0%
East Union Township	1,605	115	7.2%
Eldred Township	758	0	0.0%
Foster Township	251	248	98.8%
Frackville Borough	3,805	205	5.4%
Frailey Township	429	429	100.0%
Gilberton Borough	773	772	99.9%
Girardville Borough	1,519	1,519	100.0%
Gordon Borough	763	0	0.0%
Hegins Township	3,516	200	5.7%
Hubley Township	854	0	0.0%
Kline Township	1,438	694	48.3%
Landingville Borough	159	0	0.0%
Mahanoy City Borough	4,162	4,162	100.0%
Mahanoy Township	3,152	3,152	100.0%
Mcadoo Borough	2,300	1,178	51.2%
Mechanicsville Borough	455	455	100.0%
Middleport Borough	405	405	100.0%
Minersville Borough	4,397	4,397	100.0%
Mount Carbon Borough	91	0	0.0%
New Castle Township	415	415	100.0%
New Philadelphia Borough	1,085	1,085	100.0%
New Ringgold Borough	276	0	0.0%
North Manheim Township	3,766	0	0.0%
North Union Township	1,476	0	0.0%
Norwegian Township	2,310	2,283	98.8%
Orwigsburg Borough	3,099	0	0.0%
Palo Alto Borough	1,032	1,032	100.0%
Pine Grove Borough	2,186	0	0.0%
Pine Grove Township	4,123	0	0.0%
Port Carbon Borough	1,889	1,889	100.0%
Port Clinton Borough	326	0	0.0%
Porter Township	2,176	189	8.7%

Municipality	U.S. Census 2010 Population	Estimated Population Exposed	Percent of Total
Pottsville City	14,330	13,807	96.4%
Reilly Township	726	726	100.0%
Ringtown Borough	818	0	0.0%
Rush Township	3,412	17	0.5%
Ryan Township	2,459	159	6.5%
Schuykill Haven Borough	5,437	0	0.0%
Schuykill Township	1,129	1,120	99.2%
Shenandoah Borough	5,071	5,071	100.0%
South Manheim Township	2,504	0	0.0%
St. Clair Borough	3,004	3,004	100.0%
Tamaqua Borough	7,107	7,028	98.9%
Tower City Borough	1,346	0	0.0%
Tremont Borough	1,752	1,752	100.0%
Tremont Township	280	219	78.2%
Union Township	1,273	28	2.2%
Upper Mahantongo Township	655	0	0.0%
Walker Township	1,054	241	22.9%
Washington Township	3,033	0	0.0%
Wayne Township	5,113	0	0.0%
West Brunswick Township	3,332	0	0.0%
West Mahanoy Township	2,868	2,279	79.5%
West Penn Township	4,442	0	0.0%
Schuykill County (Total)	148,289	73,588	49.6%

Source: U.S. Census 2010, Pennsylvania Bureau of Topographic and Geologic Survey 2001

Note: The U.S. Census blocks do not align with the anthracite field polygon in the spatial data, and these estimates are for planning purposes only.

Impact on General Building Stock

There is no standard loss estimation model for the mine subsidence hazard. To estimate the built environment exposed to the hazard, the anthracite coal field layer was overlaid on the building footprints and default building inventory in HAZUS-MH at the Census-block level. The U.S. Census blocks do not align with the anthracite field; therefore, these estimates are for planning purposes only. Table 4.3.7-5 lists the replacement cost value (RCV) (structure and contents) of the general building stock and number of structures located on anthracite coal fields by municipality. Based on this analysis, there are 36,391 structures located on anthracite coal fields.

Table 4.3.7-5. Building Stock Replacement Value and Structures Located on Anthracite Coal Fields in Schuykill County

Municipality	Total GBS RCV	Estimated GBS RCV Exposed	Percent of Total	Total Number of Structures	Number of Structures in Hazard Area	Percent of Total
Ashland Borough	\$620,713,000	\$620,713,000	100.0%	1,305	1,305	100.0%



Municipality	Total GBS RCV	Estimated GBS RCV Exposed	Percent of Total	Total Number of Structures	Number of Structures in Hazard Area	Percent of Total
Auburn Borough	\$103,863,000	\$0	0.0%	654	0	0.0%
Barry Township	\$158,166,000	\$0	0.0%	1,424	6	0.4%
Blythe Township	\$116,013,000	\$110,091,000	94.9%	842	697	82.8%
Branch Township	\$267,249,000	\$267,153,000	100.0%	1,434	1,429	99.7%
Butler Township	\$678,513,000	\$160,932,000	23.7%	3,520	446	12.7%
Cass Township	\$214,671,000	\$214,671,000	100.0%	1,786	1,786	100.0%
Coaldale Borough	\$486,727,000	\$486,727,000	100.0%	1,204	1,204	100.0%
Cressona Borough	\$953,030,000	\$0	0.0%	1,062	0	0.0%
Deer Lake Borough	\$99,765,000	\$0	0.0%	450	0	0.0%
Delano Township	\$83,326,000	\$71,623,000	86.0%	351	337	96.0%
East Brunswick Township	\$324,669,000	\$0	0.0%	2,201	0	0.0%
East Norwegian Township	\$143,736,000	\$143,736,000	100.0%	817	817	100.0%
East Union Township	\$204,679,000	\$38,509,000	18.8%	1,650	199	12.1%
Eldred Township	\$121,735,000	\$0	0.0%	1,266	0	0.0%
Foster Township	\$38,321,000	\$37,414,000	97.6%	318	308	96.9%
Frackville Borough	\$752,136,000	\$34,428,000	4.6%	2,170	134	6.2%
Frailey Township	\$53,438,000	\$53,396,000	99.9%	450	450	100.0%
Gilberton Borough	\$128,081,000	\$127,631,000	99.6%	589	589	100.0%
Girardville Borough	\$222,078,000	\$222,078,000	100.0%	663	663	100.0%
Gordon Borough	\$100,774,000	\$0	0.0%	532	0	0.0%
Hegins Township	\$685,956,000	\$27,013,000	3.9%	4,433	463	10.4%
Hubley Township	\$105,069,000	\$0	0.0%	1,574	0	0.0%
Kline Township	\$240,993,000	\$108,286,000	44.9%	1,184	454	38.3%
Landingville Borough	\$27,592,000	\$0	0.0%	168	0	0.0%
Mahanoy City Borough	\$659,011,000	\$659,011,000	100.0%	904	904	100.0%
Mahanoy Township	\$184,548,000	\$184,548,000	100.0%	1,079	1,071	99.3%
Mcadoo Borough	\$319,053,000	\$182,357,000	57.2%	1,262	569	45.1%
Mechanicsville Borough	\$59,144,000	\$59,144,000	100.0%	297	297	100.0%
Middleport Borough	\$60,507,000	\$60,507,000	100.0%	304	304	100.0%
Minersville Borough	\$740,701,000	\$740,701,000	100.0%	1,705	1,705	100.0%
Mount Carbon Borough	\$17,094,000	\$0	0.0%	65	0	0.0%
New Castle Township	\$74,575,000	\$74,575,000	100.0%	337	335	99.4%
New Philadelphia Borough	\$162,575,000	\$162,575,000	100.0%	609	609	100.0%
New Ringgold Borough	\$37,501,000	\$0	0.0%	267	0	0.0%
North Manheim Township	\$729,771,000	\$0	0.0%	3,235	2	0.1%
North Union Township	\$263,112,000	\$0	0.0%	1,571	16	1.0%
Norwegian Township	\$504,898,000	\$500,604,000	99.1%	1,569	1,538	98.0%



Municipality	Total GBS RCV	Estimated GBS RCV Exposed	Percent of Total	Total Number of Structures	Number of Structures in Hazard Area	Percent of Total
Orwigsburg Borough	\$650,863,000	\$0	0.0%	1,611	0	0.0%
Palo Alto Borough	\$166,890,000	\$166,890,000	100.0%	590	589	99.8%
Pine Grove Borough	\$488,857,000	\$0	0.0%	1,278	0	0.0%
Pine Grove Township	\$572,921,000	\$0	0.0%	4,729	0	0.0%
Port Carbon Borough	\$248,182,000	\$248,182,000	100.0%	1,040	1,040	100.0%
Port Clinton Borough	\$53,248,000	\$0	0.0%	251	0	0.0%
Porter Township	\$322,132,000	\$24,402,000	7.6%	2,522	279	11.1%
Pottsville City	\$2,835,912,000	\$2,774,281,000	97.8%	5,667	5,398	95.3%
Reilly Township	\$87,148,000	\$87,148,000	100.0%	615	615	100.0%
Ringtown Borough	\$196,315,000	\$0	0.0%	591	0	0.0%
Rush Township	\$638,207,000	\$488,000	0.1%	3,358	37	1.1%
Ryan Township	\$258,861,000	\$35,517,000	13.7%	1,552	75	4.8%
Schuykill Haven Borough	\$1,167,905,000	\$0	0.0%	2,672	0	0.0%
Schuykill Township	\$148,930,000	\$148,480,000	99.7%	909	893	98.2%
Shenandoah Borough	\$1,114,064,000	\$1,114,064,000	100.0%	1,652	1,652	100.0%
South Manheim Township	\$472,442,000	\$0	0.0%	2,543	0	0.0%
St. Clair Borough	\$641,674,000	\$641,674,000	100.0%	1,571	1,571	100.0%
Tamaqua Borough	\$1,146,438,000	\$1,138,702,000	99.3%	3,027	2,765	91.3%
Tower City Borough	\$275,734,000	\$0	0.0%	952	0	0.0%
Tremont Borough	\$261,136,000	\$261,136,000	100.0%	954	954	100.0%
Tremont Township	\$59,522,000	\$52,666,000	88.5%	372	162	43.5%
Union Township	\$141,163,000	\$2,184,000	1.5%	1,590	13	0.8%
Upper Mahantongo Township	\$134,904,000	\$0	0.0%	1,203	0	0.0%
Walker Township	\$129,306,000	\$29,424,000	22.8%	1,399	86	6.1%
Washington Township	\$378,935,000	\$0	0.0%	3,784	0	0.0%
Wayne Township	\$884,718,000	\$0	0.0%	5,373	0	0.0%
West Brunswick Township	\$656,084,000	\$0	0.0%	3,297	0	0.0%
West Mahanoy Township	\$586,962,000	\$453,920,000	77.3%	2,208	1,633	74.0%
West Penn Township	\$552,845,000	\$0	0.0%	5,677	0	0.0%
Schuykill County	\$26,016,081,000	\$12,527,581,000	48.2%	108,238	36,399	34.20%

Source: HAZUS-MH v4.0; Schuykill County; Pennsylvania Bureau of Topographic and Geologic Survey 2001

Notes:

GBS General Building Stock
RCV Replacement cost value

Impact on Critical Facilities

Table 4.3.7-6 summarizes the number of critical facilities that are located on anthracite coal fields. Many of the exposed facilities are the locations for vulnerable populations (schools) and responding agencies to events (fire and police). In addition to impacting buildings and facilities, subsidence can severely impact roads and infrastructure. Portions of



Interstate I-81, US Route US-209, and multiple State Routes, including PA-25, PA-54, PA-61, PA-125, PA-309, PA-339, PA-901, and PA-924 run above anthracite coal fields. The following summarizes potential impacts to critical infrastructure.

- **Roads**—Access to major roads after a disaster is crucial to safety and to response operations. Depending upon the size, events can block egress and ingress on roads, causing isolation for residents and potentially neighborhoods, traffic problems and delays for transportation. This can result in economic losses for businesses.
- **Bridges**—Mass movements can knock out bridge abutments or significantly weaken the soil supporting them, making them hazardous for use.
- **Power Lines**—A subsidence event could trigger failure of the soil underneath a tower, causing it to collapse and ripping down the lines. Power and communication failures can create problems for vulnerable populations and businesses.

Table 4.3.7-6. Number of Critical Facilities Located on Anthracite Coal Fields in Schuylkill County

Municipality	Airport	Bridge	Children/Youth Services	Communication	Correctional Facility	County Building	Dam	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Gas	Hazmat	Hospital	Hydrant	Mental Health	Nursing Home	Police	Polling	Potable Water Treatment	School	Senior	Wastewater Treatment
Ashland Borough	0	3	0	0	0	0	0	0	1	1	1	3	0	4	0	0	0	0	1	5	0	0	0	1
Auburn Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barry Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blythe Township	0	5	1	0	0	0	2	0	0	0	1	2	0	2	0	0	0	0	1	2	1	0	0	0
Branch Township	0	5	0	0	0	0	0	0	2	0	1	2	0	5	0	0	1	0	2	1	0	1	0	2
Butler Township	0	11	0	0	1	0	0	0	0	0	0	0	0	4	0	9	0	0	0	0	0	0	0	0
Cass Township	0	6	0	0	0	0	5	0	1	0	1	3	0	3	0	0	1	0	1	3	2	1	0	0
Coaldale Borough	0	0	0	0	0	0	0	2	0	0	1	1	0	2	1	0	0	0	1	3	0	0	0	1
Cressona Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deer Lake Borough	0	11	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0
Delano Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Brunswick Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Norwegian Township	0	3	0	0	0	0	0	0	1	0	1	2	0	7	0	0	0	1	0	2	0	0	0	1
East Union Township	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0	56	0	0	0	0	1	0	0	0
Eldred Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Foster Township	1	3	0	0	0	0	0	1	0	0	1	1	0	5	0	0	0	0	1	1	0	1	0	0
Frackville Borough	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Frailey Township	0	13	0	0	0	0	0	0	0	0	1	1	0	3	0	0	0	0	0	1	0	0	0	0

Municipality	Airport	Bridge	Children/Youth Services	Communication	Correctional Facility	County Building	Dam	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Gas	Hazmat	Hospital	Hydrant	Mental Health	Nursing Home	Police	Polling	Potable Water Treatment	School	Senior	Wastewater Treatment
Gilberton Borough	0	5	0	0	0	0	0	0	0	0	1	2	0	2	0	0	0	0	1	2	0	0	0	0
Girardville Borough	0	7	0	0	0	0	0	2	0	1	1	2	0	1	0	30	0	0	1	4	0	0	0	0
Gordon Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hegins Township	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hubley Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kline Township	0	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	0	0	0	0
Landingville Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mahanoy City Borough	0	5	0	0	0	0	0	1	2	1	1	5	0	2	0	0	1	0	1	7	0	1	0	0
Mahanoy Township	0	12	0	0	1	0	8	0	0	0	1	0	0	7	0	0	1	1	1	2	1	2	0	1
Mcadoo Borough	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	1	1	1	0	1	1	0
Mechanicsville Borough	0	0	0	0	0	0	0	1	3	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
Middleport Borough	0	4	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0
Minersville Borough	0	1	0	0	0	0	0	3	3	1	1	4	0	2	0	0	0	0	1	4	0	3	0	0
Mount Carbon Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Castle Township	0	4	0	0	0	0	3	0	0	0	1	0	0	3	0	0	0	0	1	1	2	1	0	0
New Philadelphia Borough	0	4	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	1	1	0	1	0	0
New Ringgold Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Manheim Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Union Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0
Norwegian Township	0	0	2	1	0	0	1	1	0	0	1	2	0	6	0	0	2	1	0	2	0	1	0	0



Municipality	Airport	Bridge	Children/Youth Services	Communication	Correctional Facility	County Building	Dam	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Gas	Hazmat	Hospital	Hydrant	Mental Health	Nursing Home	Police	Polling	Potable Water Treatment	School	Senior	Wastewater Treatment
Orwigsburg Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Palo Alto Borough	0	2	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	1	2	0	0	0	0
Pine Grove Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pine Grove Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Port Carbon Borough	0	7	0	0	0	0	0	1	0	0	1	1	0	1	0	0	0	0	1	2	0	1	0	0
Port Clinton Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Porter Township	0	1	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0
Pottsville City	0	6	9	1	1	6	0	5	15	1	2	10	0	4	4	0	19	3	3	21	0	9	2	0
Reilly Township	0	2	0	0	0	0	0	0	0	0	1	2	0	0	2	0	0	0	0	1	0	0	0	0
Ringtown Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rush Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ryan Township	0	8	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schuylkill Haven Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schuylkill Township	0	5	0	1	0	0	0	0	1	0	1	3	0	2	0	0	0	0	1	2	1	0	0	0
Shenandoah Borough	0	3	0	0	0	0	0	2	2	1	1	6	0	3	0	0	1	1	1	11	0	3	1	0
South Manheim Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
St. Clair Borough	0	10	0	0	0	0	0	2	1	1	1	6	0	1	1	0	1	0	1	5	0	1	0	0
Tamaqua Borough	0	11	0	0	0	0	0	7	7	1	1	6	0	7	0	0	3	0	1	6	0	3	0	0
Tower City Borough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tremont Borough	0	9	0	0	0	0	0	0	3	1	1	2	0	1	0	0	0	0	1	1	1	0	0	0



Municipality	Airport	Bridge	Children/Youth Services	Communication	Correctional Facility	County Building	Dam	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Gas	Hazmat	Hospital	Hydrant	Mental Health	Nursing Home	Police	Polling	Potable Water Treatment	School	Senior	Wastewater Treatment	
Tremont Township	0	5	0	0	0	0	0	3	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	1
Union Township	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Upper Mahantongo Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walker Township	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
Washington Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wayne Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
West Brunswick Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
West Mahanoy Township	0	5	0	1	0	0	2	1	3	1	1	1	0	7	0	0	1	2	1	4	1	0	0	0	1
West Penn Township	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schuylkill County	1	187	12	4	4	6	22	32	47	11	32	75	1	96	8	101	31	11	27	102	9	31	4	8	

Source: Pennsylvania Bureau of Topographic and Geologic Survey 2001; Schuylkill County 2018

Notes:

EOC = Emergency Operations Center

EMS = Emergency Medical Services

Impact on the Economy

It is not possible to estimate potential future economic losses caused by mine subsidence events at this time. Economic losses include the damage and cost to repair or replace the buildings and infrastructure damaged/lost as a result of an event.

As evidenced by the October 2017 sinkhole event that shut down a section of SR-125, recovery from these events can be costly. This sinkhole was approximately 25 feet deep and 25 feet wide. The cost to repair was approximately \$580,000 (Young 2018).

Impact on the Environment

Mining activities and acid mine drainage can contaminate surface and groundwater, create acid mine drainage, cause changes in water temperature and damage to streams, lakes, ponds, estuaries, and wetland ecosystems. The earth movement from subsidence can disrupt aquifers and reduce or eliminate water sources (Commonwealth of Pennsylvania HMP 2018).

Future Growth and Development

Areas targeted for potential future growth and development in the next 5 years have been identified across the County at the municipal level. It is anticipated that any new development and new residents above coal fields will be exposed to the hazard. In the County's subdivision ordinance, which governs the subdivision for approximately 50-percent of the municipalities, the Planning Commission has the ability to request a subsurface coal report. For the municipal reviews of subdivisions for the other 50-percent of the municipalities in the County, if the area is within the coal fields the following statement is provided as a result of County review:

The Schuylkill County Hazard Mitigation Plan, which was adopted by your municipality via resolution, established a strategy to reduce the impact of hazards throughout the county. Mine Subsidence has been identified in the Hazard Mitigation Plan as a hazard. It appears that the proposed development is located within the anthracite fields of the county. Consider informing the applicant that the proposed development may be located within in an area at risk for mine subsidence. They can be referred to PA Department of Environmental Protection's Mine Subsidence website at <http://www.dep.state.pa.us/MSIHomeowners/> for more information on determining risk and mine subsidence insurance.

Effect of Climate Change on Vulnerability

According to the PA DEP's Technical Guide to Mine Subsidence, underground mine openings can allow surface water and groundwater to infiltrate into the mine. If the mines are excavated below the water table, the mine voids serve as low-pressure sinks inducing groundwater to move to the openings from the surrounding saturated rock (PADEP, Date Unknown). Surface subsidence over underground mines can be caused by internal soil erosion if there is an easily erodible unit overlying the mine void, an adequate source of water that has access to the erodible material positioned so that flow can occur, and a conduit or channel way that allows the hydraulic transport of erodible material into the mine reservoir (Prakash et al. 2010). More frequent and severe rainfall events, as is predicted for the region, will alter the hydrologic conditions and stability of the soil through increased erosion and changes in soil saturation. With the changes to the soil dynamics, risk to surface collapse can increase due to changes in hydrostatic pressure between the mine void and surface or loss of soil strength from saturation (Prakash et al. 2010).

The potential effects of climate change on the Schuylkill County's vulnerability to mine subsidence events need to be considered as a greater understanding of regional climate change impacts develop.

Additional Data and Next Steps

While it is not possible to predict when and where the next event may take place, the Schuylkill County emergency services, including local fire and police departments, are well-equipped and prepared to respond to emergencies as they arise. In addition, mine subsidence insurance is available but not many residents may be aware of its availability. Increased public awareness of insurance options may also be considered. The status of mine subsidence risk in Schuylkill County will continue to be monitored and ongoing and new mitigation efforts will continue to be developed.

4.3.8 NUCLEAR INCIDENTS

PROFILE

Nuclear hazards and incidents generally refer to incidents involving (1) a release of significant levels of radioactive materials or (2) exposure of workers or the general public to radiation. Primary concerns following a nuclear incident or accident are the impact on public health from direct exposure to a radioactive plume; inhalation of radioactive materials; ingestion of contaminated food, water, and milk; and long-term exposure to deposited radioactive materials in the environment that may lead to either acute (radiation sickness or death) or chronic (cancer) health effects.

The nuclear industry has adopted pre-determined, site-specific Emergency Action Levels (EAL). The EALs provide the framework and guidance for observing, addressing, and classifying the severity of site-specific incidents and conditions that are communicated to off-site emergency response organizations (Nuclear Regulatory Commission [NRC] 2008). Additional EALs specifically deal with issues of security, such as threats of airborne attack, hostile action within the facility, or attack on the facility. These EALs ensure that appropriate notifications of a security threat will occur in a timely manner.

The NRC encourages the use of Probabilistic Risk Assessments (PRA) to estimate quantitatively the potential risk to public health and safety considering the design, operations, and maintenance practices at nuclear power plants. PRAs typically focus on accidents that can severely damage the core and that may challenge containment. The FEMA, PEMA, and county governments have formulated Radiological Emergency Response Plans to prepare for radiological emergencies at the five nuclear power-generating facilities in the Commonwealth of Pennsylvania. These plans include a Plume Exposure Pathway Emergency Planning Zone (EPZ) (an area with a radius of 10 miles from each nuclear power facility), and an Ingestion Exposure Pathway EPZ (an area with a radius of 50 miles from each facility).

Location and Extent

There are five nuclear power generation stations located in the Commonwealth; however, none are located within Schuylkill County limits. The County is located wholly within the 50-mile Ingestion Exposure Pathway EPZ of the Susquehanna Steam Electric Station located in Luzerne County, and portions of the County are located within the Three Mile Island and Limerick Generating Station EPZ located in Dauphin and Montgomery Counties, respectively. Should an accident occur at any of these facilities, the area within the Ingestion Exposure Pathway EPZ could receive some radioactive contamination. Figure 4.3.8-1 provides visual representation of where Schuylkill County falls in the Plume Exposure Pathway EPZ and Ingestion Exposure Pathway EPZ of nuclear power plants.

Figure 4.3.8-1. Schuykill County Jurisdictions in the 50-Mile Ingestion Exposure Pathway Zone

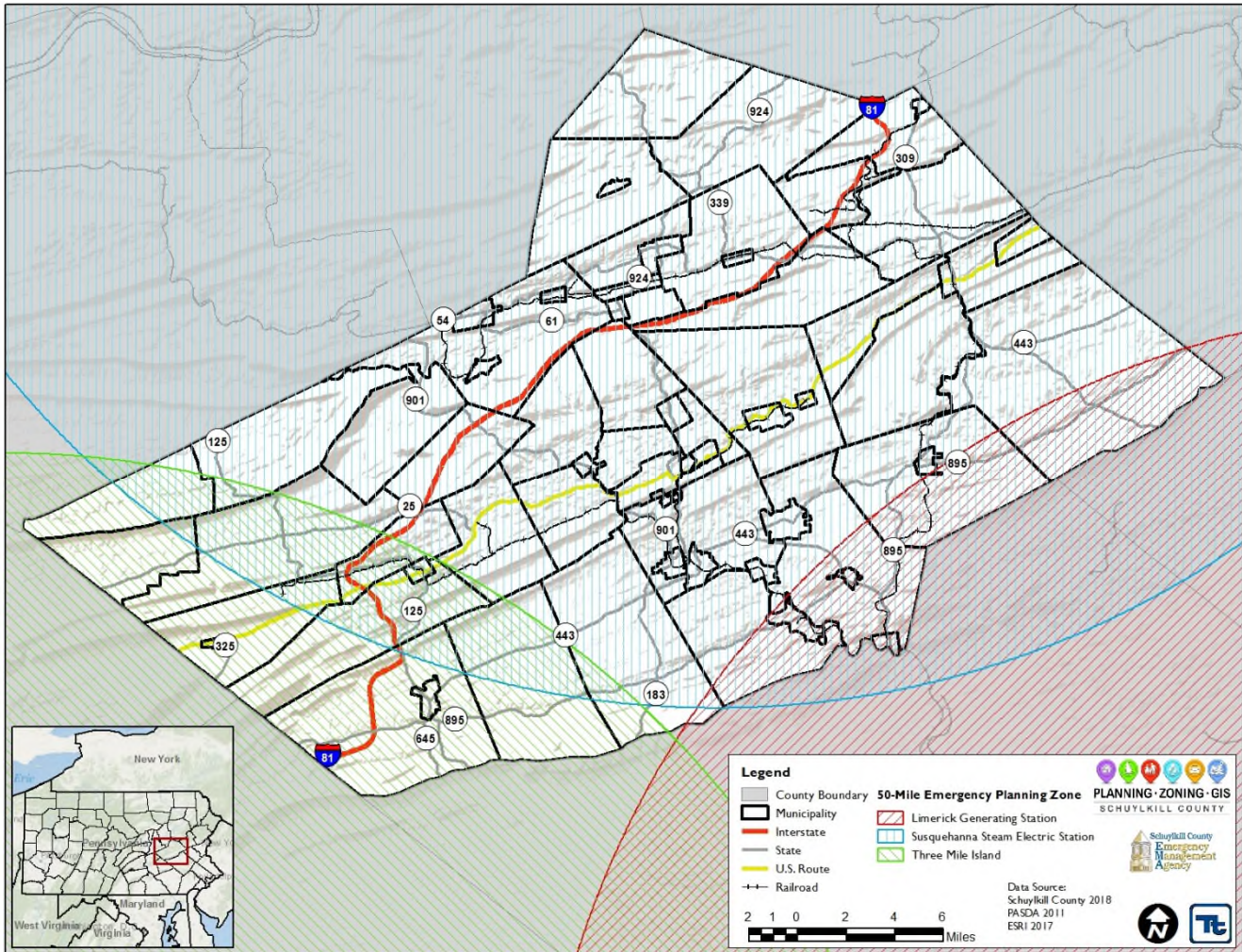


Table 4.3.8-1 lists the jurisdictions in Schuykill County that are located within the 50-mile EPZs for Susquehanna Steam Electric Station, Three Mile Island Nuclear Generating Station and Limerick Generating Station.

4.3.8-1. Schuykill County Jurisdictions in the 50-Mile Ingestion Exposure Pathway Emergency Planning Zones

Municipality	50-Mile Ingestion Exposure Pathway Zone – Susquehanna Steam Electric Station	50-Mile Ingestion Exposure Pathway Zone – Three Mile Island Nuclear Generating Station	50-Mile Ingestion Exposure Pathway Zone – Limerick Generating Station
Ashland Borough	Yes	No	No
Auburn Borough	Yes	No	Yes
Barry Township	Yes	No	No
Blythe Township	Yes	No	No
Branch Township	Yes	No	No
Butler Township	Yes	No	No
Cass Township	Yes	No	No

Municipality	50-Mile Ingestion Exposure Pathway Zone – Susquehanna Steam Electric Station	50-Mile Ingestion Exposure Pathway Zone – Three Mile Island Nuclear Generating Station	50-Mile Ingestion Exposure Pathway Zone – Limerick Generating Station
Coaldale Borough	Yes	No	No
Cressona Borough	Yes	No	No
Deer Lake Borough	Yes	No	Yes
Delano Township	Yes	No	No
East Brunswick Township	Yes	No	Yes
East Norwegian Township	Yes	No	No
East Union Township	Yes	No	No
Eldred Township	Yes	Yes	No
Foster Township	Yes	No	No
Frackville Borough	Yes	No	No
Frailey Township	Yes	Yes	No
Gilberton Borough	Yes	No	No
Girardville Borough	Yes	No	No
Gordon Borough	Yes	No	No
Hegins Township	Yes	Yes	No
Hubley Township	Yes	Yes	No
Kline Township	Yes	No	No
Landingville Borough	Yes	No	No
Mahanoy City Borough	Yes	No	No
Mahanoy Township	Yes	No	No
McAdoo Borough	Yes	No	No
Mechanicsville Borough	Yes	No	No
Middleport Borough	Yes	No	No
Minersville Borough	Yes	No	No
Mount Carbon Borough	Yes	No	No
New Castle Township	Yes	No	No
New Philadelphia Borough	Yes	No	No
New Ringgold Borough	Yes	No	Yes
North Manheim Township	Yes	No	No
North Union Township	Yes	No	No
Norwegian Township	Yes	No	No
Orwigsburg Borough	Yes	No	No
Palo Alto Borough	Yes	No	No
Pine Grove Borough	No	Yes	No
Pine Grove Township	Yes	Yes	No
Port Carbon Borough	Yes	No	No
Port Clinton Borough	Yes	No	Yes
Porter Township	Yes	Yes	No

Municipality	50-Mile Ingestion Exposure Pathway Zone – Susquehanna Steam Electric Station	50-Mile Ingestion Exposure Pathway Zone – Three Mile Island Nuclear Generating Station	50-Mile Ingestion Exposure Pathway Zone – Limerick Generating Station
Pottsville City	Yes	No	No
Reilly Township	Yes	Yes	No
Ringtown Borough	Yes	No	No
Rush Township	Yes	No	No
Ryan Township	Yes	No	No
Saint Clair Borough	Yes	No	No
Schuylkill Haven Borough	Yes	No	No
Schuylkill Township	Yes	No	No
Shenandoah Borough	Yes	No	No
South Manheim Township	Yes	No	Yes
Tamaqua Borough	Yes	No	No
Tower City Borough	No	Yes	No
Tremont Borough	Yes	Yes	No
Tremont Township	Yes	Yes	No
Union Township	Yes	No	No
Upper Mahantongo Township	Yes	Yes	No
Walker Township	Yes	No	No
Washington Township	Yes	Yes	No
Wayne Township	Yes	Yes	Yes
West Brunswick Township	Yes	No	Yes
West Mahanoy Township	Yes	No	No
West Penn Township	Yes	No	Yes

The U.S. Department of Energy transports used nuclear fuel to the repository by rail and road, inside sealed containers. The used fuel may be shipped along specified highway routes. Rail is used to transport nuclear waste as well (Nuclear Energy Institute 2016). There is the potential for fuel rods to be transported through Schuylkill County and a hazardous materials in-transit threat.

Range of Magnitude

The Plume Exposure Pathway EPZ refers to whole-body external exposure to radiation from a radioactive plume and from deposited materials and inhalation exposure from the passing radioactive plume. The duration of primary exposures could range in length from hours to days. The 10-mile Plume Exposure Pathway EPZ does not reach Schuylkill County for any of the nearby nuclear facilities. Additionally, the area outside of the 10-mile EPZ is unimproved land with no population.

The 50-mile Ingestion Exposure Pathway EPZ refers to exposure primarily from ingestion of water or foods such as milk and fresh vegetables that have been contaminated with radiation. This kind of exposure can stem from any of the three categories of nuclear accidents described below. The 50-mile Ingestion EPZs include nearly all of Schuylkill County for

the Susquehanna Steam Electric Station, and portions of Schuylkill County for Three Mile Island Nuclear Generating Station and Limerick Generating Station (refer to Figure 4.3.8-1 and Table 4.3.8-1).

Nuclear facility accidents are classified into three categories, and exposure to radiation can stem from any of the three:

- Criticality accidents: Involves loss of control of nuclear assemblies or power reactors.
- Loss-of-coolant accidents: Occurs whenever a reactor coolant system experiences a break or opening large enough so that the coolant inventory in the system cannot be maintained by the normally operating make-up system.
- Loss-of-containment accidents: Involves the release of radioactivity from materials such as tritium; fission products; plutonium; and natural, depleted, or enriched uranium. Points of release have been containment vessels at fixed facilities or damaged packages during transportation accidents.

In accordance with regulations specified by FEMA and NRC, each facility is required to notify jurisdictional agencies of an incident or occurrence within that facility. The NRC uses four classification levels for nuclear incidents (NRC 2008). The PEMA and facility owners with whom PEMA coordinates use the following notification levels based on an internal trigger:

- Unusual Event: Incidents are occurring or have occurred that indicate potential degradation in the level of safety of the plant. No release of radioactive material requiring off-site response or monitoring is expected unless further degradation occurs.
- Alert: Incidents are in process or have occurred that involve actual or potential substantial degradation in the level of safety of the plant. Any releases of radioactive material from the plant are expected to be limited to a small fraction of the U.S. Environmental Protection Agency (EPA) Protective Action Guides (PAG).
- Site Area Emergency: Incidents are in process or have occurred that resulted in actual or likely major failures of plant functions needed for protection of the public. Any releases of radioactive material are not expected to exceed EPA PAGs except near the site boundary.
- General Emergency: Incidents are in process or have occurred that have caused actual or imminent substantial core damage or melting of reactor fuel with potential for loss of containment integrity. Radioactive releases during a general emergency can reasonably be expected to exceed the EPA PAGs over more than the immediate site area.

After a nuclear incident, the primary concern is the effect on the health of the population near the incident. The duration of primary exposure could range in length from hours to months depending on the proximity to the point of radioactive release. External radiation and inhalation and ingestion of radioactive isotopes can cause acute health effects (e.g. death, severe health impairment), chronic health effects (e.g. cancers) and psychological effects.

Potential environmental impacts specific to the 50-mile Ingestion Exposure Pathway EPZ, and therefore of most concern to Schuylkill County, include the long-term effects of radioactive contamination in the environment and in agricultural products. Schuylkill County can expect some radioactive contamination in very small amounts in the case of a nuclear incident. This is not a significant concern in terms of external exposure and immediate health risks, but even a small amount of radiation will require the protection of the food chain, particularly milk supplies. Small amounts of radiation ingested over time could lead to future health issues. As a result, in the case of a nuclear incident, foodstuffs, crops, milk, livestock feed and forage, and farm water supplies will need to be protected from and tested for contamination. Additionally, spills and releases of radiologically active materials from accidents can result in the contamination of soil and public water supplies.

The worst-case scenario nuclear incidents for Schuylkill County would be if a General Emergency occurred at Susquehanna Steam Electric Station that leaked sufficient radiation to create longer-term damage in the form of contaminated water, soil, and food supplies in the county.

Schuylkill County updates their radiation plan annually, tests it biannually for both Three Mile Island and Susquehanna Steam Electric Station, and participates in an ingestion tabletop exercise every six years.

Past Occurrence

Pennsylvania is home to the only recorded nuclear emergency in the United States. In 1979, the Three Mile Island Nuclear Generating Station declared a general emergency following an internal system failure. Repercussions from this event were swift, with sweeping changes to NRC oversight that included assignment of responsibility to FEMA for outside support. Growth in the nuclear power industry immediately slowed, with the number of facilities decreasing over the next decade. In addition, public confidence in the nuclear industry decreased considerably.

While reports show conflicting information regarding medical impacts on the residential population following the disaster, costs of the cleanup phase of this incident exceeded \$1 billion. No FEMA disaster declarations have since occurred regarding nuclear emergencies in Pennsylvania.

Future Occurrence

Pennsylvania is home to the only nuclear power plant General Emergency in the nation. Since the Three Mile Island incident, nuclear power has become significantly safer and is one of the most heavily regulated industries in the nation. Despite the knowledge gained since then, there is still the potential for a similar accident to occur again at one of the five nuclear generating facilities in the Commonwealth. The Nuclear Energy Agency of the Organization for Economic Co-Operation and Development notes that studies estimate the chance of protective barriers failing in a modern nuclear facility at less than one in 100,000 per year (Schuylkill County HMP 2013).

Across the United States, a number of *Unusual Event* and *Alert* classification level events occur each year at the 100+ nuclear facilities that warrant notification of local emergency managers. Of these, *Alert* emergencies occur less frequently. For example, in 1997, there were forty notifications of *Unusual Events* and three *Alert* events nationwide. Based on historical events, *Site Area Emergency* and *General Emergency* incidents are very rare. Based on available historical data and the lack of nuclear incident events impacting Schuylkill County, the future occurrence of nuclear incident events can be considered *unlikely* as defined by the Risk Factor Methodology probability criteria (refer to Section 4.4).

VULNERABILITY ASSESSMENT

Effects from a radiological incident at a fixed facility would vary depending on the product released (type of radiation), amount of radiation released, current weather conditions and time of day. The priority following an incident at any of the facilities within the Commonwealth of Pennsylvania is the life and safety of all individuals within the area impacted. Secondary to health and safety would be effects on critical infrastructure, environment, property, and the economy.

Contamination of agriculture, livestock, and production can lead to loss of commerce with other regions of the State, country, and even the world. Recently, many countries halted imports of products from Japan for fear of contamination following the tsunami-related nuclear incident at the Fukushima Power Plant. This loss in revenue compounded losses that Japan and its region were already encountering following the initial disaster.

Impacts within the affected area can include loss of utility service, contamination of local crops and livestock, loss of residential property due to measurable quantities of nuclear materials, and increased risk to health and wellbeing of individuals within the area.

As stated above, none of the municipalities are in the 10-mile Plume Exposure Pathway. All municipalities have a portion of their community located within the 50-mile Ingestion Pathway EPZ of the Susquehanna Steam Electric Station except Pine Grove Borough and Tower City Borough. Additionally, the location of Three Mile Island Generating Station and Limerick Generating Station place some municipalities within two or three Ingestion Pathway EPZs. The municipalities located within an EPZ are more vulnerable to the contamination effects of nuclear incidents. The number of structures and critical facilities within the 50-mile EPZ of each power plant is displayed in Table 4.3.8-2.

Table 4.3.8-2. Structures and Critical Facilities within the 50-mile EPZ

Municipality	Building Count in 50-mile EPZ of Susquehanna Steam Electric Station	Total Critical Facilities in 50-mile EPZ of Susquehanna Steam Electric Station	Building Count in 50-mile EPZ of Three Mile Island Nuclear Generating Station	Total Critical Facilities in 50-mile EPZ of Three Mile Island Nuclear Generating Station	Building Count in 50-mile EPZ of Limerick Generating Station	Total Critical Facilities in 50-mile EPZ of Limerick Generating Station
Ashland Borough	1,305	20	0	0	0	0
Auburn Borough	654	7	0	0	654	7
Barry Township	1,424	13	0	0	0	0
Blythe Township	842	21	0	0	0	0
Branch Township	1,434	26	0	0	0	0
Butler Township	3,520	80	0	0	0	0
Cass Township	1,786	27	0	0	0	0
Coaldale Borough	1,204	12	0	0	0	0
Cressona Borough	1,062	16	0	0	0	0
Deer Lake Borough	450	9	0	0	450	9
Delano Township	351	14	0	0	0	0
East Brunswick Township	2,201	21	0	0	1,103	7
East Norwegian Township	817	18	0	0	0	0
East Union Township	1,650	124	0	0	0	0
Eldred Township	1,266	17	50	0	0	0
Foster Township	318	16	0	0	0	0
Frackville Borough	2,170	20	0	0	0	0
Frailey Township	450	19	414	15	0	0
Gilberton Borough	589	13	0	0	0	0
Girardville Borough	663	49	0	0	0	0
Gordon Borough	532	24	0	0	0	0
Hegins Township	3,784	38	4,140	44	0	0
Hubley Township	78	0	1,574	14	0	0
Kline Township	1,184	17	0	0	0	0
Landingville Borough	168	5	0	0	0	0
Mahanoy City Borough	904	27	0	0	0	0
Mahanoy Township	1,079	38	0	0	0	0

Municipality	Building Count in 50-mile EPZ of Susquehanna Steam Electric Station	Total Critical Facilities in 50-mile EPZ of Susquehanna Steam Electric Station	Building Count in 50-mile EPZ of Three Mile Island Nuclear Generating Station	Total Critical Facilities in 50-mile EPZ of Three Mile Island Nuclear Generating Station	Building Count in 50-mile EPZ of Limerick Generating Station	Total Critical Facilities in 50-mile EPZ of Limerick Generating Station
McAdoo Borough	1,262	11	0	0	0	0
Mechanicsville Borough	297	6	0	0	0	0
Middleport Borough	304	7	0	0	0	0
Minersville Borough	1,705	23	0	0	0	0
Mount Carbon Borough	65	3	0	0	0	0
New Castle Township	337	20	0	0	0	0
New Philadelphia Borough	609	10	0	0	0	0
New Ringgold Borough	267	5	0	0	0	0
North Manheim Township	3,235	52	0	0	0	0
North Union Township	1,571	66	0	0	0	0
Norwegian Township	1,569	20	0	0	0	0
Orwigsburg Borough	1,611	25	0	0	0	0
Palo Alto Borough	590	9	0	0	0	0
Pine Grove Borough	0	0	1,278	30	0	0
Pine Grove Township	306	4	4,729	48	0	0
Port Carbon Borough	1,040	15	0	0	0	0
Port Clinton Borough	251	7	0	0	251	7
Porter Township	304	4	2,522	21	0	0
Pottsville City	5,667	122	0	0	0	0
Reilly Township	615	8	4	0	0	0
Ringtown Borough	591	13	0	0	0	0
Rush Township	3,358	45	0	0	0	0
Ryan Township	1,552	30	0	0	0	0
Schuylkill Haven Borough	2,672	35	0	0	0	0
Schuylkill Township	909	17	0	0	0	0
Shenandoah Borough	1,652	36	0	0	0	0
South Manheim Township	2,543	15	0	0	365	6
St. Clair Borough	1,571	31	0	0	0	0
Tamaqua Borough	3,027	57	0	0	0	0
Tower City Borough	0	0	952	9	0	0
Tremont Borough	954	20	954	20	0	0
Tremont Township	330	24	372	24	0	0
Union Township	1,590	20	0	0	0	0
Upper Mahantongo Township	605	10	1,090	19	0	0
Walker Township	1,399	23	0	0	0	0
Washington Township	2,472	16	3,495	26	0	0
Wayne Township	5,008	31	779	5	0	0
West Brunswick Township	3,297	41	0	0	1,631	24

Municipality	Building Count in 50-mile EPZ of Susquehanna Steam Electric Station	Total Critical Facilities in 50-mile EPZ of Susquehanna Steam Electric Station	Building Count in 50-mile EPZ of Three Mile Island Nuclear Generating Station	Total Critical Facilities in 50-mile EPZ of Three Mile Island Nuclear Generating Station	Building Count in 50-mile EPZ of Limerick Generating Station	Total Critical Facilities in 50-mile EPZ of Limerick Generating Station
West Mahanoy Township	2,208	39	0	0	0	0
West Penn Township	5,677	36	0	0	2,192	13
Schuylkill County	94,905	1,647	22,353	275	6,646	73

Source: Schuylkill County 2018
 EPZ = Emergency Planning Zone

As stated earlier, the County’s primary vulnerability to nuclear incidents comes in the form of food, soil, and water contamination. Since every municipality is exposed to the 50-mile Ingestion Pathway EPZ for at least one nearby facility, the approximately 105,749 acres of total farmland in the County is vulnerable to radiological contamination from a nuclear incident (USDA, 2012). According to the 2012 USDA Census of Agriculture, the market value of all agricultural products of these farms totaled approximately \$165 million. Time of year also impacts the vulnerability and losses estimated for a nuclear incident; an incident that occurs during the prime growing and harvesting season will have a larger impact on the County.

It is important to note that the entire County, not just the areas in the EPZ may be impacted based on the flow of goods and services and where residents get their food supply. Water contamination is also a concern in nuclear incidents. Public water suppliers that operate in or provide water to the County, coupled with the County’s 3,581 domestic drinking water wells, are all vulnerable to the effects of a nuclear incident (PADCNR).

4.3.9 RADON EXPOSURE

PROFILE

Radon is a natural gas that cannot be seen, smelled, or tasted. It is a noble gas that originates from 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) (EPA 402-R-03-003: EPA Assessment), radon is estimated to cause approximately 21,000 lung cancer deaths per year, second only to smoking as the leading cause of lung cancer (EPA 2013). An estimated 40 percent of the homes in Pennsylvania are believed to have elevated radon levels (PEMA 2013).

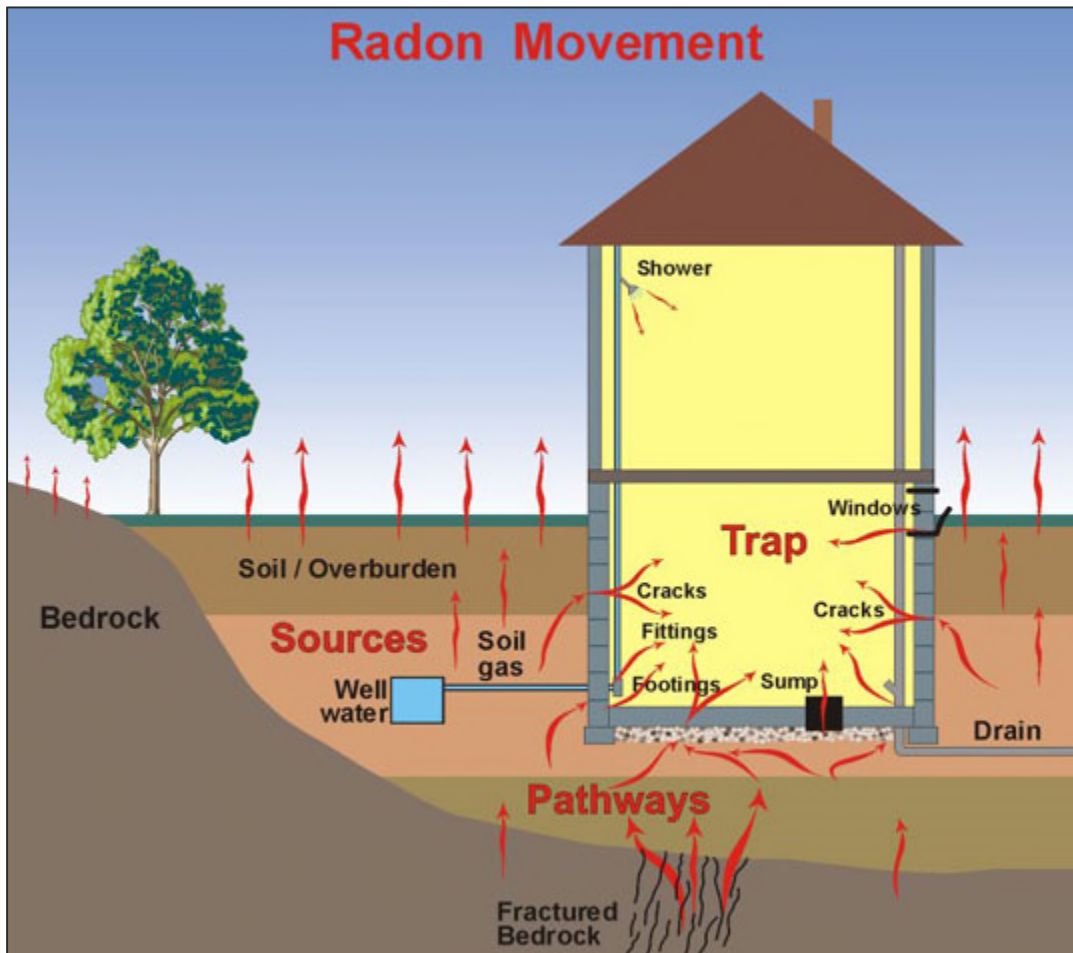
Location and Extent

Radioactivity caused by airborne radon has been recognized for many years as an important component in the natural background radioactivity exposure of humans. Not until the 1980s were the wide geographic distribution of elevated radon levels in houses and the possibility of extremely high radon concentrations in houses recognized. In 1984, routine monitoring of employees leaving the Limerick nuclear power plant near Reading, Pennsylvania, showed that readings from one employee frequently exceeded expected radiation levels, yet only natural, nonfission-product radioactivity was detected on him. Radon levels in his home were detected around 2,500 picoCuries per liter (pCi/L), much higher than the 4 pCi/L guideline set by EPA or even the 67 pCi/L limit for uranium miners. As a result of this event, the Reading Prong section, a physiographic province of Pennsylvania, where this person lived became the focus of the first large-scale radon scare in the world (PEMA 2013).

Radon (Rn-222), which has a half-life of 3.8 days, is a widespread hazard. The distribution of radon correlates with the distribution of radium (Ra-226), its immediate radioactive parent, and with uranium, its original ancestor. 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 2013). Figure 4.3.9-1 illustrates radon entry points into a home. Three sources of radon in houses are now recognized:

- Radon in soil air that flows into the house
- Radon dissolved in water from private wells and exsolved during water usage (This source is rarely a problem in Pennsylvania.)
- Radon emanating from uranium-rich building materials, such as concrete blocks or gypsum wallboard (This source also is not known to be a problem in Pennsylvania) (PEMA 2013).

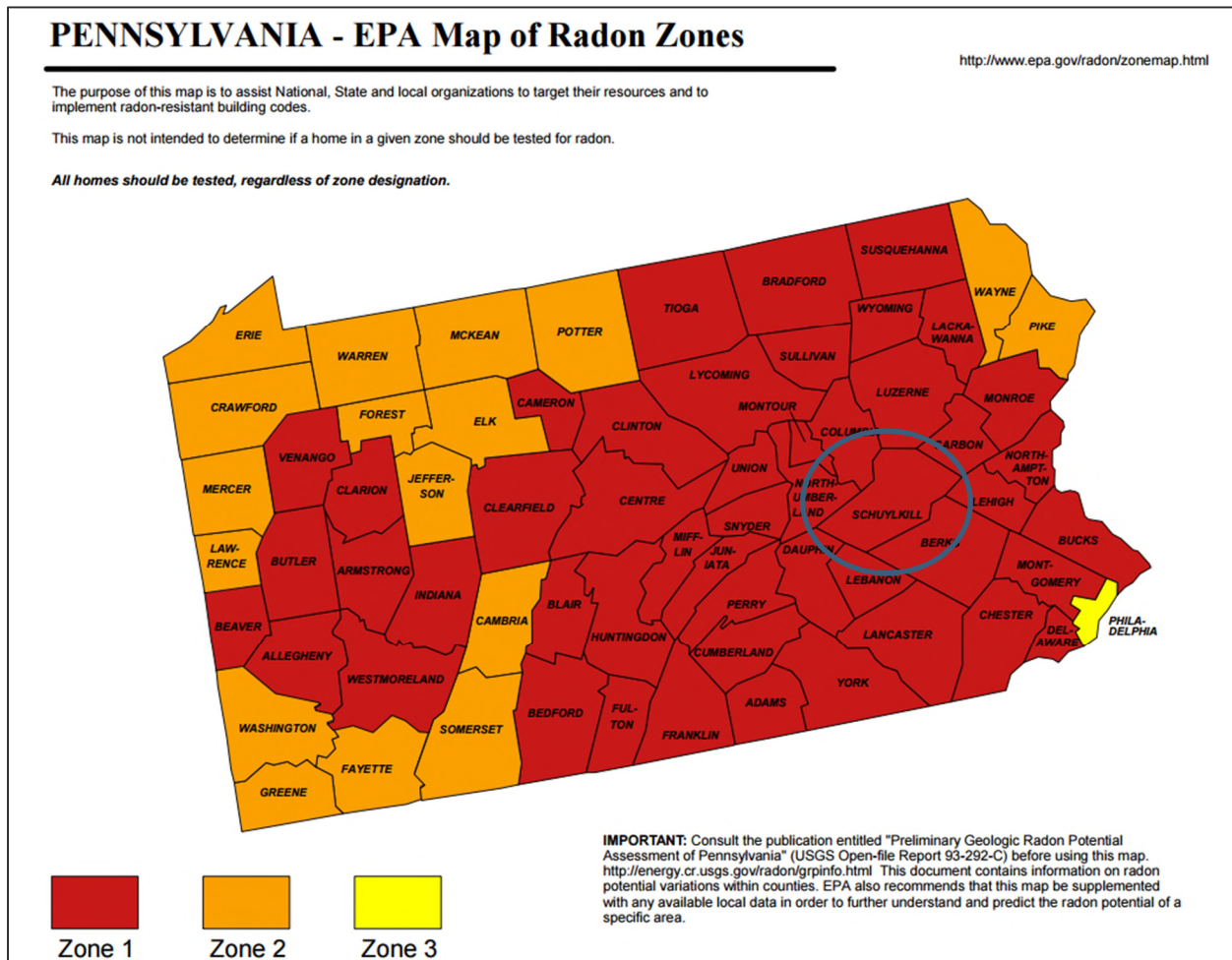
Figure 4.3.9-1. Sketch of Radon Entry Points into a House



Sources: Arizona State Geological Survey 2012

Each county in Pennsylvania is classified as having a low (Zone 3), moderate (Zone 2), or high (Zone 1) radon hazard potential (Refer to Figure 4.3.9-2). A majority of counties across the Commonwealth, particularly counties in eastern Pennsylvania, have a high hazard potential. According to the EPA map of radon zones, Schuykill County is located in Zone 1 (counties with predicted average indoor radon screening levels greater than 4 pCi/L).

Figure 4.3.9-2. EPA Radon Zones in Pennsylvania



Source: EPA 2016

Note: Schuykill County is identified by a blue circle. The figure indicates that Schuykill County is located 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 air flow into and out of houses, plus the location of air inflow and the radon content of air in the surrounding soil, are key factors 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 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 through 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 2013).

Radon concentration in soil gas depends on a number of soil properties, the importance of which are 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 clearly tends to be higher in soils containing

higher levels of radium and uranium, especially if the radium occupies a site on or near the surface of a grain from which the radon can easily escape. The amount of pore space in the soil and its permeability for air flow, including cracks and channels, are important factors determining radon concentration in soil gas and its rate of flow into a house. Soil depth and moisture content, mineral host and form for radium, and other soil properties may also be important. Fractured zones may supply air having radon concentrations similar to those in deep soil for houses built on bedrock (PEMA 2013).

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

- Areas of very elevated uranium content (above 50 parts per million [ppm]) around uranium deposits and prospects: Although very high levels of radon can occur in these areas, 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 (5 to 50 ppm): In Pennsylvania, these rock types include granitic and felsic alkali igneous rocks and black shales. 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: This group is 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 for 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 exceedance of 4 pCi/L in 93 percent of a sample of houses built on limestone-dolomite soils near State College, Centre County, and 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 5 ppm (PEMA 2013).

Range of Magnitude

Exposure to radon 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 air and, thus far, no evidence indicates that children are at greater risk of lung cancer than adults. The main hazard is actually from the radon daughter products (polonium-218, lead-214, bismuth-214), which may become attached to lung tissue and induce lung cancer by their radioactive decay. Table 4.3.9-1 lists the following information for smokers and nonsmokers: (1) cancer risks from exposure to radon at various levels, (2) comparisons of lung cancer risks from radon exposure to comparable cancer risks from other hazards, and (3) action thresholds (PEMA 2013).

Table 4.3.9-1. Radon Risk for Smokers and Nonsmokers

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
1.3	About 2 people could get lung cancer	(Average indoor radon level)	Reducing radon levels below 2 pCi/L is difficult
0.4	-	(Average outdoor radon level)	
<p>Note: Risk may be lower for former smokers. * Lifetime risk of lung cancer deaths from U.S. Environmental Protection Agency (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.</p>			

Source: EPA 2016

The worst-case scenario for radon exposure would be a large area of tightly sealed homes in Schuylkill County causing high levels of exposure over a prolonged period of time 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 abundance and distribution of radon as it affects individual houses in the Commonwealth of Pennsylvania in general is considered incomplete and potentially biased (PEMA 2013). Schuylkill County is not an exception. The EPA has estimated that the national average indoor radon concentration is 1.3 pCi/L and the level for action is 4.0 pCi/L; however they have estimated that the average indoor concentration in Pennsylvania basements is about 7.1 pCi/L and 3.6 pCi/L on the first floor (PADEP 2016).

The PADEP Bureau of Radiation Protection provides information for homeowners on how to test for radon in their houses. If a test results in radon concentrations over 4.0 pCi/L, then the Bureau works to help the homeowners make repairs to their houses to mitigate against high radon levels. The total number tests reported to the Bureau since 1990 and their results are provided by zip code on the Bureau’s website and are summarized in Table 4.3.9-2 below for Schuylkill County. However, this information is only provided if over 30 tests total were reported in order to best approximate the average for the area (PADEP 2016).

In Schuylkill County, 28 of 58 zip codes had reported results from a sufficient number of tests to allow the Bureau to report the findings, which are shown in the table below. Please note that the PADEP does not post public results unless a zip code has had at least 30 tests conducted. 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 that **all** homeowners test for radon, regardless of test results within their respective zip codes. Despite a low average text result within a zip code, many homes in that zip code may have elevated radon levels.

Table 4.3.9-2. Radon Level Tests and Results by Zip Code

ZIP Code	Location	Area in Home	Number of Tests	Maximum Result (pCi/L)	Average Result (pCi/L)
17901	Pottsville City	Basement	1,962	193.9	11.2
		First Floor	248	105.3	5.0
17921	Ashland	Basement	267	194.6	16.4
		First Floor	37	23.0	3.6
17922	Auburn	Basement	796	360.1	18.1
		First Floor	94	91.7	11.9
17929	Cressona	Basement	116	77.5	11.7
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data
17931	Frackville	Basement	281	103.3	7.5
		First Floor	34	16.0	4.3
17936	Gordon	Basement	49	16.5	5.9
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data
17938	Hegins	Basement	181	88.0	13.5
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data
17948	Mahanoy City	Basement	37	41.3	2.7
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data
17951	Mar Lin	Basement	30	34.0	8.6
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data
17954	Minersville	Basement	184	114.1	10.2
		First Floor	37	68.7	5.1
17959	New Philadelphia	Basement	61	150.8	24.9
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data
17960	New Ringgold	Basement	258	320.5	27.7
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data
17961	Orwigsburg	Basement	804	406.5	8.9
		First Floor	118	53.7	4.5
17963	Pine Grove	Basement	580	173.8	18.9
		First Floor	95	51.0	7.6
17965	Port Carbon	Basement	90	54.6	7.6
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data
17967	Ringtown	Basement	146	201.1	19.4
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data
17970	Saint Clair	Basement	72	69.0	9.4
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data

ZIP Code	Location	Area in Home	Number of Tests	Maximum Result (pCi/L)	Average Result (pCi/L)
17972	Schuylkill Haven	Basement	924	423.6	18.6
		First Floor	112	59.8	10.6
17976	Shenandoah	Basement	130	57.8	6.7
		First Floor	32	11.7	1.6
17980	Tower City	Basement	96	69.0	9.0
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data
17981	Tremont	Basement	88	54.6	7.5
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data
17983	Valley View	Basement	104	215.3	19.0
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data
17985	Zion Grove	Basement	55	100.3	12.1
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data
18211	Andreas	Basement	112	321.8	25.4
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data
18214	Barnesville	Basement	141	499.3	32.5
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data
18218	Coaldale	Basement	75	32.3	5.4
		First Floor	Insufficient Data	Insufficient Data	Insufficient Data
18237	McAdoo	Basement	199	38.4	5.7
		First Floor	58	19.7	2.3
18252	Tamaqua	Basement	559	162.9	12.2
		First Floor	83	47.6	5.3

Source: PADEP 2018

Note: Zip codes in Schuylkill County not listed in the table have insufficient data to report results for both basement and first floor areas in the home.

Future Occurrence

Radon exposure is inevitable, given 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 2013). 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 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 4.0 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).

The Core Planning Team ranked the hazards 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 radon exposure in Schuylkill County is considered “highly likely” (greater than 90% annual probability) as defined by the Risk Factor Methodology probability criteria (Section 4.4). Radon is ranked as a high-risk hazard in Schuylkill County.

VULNERABILITY ASSESSMENT

To understand risk, a community must evaluate assets exposed and vulnerable within the identified hazard area. The following section discusses potential impacts of the radon hazard on Schuylkill County, including:

- Impacts 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 collections that will assist in understanding this hazard over time.

Radon exposure is of particular concern in Schuylkill County because of the County's location within EPA Radon Zone 1 (high potential). While structural factors (such as building construction and engineered mitigation measures) can influence the level of radon exposure, all residents and structures within Schuylkill County are potentially vulnerable to radon.

Impact on Life, Health, and Safety

For the purposes of this plan, the entire population of the County is assumed exposed to radon. 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 air, and thus far, no evidence indicates that children are at greater risk of lung cancer than are adults (EPA 2010).

Impact on General Building Stock and Critical Facilities

While the entire general building stock and critical facility inventory in the County is exposed to radon, radon does not result in direct damage to structures and facilities. Rather, engineering methods are installed to mitigate human exposure to radon in structures.

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 High Potential (Level 1) counties have elevated radon levels, and each would require a radon mitigation system installed at the EPA-estimated average of \$1,200 (PEMA 2013). Therefore, within Schuylkill County, estimated radon mitigation costs for residential structures could exceed \$15 million. However, this total could be higher based on the number of households in the County with radon levels exceeding 4 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) where the gas is released (PEMA 2013).

Future Growth and Development

Areas targeted for potential future growth and development within the next 5 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* contractor report, the primary factors that influence radon entry into a home include: radon content of the soil; pressure differential between the interior of the home and the soil; the air exchange rate for the home; the moisture content surrounding the home; and the presence and size of entry pathways. These factors can be affected by climate change to different degrees. Climate change may also affect the depositional environment within the home resulting in changes to the delivered dose by radon decay products. Additionally, the EPA stated that the relative concentration of radon to its decay products, and the ability to deliver dose, is impacted by numerous factors including building ventilation rate, decay product attachment to aerosols, and particle deposition rate on surface. All these factors could be impacted by housing as well as behavioral changes driven directly or indirectly by climate change. For example, the increased use of ceiling fans could increase deposition of radon decay products and reduce the delivered radon-related doses to the lungs (EPA 2010).

Additional Data and Next Steps

The assessment above 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 Schuylkill 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.

4.3.10 TORNADO

PROFILE

Tornados are nature's most violent storms and can cause fatalities and devastate neighborhoods in seconds. A tornado appears as a rotating, funnel-shaped cloud that extends from a thunderstorm to the ground with whirling winds that can reach 250 mph. Damage paths can be greater than 1 mile wide and 50 miles long. Tornados typically develop from either a severe thunderstorm or hurricane as cool air rapidly overrides a layer of warm air. Tornados typically move at speeds between 30 and 125 mph, and can generate internal winds exceeding 300 mph. The lifespan of a tornado rarely is longer than 30 minutes (FEMA 1997).

High wind velocity and wind-blown debris, along with lightning or hail, cause the damage from tornados. Destruction from tornados depends on the size, intensity, and duration of the storm. Tornados cause the greatest damage to structures that are light, such as residential and mobile homes (Northern Virginia Regional Commission [NVRC] 2006).

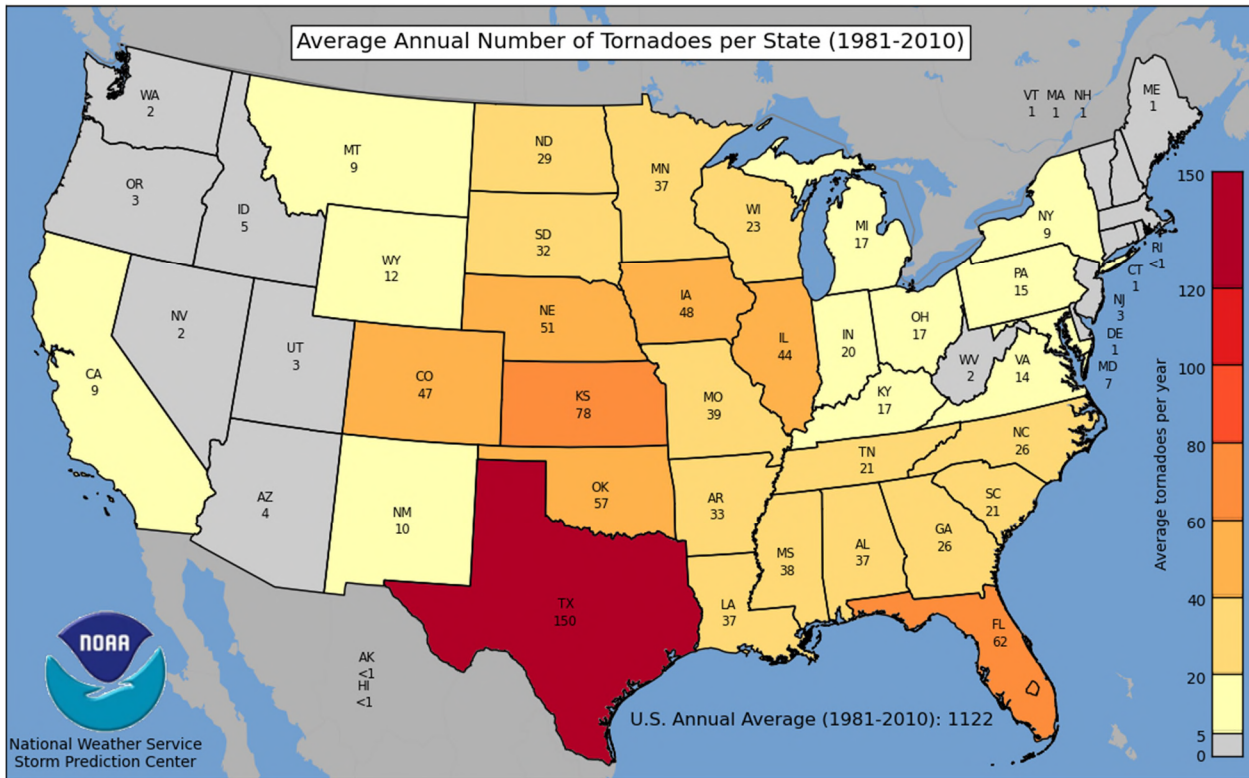
Location and Extent

Tornadoes can occur throughout Schuylkill County though events are usually localized. However, severe thunderstorms that cover a larger geographic area may result in conditions favorable to the formation of numerous or long-lived tornadoes. 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. These events are most likely to occur during the spring and early summer months of March through June when these conditions are prevalent (PEMA 2013).

Tornado movement is characterized in two ways: direction and speed of spinning winds, and forward movement of the tornado, also known as the storm track. The forward motion of the tornado path can be a few hundred yards or several hundred miles in length. The width of tornadoes can vary greatly, but generally 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. Straight-line winds and windstorms occur on a region-wide scale (PEMA 2013). While such winds usually accompany tornadoes, straight-lined 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.

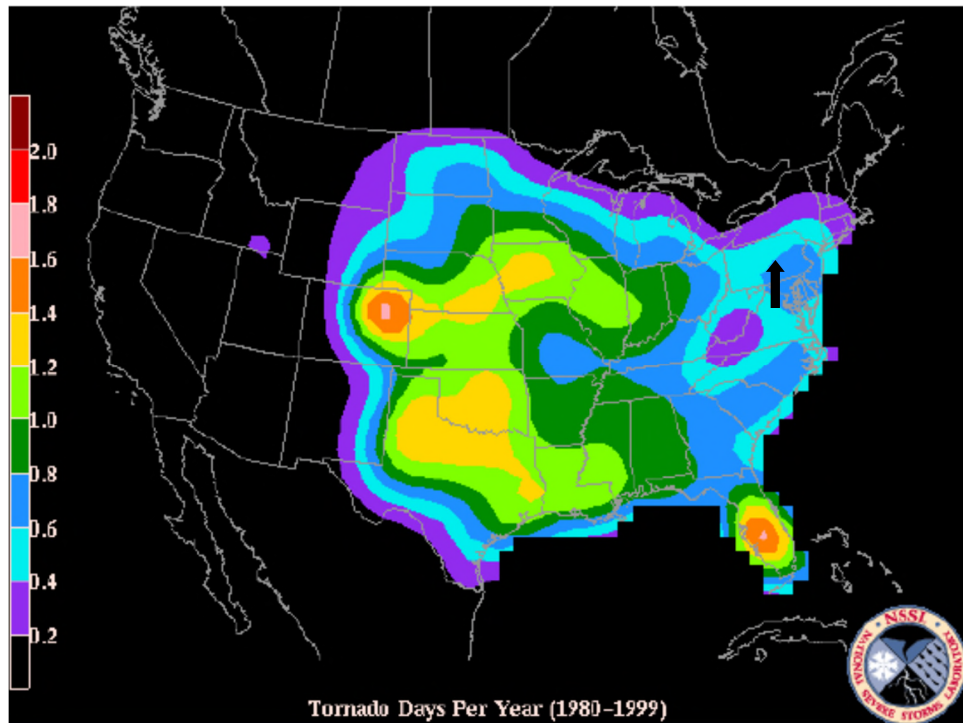
While the extent of tornado damage is usually localized, extreme winds of this vortex can be among the most destructive on Earth when they move through populated, developed areas. The Commonwealth of Pennsylvania underwent an average of 15 tornado events annually between 1981 and 2010. Figure 4.3.10-1 shows the annual average number of tornadoes between 1981 and 2010 (Johns et. al. 2011). The Commonwealth of Pennsylvania experienced an average of 15 tornado events annually.

Figure 4.3.10-1. Annual Average Number of Tornadoes in the United States, 1981 to 2010



The NSSL used historical data to estimate the daily probability of tornado occurrences across the United States, without considering the magnitude of the tornado; refer to Figure 4.3.10-2. In Pennsylvania, it is estimated that the probability of a tornado occurring is 0.2 to 0.8 day per year. In Schuykill County, it is estimated that the probability of a tornado occurring is 0.4 to 0.8 day per year (NSSL 2013).

Figure 4.3.10-2. Total Annual Threat of Tornado Events in the United States, 1980-1999



Source: NSSL 2013

Notes: The mean number of days per year with one or more events within 25 miles of a point is shown here. The fill interval for tornadoes is 0.2, with the purple starting at 0.2 day. For the non-tornadic threats, the fill interval is 1, with the purple starting at 1. For the significant (violent) threats, it is 5 days per century (millennium). The black arrow indicates the general location of Schuykill County.

Range of Magnitude

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) (measure of wind intensity) and the Mach number scale (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 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 rating of tornados and, in some cases, overestimates of tornado wind speeds. The limitations encouraged and induced 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 (NWS 2016).

The EF Scale became operational on February 1, 2007. It is used to assign tornados 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 (NWS 2016). Table 4.3.10-2 details each of the six categories of the EF Scale.

Table 4.3.10-2. 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 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 completely leveled; cars thrown, and small missiles 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 2016

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 complete destruction of the DI. Table 4.3.10-4 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 4.3.10-4. EF Scale Damage Indicators

Number	Damage Indicator	Abbreviation	Number	Damage Indicator	Abbreviation
1	Small barns, farm outbuildings	SBO	15	School – 1-story elementary (interior or exterior halls)	ES
2	One- or two-family residences	FR12	16	School – junior or senior high school	JHSH
3	Single-wide mobile home	MHSW	17	Low-rise (1-4 story) building	LRB

Number	Damage Indicator	Abbreviation	Number	Damage Indicator	Abbreviation
4	Double-wide mobile home	MHDW	18	Mid-rise (5-20 story) building	MRB
5	Apartment, condominium, townhouse (3 stories or less)	ACT	19	High-rise (over 20 stories)	HRB
6	Motel	M	20	Institutional building (hospital, government, or university)	IB
7	Masonry apartment or motel	MAM	21	Metal building system	MBS
8	Small retail building (fast food)	SRB	22	Service station canopy	SSC
9	Small professional (doctor office, branch bank)	SPB	23	Warehouse (tilt-up walls or heavy timber)	WHB
10	Strip mall	SM	24	Transmission line tower	TLT
11	Large shopping mall	LSM	25	Free-standing tower	FST
12	Large, isolated ("big box") retail building	LIRB	26	Free-standing pole (light, flag, luminary)	FSP
13	Automobile showroom	ASR	27	Tree – hardwood	TH
14	Automotive service building	ASB	28	Tree – softwood	TS

Events after February 2007 are classified based on the EF Scale. Previous occurrences and losses associated with historical tornado events described below are classified based on the F Scale.

Wind speed zones developed by the American Society of Civil Engineers based on information including 40 years of tornado history and over 100 years of hurricane history. It identifies wind speeds that could occur across the United States to be used as the basis for design and evaluation of the structural integrity of shelters and critical facilities. According to Figure 4.3.6-1 (Hurricane and Windstorm), Schuylkill County falls within Zones II and III, meaning design wind speeds for shelters and critical facilities should be able to withstand a 3-second gust up to 200 mph, regardless of whether the gust is the result of a tornado, hurricane, tropical storm, or windstorm event. Therefore, these structures should be able to withstand speeds experienced in an EF4 tornado.

Past Occurrence

Tornadoes have occurred in all seasons and all regions of Pennsylvania, but the northern, western, and southeastern portions of the Commonwealth have been struck more frequently. Between 2012 and 2017, there were no reported tornado events that occurred in Schuylkill County according to NOAA’s National Climatic Data Center (NCDC). Prior to that, the most recently reported tornado activity was on May 26, 2011, when severe weather produced a total of six tornadoes across Pennsylvania. A NWS survey team confirmed a long-track EF 1 tornado via PSP helicopter. The track extended from approximately a half mile west of Cressona in North Manheim Township, 17 miles to one-mile northeast

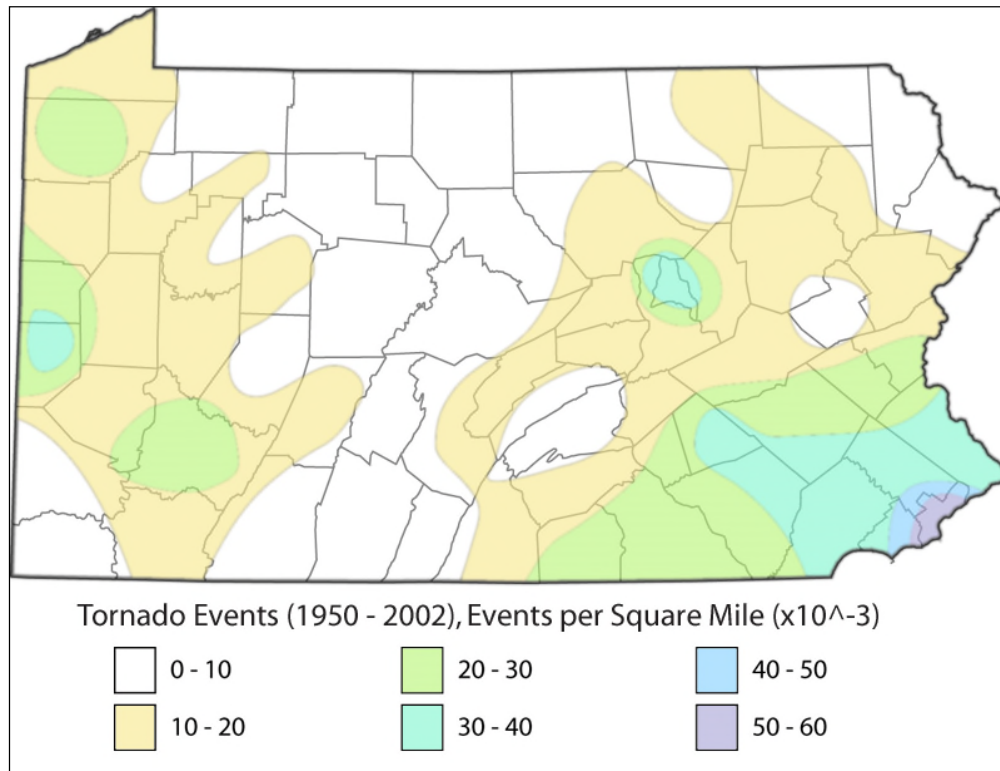
of Kepner in West Penn Township. During this event, approximately 20 residential homes, 12 barns and outbuildings, and 1,000 trees were damaged. Approximately \$250,000 in property damage occurred, but there were no reported injuries or fatalities (Schuykill 2013).

According to NOAA’s NCDC, there were 13 recorded tornadoes in Schuykill County between 1950 and 2017. These events included four tornados with an intensity of F/EF0, seven tornados with an intensity of F/EF1, and two tornados with an intensity of F/EF2. The total estimated damage caused by these events was \$3,105,000 (NCDC 2018).

Future Occurrence

Using events collected between 1950 and 2002, Figure 4.3.10-5 shows the number of total tornado events per square mile across Pennsylvania from the State Climatologist. The figure shows that a majority of Schuykill County experienced a lower frequency of tornado events than the southern portions.

Figure 4.3.10-5. Total Tornado Events Per Square Mile in Pennsylvania



Source: Pennsylvania State Climatologist 2016

For the 2019 HMP update, the most up-to-date historic data was collected to calculate the probability of future occurrence of tornado and windstorm events for Schuykill County. Information from NOAA-NCEI storm events database, the Pennsylvania State Climatologist, the 2013 Schuykill County HMP, and the Storm Prediction Center were used to identify the number of tornado events that occurred between 1950 and 2017. Table 4.3.10-5 presents the probability of future occurrence of tornado events in Schuykill County.

4.3.10-5. Probability of Future Tornado and Windstorm Events

Hazard Type	Number of Occurrences Between 1950 and 2017	Rate of Occurrence or Annual Number of Events (average)	Recurrence Interval (in years) (# Years/Number of Events)	Probability of Event in any given year	Percent chance of occurrence in any given year
Tornado (all scales)	13	0.19	5.23	0.19	19.1%

Sources: NOAA-NCEI 2017

In Section 4.4, the identified hazards of concern for Schuylkill County were ranked according to relative risk. The probability of occurrence for tornado events impacting Schuylkill County is considered ‘unlikely’ (less than 1-percent annual probability) as defined by the Risk Factor Methodology probability criteria (Section 4.4).

VULNERABILITY ASSESSMENT

To understand risk, a community must evaluate assets exposed and vulnerable within the identified hazard area. The following section discusses potential impacts of the tornado hazard on Schuylkill County, including:

- Impacts 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 collections that will assist in understanding this hazard over time.

A qualitative assessment on potential impacts to life, health and safety; buildings, critical facilities and the economy are summarized below. Refer to Section 4.3.6 (Hurricane and Windstorm) for further details on estimated potential losses as a result of the 100- and 500-year mean return period wind events using HAZUS-MH.

Impact on Life, Health, and Safety

Impacts of a tornado or windstorm on life, health, and safety depend on several factors, including severity of the event and whether adequate warning time was provided to residents. All residents in Schuylkill 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 a number of factors including their physical and financial ability to react or respond during a hazard and 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 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.

Impact on General Building Stock and Critical Facilities

While the chance of being hit by a tornado is small, the damage that results when the tornado arrives is devastating. An F4 tornado can carry wind velocities of 200 mph, resulting in a force of more than 100 pounds per square foot of surface area. This is a “wind load” that exceeds the design limits of most buildings.

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 40 feet or more long, design to be towed on its own chassis, with transportation gear integral to the unit when it leaves the factory, and without need of a permanent foundation (Census, 2010).” They can include multi-wides and expandable manufactured homes but exclude travel trailers, motor homes, and modular housing. Due to their light-weight and often unanchored design, manufactured housing is extremely vulnerable to high winds and will generally sustain the most damage.

Table 4.3.10-6 displays the number of manufactured housing units per municipality in Schuylkill County.

Table 4.3.10-6. Manufactured Housing Units per Municipality in Schuylkill County

Municipality	Number of Manufactured Homes
Ashland Borough	21
Auburn Borough	14
Barry Township	38
Blythe Township	24
Branch Township	17
Butler Township	59
Cass Township	45
Coaldale Borough	5
Cressona Borough	6
Deer Lake Borough	3
Delano Township	8
East Brunswick Township	60
East Norwegian Township	31
East Union Township	40
Eldred Township	20
Foster Township	10
Frackville Borough	20
Frailey Township	13
Gilberton Borough	30
Girardville Borough	10
Gordon Borough	6
Hegins Township	70
Hubley Township	41
Kline Township	34

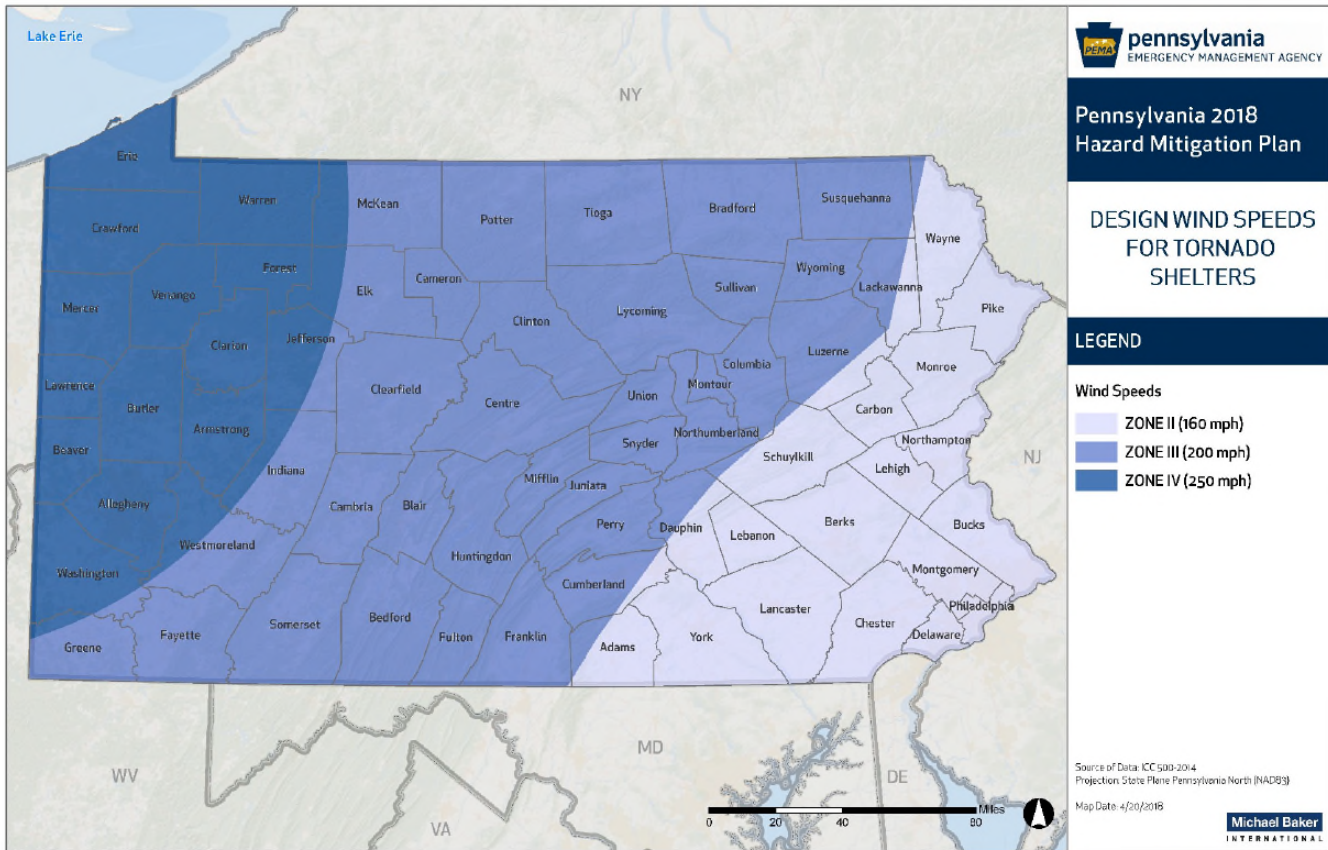
Municipality	Number of Manufactured Homes
Landingville Borough	3
Mahanoy City Borough	1
Mahanoy Township	28
McAdoo Borough	1
Mechanicsville Borough	2
Middleport Borough	6
Minersville Borough	4
Mount Carbon Borough	0
New Castle Township	8
New Philadelphia Borough	4
New Ringgold Borough	2
North Manheim Township	98
North Union Township	57
Norwegian Township	20
Orwigsburg Borough	6
Palo Alto Borough	16
Pine Grove Borough	19
Pine Grove Township	188
Port Carbon Borough	20
Port Clinton Borough	4
Porter Township	73
Pottsville City	5
Reilly Township	11
Ringtown Borough	3
Rush Township	57
Ryan Township	37
Saint Clair Borough	5
Schuylkill Haven Borough	75
Schuylkill Township	19
Shenandoah Borough	5
South Manheim Township	28
Tamaqua Borough	13
Tower City Borough	15
Tremont Borough	30
Tremont Township	16
Union Township	87
Upper Mahantongo Township	18
Walker Township	15
Washington Township	130

Municipality	Number of Manufactured Homes
Wayne Township	252
West Brunswick Township	99
West Mahanoy Township	58
West Penn Township	316
Schuykill County	2,479

Source: Schuykill County 2018

According to the 2018 State HMP, there are wind speed zones developed for the design of tornado shelters; refer to Figure 4.3.10-6. As displayed, Schuykill County is located in wind speed zones II and III, meaning design wind speeds for shelters and critical facilities should withstand 3-second gusts up to 200 mph, regardless if the wind is from a tornado, hurricane, tropical storm or windstorm event. It should be noted that these windspeeds represent the strongest anticipated throughout the Commonwealth and are not the normal wind speeds expected statewide (PEMA 2018).

Figure 4.3.10-6. Design Wind Speeds for Tornado Shelters



Source: PEMA 2018

Impact on Economy

Tornados 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 can affect business operations and provision of heating or cooling to the population.

Impact on the Environment

Tornado events are typically localized; therefore, environmental impacts are rarely widespread. Severe damage to plant species is likely from both tornado and windstorm events. This includes uprooting or total destruction of trees, and increased threat to wildfire in areas of tree debris.

Future Growth and Development

As discussed in Section 2 (County Profile), areas targeted for future growth, development and re-development have been identified across Schuylkill 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

An increase in storms will produce more wind events and may increase tornado activity. Additionally, an increase in temperature will provide more energy to produce storms that generate tornadoes (Climate Central 2016). With an increased likelihood of strong winds and tornado events, all of the County's assets will experience additional risk for losses as a result of extreme wind events.

Additional Data and Next Steps

In time, HAZUS-MH will be released with modules that address straight-line wind and tornado events. As updated versions of HAZUS-MH are released, the County can run analyses for an overall picture of the wind damages and debris generated from tornado events. Over time, Schuylkill County can 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, and an updated building inventory to include specific building information such as type of construction and details on protective features (for example, shutters and safe rooms).

4.3.11 WILDFIRE

PROFILE

A wildfire is an unwanted and unplanned fire spreading through undeveloped land and vegetative fuels. Regardless of whether it is naturally occurring or human-induced, these events often begin unnoticed and can spread quickly, creating dense smoke that can be seen for miles. A wildland-urban interface (WUI) fire is a wildfire in a geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels.

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 occur most often during long, dry, hot spells. Any small fire, if not quickly detected and suppressed, can get out of control. 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.

Schuylkill County is part of Forest District 18: Weiser with over 9,000 acres of woodlands preserved in the Weiser State Forest along with Second and Blue Mountain Ranges. Major woodland areas, located in the central portion of the County, extend from the western to the eastern County boundaries. Other woodland areas exist north of Shenandoah Borough in Union, North Union, and East Union Townships (Schuylkill 2013; USGS 2011). Approximately 16.4% of Schuylkill County is agricultural land, and 69.8% is classified as forested. These areas may be vulnerable to wildfire events. Refer to Table 4.3.11-1 which summarizes the area in Schuylkill County by land use category; Figure 4.3.11-1 illustrates the land cover in the County.

Table 4.3.11-1. Land Use Summary for Schuylkill County

Land Use Category	Total Area (square miles)	Percent of Total
Agricultural	128.8	16.4%
Barren Land	15.3	1.9%
Forest	546.8	69.8%
Urban Built Up	82.8	10.6%
Water	9.6	1.3%
Wetland	0.1	0.01%
Total	982.4	100.0%

Source: USGS 2011

Greater than 80-percent all Pennsylvania wildfires occur during the spring (March, April, and May) and fall (October and November) months. 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. Figure 4.3.11-2 shows the locations of wildfires throughout Pennsylvania from 1992 to 2015. It is important to note that 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 state or federal level. Therefore, locally-controlled blazes may not be represented in the figure below.

Figure 4.3.11-1. Land Cover in Schuykill County

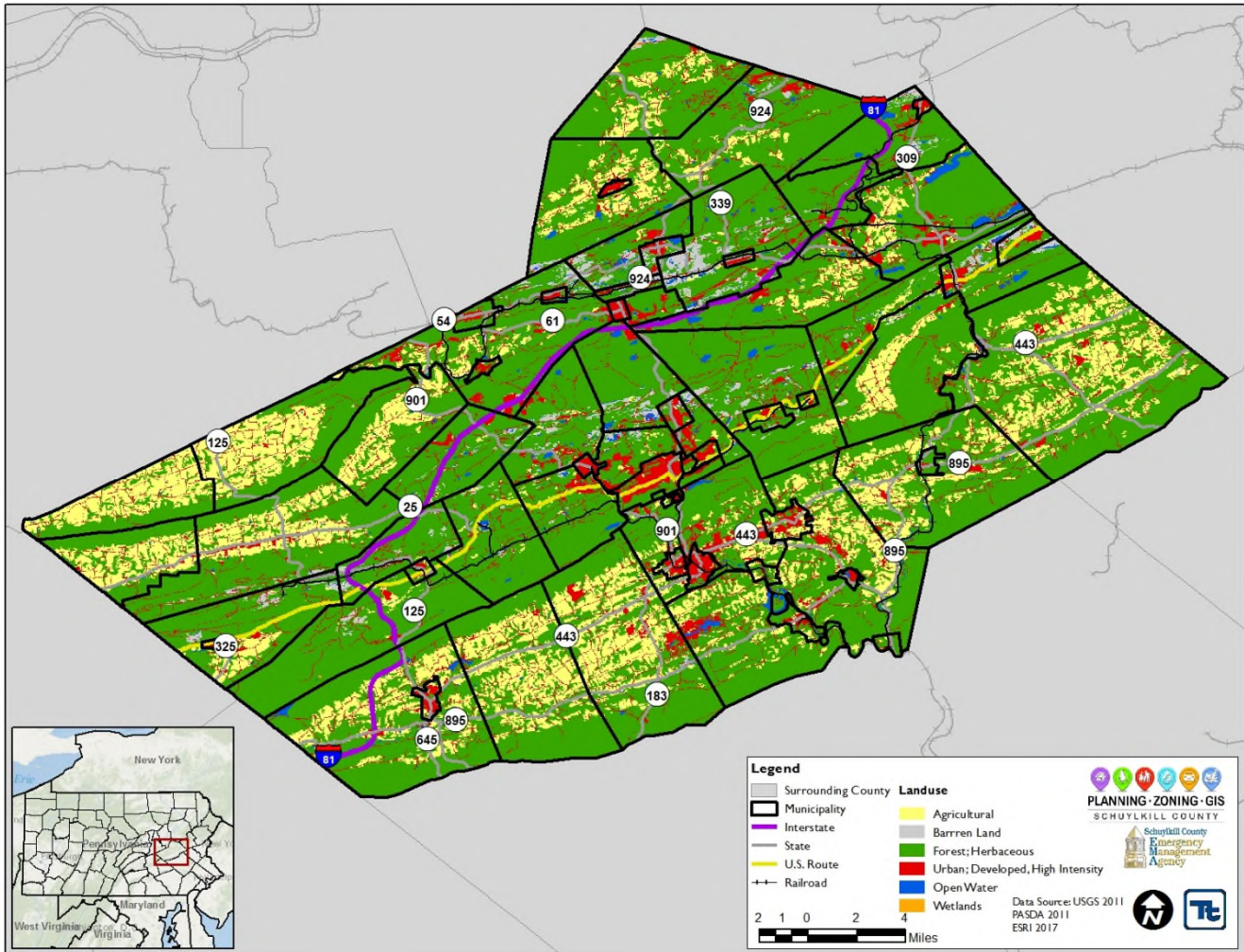
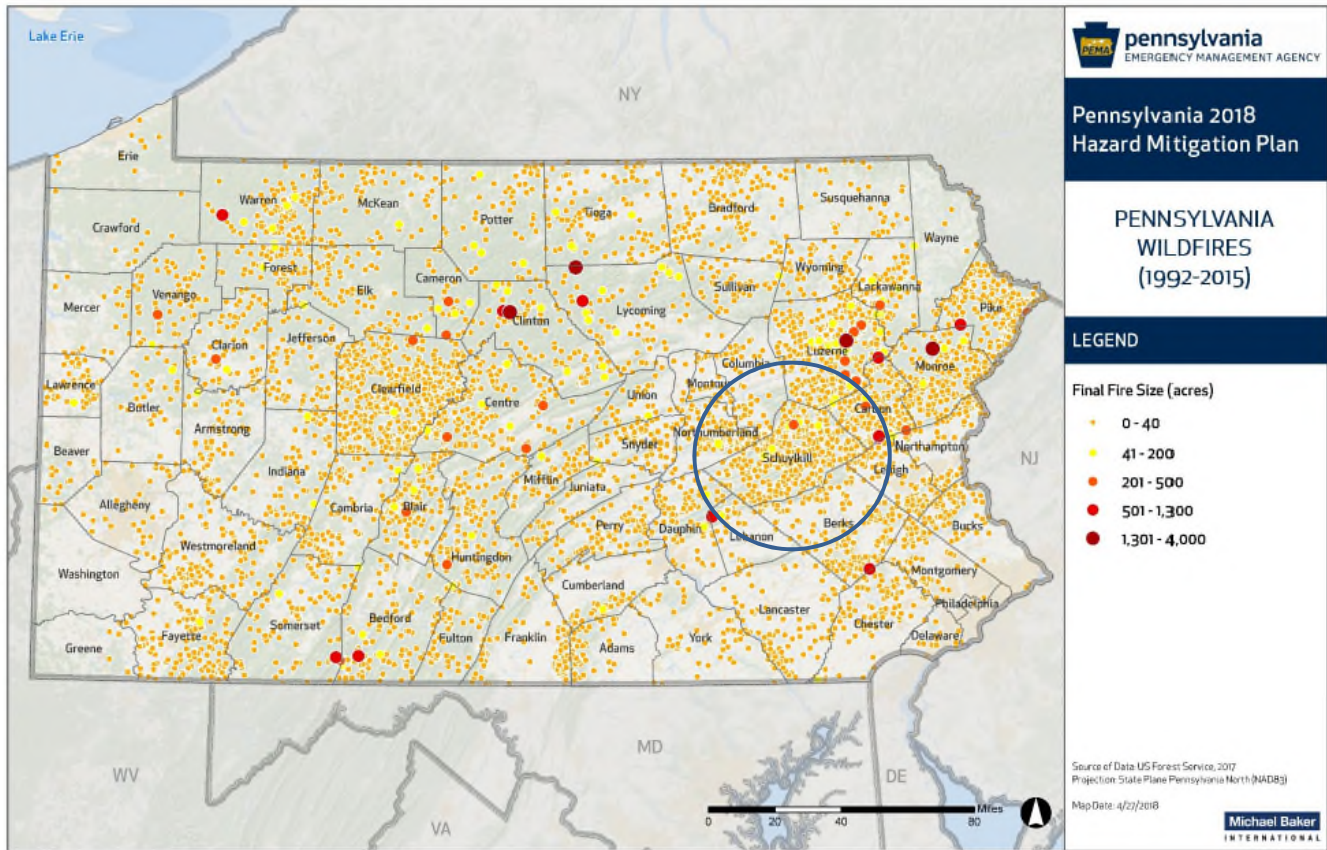


Figure 4.3.11-2. Pennsylvania Wildfires, 1992 to 2015



Source: PEMA 2018

Note: Blue circle was added to highlight Schuykill County's location within Pennsylvania

According to the Pennsylvania 2013 State All-Hazard Mitigation Plan, Schuykill County ranks in the top three Pennsylvania counties that frequently experience wildfires. However, these fires have historically been small. Most of the 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 wildfires (PEMA 2013).

Several tools are available to estimate fire potential location and extent, including (but not limited to) the WUI, Wildland Fire Assessment System, and PA DCNR Priority Landscape Analysis. These tools are discussed in further detail below.

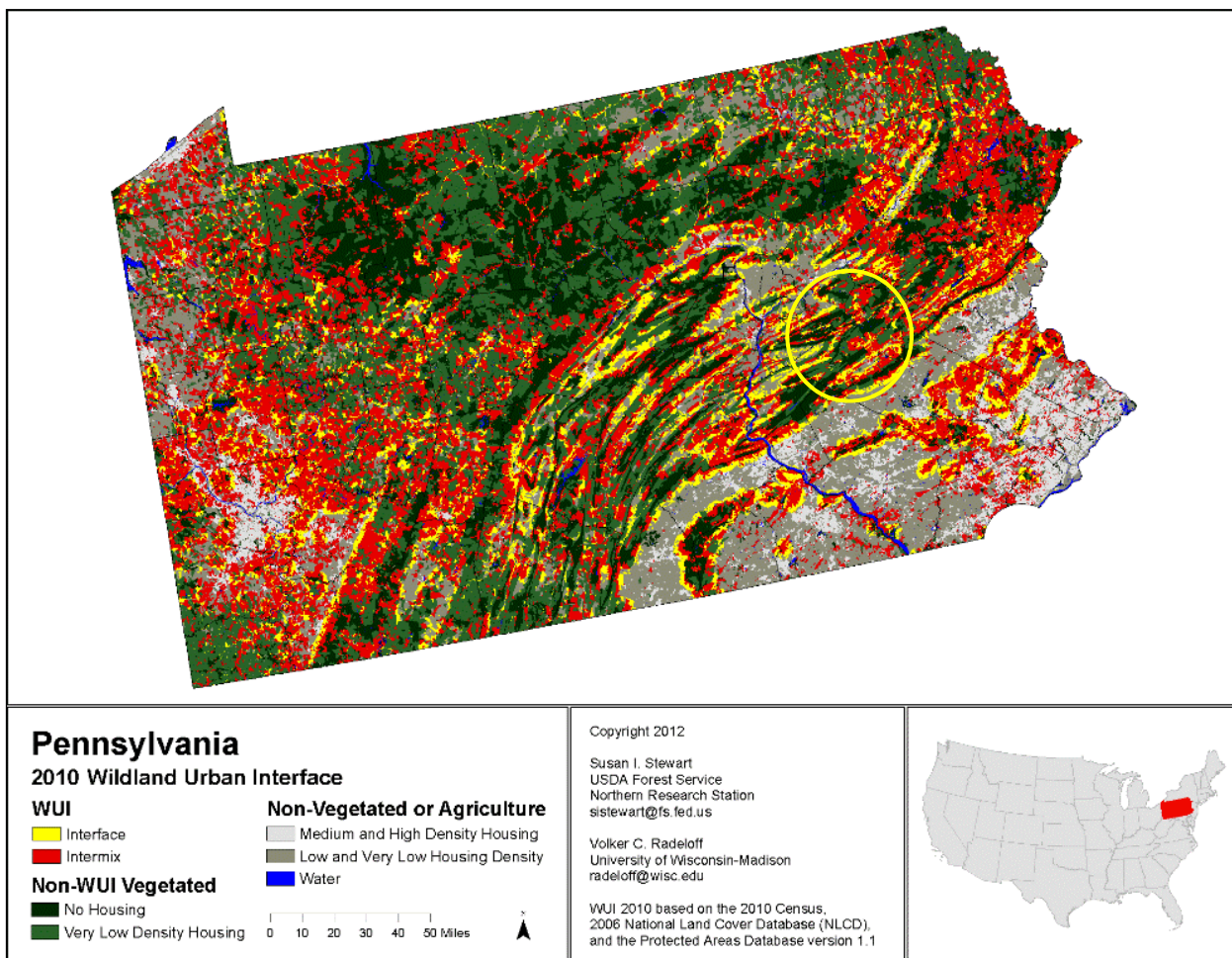
Wildland/Urban Interface (WUI)

The WUI is 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 et al. 2005).

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, were used to define the WUI (Stewart et al. 2005).

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. Schuykill County is identified as having many areas of low-density housing or very low-density housing due to the large amount of forested area. Areas where recreation and tourism dominate are also places where WUI is common (Stewart et al. 2005). Figure 4.3.11-3 depicts the WUI for Pennsylvania in 2010, and Figure 4.3.11-4 illustrates the WUI for Schuykill County. Concentrations of WUI areas greater than 50 percent are classified as WUI (intermix or interface) in the County.

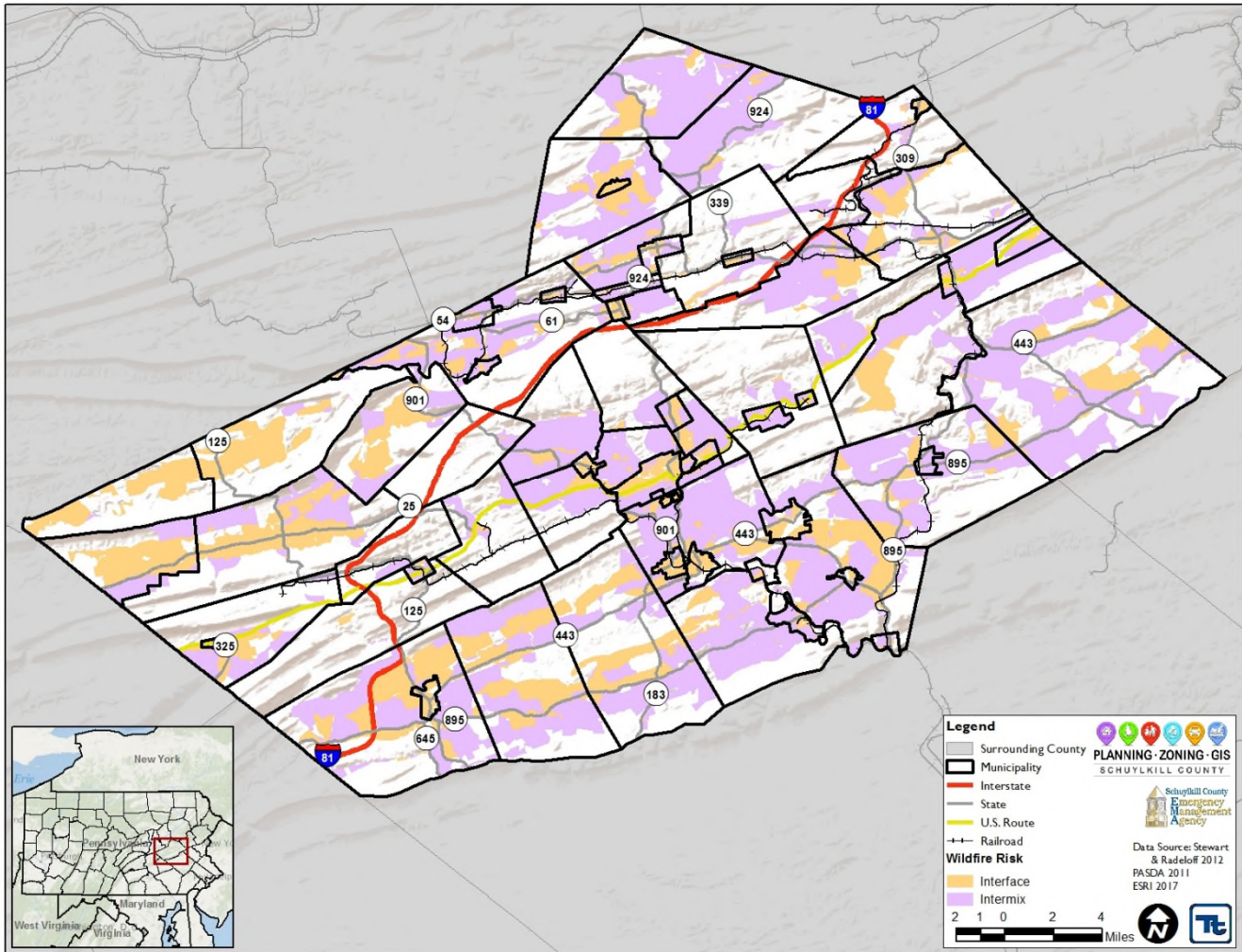
Figure 4.3.11-3. 2010 WUI for Pennsylvania



Source: Stewart 2015

Note: Yellow oval highlights Schuykill County's location within Pennsylvania.

Figure 4.3.11-4. WUI for Schuykill 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 fires danger, weather maps and satellite-derived “Greenness” maps (U.S. Forestry Service [USFS] Date Unknown). 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 WFAS (USFS 2012). The Fire Danger Rating level, described in Table 4.3.11-2 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 2012).

Table 4.3.11-2. 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 heavy slash (trunks, branches, and tree tops) or in conifer stands may be unmanageable while the extreme burning condition lasts. Under these conditions the only effective and safe control action is on the flanks until the weather changes or the fuel supply lessens.

Source: USFS 2012

Pennsylvania Department of Conservation and Natural Resources (PA DCNR) Priority Landscape Analysis

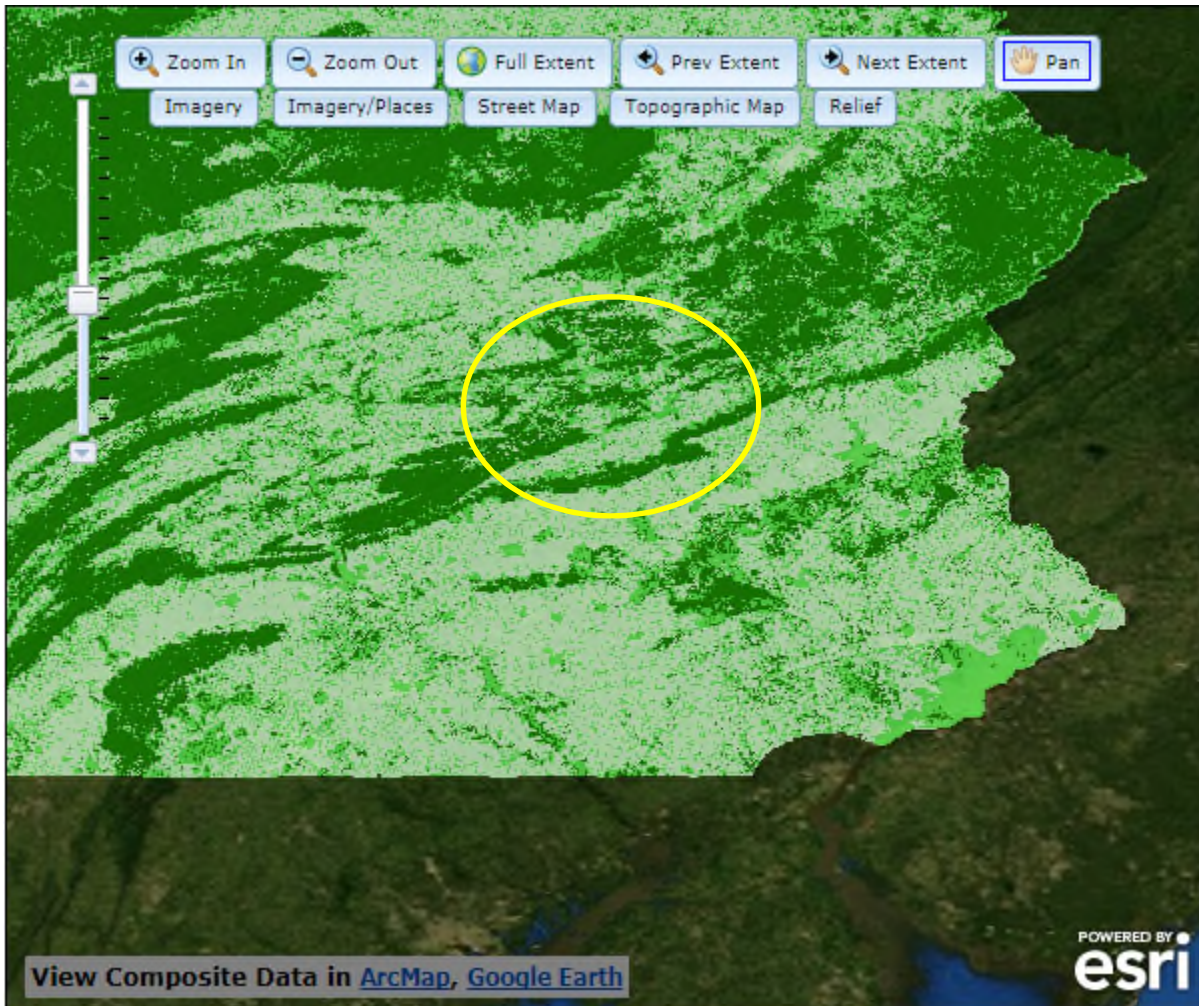
The PA DCNR conducted a wildfire priority landscape analysis identifying areas where wildland fires are predicted to occur and become problematic. The areas are classified into high, medium, and low categories. The high classification is defined as an area prone to extreme fire behavior, with the potential to cause extensive property damage, or that could threaten the safety of the Commonwealth’s citizens. 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

The WUI classifies areas where homes and other human development meet or intermingle with undeveloped land. LANDFIRE characterizes the land’s vegetation into fuel models that predict various fire behavior intensities. The Pennsylvania wildfire Point Origin Occurrences are records of wildland fire origins that have been reported. Percent slope aids in predicting fire behavior from the terrain. The local assessment of values, risks, and hazards is a municipality-based rating system; this assessment has been made by local wildland fire managers (PA DCNR 2017). Figure 4.3.11-5 illustrates the output for the wildfire priority landscapes model for Schuylkill County.

The greatest potential for wildfires is in the spring months of March, April, and May, and the autumn months of October and November. These months generally bring clear skies, high winds, low relative humidity, and prolonged periods of dry weather. In the spring, bare trees allow sunlight to reach the forest floor, drying fallen leaves and other ground debris. The same theory applies for the fall; however, the drier conditions are a more crucial factor. People cause most wildfires in Pennsylvania, often by burning debris. Several fires have started in a person’s backyard and traveled through dead grasses and weeds into bordering woodlands. According to the Pennsylvania HMP, 92 percent of Pennsylvania wildfires burn less than 10 acres and are suppressed within the operational period (PEMA 2013).

Figure 4.3.11-5. Wildfire Priority Landscapes in Schuykill County



Source:

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)
Schuykill County location within yellow oval

Range of Magnitude

Wildfire events 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. As noted by the CPT, brush fires are more typical to Schuykill County. These events can be managed by local firefighters and with additional assistance from DCNR Foresters, as needed.

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, 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 (PEMA 2018).

Past Occurrence

A complex relationship exists between environment, society and wildfire in Schuylkill County driven by fluctuations in economic conditions as discussed in a recent study by Thomas Saladyga (Concord University) and Alecea Standlee (Gettysburg College). The study was conducted in north-central Schuylkill County which coupled an approximately 120-year landscape-scale fire history with survey data that provided insights into contemporary perceptions of wildfire. Results indicate that 20th century wildfire activity was not associated with drought, but was closely linked to fluctuations in the regional anthracite coal industry with increases in ridgetop fire activity associated with periods of severe job losses (refer to Figure 4.3.11-6). Following the collapse of anthracite coal industry, fires continued to occur frequently across the landscape, but were generally less extensive compared to the first 60 years of the 20th century (Saladyga and Strandlee 2018).

Figure 4.3.11-6. Interdecadal Trends in Wildfire Events from 1900 to 2016

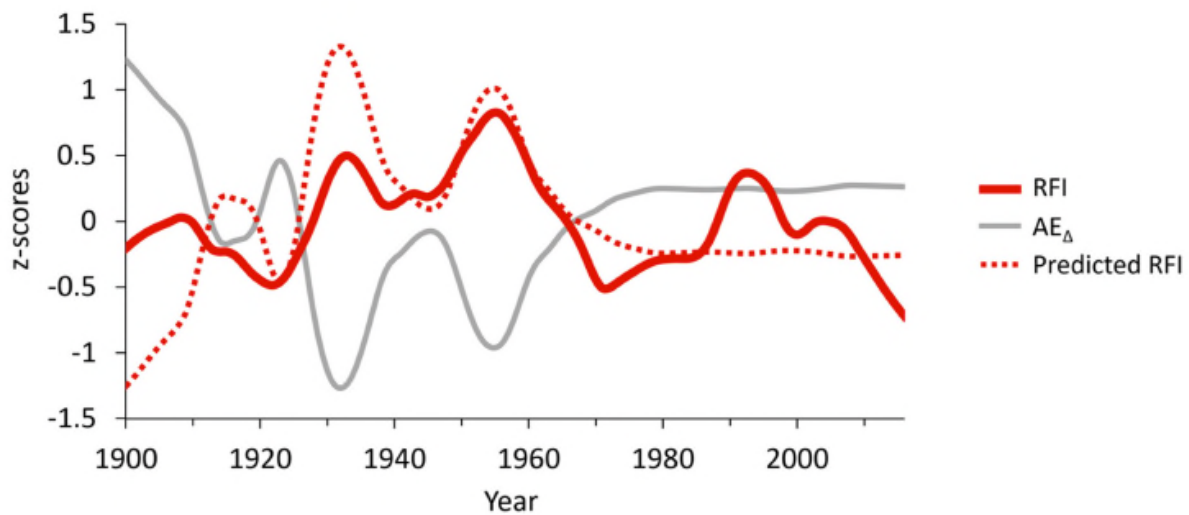


Figure 6. Interdecadal trends in the ridgetop fire index (RFI), regional anthracite employment (AE_{Δ}) [56], and predicted RFI from the 10-year average of AE_{Δ} . Each time series is smoothed using locally weighted regression ($s = 0.15$; [70]) for presentation.

Source: Saladyga and Standlee 2018

Since 2000, 2,696 acres of land burned as a result of wildfires in the County (PEMA 2018). Between 2002 and 2013, the PA DCNR Bureau of Forestry indicated that 261 wildfire events were reported for Schuylkill County. This number does not include wildfires that were not reported to DCNR or that were controlled solely by the volunteer fire departments in the County (PEMA 2013). Information provided by DCNR Weiser Forest District in May 2018 indicated that between 2008 and May 30, 2018, there were 535 wildfire incidents that burned over 1,500 acres in Schuylkill County. These

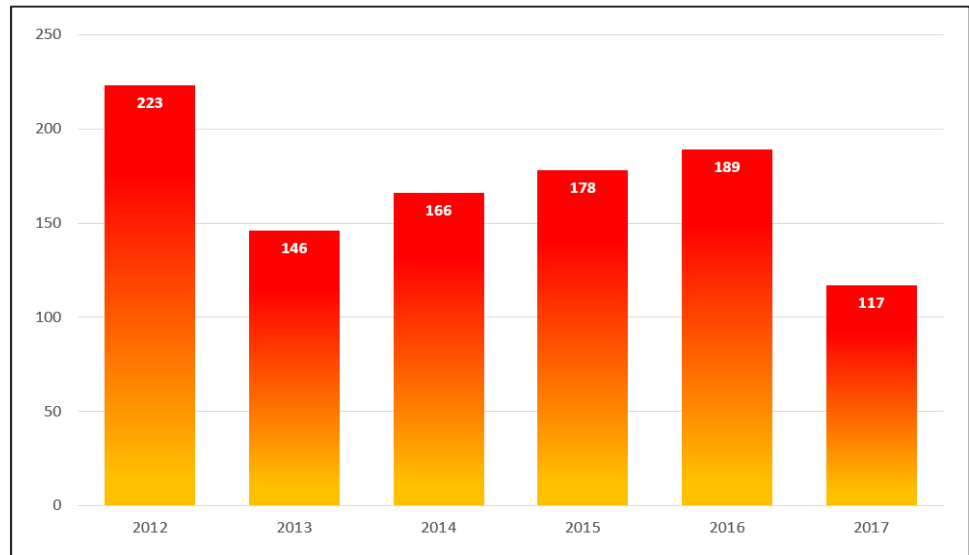
incidents resulted in one fatality, four injuries, threatened residential properties, damaged one non-residential property, and destroyed seven non-residential properties (DCNR 2018).

Between 1954 and 2017, the State of Pennsylvania has not experienced any FEMA-declared major disasters or emergencies related to wildfires. Multiple sources provided information regarding previous occurrences and losses associated with wildfire events throughout Schuylkill County.

The 2013 HMP discussed wildfire events that occurred in Schuylkill County through 2012. For this 2019 HMP update, wildfire events were summarized between 2012 and 2017. For events prior to 2012, please refer to Appendix G.

According to the Schuylkill County 911 Center, from 2012 to 2017, a total of 1,019 brush fires were reported. This includes fires of all sizes. No other details regarding these events were readily available.

Figure 4.3.11-6. Number of Brush Fires in Schuylkill County



Future Occurrence

In Schuylkill County, brush fire events will continue to occur each year. However, the likelihood of one of those fires attaining significant size and intensity cannot be predicted and is highly dependent on environmental conditions and firefighting response. Weather conditions can increase the likelihood of wildfires occurring; although historically wildfire activity has not been closely associated with drought in Schuylkill County (Salayga and Standlee 2018). 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 2013).

It is important to acknowledge that a majority of wildfire events are human-caused. Therefore, the occurrence of future wildfire events will strongly depend on patterns of human activity as noted by the recent study by Saladyga and Standlee discussed earlier in this section.

For the 2019 HMP update, the most up-to-date data was collected to calculate the probability of future occurrence of wildfire events for Schuylkill County. Information from the 2013 HMP and input from Schuylkill County were used to identify the number of wildfire events that occurred between 2004 and 2017; refer to Table 4.3.11-4. Based on these statistics, there is an estimated 100-percent chance of a wildfire event occurring in any given year in Schuylkill County.

Table 4.3.11-4. Probability of Future Wildfire Events

Hazard Type	Number of Occurrences Between 2004 and 2017	Rate of Occurrence	Rate of Occurrence or Annual Number of Events (average)	Probability of Event in Any Given Year	Percent Chance of Occurrence in Any Given Year
Wildfire	2,568	197.54	0.01	183.43	100%

Source: Schuylkill County 2018

Based on available historical data, the future occurrence of wildfires in Schuylkill County can be considered *highly 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 like 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 discusses the potential impact of the wildfire hazard on the County, including:

- Impacts 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 collections that will assist in understanding this hazard over time.

The WUI (interface and intermix) obtained through the SILVIS Lab, Department of Forest Ecology and Management, University of Wisconsin-Madison, defines the wildfire hazard area utilized for the 2019 HMP update. The asset data (population, building stock, and critical facilities) presented in the County Profile (Section 2) was used to support an evaluation of assets exposed and the potential impacts and losses associated with this hazard. Available and appropriate geographic information system (GIS) data were overlaid on the hazard area to identify what assets are exposed to wildfire. The limitations of this analysis are recognized, and as such, the analysis is used only to provide a general estimate.

Impact on Life, Health, and Safety

As demonstrated by historical wildfire events, potential losses include human health and life of residents and responders. The most vulnerable populations include emergency responders and those within a short distance of the interface between the built environment and the wildland environment. In addition, the population living within and along the WUI may only have one ingress/egress to their communities making them highly vulnerable in the event of an evacuation. The County land within the WUI was overlaid on the 2010 U.S. Census population data to estimate the Schuylkill County population vulnerable to the wildfire hazard (U.S. Census 2010). Table 4.3.11-5 summarizes the estimated population exposed by municipality. It is clear that a majority of the County’s population is exposed and potentially vulnerable to this hazard.

Table 4.3.11-5. Estimated Population Located within the WUI in Schuylkill County

Municipality	U.S. Census 2010 Population	Estimated Population Exposed	Percent of Total
Ashland Borough	2,817	2,815	99.9%
Auburn Borough	739	725	98.1%
Barry Township	932	719	77.1%
Blythe Township	924	733	79.3%
Branch Township	1,840	1,820	98.9%
Butler Township	5,224	3,447	66.0%
Cass Township	1,957	1,932	98.7%
Coaldale Borough	2,281	2,281	100.0%
Cressona Borough	1,651	1,651	100.0%
Deer Lake Borough	687	687	100.0%
Delano Township	445	413	92.8%
East Brunswick Township	1,793	1,531	85.4%
East Norwegian Township	863	860	99.7%
East Union Township	1,605	1,429	89.0%
Eldred Township	758	499	65.8%
Foster Township	251	179	71.3%
Frackville Borough	3,805	3,693	97.1%
Frailey Township	429	362	84.4%
Gilberton Borough	773	769	99.5%
Girardville Borough	1,519	1,519	100.0%
Gordon Borough	763	763	100.0%
Hegins Township	3,516	3,239	92.1%
Hublely Township	854	739	86.5%
Kline Township	1,438	1,264	87.9%
Landingville Borough	159	145	91.2%
Mahanoy City Borough	4,162	4,162	100.0%
Mahanoy Township	3,152	819	26.0%
Mcadoo Borough	2,300	2,300	100.0%
Mechanicsville Borough	455	455	100.0%
Middleport Borough	405	405	100.0%
Minersville Borough	4,397	4,370	99.4%
Mount Carbon Borough	91	91	100.0%
New Castle Township	415	379	91.3%
New Philadelphia Borough	1,085	1,085	100.0%
New Ringgold Borough	276	276	100.0%
North Manheim Township	3,766	3,588	95.3%
North Union Township	1,476	1,413	95.7%
Norwegian Township	2,310	2,277	98.6%
Orwigsburg Borough	3,099	2,254	72.7%

Municipality	U.S. Census 2010 Population	Estimated Population Exposed	Percent of Total
Palo Alto Borough	1,032	1,032	100.0%
Pine Grove Borough	2,186	2,058	94.1%
Pine Grove Township	4,123	3,443	83.5%
Port Carbon Borough	1,889	1,889	100.0%
Port Clinton Borough	326	307	94.2%
Porter Township	2,176	2,100	96.5%
Pottsville City	14,330	13,886	96.9%
Reilly Township	726	661	91.0%
Ringtown Borough	818	815	99.6%
Rush Township	3,412	3,050	89.4%
Ryan Township	2,459	1,260	51.2%
Schuylkill Haven Borough	5,437	4,825	88.7%
Schuylkill Township	1,129	1,016	90.0%
Shenandoah Borough	5,071	5,044	99.5%
South Manheim Township	2,504	2,307	92.1%
St. Clair Borough	3,004	3,004	100.0%
Tamaqua Borough	7,107	7,102	99.9%
Tower City Borough	1,346	1,346	100.0%
Tremont Borough	1,752	1,741	99.4%
Tremont Township	280	92	32.9%
Union Township	1,273	1,160	91.1%
Upper Mahantongo Township	655	492	75.1%
Walker Township	1,054	649	61.6%
Washington Township	3,033	2,504	82.6%
Wayne Township	5,113	2,960	57.9%
West Brunswick Township	3,332	2,964	89.0%
West Mahanoy Township	2,868	2,868	100.0%
West Penn Township	4,442	3,522	79.3%
Schuylkill County (Total)	148,289	132,185	89.1%

Source: U.S. Census 2010, Stewart and Radeloff 2012

Notes: WUI Wildland-Urban Interface

Impact on General Building Stock

The most vulnerable structures to wildfire events are those within the WUI. Buildings constructed of wood or vinyl siding are generally more likely to be damaged by the fire hazard than buildings constructed of brick or concrete. The WUI was overlaid on the default building inventory available in HAZUS-MH to estimate the replacement cost of buildings in Schuylkill County potentially vulnerable to the wildfire hazard. The replacement cost value (RCV) of the census blocks with their center in the WUI was totaled. To estimate the number of structures exposed to this hazard, the hazard area was overlaid on the building footprint spatial layer from Schuylkill County. Structures with their centroid in the hazard area were totaled. Table 4.3.11-6 summarizes the estimated building stock inventory exposed by municipality. Overall, greater than 80-percent of the buildings in the County are located in the WUI.

Table 4.3.11-6. Building Stock Replacement Value and Structures Located within the WUI in Schuylkill County

Municipality	Total GBS RCV	Estimated GBS RCV Exposed	Percent of Total	Total Number of Structures	Number of Structures in Hazard Area	Percent of Total
Ashland Borough	\$620,713,000	\$565,091,000	91.0%	1,305	1,238	94.9%
Auburn Borough	\$103,863,000	\$101,059,000	97.3%	654	627	95.9%
Barry Township	\$158,166,000	\$119,587,000	75.6%	1,424	1,135	79.7%
Blythe Township	\$116,013,000	\$99,357,000	85.6%	842	526	62.5%
Branch Township	\$267,249,000	\$261,126,000	97.7%	1,434	1,401	97.7%
Butler Township	\$678,513,000	\$578,755,000	85.3%	3,520	3,140	89.2%
Cass Township	\$214,671,000	\$207,997,000	96.9%	1,786	1,668	93.4%
Coaldale Borough	\$486,727,000	\$485,931,000	99.8%	1,204	1,168	97.0%
Cressona Borough	\$953,030,000	\$945,534,000	99.2%	1,062	1,048	98.7%
Deer Lake Borough	\$99,765,000	\$93,915,000	94.1%	450	438	97.3%
Delano Township	\$83,326,000	\$45,207,000	54.3%	351	291	82.9%
East Brunswick Township	\$324,669,000	\$250,565,000	77.2%	2,201	1,754	79.7%
East Norwegian Township	\$143,736,000	\$143,265,000	99.7%	817	788	96.5%
East Union Township	\$204,679,000	\$180,820,000	88.3%	1,650	1,358	82.3%
Eldred Township	\$121,735,000	\$91,141,000	74.9%	1,266	865	68.3%
Foster Township	\$38,321,000	\$19,727,000	51.5%	318	162	50.9%
Frackville Borough	\$752,136,000	\$655,511,000	87.2%	2,170	2,104	97.0%
Frailey Township	\$53,438,000	\$41,629,000	77.9%	450	315	70.0%
Gilberton Borough	\$128,081,000	\$114,121,000	89.1%	589	559	94.9%
Girardville Borough	\$222,078,000	\$219,134,000	98.7%	663	652	98.3%
Gordon Borough	\$100,774,000	\$100,774,000	100.0%	532	526	98.9%
Hegins Township	\$685,956,000	\$630,064,000	91.9%	4,433	3,586	80.9%
Hubleys Township	\$105,069,000	\$95,049,000	90.5%	1,574	1,333	84.7%
Kline Township	\$240,993,000	\$180,869,000	75.1%	1,184	902	76.2%
Landingville Borough	\$27,592,000	\$25,866,000	93.7%	168	130	77.4%
Mahanoy City Borough	\$659,011,000	\$649,133,000	98.5%	904	866	95.8%
Mahanoy Township	\$184,548,000	\$90,626,000	49.1%	1,079	672	62.3%
Mcadoo Borough	\$319,053,000	\$319,053,000	100.0%	1,262	1,259	99.8%
Mechanicsville Borough	\$59,144,000	\$59,140,000	100.0%	297	292	98.3%
Middleport Borough	\$60,507,000	\$60,507,000	100.0%	304	298	98.0%
Minersville Borough	\$740,701,000	\$728,550,000	98.4%	1,705	1,664	97.6%
Mount Carbon Borough	\$17,094,000	\$17,094,000	100.0%	65	65	100.0%
New Castle Township	\$74,575,000	\$40,331,000	54.1%	337	274	81.3%
New Philadelphia Borough	\$162,575,000	\$162,575,000	100.0%	609	595	97.7%
New Ringgold Borough	\$37,501,000	\$37,501,000	100.0%	267	256	95.9%
North Manheim Township	\$729,771,000	\$675,053,000	92.5%	3,235	2,908	89.9%
North Union Township	\$263,112,000	\$249,526,000	94.8%	1,571	1,443	91.9%

Municipality	Total GBS RCV	Estimated GBS RCV Exposed	Percent of Total	Total Number of Structures	Number of Structures in Hazard Area	Percent of Total
Norwegian Township	\$504,898,000	\$482,913,000	95.6%	1,569	1,480	94.3%
Orwigsburg Borough	\$650,863,000	\$412,488,000	63.4%	1,611	1,097	68.1%
Palo Alto Borough	\$166,890,000	\$144,380,000	86.5%	590	572	96.9%
Pine Grove Borough	\$488,857,000	\$468,706,000	95.9%	1,278	1,159	90.7%
Pine Grove Township	\$572,921,000	\$524,607,000	91.6%	4,729	4,233	89.5%
Port Carbon Borough	\$248,182,000	\$234,164,000	94.4%	1,040	1,013	97.4%
Port Clinton Borough	\$53,248,000	\$50,755,000	95.3%	251	246	98.0%
Porter Township	\$322,132,000	\$298,871,000	92.8%	2,522	2,220	88.0%
Pottsville City	\$2,835,912,000	\$2,565,130,000	90.5%	5,667	5,511	97.2%
Reilly Township	\$87,148,000	\$76,288,000	87.5%	615	517	84.1%
Ringtown Borough	\$196,315,000	\$195,745,000	99.7%	591	589	99.7%
Rush Township	\$638,207,000	\$571,372,000	89.5%	3,358	2,927	87.2%
Ryan Township	\$258,861,000	\$217,394,000	84.0%	1,552	1,413	91.0%
Schuylkill Haven Borough	\$1,167,905,000	\$969,956,000	83.1%	2,672	2,237	83.7%
Schuylkill Township	\$148,930,000	\$132,195,000	88.8%	909	754	82.3%
Shenandoah Borough	\$1,114,064,000	\$1,066,837,000	95.8%	1,652	1,603	97.0%
South Manheim Township	\$472,442,000	\$425,876,000	90.1%	2,543	2,251	88.5%
St. Clair Borough	\$641,674,000	\$580,019,000	90.4%	1,571	1,547	98.5%
Tamaqua Borough	\$1,146,438,000	\$1,095,100,000	95.5%	3,027	2,925	96.6%
Tower City Borough	\$275,734,000	\$275,734,000	100.0%	952	945	99.3%
Tremont Borough	\$261,136,000	\$247,741,000	94.9%	954	924	96.9%
Tremont Township	\$59,522,000	\$9,376,000	15.8%	372	94	25.3%
Union Township	\$141,163,000	\$128,097,000	90.7%	1,590	1,363	85.7%
Upper Mahantongo Township	\$134,904,000	\$112,742,000	83.6%	1,203	788	65.5%
Walker Township	\$129,306,000	\$105,265,000	81.4%	1,399	1,048	74.9%
Washington Township	\$378,935,000	\$317,531,000	83.8%	3,784	3,263	86.2%
Wayne Township	\$884,718,000	\$549,610,000	62.1%	5,373	3,411	63.5%
West Brunswick Township	\$656,084,000	\$506,892,000	77.3%	3,297	2,890	87.7%
West Mahanoy Township	\$586,962,000	\$454,390,000	77.4%	2,208	2,125	96.2%
West Penn Township	\$552,845,000	\$422,838,000	76.5%	5,677	4,384	77.2%
Schuylkill County	\$26,016,081,000	\$22,984,195,000	88.3%	108,238	93,835	86.7%

Source: HAZUS-MH v4.0; Schuylkill County; Stewart and Radeloff 2012

Notes:

- GBS General Building Stock
- RCV Replacement cost value
- WUI Wildland-Urban Interface

Impact on Critical Facilities

A number of critical facilities are located in the wildfire hazard area. Many of these facilities house vulnerable populations (schools) or are responding agencies to wildfire events (fire and police). Of the 258 responding agencies in the County (EMS, EOC, Fire and Police) over 80-percent (207) are located in the WUI. Table 4.3.11-7 summarizes the number of critical facilities that are located within the wildfire hazard area.

Table 4.3.11-7. Number of Critical Facilities in the WUI in Schuylkill County

Municipality	Bridge	Children/Youth Services	Communication	County Building	Dam	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Hazmat	Hospital	Hydrant	Mental Health	Military	Nursing Home	Police	Polling	Potable Water Treatment	School	Senior	Wastewater Treatment
Ashland Borough	2	0	0	0	0	0	1	1	1	3	2	0	0	0	0	0	1	5	0	0	0	1
Auburn Borough	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	1	0	0	0	0
Barry Township	8	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Blythe Township	1	1	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	2	0	0	0	0
Branch Township	3	0	0	0	0	0	2	0	1	1	1	0	0	0	0	0	2	1	0	0	0	1
Butler Township	11	0	0	0	0	1	2	0	1	3	1	1	26	2	0	0	1	3	0	2	0	0
Cass Township	5	0	0	0	0	0	1	0	1	3	1	0	0	1	0	0	1	3	1	1	0	0
Coaldale Borough	0	0	0	0	0	2	0	0	1	1	2	1	0	0	0	0	1	3	0	0	0	1
Cressona Borough	3	0	0	0	0	0	1	0	0	2	2	0	0	1	0	0	0	1	0	1	0	1
Deer Lake Borough	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Delano Township	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0
East Brunswick Township	7	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
East Norwegian Township	3	0	0	0	0	0	1	0	1	2	7	0	0	0	0	1	0	2	0	0	0	1
East Union Township	11	0	0	0	0	0	0	0	1	1	0	0	97	0	0	0	1	1	1	0	0	0
Eldred Township	8	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0
Foster Township	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0
Frackville Borough	0	0	0	0	0	1	3	1	1	1	3	0	0	0	0	1	1	2	1	1	0	0
Frailey Township	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0
Gilberton Borough	4	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0
Girardville Borough	7	0	0	0	0	2	0	1	0	2	1	0	29	0	0	0	0	4	0	0	0	0

Municipality	Bridge	Children/Youth Services	Communication	County Building	Dam	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Hazmat	Hospital	Hydrant	Mental Health	Military	Nursing Home	Police	Polling	Potable Water Treatment	School	Senior	Wastewater Treatment
Gordon Borough	2	0	0	0	1	0	0	0	1	1	2	0	17	0	0	0	0	0	0	0	0	0
Hegins Township	11	0	0	0	1	3	2	1	1	2	4	0	0	2	0	0	1	2	0	3	0	0
Hublely Township	7	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0
Kline Township	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	2	0	0	0	0
Landingville Borough	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0
Mahanoy City Borough	4	0	0	0	0	1	2	1	1	5	1	0	0	0	0	0	1	7	0	1	0	0
Mahanoy Township	2	0	0	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	0
Mcadoo Borough	0	0	0	0	0	0	0	1	1	2	2	0	0	0	0	1	1	1	0	1	1	0
Mechanicsville Borough	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Middleport Borough	3	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0
Minersville Borough	1	0	0	0	0	3	3	1	1	3	2	0	0	0	0	0	1	2	0	2	0	0
Mount Carbon Borough	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0
New Castle Township	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1	0	0	0	0
New Philadelphia Borough	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	0	1	0	0
New Ringgold Borough	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
North Manheim Township	6	0	0	1	0	2	3	0	1	0	6	0	0	1	0	0	1	2	2	3	1	1
North Union Township	6	0	0	0	1	0	1	1	1	0	0	0	39	0	0	0	1	1	0	0	0	1

Municipality	Bridge	Children/Youth Services	Communication	County Building	Dam	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Hazmat	Hospital	Hydrant	Mental Health	Military	Nursing Home	Police	Polling	Potable Water Treatment	School	Senior	Wastewater Treatment
Norwegian Township	0	2	1	0	1	1	0	0	1	2	4	0	0	2	0	1	0	2	0	1	0	0
Orwigsburg Borough	1	0	0	0	0	1	4	0	1	1	1	0	0	0	0	0	1	1	0	0	0	0
Palo Alto Borough	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	1	1	0	0	0	0
Pine Grove Borough	1	1	0	0	0	1	4	1	1	2	5	0	0	1	1	0	1	2	0	2	1	0
Pine Grove Township	17	0	0	0	1	0	2	0	1	2	5	0	0	0	0	0	0	2	0	0	1	1
Port Carbon Borough	4	0	0	0	0	1	0	0	1	1	1	0	0	0	0	0	1	2	0	1	0	0
Port Clinton Borough	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0
Porter Township	5	0	0	0	0	0	0	0	1	4	1	0	0	1	0	0	0	2	0	1	0	0
Pottsville City	3	3	1	3	0	4	15	1	0	6	4	4	0	15	0	3	2	19	0	4	2	1
Reilly Township	1	0	0	0	0	0	0	0	1	2	0	2	0	0	0	0	0	1	0	0	0	0
Ringtown Borough	1	0	0	0	0	0	0	1	1	1	4	1	0	0	0	0	1	1	1	1	0	0
Rush Township	6	0	0	0	1	1	0	0	1	2	4	0	0	0	1	0	1	2	0	1	0	0
Ryan Township	4	0	0	0	2	0	2	1	1	1	1	0	0	0	0	0	1	1	0	0	0	0
Schuylkill Haven Borough	5	0	0	0	0	6	2	1	0	4	2	0	0	3	0	0	1	4	0	3	0	0
Schuylkill Township	3	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	1	1	0	0	0	0
Shenandoah Borough	2	0	0	0	0	1	2	0	1	4	3	0	0	1	0	0	0	9	0	3	0	0
South Manheim Township	5	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1
St. Clair Borough	10	0	0	0	0	1	1	1	1	6	1	1	0	0	0	0	1	5	0	0	0	0

Municipality	Bridge	Children/Youth Services	Communication	County Building	Dam	Day Care	Developmental Programs	EMS	EOC	Fire/Rescue	Hazmat	Hospital	Hydrant	Mental Health	Military	Nursing Home	Police	Polling	Potable Water Treatment	School	Senior	Wastewater Treatment
Tamaqua Borough	7	0	0	0	0	7	7	1	0	4	4	0	0	0	0	0	0	5	0	3	0	0
Tower City Borough	0	0	0	0	0	2	0	1	1	1	0	0	0	0	0	0	1	2	0	0	1	0
Tremont Borough	9	0	0	0	0	0	3	1	0	2	1	0	0	0	0	1	1	1	0	0	0	0
Tremont Township	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Union Township	7	0	0	0	1	0	0	0	1	0	3	0	0	0	0	0	1	1	0	0	0	1
Upper Mahantongo Township	7	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	2	0	1	0	0
Walker Township	1	0	0	0	1	0	4	0	0	1	3	0	0	0	0	0	0	0	0	2	0	0
Washington Township	16	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wayne Township	6	0	0	0	4	0	3	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0
West Brunswick Township	17	0	0	0	0	2	1	0	1	0	4	0	0	0	0	1	0	2	0	0	1	1
West Mahanoy Township	1	0	2	0	1	0	3	1	1	1	3	0	0	1	0	2	2	4	1	0	0	0
West Penn Township	12	0	0	0	0	1	3	0	1	0	0	0	0	0	0	0	1	2	0	0	0	0
Schuylkill County (Total)	272	7	4	4	20	49	83	20	49	100	99	10	208	33	2	13	38	137	9	39	8	12

Source: Stewart and Radeloff 2012; Schuylkill County 2018

Notes:

WUI Wildland-Urban Interface

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 agricultural products. However, as noted earlier in this section, Schuylkill County typically experiences brush fires that can be managed by the local fire fighters and as needed with assistance from the State.

Roads provide a vital transportation link between populated areas. Road closures, as a result of a wildfire event, will have significant impacts and should be considered when determining evacuation routes for residents. Portions of Interstate I-81, US Routes US-209, and multiple State Routes, including PA-25, PA-54, PA-61, PA-125, PA-183, PA-309, PA-325, PA-339, PA-443, PA-501, PA-645, PA-895, PA-901, and PA-924 run through WUI areas.

Impact on the Environment

Wildfires threaten air quality, water quality, soil properties, nutrient cycling, vegetation and wildlife habitat. Wildfires can increase the probability of other natural disasters, specifically floods and mudflows. Wildfires, particular large-scale fires, can dramatically alter the terrain and ground conditions, making land already devastated by fire susceptible to floods. Lands impacted by wildfire 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 2013).

Future Growth and Development

Areas targeted for potential future growth and development in the next 5 years have been identified across the County; refer to Section 2 (County Profile). It is anticipated that any new development and new residents in the WUI will be exposed to the wildfire hazard.

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 2012).

Fire interacts with climate and vegetation (fuel) in predictable ways. Understanding the interactions of climate, fire, and vegetation interactions is essential for addressing issues associated with climate change that include:

- 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 (USFS 2012).

It is projected that higher summer temperatures will likely increase the high fire risk by 10 to 30-percent. Fire occurrence and area 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 and extending fire seasons and areas burned (USFS 2012).

The PA DEP 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 2009 Pennsylvania Climate Impact Assessment's main findings indicate Pennsylvania may be at increased risk for wildfires, but it is unclear how large the increase in risk will be (Shortle et al 2009). 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 2012).

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 the fire hazard 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.

The County may consider participating in Firewise; a program that teaches people how to adapt to living with wildfire and encourages neighbors to work together and take action to prevent losses. In locations where homes are at risk to wildfires, the State's 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. The County and municipalities may consider different landscape requirements in the WUI and consider updating the subdivision and zoning ordinances to indicate as such. Further, as indicated in the Saladyga and Standlee study, residents agree about the need for active flue management and an increase in wildfire prevention education, trash disposal and recycling programs and fire management training and infrastructure

4.3.12 WINTER STORM

PROFILE

Winter storms occur, on average, approximately five times each year in Pennsylvania. 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 NWS, heavy snow is generally considered snowfall accumulating to depth of 4 inches or more within 12 hours or less or snowfall accumulating to 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). Snowstorms are complex phenomena involving heavy snow and winds whose impact can be affected by a great many factors, including a region's climatological susceptibility to snowstorms, snowfall amounts, snowfall rates, wind speeds, temperatures, visibility, storm duration, topography, and occurrence during the course of the day, weekday versus weekend, and time of season (Kocin and Uccellini 2013).
- **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 of time (3 or more hours) (NWS 2009). 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 of time.
- **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 glaze upon contact with the ground. Both types of precipitation, even in small accumulations, can cause significant hazards to a community (NWS 2009).
- **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 (NWS 2009).

- Nor'easter:** Nor'easters are macro-scale, extra-tropical storms named for the strong northeasterly winds that blow in from the Atlantic Ocean ahead of the storm and over coastal areas of the northeastern United States and Atlantic Canada. They are also referred to as a type of extra-tropical cyclone (mid-latitude storms, or Great Lake storms). Wind gusts associated with Nor'easters can exceed hurricane forces in intensity. Unlike tropical cyclones that form in the tropics and have warm cores (including tropical depressions, tropical storms, and hurricanes), Nor'easters contain a cold core of low barometric pressure that forms in the mid-latitudes. Their strongest winds are close to the earth's surface and often extend several hundred miles across. Nor'easters may occur at any time of the year but are more common during fall and winter months (September through April) (PEMA 2018; New York City Office of Emergency Management [NYCOEM] Date Unknown).

Nor'easters can induce heavy snow, rain, gale-force winds, and oversized waves (storm surge) that can cause beach erosion, coastal flooding, structural damage, power outages, and unsafe human conditions. If a Nor'easter cyclone stays just offshore, the results are much more devastating than if the cyclone travels up the coast on an inland track. Nor'easters that stay inland are generally weaker and usually cause strong winds and rain. Those that stay offshore can bring heavy snow, blizzards, ice, strong winds, high waves, and severe beach erosion. In these storms, the warmer air is aloft. Precipitation falling from this warm air moves into the colder air at the surface, causing crippling sleet or freezing rain (McNoldy Multi-Community Environmental Storm Observatory [MESO], Date Unknown). 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 Schuylkill County, may include heavy snow, strong winds and blizzard conditions.

Location and Extent

Winter storms are regional events. In many cases, surrounding states and even the northeast region of the United States are affected by a single winter storm incident. The magnitude or severity of a severe winter storm depends on several factors, including 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 season.

The extent of a severe winter storm can be classified by meteorological measurements and by evaluating its societal impacts. The NOAA's National Climatic Data Center (NCDC) is currently producing 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. The index is based on spatial extent of the storm, amount of snowfall, and interaction of the extent and snowfall totals with population (based on the 2000 U.S. Census). The NCDC has analyzed and assigned RSI values to over 500 storms since 1900 (NCDC 2011). Table 4.3.12-1 lists the five RSI ranking categories.

Table 4.3.12-1. Regional Snowfall Index Ranking Categories

Category	Description	Regional Snowfall Index
1	Notable	1-3
2	Significant	3-6
3	Major	6-10
4	Crippling	10-18
5	Extreme	18.0+

Source: NCDC 2011

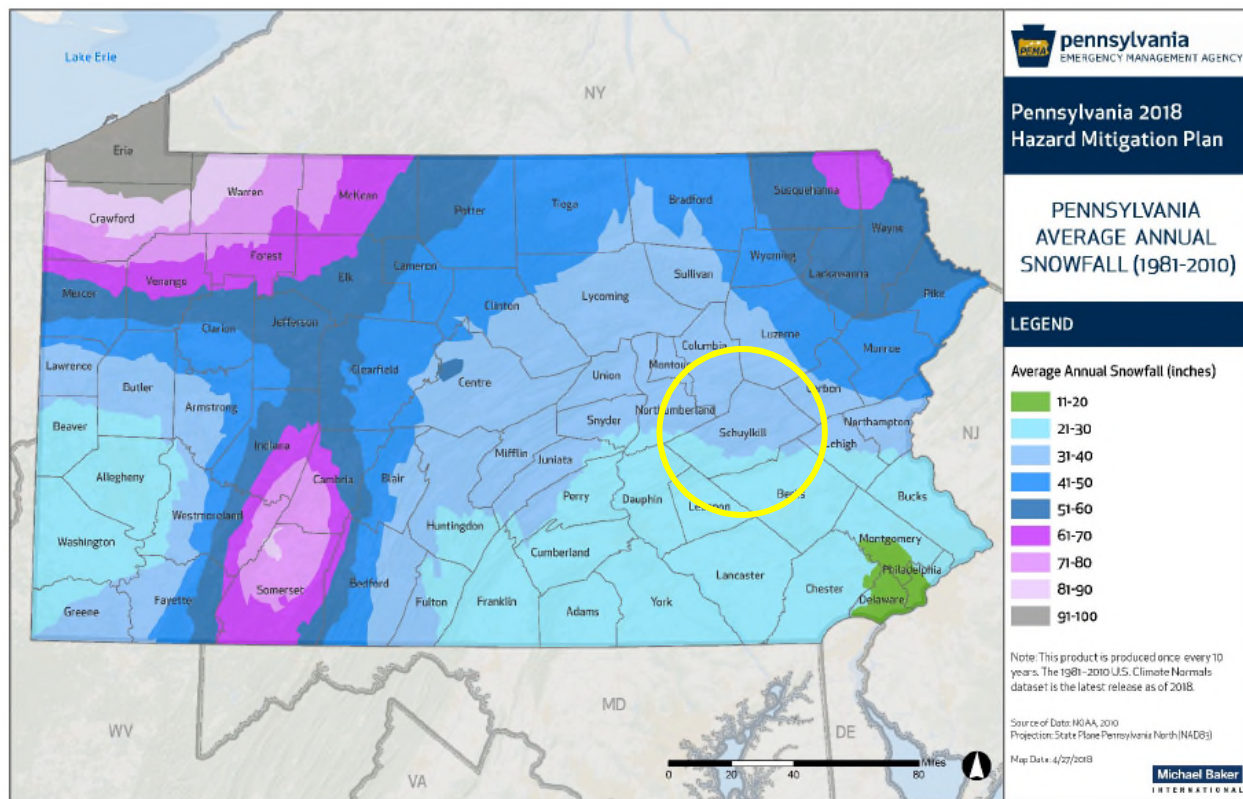
Range of Magnitude

A winter storm typically falls into one of the following categories, defined in the previous section:

- Heavy snow
- Sleet or freezing rain
- Ice storm
- Blizzard
- Nor'easter

All of Schuykill County is susceptible to winter storms. Based on the average annual snowfall from 1981 to 2010, snowfall accumulation during the winter season in Schuykill County ranges from 21 inches to 40 inches (PEMA 2018). According to this 30-year average, the greatest snowfall amounts occur in the northern two-thirds of the County; refer to Figure 4.3.12-1.

Figure 4.3.12-1. Average Annual Snowfall



Source: Pennsylvania Emergency Management Agency (PEMA) 2018

Note: The yellow oval surrounds Schuykill County.

The January 1996 snowstorm has been referred to as the “storm of the century,” and was the worst-case scenario of a winter storm in Schuykill County. As a result of the ‘Blizzard of 1996’ Schuykill County received 16 to 32 inches of snow. Emergency services throughout the County were unable to continue normal operations. Most road travel, including travel on major highways, was impossible due to high winds causing snow drifts. One fatality was reported in the County. The victim suffered a heart attack while shoveling snow. The National Guard was called upon to help

transport people to hospitals either to work or for various treatments. According to Schuykill County 911 call records, between the 8th and the 11th of January 1996, there were four (4) residential properties that suffered structural damage from collapse and two (2) unknown type structures that received damage (Schuykill 2013).

Past Occurrence

Many sources provided historical information regarding previous occurrences and losses associated with winter storm events throughout the Commonwealth of Pennsylvania and Schuykill County. Loss and impact information for many events varied depending on the source; therefore, accuracy of 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 as a whole, based on entire storm damage, and include damage from other counties.

Between 1954 and 2017, the FEMA declared that the Commonwealth of Pennsylvania experienced eight (8) 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. The PEMA and other sources indicate that Schuykill County has been declared as a disaster area as a result of six (6) of the declarations for winter storm events (FEMA 2017).

According to the NOAA-NCDC storm events database, Schuykill County experienced 11 winter storm events between January 1, 2009 and December 31, 2017. Refer to Appendix XG for previous events documented in the 2013 HMP. Based on the sources referenced, known winter storm events that have affected Schuykill County are listed in Table 4.3.12-2.

Table 4.3.12-2. Major Winter Storm Events in Schuykill County between 2009 and 2017

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts
January 6, 2006	Ice Storm	N/A	N/A	No reported losses.
January 27, 2009	Winter Storm	N/A	N/A	No reported losses.
February 5, 2010	Winter Storm	N/A	N/A	No reported losses.
February 9, 2010	Winter Storm	N/A	N/A	No reported losses.
February 25, 2010	Winter Storm	N/A	N/A	No reported losses.
February 1, 2011	Winter Storm	N/A	N/A	No reported losses.
December 14, 2013	Winter Storm	N/A	N/A	No reported losses.
February 4, 2014	Winter Storm	N/A	N/A	No reported losses.
January 22, 2016	Winter Storm	N/A	N/A	No reported losses.
February 8, 2016	Winter Storm	N/A	N/A	No reported losses.
March 13, 2017	Winter Storm	N/A	N/A	No reported losses.

Source: NCDC 2017

Notes:

<i>DR</i>	<i>Federal Disaster Declaration</i>	<i>NCDC</i>	<i>National Climate Data Center</i>
<i>FEMA</i>	<i>Federal Emergency Management Agency</i>	<i>NOAA</i>	<i>National Oceanic Atmospheric Administration</i>
<i>N/A</i>	<i>Not applicable/available</i>		

Future Occurrence

Winter storm events are a regular, annual occurrence in Schuylkill County. The probability of occurrence for the winter storm in Schuylkill County is considered “highly likely” (greater than 90% annual probability) as defined by the Risk Factor Methodology probability criteria (Section 4.4). Winter storm is ranked as a high-risk hazard in Schuylkill County.

VULNERABILITY ASSESSMENT

To understand risk, a community must evaluate assets exposed and vulnerable within the identified hazard area. The following section discusses potential impacts of the winter storm hazard on Schuylkill County, including:

- Impacts 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 collections that will assist in understanding this hazard over time.

National weather databases, the State HMP, and local resources were referenced to acquire information about and analyze severe winter storm impacts on Schuylkill County. The HAZUS-MH building inventory for Schuylkill County supported an evaluation of exposed assets and potential impacts associated with this hazard.

Impact on Life, Health, and Safety

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 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 2015).

Road closures are frequent occurrences during winter storm events due to the terrain of the County. Emergency services experience an increase in call volume (i.e., medical and emergency services) to assist residents, motorists and respond to calls for assistance. Many municipalities do not have a full-time police force; therefore, volunteer fire services are often called to assist with traffic control during winter weather.

For the purposes of this HMP, the entire population of Schuylkill County is considered exposed to winter storm events (U.S. Census 2010). The elderly are considered most susceptible to this hazard because of their increased risk of injuries and death from falls and overexertion, and/or hypothermia from exposure while attempting to clear snow and ice. In addition, winter storm events can reduce 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). The County Profile (Section 2) 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 Schuylkill 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. As discussed above, six properties suffered structural damage during the January 1996 winter storm event, considered the worst-case scenario for the County. This represents less than 1-percent of the County's total structural replacement cost value. Therefore, for the purposes of this HMP, a 1-percent of damage assumption has been applied as a conservative loss estimate. The 1-percent loss to the total building inventory (structure only) would be an estimated \$155,582,370 in replacement cost value (FEMA HAZUS-MH).

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 (Section 4.3.4). 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 4.3.4.

Impact on Critical Facilities

Full functionality of critical facilities such as police, fire, and medical services is essential for response during and after a winter storm event. These critical facility structures are largely constructed of concrete and masonry; therefore, these should undergo only minimal structural damage from severe winter storm events. These larger buildings can have mechanicals on the roofs where snow and ice can accumulate. Because power interruption can occur, backup power is recommended for critical facilities and infrastructure.

Impact on the Economy

Infrastructure at risk from the winter storm hazard includes roadways that could be damaged by 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 2013).

Winter storms have a positive environmental impact: gradual melting of snow and ice recharges groundwater. However, abrupt high temperatures following a heavy snowfall can accelerate snowmelt, leading to rapid surface water runoff and severe flooding (PEMA 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 at the municipal level, and are further discussed in Section 2 (County Profile) of this HMP. Because Schuylkill 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.

Effect of Climate Change on Vulnerability

According to the recently released 2018 State HMP, while there may be an increase in intense winter storm events in the Commonwealth, the overall snow cover is expected to decline. Climate model projections vary by region and model agreement is low. Therefore, for the purposes of this HMP update, there has been no change in vulnerability for Schuylkill County over the performance period of the 2013 HMP and it is anticipated that the County will continue to remain vulnerable to the winter storm hazard over the 2019 HMP performance period.

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 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 2015). Acquisition of additional/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 Ranking

As discussed in Section 4.2, Hazard Identification, a comprehensive range of natural and non-natural hazards that pose significant risk to Schuylkill County were selected and considered in this plan. However, the communities in Schuylkill 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 most effectively and efficiently manage risk.

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 Pennsylvania Emergency Management Agency’s (PEMA) All-Hazard Planning Standard Operating Guide (PEMA October 2013). 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:

Example Equation

$$\text{RF Value} = [(\text{Probability} \times .30) + (\text{Impact} \times .30) + (\text{Spatial Extent} \times .20) + (\text{Warning Time} \times .10) + (\text{Duration} \times .10)]$$

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 4.4-1 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 4.4-2 shows the five risk assessment categories’ values for each of Schuylkill County’s hazards, and each hazard’s RF.

At the May 2018 Risk Assessment meeting, the Core Planning Team reviewed and revised the hazard ranking to ensure it reflected the County’s hazard risk. Following the risk assessment review at this meeting, Core and Municipal Planning Team members were requested to complete a hazard ranking worksheet for their communities. The same methodology was applied to rank the hazards at the municipal level. Municipal hazard rankings may be found in Appendix D.

Table 4.4-1. Summary of Risk Factor (RF) Approach

Summary of Risk Factor (RF) Approach				
Risk Assessment Category	Degree of Risk			Weight Value
	Level	Criteria	Index	
PROBABILITY <i>What is the likelihood of a hazard event occurring in a given year?</i>	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 PROBABILITY	4	
IMPACT <i>In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?</i>	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 <i>How large of an area could be impacted by a hazard event? Are impacts localized or regional?</i>	NEGLECTIBLE	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 <i>Is there usually some lead time associated with the hazard event? Have warning measures been implemented?</i>	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 <i>How long does the hazard event usually last?</i>	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	

Source: PEMA All-Hazard Mitigation Planning Standard Operating Guide, October 2013

Table 4.4-2. Risk Ranking for Schuylkill County

HAZARD RISK	HAZARDS	RISK ASSESSMENT CATEGORY					RISK FACTOR (RF)
		PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	
HIGH	Blight	4	2	4	1	4	3.1
	Drought and Water Deficiencies	4	2	4	1	4	3.1
	Flood	4	3	2	2	3	3.0
	Winter Storm	4	2	4	1	2	2.9
	Radon	4	1	4	1	4	2.8
	Hurricane/Windstorm	2	2	4	4	3	2.7
	Nuclear	1	3	3	4	4	2.6
MODERATE	Mine Subsidence	2	2	3	4	2	2.4
	Hazardous Materials and Transportation Incidents	3	1	2	4	2	2.2
	Dam and Levee Failure	1	3	2	4	1	2.1
	Wildfire	3	1	2	4	2	2.1
LOW	Tornado	1	2	2	4	1	1.8

SECTION 5. CAPABILITY ASSESSMENT

The capability assessment evaluates Schuylkill County’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 for the Schuylkill County HMP update is to describe the basic approaches available to reduce hazard risks. According to the 2013 Pennsylvania Emergency Management Agency (PEMA) All-Hazard Mitigation Planning Standard Operating Guide (SOG), the following four general approaches may reduce hazard risks:

- **Local Plans and Regulations** – These actions include government authorities, policies, or codes that influence the ways land is developed and buildings are constructed.
- **Structure and Infrastructure** – These actions involve modifying existing structures and infrastructure or constructing new structures to reduce hazard vulnerability.
- **Natural Systems Protection** – These are actions that minimize damage and losses and also preserve or restore the functions of natural systems.
- **Education and Awareness** – These are actions taken to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Education and awareness actions may also include participation in national programs (PEMA SOG 2013).

Capability assessments document the existing resources available to local communities to reduce hazard risks. Resources can be divided into the following five categories (according to the PEMA All-Hazard Mitigation Planning SOG). For each basic capability or approach, one or more of the five resources described below may be available:

- **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 9-1-1 communications systems. They also include technical requirements established by law, regulation, or ordinance.
- **Informational resources** include materials about disasters, and actions related to hazard mitigation and planning. Informational 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.

5.1 UPDATE PROCESS SUMMARY

During the plan update process, Schuylkill County and all municipalities were surveyed 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 2013 edition of the PEMA All-Hazard Mitigation Planning SOG (PEMA SOG 2013). The survey was provided to each of the municipal planning points of contact at the municipal kick-off meeting. Completed capability assessment surveys, whether completed by hand, electronically, or filled in working alongside the County, may be found in Appendix D.

Schuylkill County has a number of resources it can access to implement hazard mitigation initiatives including emergency response measures, local planning and regulatory tools, administrative assistance and technical expertise, fiscal capabilities, and participation in local, regional, state, and federal programs. The presence of these resources enables community resiliency through actions taken before, during, and after a hazard event. The most important resources which provide the basis for addressing hazard potential and mitigation are the emergency services manpower, equipment, fiscal and other resources available within Schuylkill County communities.

This section describes and summarizes the federal, state, county, and local capabilities to address hazard risk in Schuylkill County.

5.2 Capability Assessment Findings

A jurisdiction's ability to effectively manage natural hazard risk is directly related to their level of hazard mitigation capabilities. As such, mitigation strategies developed in coordination with Schuylkill County's municipalities have a direct effect on establishing new capability functions in the community or strengthening existing capabilities.

Schuylkill County and most of the municipalities updated and completed the Capability Assessment Survey (Appendix C). Overall, limited staffing and limited funding are critical barriers to the implementation of hazard mitigation activities in the County. The County and municipalities will need to rely on regional, state and federal partnerships for financial assistance. Schuylkill County will continue to alert municipalities when FEMA grant funding is available to apply and implement eligible projects in this HMP update.

The following sections further detail the capability assessment findings.

5.2.1 PLANNING AND REGULATORY CAPABILITY

COUNTY AND MUNICIPAL PLANNING CAPABILITIES

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 support their ability to manage natural and non-natural hazard risk. 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 codes. In Schuykill County, about half of the municipalities do not have their own zoning or subdivision and land development ordinances and instead rely on the County to administer subdivision and zoning.

Specific departments and plans under the planning and regulatory capability guiding hazard mitigation in Schuykill County are described in the sections below.

Schuykill Board of County Commissioners

The Schuykill Board of County Commissioners consists of three County Commissioners whose role is primarily administrative in nature with legislative or policy-making powers. They are vested with selective policy-making authority to provide certain local services and facilities including fiscal management on a countywide basis. The County Commissioners also have the authority to amend the County Zoning Ordinance and the County Subdivision and Land Development Ordinance, which apply to municipalities that have not adopted their own ordinances. In addition, the County Commissioners also adopt the Comprehensive Plan.

Schuykill County Planning Department

The Schuykill County Planning Department is co-leading the HMP update effort and leads all County planning activities, coordinates the County geographic information system (GIS) enterprise including an ArcGIS Online map gallery, and administers activities related to zoning, subdivision of land and approval of land development. Currently the County administers both the subdivision and zoning for 29 municipalities, administers only the zoning for 1 municipality and administers only the subdivision for three (3) municipalities (Table 5.1). The remainder of the municipalities maintains independent zoning and subdivision regulations.

Table 5-1. Municipal Subdivision and Zoning Regulations as Governed by the County or Maintained by the Municipality

Jurisdiction	Governed by County Code		Maintains Independent Code	
	Subdivision	Zoning	Subdivision	Zoning
Ashland (B)	■	■		
Auburn (B)	■	■		
Barry (T)	■	■		
Blythe (T)			■	■
Branch (T)			■	■
Butler (T)			■	■
Cass (T)			■	■
Coaldale (B)			■	■
Cressona (B)			■	■
Deer Lake (B)	■			■
Delano (T)		■	■	
East Brunswick (T)			■	■
East Norwegian (T)	■	■		
East Union (T)			■	■
Eldred (T)	■	■		

Jurisdiction	Governed by County Code		Maintains Independent Code	
	Subdivision	Zoning	Subdivision	Zoning
Foster (T)			■	■
Frackville (B)	■	■		
Frailey (T)	■	■		
Gilberton (B)	■	■		
Girardville (B)	■	■		
Gordon (B)	■	■		
Hegins (T)			■	■
Hubley (T)			■	■
Kline (T)			■	■
Landingville (B)	■	■		
Mahanoy (T)			■	■
Mahanoy City (B)	■	■		
McAdoo (B)	■			■
Mechanicsville (B)	■	■		
Middleport (B)	■	■		
Minersville (B)	■	■		
Mount Carbon (B)	■	■		
New Castle (T)			■	■
New Philadelphia (B)	■	■		
New Ringgold (B)	■	■		
North Manheim (T)			■	■
North Union (T)	■	■		
Norwegian (T)			■	■
Orwigsburg (B)			■	■
Palo Alto (B)	■	■		
Pine Grove (B)	■	■		
Pine Grove (T)			■	■
Port Carbon (B)	■			■
Port Clinton (B)	■	■		
Porter (T)	■	■		
Pottsville (C)			■	■
Reilly (T)	■	■		
Ringtown (B)			■	■
Rush (T)			■	■
Ryan (T)			■	■
Saint Clair (B)			■	■
Schuylkill (T)			■	■
Schuylkill Haven (B)			■	■
Shenandoah (B)			■	■
South Manheim (T)			■	■
Tamaqua (B)			■	■
Tower City (B)	■	■		
Tremont (B)	■	■		
Tremont (T)		■	■	

Jurisdiction	Governed by County Code		Maintains Independent Code	
	Subdivision	Zoning	Subdivision	Zoning
Union (T)	■	■		
Upper Mahantongo (T)	■	■		
Walker (T)			■	■
Washington (T)	■	■		
Wayne (T)			■	■
West Brunswick (T)			■	■
West Mahanoy (T)			■	■
West Penn (T)			■	■

Source: Schuykill County 2014

Notes:

B = Borough

C = City

T = Township

Geographic Information Systems (GIS)

The County GIS capabilities are within the County Planning Department. GIS is a set of tools (hardware, software and people) used to collect, manage, analyze and display spatially referenced data. Schuykill County has been and continues to incorporate GIS into existing planning and emergency operations. Schuykill County uses GIS technology in a variety of departments. Specific to the emergency operations, the EOC is equipped with two (2) GIS licenses. GIS is used to: track the allocation of resources; provide hard copy maps illustrating the scope of the event, staging areas, evacuation routes, etc.; assist with planning efforts; display incident status to EOC staff; and prepare for and collect damage assessment information. The deployment of GIS has and will continue to transition from a purely desktop/advanced environment to a more ubiquitous reliance on GIS in a web-based form. Currently, the County Planning Department leads the ArcGIS Online gallery for Schuykill County available at:

<https://schuykill.maps.arcgis.com/home/gallery.html?view=grid&sortOrder=true&sortField=relevance>

In addition, the County also maintains the online Mapviewer that is widely used and includes information on environmental data (streams, elevations, wetlands, soils) and floodplain data available at:

<http://gis.co.schuykill.pa.us/mapviewercontent/>

GIS has been invaluable asset in helping identify areas that area vulnerable to hazards. Existing GIS layers such as tax parcels, floodplains, critical facilities, coal, soils, land use, and other datasets were used for the vulnerability analysis for the 2019 HMP update. GIS was also used to provide collect information from residents and business owners regarding impacts resulting from the 2018 flood events.

Planning Documents

Schuykill County Comprehensive Plan

Comprehensive Plans promote sound land use and regional cooperation among local governments to address planning issues. These plans serve as the official policy guide for influencing the location, type and extent of future development by establishing the basis for decision-making and review processes on zoning matters, subdivision and land development, land uses, public facilities and housing needs over time. County governments are required by law to adopt a comprehensive plan, while local municipalities may do so at their option.

The most recent County Comprehensive Plan was developed and adopted by the County in 2006. The Plan identifies the direction for the future development of the county derived from exploring alternative development patterns. The Comprehensive Plan identifies the goals and policies and lays out an implementation strategy to achieve the goals of the Plan in the areas of open space conservation, roadway corridor planning, traffic management, historic preservation, infrastructure planning, and mine reclamation planning. Schuylkill County plans to update the County Comprehensive Plan within the next HMP update cycle. Future comprehensive plan updates and improvements will consider 2019 HMP findings.

The environmental protection element identifies specific areas in the county that are environmentally sensitive, including floodplains, wetlands, aquifer recharge and wellhead areas, and includes other critical natural features and stormwater management. The Plan recommends land use regulation revisions to provide incentives for clustered residential development and conserve woodlands in order to maintain an overall low intensity of development through large portions of the county designated as open space and resource protection areas

The following objectives in the Comprehensive Plan speak directly or indirectly to hazard mitigation issues, particularly in the area of resource management:

- Ensure that development occurs in ways that minimize degradation of natural and cultural environments.
- Protect environmentally sensitive areas of the county.
- Protect groundwater, floodplains, wetlands, mature woodlands, steep slopes, prime farmland, orchards, habitats of rare and endangered species, and other environmental features.

The following recommendations are relevant to the Hazard Mitigation Plan Update:

Zoning and Land Use Techniques

- Promote residential clustering through the preparation of model zoning ordinances and their adoption by municipalities.
- Devise model zoning provisions consistent with the housing element of the Comprehensive Plan; present to each municipality.
- Promote innovative techniques to reduce housing sprawl including agricultural zoning, cluster development, and small-lot single family detached and mixed structural types constructed in growth areas.
- Promote innovative approaches to reducing housing costs, including performance subdivision regulations, streamlined approvals process and provisions for residential conversions, accessory apartments and shared housing.
- Promote rehabilitation and selective redevelopment of housing in existing communities.

Stormwater Management

- Assist municipalities in preparing estimates of stormwater runoff.
- Assist municipalities in evaluating the capacities of stormwater facilities.
- Assist municipalities in developing stormwater management programs- coordinate the programs.
- Assist the municipalities in preparing Act 167 stormwater management plans by watershed.
- Review, have revised as necessary, and approve the stormwater management plans per Act 167.
- Work with the municipalities to conduct watershed studies to focus on potential effects of land development upon discharge rates into creeks and streams and develop model subdivision and land development regulations to assure that developments minimize off-site stormwater runoff, increase on-site infiltration, minimize off- site discharge of pollutants, and encourage natural filtration functions.

Wetlands

- Direct development away from wetlands;
- Encourage cluster development on higher ground that surrounds wetlands;
- Purchase wetlands that are important to protecting local floodplains or ecological systems.

Schuylkill County Open Space and Greenway Plan

The need for an Open Space and Greenway Study was identified in order to promote the importance of the County's open spaces, ensure a high quality of life for residents, and protect natural resources within the county and to address the concern of gradual encroachment of these spaces as land continues to be developed. One of the Plan's goals is to protect environmentally sensitive areas of the county by protecting groundwater, floodplains, wetlands, mature woodlands, steep slopes, prime farmland, orchards, habitats of rare and endangered species, and other environmental features. The plan also calls for the protection of culturally significant areas of the county by preserving historic resources.

General recommendations and policies from the Open Space and Greenway Plan that are relevant to hazard mitigation include the following:

- Prepare and promote the adoption of model ordinances and design guidelines for the retention of stormwater from new development and for temporary and permanent sedimentation and erosion control.
- Initiate watershed studies with the participation of relevant municipalities.
- Encourage cluster development to create open space buffers to manage the impact of adjacent uses and can focus development in a defined area.
- Provide incentives in the form of density bonuses to encourage landowners to develop compact arrangements of dwelling units, rather than widely spread development to reduce the potential land area disturbed in development.
- Subject areas with flood prone soils to all of the development restrictions of the land within the 100-year floodplain.
- Provide long-term wetlands protection by directing development away from these areas, by encouraging clustered construction on higher ground surrounding wetlands, and by purchasing wetlands important to protecting local floodplains or ecological systems.
- Develop a policy toward environmentally sensitive areas to discourage development wherever possible to prevent destruction of important resources or to protect residents of the county.

Schuylkill County Conservation District Strategic Plan

The Schuylkill County Conservation District directors, staff and cooperating organizations identified and prioritized natural resource needs of the County and create a plan of action to meet those needs. As a result, the following focus areas were determined with associated strategies identified:

- Planned growth to conserve and protect natural resources
- Protect and improve water quality
- Environmental education
- Public relations and image

Pine Grove Area – Upper Swatara Watershed PA Recovery Strategy

As a result of the severe flooding from Tropical Storm Lee in 2011, the Upper Swatara Watershed developed a strategic action plan to guide their long-term community recovery process. The process engaged local leaders, residents, and businesses of the Pine Grove Area/Upper Swatara community. Strategies developed during this process, and documented in the report, focused in two areas: community capacity building and watershed improvements. There are eight municipalities in the Upper Swatara Watershed who have been actively implementing these projects during the performance period of the 2013 HMP and have included an updated strategy to continue seeking funding to implement the recommended actions to continue on the path of recovery and revitalization.

Port Carbon Watershed Study

In March 2017, Port Carbon Borough completed the Port Carbon Watershed Study. The goal of the study was to look at the existing and future conditions of Mill Creek and the Schuylkill River Watershed, and to determine and prioritize flooding concerns while developing flood mitigation conceptual design alternatives in addition to, implementing watershed restoration and protection initiatives in the vicinity of the Borough of Port Carbon. This study provides background information on the entire watershed with a focus on the Port Carbon Borough and how water quality and quantity issues can be addressed in a meaningful way.

Stormwater Management

Stormwater management regulations address the run-off of stormwater from new developments onto other properties and into floodplains. Development outside a floodplain can contribute significantly to flooding problems; when land is developed, the natural ground cover is replaced, and runoff is increased. Thus, in order to prevent stormwater from flooding roads and buildings, storm sewers and ditches are constructed to transport the water effectively.

Stormwater management regulations require developers to build retention or detention basins to minimize the increases in the run-off rate caused by impervious surfaces and new drainage systems. The goal is to ensure minimal increases in the rate of stormwater discharge after development, in comparison to the site's conditions prior to development.

The Stormwater Management Act - Act 167 was passed in 1978. Act 167 requires counties to prepare stormwater management plans by watershed. State funding for Act 167 Stormwater Plan preparation has been greatly reduced, but hopefully will be re-funded in the future. The Act 167 plan serves to maintain

existing peak runoff rates throughout a watershed as land development continues to take place. This process does not solve existing flooding problems although it may prevent these problems from getting worse. 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.

Most stormwater regulations are in place at the municipal level, and most erosion and sedimentation regulations are in place at the State level. A total of 13 Act 167 study areas have been designated within Schuylkill County. Act 167 plans have been completed for the following watersheds: Mahoning Creek, Lizard Creek, Nesquehoning Creek, and Mauch Chunk Creek in the eastern section of the county and the Wiconisco Creek watershed in the western section of the county.

A mitigation action was added to Section 6 (Mitigation Strategy) to complete the Act 167 plan over the performance period of the 2019 HMP.

Zoning and Subdivision Regulations

As discussed above, many municipalities do not have their own zoning or subdivision and land development ordinances. These municipalities rely on the County to administer activities related to zoning, subdivision of land and approval of land development through the Department of Planning (refer to Table 5.1).

Zoning

A zoning ordinance is an important tool that regulates how land should be developed. A zoning ordinance typically includes: 1) use of land and structures and the height and bulk of structures; 2) density of population and intensity of land and structural use; and 3) provision for yards and setbacks. Development is regulated by dividing the community into zones or districts and setting specific development parameters for each of these districts.

The County's Zoning Ordinance was updated in December 2010 and is available online on the Schuylkill County Planning Department's website. Of the 67 municipalities, 36 municipalities in the County have their own Zoning Ordinances; the remaining are governed by the County's Zoning Ordinance. Many municipal zoning ordinances can be found here: <http://elibrary.pacounties.org/Pages/default.aspx>

Subdivision Regulations

The Schuylkill County Subdivision and Land Development Ordinance was adopted in February 2009. Of the County's 67 municipalities 35 municipalities have their own Subdivision and Land Development Ordinances (SALDO). The remaining 32 municipalities use the County's Subdivision and Land Development Ordinance.

The following design standards and specifications pertain to hazard mitigation:

- Stormwater management facilities are required be designed to provide a minimum one foot of freeboard above the maximum 100-year water surface elevation for post-development.

- Post-development peak flows cannot exceed pre-development peak flows for 2, 10, 25, and 50-year return period design storms. Post development volume cannot exceed the pre-development volume for the 2-year 24-hour design storm.
- Open channels must be able to convey post-development runoff from a 10-year design storm within their banks with a minimum half-foot freeboard and not create a hazard to any persons or property.
- Freeboard, the difference between the design flow elevations in the emergency spillway and the top of the settled detention basin embankment must be one and one-half feet at a minimum.
- Fills, when placed adjacent to natural watercourses or constructed channels must have suitable protection against erosion during periods of flooding.
- All drainage structures, culverts, boxes, grates, etc., must conform to the current specifications of the Pennsylvania Department of Transportation.
- All erosion and sediment control structures and other devices shall conform to the requirements of the Department of Environmental Protection Erosion and Sediment Control Manual in its latest edition.

Building Codes

Building codes regulate construction standards for new construction and substantially renovated buildings. Standards can be adopted that require resistant or resilient building design practices to address hazard impacts common to a given community. In 2003, the Commonwealth of Pennsylvania implemented Act 45 of 1999, the Uniform Construction Code (UCC), a comprehensive building code that establishes minimum regulations for most new construction, including additions and renovations to existing structures. All municipalities in Schuylkill County are required to adhere to the Pennsylvania UCC. On December 10, 2009 the Commonwealth adopted regulations of the 2009 International Code Council's codes (residential and commercial). The effective date of the regulations is December 31, 2009. However, several residential provisions from the 2015 IECC as of been adopted as of January 1, 2016.

The UCC is enforced locally in 65 municipalities. The effective date of the Code used in all municipalities was between April and July 2004 (with or without amendments). The Commonwealth Department of Labor and Industry enforces the UCC on behalf of the remaining 2 municipalities (Wayne Township and Mount Carbon Borough). Local municipalities are not allowed to modify or add to the Statewide UCC.

Erosion and Sediment Control

Erosion and sedimentation is regulated comprehensively by the State. The municipality's primary role is to make sure that Erosion and Sediment Control Plans are submitted by developers to the County Conservation District, which oversees most of its administration.

Schuylkill County Office of Public Safety

Schuylkill County manages emergencies through two primary county departments.

1. The Schuylkill County 911 Communications Center is the Public Safety Answering Point (PSAP) for the 67 municipalities. The 911 Center is the primary point of contact for individuals facing emergencies. The effectiveness is in the center staff's ability to quickly assess the situation, determine location and dispatch the appropriate emergency services. The interaction via phone and land mobile radio continues throughout the incident in partnership with the emergency response entities, local and state agencies, municipal services, the private sector and non-government organizations. An emerging challenge is the

need to retool equipment and alter procedures and training to accommodate the changes in technology, in particular texting to 911.

2. The Schuylkill County Emergency Management Agency is charged with preparedness and support of response, recovery and mitigation. An ongoing partnership exist with municipal government, county and state agencies, the emergency services, the education community and many private and public entities. The preparedness is the key component accomplished through the collaboration in or direct development of emergency action plans for numerous sites and situations. The effectiveness of the plan is dependent on the training, exercising and continual improvement cycle of the living documents.

In anticipation of or during a disaster, the Schuylkill County Emergency Operations Center is activated to address the immediate issues related to the event. 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. When activated, the EOC is in communication with the 911 Center to ensure coordination of activities.

The Schuylkill County Emergency Management Agency and its municipalities have been active in growing their capabilities since the 2013 HMP with an update of the Emergency Operations Plan in January 2018 which is posted online at <https://www.scema.org/emergency-planning/>. In addition to information regarding the EOP, and the HMP update, the County has emergency planning templates and toolkits for child care facilities available online.

Knowledge Center

Knowledge Center is an incident management application that is accessible through an online portal. It provides a means of sharing information locally as well to all levels of government. Emergency plans, mapping data, resources and contact information is immediately accessible to those logged into the portal. The application improves situational awareness and contributes to the effective utilization of resources.

Emergency Operations Plan (EOP)

The Schuylkill County EOP outlines how the Schuylkill County Government complies with and implements the requirements of the Pennsylvania Emergency Management Services Code to protect the lives and property of the citizens of the County. The County EOP represents a coordinated emergency management program between school districts, local municipalities and the County.

The County EOP is an all-hazards plan that complies with the National Incident Management System and basis for coordinated and effective response to any disaster in Schuylkill County. The EOP is reviewed on an annual basis. The EOP and the HMP are compatible plans in that they both identify known areas of concern and use their resource annexes to mitigate the hazard and associated risk.

The Emergency Management Services Code (PA Title 35) requires that all municipalities in the Commonwealth have a local EOP which is updated every two years.

Continuity of Operations Plan

Continuity of Operations Planning is the process of developing advance arrangements and procedures that enable an organization to continue its essential functions despite events that disrupt them.

Dam Emergency Action Plans

Dam safety fact sheets, as well as a list of the high hazard dams, public notices and affected municipalities that have endangered populated areas downstream as a result of a dam failure, are available on the Schuylkill County Emergency Management website.

Schuylkill Alert

The Schuylkill County Emergency Management Agency recently deployed Schuylkill Alert where you can sign up to get local alerts about emergencies, severe weather, and significant road closures. This is advertised on the Emergency Management Agency website and was distributed to the Core Planning Team through the Lunch & Learn email campaign. Every municipality within the County was offered the opportunity to utilize the same system. Local municipal officials can then customize alerts for their residents including information on snow emergency routes or utility outages.

Amateur Radio

Schuylkill County relies on a group of dedicated and skilled individuals who comprise our ARES (Amateur Radio Emergency Services)/RACES (Radio Amateur Civil Emergency Service) team and provide the backbone of the Auxiliary Communications Network.

Schuylkill County Animal Response Team (CART)

The Schuylkill County Animal Response Team (Schuylkill CART) is a volunteer organization dedicated to assisting the community, emergency services and Schuylkill County Emergency Management by providing emergency shelter and rescue to animals in times of disaster, both natural and man-made. The team is organized under the rules and guidance established by the Pennsylvania State Animal Response Team.

Special Needs Survey Tool

The Special Needs Survey (SNS) Tool is an effort by County government to better identify those in our community who are most at risk during a disaster. In the emergency management field, these individuals are designated as part of the “special needs population”. The tool is a web-based data collection tool is available for residents to enter information about additional assistance that may be needed for yourself, loved ones, friends or neighbors.

Flood Survey Form

The Schuylkill County Emergency Management Agency developed a dedicated webpage to capturing data as a result of the July and August 2018 flood events. A flood survey information form is posted to enable individuals and businesses to capture and submit flood impacts to support the request to PEMA and FEMA for a Presidential Disaster Declaration for Individual Assistance. The Planning Department then geocoded the information submitted to date and this information is presented in Section 4.3.4 (Flood) in the Risk Assessment.

Schuylkill County Training Academy

The Schuylkill County Emergency Services Training Center provides comprehensive training in Fire, Safety and Industrial Applications. Training is offered by State-Certified Instructors and the Schuylkill County Burn Building may be used for training exercises. The Schuylkill County Incident Management Team (Type 5) is a group of

emergency responders from various response disciplines and specialties that have received extensive training and experience with response and management of large-scale and specialized events. The IMT is an “all-hazards” team that can assist local responders with everything from major fires or natural disasters, to planning for specialized events. In addition, there is a Schuylkill County Fire Chiefs Association and Schuylkill County Firefighters Association; standard operating guides are available on their website at: <http://www.schcountytrainingacademy.com/>

Local Emergency Management Capabilities

Each municipality has a designated local emergency management coordinator as required by the Pennsylvania Emergency Management Services Code, 35 Pa. C. S. A significant amount of information used to develop the HMP update was obtained from the emergency management coordinators, many of whom participated as part of the HMP update as primary points of contact for their municipality.

According to Pennsylvania Title 35 (Emergency Management Services Code), Chapter 7500, the following stipulations apply:

- Each political subdivision of Pennsylvania 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 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 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 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 the agency.
 - 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 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

All 67 municipalities within Schuylkill County have signed a Mutual Aid Agreement. Schuylkill County has a Mutual Aid Agreement in place with the Taskforce Counties as well as all adjacent counties that are not part of the East Central Pennsylvania Taskforce.

East Central Pennsylvania Task Force

The mission of the East Central Pennsylvania Task Force is to provide a centralized organization responsible for developing, coordinating and equipping emergency response organizations represented in the regional Taskforce area; training, preparation, assistance and equipment necessary in the disaster preparedness and prevention; and emergency response to and recovery from a real or threatened act of terrorism or Weapons of Mass Destruction event. The Taskforce includes Schuylkill County, as well as, Berks, Columbia, Luzerne, Montour, Northumberland, and Wyoming Counties.

Since its inception, the Taskforce has developed regional assets which are available to all of the counties within the Taskforce including:

- Air Monitoring Teams with locations in the County at Tamaqua, Pottsville, Frackville, Sacramento and Pine Grove
- Decontamination Teams with locations in the County at Pottsville, Minersville and Tamaqua
- Heavy Rescue Team with locations in the County at Orwigsburg, Pottsville, Mahanoy City, Ryan Township
- Squad 1 (specialized Disaster Response Team) supported by Columbia and Luzerne counties
- Reading Bomb Squad located in Berks County
- Incident Management Team, which is a Taskforce wide team

Local Emergency Planning Committee

The Local Emergency Planning Committee of Schuylkill County was created as a direct result of Congress passing Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986. The mission of the LEPC focuses on the development of plans to minimize emergency situations related to the release of a hazardous material. This committee works to ensure appropriate response to a release of a hazardous material and creates a forum to foster knowledge of chemical related hazards and protective measures.

The LEPC is responsible for the following tasks.

- Identifies the chemicals stored, used and/or manufactured in the communities of Schuylkill County and determines the health risks that those chemicals pose to the public
- Develops a comprehensive emergency plan for each facility and keeps the plans current
- Receives information about accidental chemical releases
- Collects, manages, and provides public access to information on hazardous chemicals in the communities of Schuylkill County
- Develops training programs to enhance emergency response capabilities
- Educates the public about risks from accidental and routine releases of chemicals and works with facilities to minimize these risks.

Voluntary Organizations Active in Disaster (VOAD)

The Voluntary Organizations Active in Disaster is a humanitarian association of independent voluntary organizations who are active in all phases of a disaster. The organization's mission is to foster efficient, streamlined service delivery to people affected by disaster, while eliminating unnecessary duplication of effort, through cooperation in the four phases of disaster: preparation, response, recovery, and mitigation.

PARTICIPATION IN THE NATIONAL FLOOD INSURANCE PROGRAM

According to FEMA's 2002 National Flood Insurance Program (NFIP) program description, the U.S. Congress established the NFIP with the passage of the National Flood Insurance Act of 1968 (FEMA 2002). The NFIP is a federal program 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.

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 to reduce the escalating costs of repairing damage to buildings and their contents caused by floods (FEMA 2002).

All jurisdictions in Schuylkill County participate in the NFIP. Local municipalities participate in the program through ordinance adoption and floodplain regulation and enforcement. Similarly, permitting processes needed for building construction and development in the floodplain are implemented at the municipal level through various ordinances (e.g. zoning and floodplain ordinances). Each community participating in the NIP has a designated floodplain administrator identified in their ordinance.

The Pennsylvania Floodplain Management Act (Act 166) mandates municipal participation in and compliance with the NFIP. It also establishes higher regulatory standards for new or substantially improved structures which are used for the production or storage of dangerous materials (as defined by Act 166) by prohibiting them in the floodway. Additionally, Act 166 establishes the requirement that a Special Permit be obtained prior to any construction or expansion of any manufactured home park, hospital, nursing home, jail and prison if said structure is located within a special flood hazard area.

Through administration of floodplain ordinances, municipalities can ensure that all new construction or substantial improvements to existing structures located in the floodplain are flood-proofed, dry-proofed, or built above anticipated flood elevations. Floodplain ordinances may also prohibit development in certain areas altogether. The NFIP establishes minimum ordinance requirements which must be met in order for that community to participate in the program. However, a community is permitted and in fact, encouraged, to adopt standards which exceed NFIP requirements. Through participation in the NFIP, all municipalities within the County have floodplain regulations in place.

As new Digital Flood Insurance Rate Maps (DFIRMs) are published, the Pennsylvania State NFIP Coordinator housed at the Pennsylvania Department of Community and Economic Development (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 CIS, 2011).

FEMA Region III makes an ordinance review checklist available to communities which lists required provisions for floodplain management ordinances. This checklist helps communities develop an effective floodplain management ordinance that meets federal requirements for participation in the NFIP.

The DCED provides communities, based on their CFR, Title 44, Section 60.3 level of regulations, with a suggested ordinance document to assist municipalities in meeting the minimum requirements of the NFIP along with the Pennsylvania Flood Plain Management Act (Act 166). These suggested or model ordinances contain provisions that are more restrictive than state and federal requirements. Suggested provisions include, but are not limited to:

- Prohibiting manufactured homes in the floodway.
- Prohibiting manufactured homes within the area measured 50 feet landward from the top-of bank of any watercourse within a special flood hazard area.
- Special requirements for recreational vehicles within the special flood hazard area.
- Special requirement for accessory structures.
- Prohibiting new construction and development within the area measured 50 feet landward from the top-of bank of any watercourse within a special flood hazard area.

NFIP Floodplain Administrator and NFIP Compliance

As noted, all municipalities participate in the NFIP, and all municipalities, with the exception of Landingville Borough, adopted the 2013 HMP. During the collection of updated planning and regulatory capabilities for the

2019 HMP update, the County used this as an opportunity to educate the municipal officials on NFIP participation, the HMP, as well as the role and responsibilities of the NFIP Floodplain Administrator.

Overall the individual and position designated by the municipalities as the NFIP Floodplain Administrator varies across the 67 municipalities. Many municipalities delegate authority to their municipal engineer and/or the third-party company responsible for UCC inspections/permitting. As part of collecting the Letter of Intent to Participate (LOIP) in the 2019 HMP update planning process, the County not only requested each municipality to identify a primary and secondary point of contact, but also identify their NFIP Floodplain Administrator and requested their participation in the planning process as well. Municipalities that returned a LOIP and listed their NFIP Floodplain Administrators may be found in Appendix D.

The County has a widely used property viewer known as the Schuylkill County Map Viewer (available at gis.co.schuylkill.pa.us/Mapviewer) which is freely accessible to both municipal officials and the general public. Integrated into the Map Viewer is FEMA's National Flood Hazard Layer GIS web service which provides NFIP Floodplain Administrators as well as residents access to the flood hazard layer.

In 2014, Schuylkill County municipalities worked with an independent contractor hired by PA DCED to assist municipalities with updating their municipal floodplain ordinances due to a change in the maps and a new Map Effective date. More recently, FEMA, along with the DCED and PEMA, led the Flood Risk Discovery process in Schuylkill County. Discovery is the first phase of a Risk Mapping, Assessment, and Planning (Risk MAP) flood risk project, designed to collect data and information from the community to provide a more holistic picture of where flood-related vulnerabilities exist, determine the current flood hazards, and identify opportunities to facilitate mitigation planning to help your community further actions to reduce flood damage across the watershed.

In August 2018 FEMA issued preliminary FIRMs for Schuylkill County and held the Community Coordination and Outreach (CCO) meeting in September 2018. The appeal period will take place approximately over the winter of 2018 into 2019; which will have a 90-day duration after the appeal period starts. The preliminary FIRMs are available on the FEMA Map Service Center for review at msc.fema.gov. As a result of these map changes, municipalities already anticipate updating their floodplain ordinance when the map becomes effective. Several Schuylkill municipalities, at the urging of FEMA at the CCO meeting, intend to reach out to property owners advising them of a possible change to mapping.

Due to the information learned during the capability assessment update and that the Schuylkill County maps are currently being updated, the Schuylkill County Planning Department and Emergency Management Agency along with all municipalities, identified a new mitigation action to support increased education on NFIP Floodplain Administrator roles and responsibilities, as well as NFIP compliance and enforcement. Refer to Section 6 (Mitigation Strategy), Table 6-4 mitigation action 2019-SC-17 and Appendix H for the worksheet that may be used to support this action. Additional information on the NFIP program and its implementation within Schuylkill County may be found in the flood hazard profile in Section 4.3.4 (Flood).

COMMUNITY RATING SYSTEM (CRS)

In the 1990s, the Flood Insurance Administration (FIA) established the Community Rating System (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 above and beyond the minimum required in order to:

- Reduce losses from floods
- Facilitate accurate insurance ratings
- Promote public awareness of the availability of flood insurance

The 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 the CRS, municipalities can leverage greater flood protection while receiving flood insurance discounts. Currently, no municipalities in Schuylkill County participate in the CRS.

Schuylkill County, along with many of the municipalities, have identified specific mitigation initiatives in this plan update to help build and enhance mitigation-related planning and regulatory capabilities in Schuylkill County including determining if there are sufficient capabilities to enroll and sustain participating in the CRS (refer to action 2019-SC-012 in Table 6-4 in Section 6 – Mitigation Strategy).

Table 5-2 below summarizes the planning and regulatory capabilities as provided by plan participants. Please note all municipalities in Schuylkill County participate in the NFIP and have a floodplain ordinance; however, this was not indicated as such in the submitted worksheets. Copies of the individual responses are provided in Appendix D.

Table 5-2. Planning and Regulatory Capability

Jurisdiction	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	Firewise	Storm Ready	Other	
Ashland (B)														-	-	-	-	-	-					-	
Auburn (B)	x	x	-	-	-	-	-	x	x	x	x	x	x							x	x				
Barry (T)																									
Blythe (T)	x	x	-	-	Limited	x	-	-		UD															
Branch (T)	x	-	-		-	x			x*	x	x	x	x		-	-	-	-	-	x	-	-	-	-	Tree maintenance but only on Twp. Property
Butler (T)	x	x	-	x	x	x	-	x	-	x	x	x	x	x	-	x	-	-	-	x	-	-	x	-	County open space plan; Storm ready County EMA
Cass (T)																									
Coaldale (B)																									
Cressona (B)	x	x	-	-	-	-	-	x	x	x	x	-	x*	-	-	-	-	-	-	x	-	-	-	-	-
Deer Lake (B)	x	x	-	-	Limited	x	-	-	x	UD															
Delano (T)																									
East Brunswick (T)	x	x		x		x		x		x	x	x	x	x						x	x		x		
East Norwegian (T)	x	x				x		x		x	x	x	x							x			x		
East Union (T)																									

Jurisdiction	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	Firewise	Storm Ready	Other
Eldred (T)																								
Foster (T)	x	x	-	-	-	-	-	x	x	x	x	x	-	-	-	-	-	-	-	x	x	-	-	-
Frackville (B)																								
Frailey (T)	x	x				x		x		x	x	x	x							x			x	Property Maintenance; Unsafe structures
Gilberton (B)	x	x				x																		
Girardville (B)																								
Gordon (B)		x	-	-	-	x	x	x	-	x	x	x	x	-	-	-	-	-	-	x	x	-	-	Blight Ordinance
Hegins (T)	x	x	x						x	x	x	x		x					x	x	x			
Hubley (T)																								
Kline (T)	x	x	-	-	Limited	x	-	-		UD														
Landingville (B)																								
Mahanoy (T)																								
Mahanoy City (B)																								
McAdoo (B)																								
Mechanicsville (B)																								
Middleport (B)																								
Minersville (B)																								

Jurisdiction	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	Firewise	Storm Ready	Other
Mount Carbon (B)	x	x	-	-	Limited	x	-	-		UD														
New Castle (T)	x	x	-	-	Limited	x	-	-		UD														
New Philadelphia (B)																								
New Ringgold (B)																								
North Manheim (T)	x	x	-	-	-	-	-	x	x	x	x	x	x*	x	-	-	-	-	-	x	-	-	-	-
North Union (T)	x	x		x		x		x		x	x	x	x							x			x	
Norwegian (T)	x	x			x	x		x		x	x	x	x	x						x	x		x	
Orwigsburg (B)																								
Palo Alto (B)	x	x	-	-	-		-	x	-	x	x	x	x	-	-	-	-	-	-	x	-	-	-	-
Pine Grove (B)	x	x	-	-	-	x	x	x	x	x	x	x	x	x		x				x	x		x	
Pine Grove (T)		x		x						x	x	x		x					x	x				
Port Carbon (B)		x				x		x		x		x	x	-	-	-	-	-	-	x	-	-	-	Schuylkill Alert
Port Clinton (B)																								
Porter (T)																								
Pottsville (C)	x	x	x	x				x	x	x	x	x	x	x				x	N/A	x	x		x	
Reilly (T)	x	x		x		x		x		x	x	x	x			x				x			x	
Ringtown (B)																								
Rush (T)																								
Ryan (T)																								

Jurisdiction	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	Firewise	Storm Ready	Other	
Saint Clair (B)	x	x			x	x		x		x	x	x	x			x				x			x		
Schuylkill (T)																									
Schuylkill Haven (B)	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x		-	x	x		x		
Shenandoah (B)																									
South Manheim (T)	x	x	-	-	-	x	-	x	x	x	x	x	-	x	-	-	-	-	-	-	x	-	-	-	-
Tamaqua (B)																									
Tower City (B)	x	x	x	x	x					x	x	x	x	x		x				-	x	x	X*	X*	
Tremont (B)	x	x	x			x		x		x	x	x	x								x			x	
Tremont (T)	x							x	x	x	x	x									x				
Union (T)	x	x				x		x		x	x	x	x							x	x			x	
Upper Mahantongo (T)																									
Walker (T)	x	x						x		x	x	x								x	x	x			
Washington (T)																									
Wayne (T)								x		x	x	x		x											
West Brunswick (T)	x*	x		x		x		x		x	x	x	x							x	x			x	
West Mahanoy (T)																									
West Penn (T)	x/x*	x				x		x	x	x	x	x	x	x		x				x	x			x	

Source: Schuylkill County HMP Capability Assessment Surveys

"X" indicates that the jurisdiction currently has this capability in place.

"UD" indicates this capability is under development.

"X*" indicates this is under development

"-" indicates no capability is currently in place.



Blank space = no response was received from the jurisdiction.
COOP = Continuity of Operations Plan
EOP = Emergency Operations Plan

*All communities participate in the NFIP; responses in the table reflect what was submitted by each municipality.
CRS = Community Rating System
NFIP = National Flood Insurance Program

5.2.2 ADMINISTRATIVE AND TECHNICAL CAPABILITY

Administrative capability is described by an adequacy of departmental and personnel resources for the implementation of mitigation-related activities. Technical capability relates to an adequacy of knowledge and technical expertise of local government employees or the ability to contract outside resources for this expertise in order to effectively execute mitigation activities. Common examples of skill sets and technical personnel needed for hazard mitigation include: planners with knowledge of land development/management practices, engineers or professionals trained in construction practices related to buildings and/or infrastructure (e.g. building inspectors), planners or engineers with an understanding of natural and/or human caused hazards, emergency managers, floodplain managers, land surveyors, scientists familiar with hazards in the community, staff with the education or expertise to assess community vulnerability to hazards, personnel skilled in geographic information systems, resource development staff or grant writers, 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, the majority of support agencies and resources have been identified and referenced throughout this plan update.

Schuylkill County and its municipalities have identified specific mitigation initiatives described in Section 6 which will help build and enhance mitigation-related administrative and technical capabilities.

FEDERAL AND STATE CAPABILITIES

Federal agencies which 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

State agencies which can provide technical assistance for mitigation activities include, but are not limited:

- Pennsylvania Department of Community and Economic Development
- Pennsylvania Department of Conservation and Natural Resources
- Pennsylvania Department of Environmental Protection
- Pennsylvania Silver Jackets

The Pennsylvania Silver Jackets Team is an interagency (federal, regional, profession and Commonwealth agencies) team dedicated to working collaboratively with the Commonwealth and appropriate stakeholders in developing and implementing solutions to flood hazards by combining available agency resources, which include funding, programs, and technical expertise. The goal of the Silver Jackets program is to promote interagency collaboration and to leverage available national, regional and local resources. The team provides a variety of flood risk management resources available to the public and can found here:

<http://www.nab.usace.army.mil/Home/Silver-Jackets/>

COUNTY CAPABILITIES

Schuylkill County Conservation District

The Schuylkill Conservation District is dedicated to protect, enhance, restore and promote the responsible use of the County's natural resources for future generations by partnering, coordinating, and fostering cooperation. This is accomplished with the assistance of public agencies, private groups, and individuals. The Conservation District has District and Associate Directors, and staff that provide support for: environmental education, parks and recreation leads, conservation programs, natural resources, watershed maintenance, flood recovery and agricultural programs.

One of the many focuses of the District is on Erosion and Sediment Control with emphasis on the conservation of soil and water resources. The District administers the Erosion and Sedimentation Control Program through a delegation agreement with the PA DEP.

The Chesapeake Bay Program, managed by the District, is a unique federal and state funded program that provides cost share funds and technical assistance on the local level to agricultural operations within the Susquehanna River Watershed for the installation of Best Management Practices (BMPs). The goal of the program is to reduce nutrients entering streams and waterways by the installation of BMPs and the implementation of nutrient management plans.

Schuylkill County has numerous watersheds throughout the county. As such the County has a dedicated Watershed Specialist. Schuylkill County has numerous watershed associations in the County that are working together with a common interest to protect and restore the health of the watersheds. The following provides a brief summary of these associations:

- Catawissa Creek Restoration Association – The Association is working to reduce or eliminate stream pollution and improve stream habitat for organisms. The Association is expanding upon its watershed-monitoring program as well as planning for stream cleanups.
- Mahanoy Creek Watershed Association - The Mahanoy Creek Watershed Association is working to improve the quality of the Mahanoy Creek, which flows 56 miles from its origin to where it empties to the Susquehanna River.
- Tri-Valley Watershed Association - The Tri-Valley Watershed Association is dedicated to improving water quality, and preventing soil erosion and sediment pollution in their watershed. They have received water quality equipment through grant money and plan to do a watershed assessment in the near future.
- Wiconisco Creek Restoration Association - The Association has been actively working to improve the water quality of the watershed trying to remediate the abandoned mine drainage issues that exist.
- Northern Swatara Creek Watershed Association – Promotes the environmental integrity of Swatara Creek, its tributaries and watershed that lie within the boundaries of Schuylkill County.
- The Schuylkill Headwaters Association is a non-profit organization that works to protect and enhance the headwaters of the Schuylkill River by education residents and implementing projects to reduce and control pollution.

Schuylkill County Department of Planning

As noted earlier in this section, the Schuylkill County Department of Planning comprehensively addresses county-wide planning issues and initiatives. The office staff include a Planning Director, Zoning Officer and GIS staff. The GIS Coordinator leads the maintenance and update of the County's GIS Map Viewer and ArcGIS Online map gallery which contains valuable spatial information for municipalities and residents including but not limited to, parcels, coal tracts, zoning, environmental and floodplain data.

Schuylkill County Economic Development

The Economic Development Department reports to the County Administrator with the following areas: community development; U.S. Housing and Urban Development grants and demolition.

MUNICIPAL CAPABILITIES

Participating municipalities in this planning effort were provided with a capabilities survey. Table 5-3 summarizes the responses of the municipalities and County based on administrative and technical capability documented on the submitted worksheets. Copies of the individual responses are found in Appendix D.

Based on assessment results, there is a wide-range of administrative and technical capabilities across the County with responses indicating from 'high' to 'limited'. Overall, municipalities in Schuylkill County have low-to-moderate administrative and technical staff needed to conduct hazard mitigation activities. Many technical areas are typically contracted to outside providers.

Interesting to note that during the capability assessment update for this plan update, the County needed to inform many communities that they have a NFIP Floodplain Administrator, who serves in that role and where the information can be found (floodplain ordinance). As a result, the County included a new mitigation action to help further inform municipalities and NFIP Floodplain Administrators about their role, responsibilities and floodplain management and enforcement (refer to Table 6-4, Section 6 – Mitigation Strategy).

A majority of communities do not have their own personnel skilled in GIS, grant-writing or individuals knowledgeable in benefit-cost analyses which are technical areas needed to apply for FEMA mitigation funding. However, the County is able to support the municipalities with some GIS and grant-writing services. There seems to be sufficient emergency management staff (although volunteer positions) across the County. All municipalities have an identified emergency management coordinator.

Table 5-3. Administrative and Technical Capability

Jurisdiction	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 FEMA's HAZUS program	Grant writers or fiscal staff to handle large/complex grants	Staff with expertise or training in benefit-cost analysis	Other
Ashland (B)											
Auburn (B)	x	x	x	x	x	x	x	x	x	x	-
Barry (T)											
Blythe (T)	x	x	x	x	x	x	x	x	x	-	
Branch (T)	x	x	-	x	x	-	x	-	x	-	Fire depts w/ staff for hazmat
Butler (T)	-	x	x	x	x	-	-	-	-	-	
Cass (T)											
Coaldale (B)											
Cressona (B)	x	x	x	x	x	x	x	x	x	-	
Deer Lake (B)											
Delano (T)	x	x	x	x	x	x	x	x	x	-	
East Brunswick (T)	x	x	x	x	x	x	x	-	x	-	
East Norwegian (T)	x	x	x	-	x	x	-	-	x	-	-
East Union (T)											
Eldred (T)											
Foster (T)	-	x	x	x	x	x	-	-	x	-	

Jurisdiction	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 FEMA's HAZUS program	Grant writers or fiscal staff to handle large/complex grants	Staff with expertise or training in benefit-cost analysis	Other
Frackville (B)	X	X	X	X	X	X	-		X	-	
Frailey (T)											
Gilberton (B)	-	-	-	X	X	-	-	-	-	-	
Girardville (B)											
Gordon (B)	X	X	X	X	X	X	X	X	X	-	
Hegins (T)	-	-	-	-	-	-	-	-	-	-	-
Hubley (T)											
Kline (T)	X	X	X		X	X	X	X	X	-	
Landingville (B)											
Mahanoy (T)											
Mahanoy City (B)											
McAdoo (B)											
Mechanicsville (B)											
Middleport (B)											
Minersville (B)											
Mount Carbon (B)	X	X	X	X	X	X	X	X	X	-	
New Castle (T)	X	X	X			X	X	X	X	-	
New Philadelphia (B)											
New Ringgold (B)											

Jurisdiction	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 FEMA's HAZUS program	Grant writers or fiscal staff to handle large/complex grants	Staff with expertise or training in benefit-cost analysis	Other
North Manheim (T)	x	x	x	x	x	x	x	x	x	x	-
North Union (T)	-	-	-	-	-	-	x	-	-	-	-
Norwegian (T)				x			x	-	-	-	
Orwigsburg (B)											
Palo Alto (B)	-	-	x	-	x	-	-	-	-	-	-
Pine Grove (B)		x	x	x	x	x	-	x	x	x	
Pine Grove (T)	x	x	x	x	x	x	x	x	-	-	
Port Carbon (B)	-			x		-	-	-	-	-	
Port Clinton (B)											
Porter (T)											
Pottsville (C)	x	x	x	x	x	x	x	-	x	x	
Reilly (T)	x	x	x	x	x	-	x	-	x	-	
Ringtown (B)											
Rush (T)											
Ryan (T)											
Saint Clair (B)				x	x		-	-		-	
Schuykill (T)											
Schuykill Haven (B)	x	x	x		x	-	x		x		
Shenandoah (B)											

Jurisdiction	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 FEMA's HAZUS program	Grant writers or fiscal staff to handle large/complex grants	Staff with expertise or training in benefit-cost analysis	Other
South Manheim (T)	X	X	X	X	X	X	X	X	X	-	
Tamaqua (B)											
Tower City (B)		X	X	X	X	X	X	X			
Tremont (B)				X	X		X		X		
Tremont (T)	X	X	X	X	X	-	X	?	X	-	
Union (T)	X	-	X	X	X	-	-	X	-	-	
Upper Mahantongo (T)											
Walker (T)	X	X	X	X	X	X	-	X	-	-	
Washington (T)											
Wayne (T)					X						
West Brunswick (T)	-	-	-	X	X	-	-	-	-	-	
West Mahanoy (T)											
West Penn (T)	X	X	X	X	X	X	X	X	X	X	

Notes:

"X" indicates that the jurisdiction currently has this capability in place (even if contracted as needed).

"-" indicates no capability is currently in place.

All communities participate in the NFIP and have a designated NFIP Floodplain Administrator.

DK indicates "don't know."

Blank space indicates no response was received from the municipality.

B = Borough

FEMA = Federal Emergency Management Agency

GIS = Geographic Information System

HAZUS = Hazards U.S.

NFIP = National Flood Insurance Program

T = Township

In addition to the capability assessment, the County Planning Department wanted to survey all municipalities a bit further on building codes. The following questions were asked with responses summarized in Table 5-4. Individual responses may be found in Appendix D.

- Are you an “opt-in” or “opt-out” municipality as it pertains to the Pennsylvania Construction Code Act (Act 45) regarding the Uniform Construction Code?
- If you are an opt-in municipality, does an employee of your municipality complete inspections? Or, have you hired a third-party company? If a third-party company, which one?
- Is your Building Code Official an employee of your municipality or hired as a third-party company? If a third party company, which one?
- Have you adopted any more restrictive codes above the 2004 UCC?
- Do you have an ordinance regarding property maintenance? If so, does the ordinance reference the International Property Maintenance Code of 2015? Does the ordinance allow for future releases of the IMPC to be enforced under current ordinance language or would you be required to amend your ordinance?
- Who enforces your property maintenance? Is it an employee of your municipality? Or, have you hired a third-party company? If a third-party company, which one?

Based on the results received, all municipalities indicated they are an ‘opt-in’ municipality and inspections are conducted by a third party. An overwhelming majority of the municipalities do not have a dedicated building code official; instead they contract the services through a third-party. The third-party is responsible for enforcing property maintenance along with the police and engineers.

Table 5-4 Building Code Survey

Jurisdiction	Opt in or Opt out?	If Opt in, do you complete inspections?	Is your building code official an employee or third-party?	Do you have more restrictive codes above 2004 UCC? (Yes/No)	Do you have a property maintenance ordinance? (Yes/No)	Who enforces property maintenance?
Ashland (B)						
Auburn (B)	Opt-In	Third Party	Third Party	Yes	Yes	Third Party
Barry (T)						
Blythe (T)	Opt-Out	Third Party	Third Party	No	Yes	Third Party
Branch (T)	Opt-In	Third Party	Employee	No	Yes	Building Code Official
Butler (T)	Opt-In	Third Party	Third Party	No	Yes	Township Foreman
Cass (T)						
Coaldale (B)						
Cressona (B)	Opt-In	Third Party	Third Party	Yes	Yes	Third Party
Deer Lake (B)	Opt-Out	Third Party	Third Party	No	Yes	Third Party
Delano (T)						
East Brunswick (T)	Opt-In	Third Party	Third Party	No	No	-
East Norwegian (T)	Opt-In	Third Party	Third Party	No	No	Third Party
East Union (T)						
Eldred (T)						
Foster (T)	Opt-In	Third Party	Third Party	No	Yes	Third Party
Frackville (B)						
Frailey (T)	Opt-In	Third Party	Third Party	No	Yes	Third Party
Gilberton (B)	Opt-In	Third Party	Yes	No	Yes	Both
Girardville (B)						
Gordon (B)	Opt-In	Third Party	Third Party	Yes	Yes	In house
Hegins (T)	Opt-In	Third Party	Third Party	No	No	In house
Hubley (T)						
Kline (T)	Opt-Out	Third Party	Third Party	No		Third Party
Landingville (B)						
Mahanoy (T)						
Mahanoy City (B)						

Jurisdiction	Opt in or Opt out?	If Opt in, do you complete inspections?	Is your building code official an employee or third-party?	Do you have more restrictive codes above 2004 UCC? (Yes/No)	Do you have a property maintenance ordinance? (Yes/No)	Who enforces property maintenance?
McAdoo (B)						
Mechanicsville (B)						
Middleport (B)						
Minersville (B)						
Mount Carbon (B)	Opt-Out	Third Party	Third Party	No	Yes	Third Party
New Castle (T)	Opt-Out	Third Party	Third Party	No		Third Party
New Philadelphia (B)						
New Ringgold (B)						
North Manheim (T)	Opt-In	Third Party	Third Party	Yes	Yes	Third Party
North Union (T)	Opt-In	Municipal Employee	Third Party	No	Yes	Municipal Employee
Norwegian (T)	Opt-In	Third Party		No	Yes	In House
Orwigsburg (B)						
Palo Alto (B)	Opt-In	Third Party	Third Party	Yes	No	Quality of life ordinance, a resident gets appointed as your quality of life ordinance
Pine Grove (B)	Opt-In	Third Party	Third Party	No	Yes	Undefined
Pine Grove (T)	Opt-In	Third Party	Third Party	No	Yes	Third Party
Port Carbon (B)	Opt-In	Third Party	Third Party	No		Third Party
Port Clinton (B)						
Porter (T)						
Pottsville (C)	Opt-In	Yes	Yes	Yes	Yes	Employee
Reilly (T)	Opt-In	None	None	No	Yes	None
Ringtown (B)						
Rush (T)						
Ryan (T)						
Saint Clair (B)	Opt-In	Third Party	Third Party	No	Yes	Employee
Schuylkill (T)						
Schuylkill Haven (B)	Opt-In	Third Party	Employee	Yes	Yes	Employee

Jurisdiction	Opt in or Opt out?	If Opt in, do you complete inspections?	Is your building code official an employee or third-party?	Do you have more restrictive codes above 2004 UCC? (Yes/No)	Do you have a property maintenance ordinance? (Yes/No)	Who enforces property maintenance?
Shenandoah (B)						
South Manheim (T)	Opt-In	Third Party	Third Party	No	No	Third Party
Tamaqua (B)						
Tower City (B)						
Tremont (B)	Opt-In	Third Party	Third Party	No	No	Police
Tremont (T)	Opt-In	Third Party	Third Party	No	Yes	Third Party
Union (T)	Opt-In	Third Party	Third Party	Yes	No	
Upper Mahantongo (T)						
Walker (T)	Opt-In	Third Party	Third Party		No	Zoning Officer/ARRO
Washington (T)						
Wayne (T)	Opt-In	Third Party	Third Party	No	No	N/A
West Brunswick (T)	Opt-In	Third Party	Third Party	No	No	No
West Mahanoy (T)						
West Penn (T)	Opt-In	Third Party	Third Party	No	Yes	Third Party

B = Borough
T = Township

5.2.3 FISCAL 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 level to support 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) 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. This section describes the funding sources and programs available to Schuylkill County in support of their mitigation efforts.

FEDERAL HAZARD MITIGATION FUNDING OPPORTUNITIES

Hazard Mitigation Grant Program (HMGP)

The 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 that will protect public or private property in an area covered by a federal disaster declaration or that will reduce the likely damage from future disasters. Examples of projects include acquisition and demolition of structures in hazard-prone areas, flood proofing 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 placed in rank 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.

FEMA Stafford Act Sections 404 and 406 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 actually damaged by a disaster, and the mitigation measures that provide protection from subsequent events.

Flood Mitigation Assistance (FMA) Program

The 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 very limited and, as with the HMGP, individuals cannot apply directly for the program. 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 State. 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 (RL) properties or Severe Repetitive Loss (SRL) property definitions as described in Section 4.3.7 of this plan.

Pre-Disaster Mitigation (PDM) Program

The PDM program is an annually funded, nationwide, competitive grant program. No disaster declaration is required. Federal funds will cover 75 percent of a project's cost up to \$3 million. As with the HMGP and FMA, a FEMA-approved local HMP is required to be approved for funding under the PDM program.

In addition to these FEMA grants, the federal government, through the Emergency Management Institute, offers training in all aspects of emergency management, including hazard mitigation. The courses available at the Institute are free to local government staff.

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. Should the President of the United States declare the event a major disaster, the following general types of assistance are offered:

- **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 largely funds this program. 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. Non-profit 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. This program is largely funded by FEMA with both local and state matching contributions required.

U.S. HUD Community Development Block Grants (CDBG)

The U.S. HUD CDBGs are federal funds intended to provide low- and moderate-income households 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. Schuylkill County and several of its municipalities have utilized CDBG funding for infrastructure and other necessary improvements to increase County resiliency.

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: Undertake 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). It is not necessary for a national emergency to be declared 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, protect destabilized stream banks, establish cover on critically eroding lands, repairing conservation practices, and the purchase of floodplain easements. The program is designed for installation of recovery measures.

COMMONWEALTH HAZARD MITIGATION FUNDING OPPORTUNITIES

State programs which 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

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 nonpoint 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 for planning, acquisition, development, rehabilitation and repair of greenways, recreational trails, open space, parks and beautification projects. Projects can involve development, rehabilitation and improvements to public parks, recreation areas, greenways, trails, and river conservation.

Flood Mitigation Projects – Finally, Act 13 of 2012 allocates funds to the Commonwealth Financing 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 Schuylkill 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.

Growing Greener

Growing Greener is a state grant program to address critical environmental concerns. Growing Greener has funded the following project types statewide: protect open space; eliminate the maintenance backlog in state parks; clean up abandoned mines and restore watersheds; provide funds for recreational trails and local parks; help communities address land use; and provide new and upgraded water and sewer systems. The funds are distributed among four state agencies: the Department of Agriculture to administer farmland preservation projects; the Department of Conservation and Natural Resources for state park renovations and improvements; and the Pennsylvania Infrastructure Investment Authority for water and sewer system upgrades.

Growing Greener II is a program to clean up rivers and streams, protect natural areas, open spaces and working farms; and shore up key programs to improve quality of life and revitalize communities. Growing Greener was signed into law in June 2005.

Schuylkill County has received Growing Greener funding for watershed improvements in the Upper Swatara Watershed and also funded the Port Carbon Watershed Study.

Watershed Grants

The Environmental Stewardship and Watershed Protection Act authorizes the Department of Environmental Protection (DEP) to allocate nearly \$547 million in grants for acid mine drainage abatement, mine cleanup efforts, abandoned oil and gas well plugging and local watershed-based conservation projects. These projects can include: watershed assessments and development of watershed restoration or protection plans; implementation of watershed restoration or protection projects (stormwater management wetlands, riparian buffer fencing and planting, streambank restoration (especially FGM), agricultural BMPs); construction of mine drainage remediation systems; reclamation of previously mined lands; and demonstration/education projects and outreach activities.

These grants are available to a variety of eligible applicants, including: counties, authorities and other municipalities; county conservation districts; watershed organizations; and other organizations involved in the restoration and protection of Pennsylvania's environment. These grants will support local projects to clean up non-point sources of pollution throughout Pennsylvania.

MUNICIPAL CAPABILITIES

The implementation of mitigation actions requires time and fiscal resources. While some mitigation actions are less costly than others, it is important that money is available locally to implement policies and projects. Financial resources are particularly important if jurisdictions are trying to take advantage of state or federal mitigation grant funding opportunities that require local-match contributions. Based on survey results and municipal feedback, most municipalities within the County perceive fiscal capability to be limited.

The municipalities within the County receive most of their revenue through property tax revenue and intergovernmental contributions (Federal and state pass-through dollars) or grants. It is unlikely that any of the communities could easily afford to provide the funds needed for hazard mitigation projects. While the majority of the grant programs are available at the state or federal level, the Community Development and Block Grant program, administered by the County is a source of funding available to the municipalities for stormwater projects and demolition projects. Generally, CDBG funds must be used to eliminate blight or to serve areas with a concentration of low- or moderate-income residents. State and Federal programs available to the local municipalities include: Growing Greener program administered through PA Department of Environmental Protection and the Hazard Mitigation Assistance Program (pre and post disaster) which can be used to fund projects such as acquisition, demolition, flood-proofing, elevation, etc (2013 HMP).

Capital Improvement Planning

Capital improvement plans are often recommended by counties to their municipalities, as these plans help identify specific capital projects to be funded and completed according to a defined schedule. The Capital Improvements Program helps: 1) distribute the costs of projects realistically over a number of years; 2) recognize the scarcity of the local financial resources and the increased competition for the tax dollar; and 3) maximize the various financial resources available to the individual municipalities.

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 from the effects of winds and ice storms, is expensive. These fees help to offset that cost. There are only two municipalities that bill and/or are responsible for electric: Saint Clair and Schuylkill Haven.

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 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 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 fund 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 67 municipalities within Schuylkill 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.

Municipalities participating in this planning effort were provided with a capabilities survey with a section dedicated to fiscal capabilities. Table 5-5 summarizes the responses of the County and municipalities based on fiscal capabilities. Copies of the individual municipal responses are found in Appendix D.

Table 5-5. Fiscal Capability

Jurisdiction	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
Ashland (B)										
Auburn (B)	-	x	-	-	-	-	-	-	-	-
Barry (T)										
Blythe (T)	x	x								
Branch (T)	-	x	x	-	-	-	-	-	x	-
Butler (T)	x	x (County)	-	-	-	-	-	-	x (Mutual aid fire companies)	
Cass (T)										
Coaldale (B)										
Cressona (B)	-	x	-	-	-	-	-		-	
Deer Lake (B)	x	x								
Delano (T)										
East Brunswick (T)	-	-	x	-	-	-	-	-	x	
East Norwegian (T)	-	x	x	-	-	-	-	-	-	-
East Union (T)										
Eldred (T)										
Foster (T)	-	x	-	-	x	-	x	-	x	
Frackville (B)										
Frailey (T)	-	x	x	-	-	-	-	-	x	-
Gilberton (B)	-	x	-	-	x	-	-	x	-	
Girardville (B)										
Gordon (B)	-	x	-	-	-	-	x	-	-	
Hegins (T)	-	-	-	-	-	-	-	-	-	-
Hubley (T)										
Kline (T)	x	x								
Landingville (B)										
Mahanoy (T)										
Mahanoy City (B)										

Jurisdiction	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
McAdoo (B)										
Mechanicsville (B)										
Middleport (B)										
Minersville (B)										
Mount Carbon (B)	x	x								
New Castle (T)	x	x								
New Philadelphia (B)										
New Ringgold (B)										
North Manheim (T)	-	-	x	-	-	-	-	x	-	-
North Union (T)	-	-	-	-	-	-	-	-	-	-
Norwegian (T)	x	x	x	-	x	-	-	-	x	
Orwigsburg (B)										
Palo Alto (B)		-		-	-	-	-	-	-	
Pine Grove (B)	x	x	-		x	-	x	-	x	
Pine Grove (T)	x	x	x	-	-		x	x	-	
Port Carbon (B)	-	x	-	-	-	-	-	-		
Port Clinton (B)										
Porter (T)										
Pottsville (C)	x	x	x	-	-	-	x	x	x	
Reilly (T)	x	x	x	-	-	-	-	-	x	
Ringtown (B)										
Rush (T)										
Ryan (T)										
Saint Clair (B)	x	x	x	x	x	-	x	-	x	
Schuykill (T)										
Schuykill Haven (B)	x	x	-	x	x	-	-		x	
Shenandoah (B)										
South Manheim (T)	-	x	-	-	-	-	-	-	x	-
Tamaqua (B)										

Jurisdiction	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
Tower City (B)										
Tremont (B)	-		x	-	-	-	-	-	x	
Tremont (T)	-	x	x	-	-	-	-	-	x	
Union (T)	-	-	-	-	-	-	-	-	-	
Upper Mahantongo (T)										
Walker (T)	x	-	x	-	-	-	x	-	-	
Washington (T)										
Wayne (T)		x								
West Brunswick (T)	-		-	-		-	-	-	x	
West Mahanoy (T)										
West Penn (T)	x	x	x	-	-	-	x		x	Donations to Twp (i.e. jersey barriers, etc.)

Notes:

"X" indicates that the jurisdiction currently has this capability in place.

"-" indicates no capability is currently in place.

DK indicates "don't know."

NA indicates the jurisdiction noted not applicable.

Blank space indicates no response was received from the jurisdiction.

B = Borough

T = Township

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.

The Schuylkill County Conservation District places great emphasis on education and outreach efforts. Programs are presented to the general public at schools, churches, senior groups and to scouts and special education populations. The District cooperates with other agencies including the Schuylkill County Sportsmen's Association, DCNR-Bureau of Forestry, PA Game Commission, PA Fish and Boat Commission, Natural Resources Conservation Service and Penn State Cooperative Extension-Schuylkill County. The Conservation District provides programs at the Bear Creek Environmental Area based in the Schuylkill County Fairgrounds in Summit Station. The site features a trail system and its Dr. James S. Shadle Nature Center, which is a nature center wildlife museum.

At the municipal level, education and outreach capabilities vary. Some municipalities have the capability to handle outreach initiatives while others rely on County resources. Several municipalities have dedicated community websites, while others just rely on social media, such as Facebook, to communicate information to residents. Table 5-6 summarizes the responses of the municipalities based on their education and outreach capabilities. Copies of the individual responses are found in Appendix D.

Table 5-6. Education and Outreach Capabilities

Jurisdiction	Firewise Certification	StormReady Certification	Natural disaster or safety-related school programs	Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Public-private partnership initiatives addressing disaster-related issues	Local citizen groups or non-profit organizations (focused on environmental protection, emergency preparedness, access and functional needs populations, etc.)	Other (website with mitigation information posted)
Ashland (B)							
Auburn (B)	-	-	-	-	-	x	-
Barry (T)							
Blythe (T)							
Branch (T)	-	-	-	-	-	-	-
Butler (T)	-	x	-	-	-	-	-
Cass (T)							
Coaldale (B)							
Cressona (B)	-	-	-	-	-	-	-
Deer Lake (B)							
Delano (T)							
East Brunswick (T)							
East Norwegian (T)	-	x	-	-	-	-	-
East Union (T)							
Eldred (T)							
Foster (T)	-	-	-	-	-	-	-
Frackville (B)							
Frailey (T)	-	x	x	x	-	-	

Jurisdiction	Firewise Certification	StormReady Certification	Natural disaster or safety-related school programs	Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Public-private partnership initiatives addressing disaster-related issues	Local citizen groups or non-profit organizations (focused on environmental protection, emergency preparedness, access and functional needs populations, etc.)	Other (website with mitigation information posted)
Gilberton (B)	-	-	-	-	-	-	
Girardville (B)							
Gordon (B)	-	-	-	x	-	-	
Hegins (T)	-	-	-	-	-	-	-
Hubley (T)							
Kline (T)							
Landingville (B)							
Mahanoy (T)							
Mahanoy City (B)							
McAdoo (B)							
Mechanicsville (B)							
Middleport (B)							
Minersville (B)							
Mount Carbon (B)							
New Castle (T)							
New Philadelphia (B)							
New Ringgold (B)							
North Manheim (T)	-	-	-	-	-	x	x
North Union (T)	x	-	-	-	-	-	-

Jurisdiction	Firewise Certification	StormReady Certification	Natural disaster or safety-related school programs	Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Public-private partnership initiatives addressing disaster-related issues	Local citizen groups or non-profit organizations (focused on environmental protection, emergency preparedness, access and functional needs populations, etc.)	Other (website with mitigation information posted)
Norwegian (T)	-	x	-	x	-	-	-
Orwigsburg (B)							
Palo Alto (B)	-	-	-	-	-		Schuylkill Alert
Pine Grove (B)	-	-	x	-	-	x	
Pine Grove (T)							
Port Carbon (B)	-	-	-		-	-	
Port Clinton (B)							
Porter (T)							
Pottsville (C)	-		x	x	x	x	Schuylkill Alert
Reilly (T)	-	x	-	-	-	-	-
Ringtown (B)							
Rush (T)							
Ryan (T)							
Saint Clair (B)	-	x	x	x	-	x	
Schuylkill (T)							
Schuylkill Haven (B)			x	-	-	-	
Shenandoah (B)							
South Manheim (T)	-	-	-	-	-	-	-

Jurisdiction	Firewise Certification	StormReady Certification	Natural disaster or safety-related school programs	Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Public-private partnership initiatives addressing disaster-related issues	Local citizen groups or non-profit organizations (focused on environmental protection, emergency preparedness, access and functional needs populations, etc.)	Other (website with mitigation information posted)
Tamaqua (B)							
Tower City (B)	-	-		x	x	x	
Tremont (B)	-	x	x			x	Schuylkill Alert
Tremont (T)							
Union (T)		-	-		-	-	
Upper Mahantongo (T)							
Walker (T)	-	-	-	-	-	-	
Washington (T)							
Wayne (T)							
West Brunswick (T)	-	x	-	-	-	-	
West Mahanoy (T)							
West Penn (T)	-	x		x	-	x	

Notes:

"X" indicates that the jurisdiction currently has this capability in place.

DK indicates "don't know."

Blank space indicates no response was received from the jurisdiction.

B = Borough

C = City

T = Township

"-" indicates not is currently in place.

NA indicates the jurisdiction noted not applicable.

5.2.5 SELF-ASSESSMENT

Through the Capability Assessment Surveys, all participating jurisdictions were further asked to provide a self-assessment of their jurisdiction’s capability in the areas of Planning and Regulatory Capability, Administrative and Technical Capability, Financial Capability, Education and Outreach Capability, Community Political Capability and Community Resiliency Capability. Respondents evaluated their degree of capability in these areas as “Limited”, “Moderate” or “High.” Table 5-7 provides the summary results from municipalities that completed capability self-assessment worksheets. Figures 5-1 through 5-6 illustrate the responses per capability category. Although not all municipalities submitted a response, based on the responses received, the greatest capabilities are in the planning and regulatory, and administrative and technical categories.

Table 5-7. Capability Self-Assessment Matrix

Municipality	Capability Category					
	Planning and Regulatory Capability	Administrative and Technical Capability	Financial Capability	Education and Outreach Capability	Community Political Capability	Community Resiliency Capability
Ashland (B)						
Auburn (B)	Moderate	High	Limited	Limited	Limited	Limited
Barry (T)						
Blythe (T)	High	High	Limited	Limited		
Branch (T)	Limited	Limited	Limited	Limited	Limited	Limited
Butler (T)	Limited	Limited	Limited	Limited	Limited	Limited
Cass (T)						
Coaldale (B)						
Cressona (B)	High	High	Limited	Limited	Moderate	Moderate
Deer Lake (B)	High	High	Limited	Limited		
Delano (T)						
East Brunswick (T)	Moderate	Limited	Moderate	Limited		
East Norwegian (T)	Moderate	Moderate	Moderate	Limited		
East Union (T)						
Eldred (T)						
Foster (T)	High	High	High	Moderate	Moderate	Moderate
Frackville (B)						
Frailey (T)	High	High	High	Limited		
Gilberton (B)						
Girardville (B)						
Gordon (B)	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Hegins (T)	Limited	Limited	Limited	Limited		
Hublely (T)						
Kline (T)	High	High	Limited	Limited		
Landingville (B)						

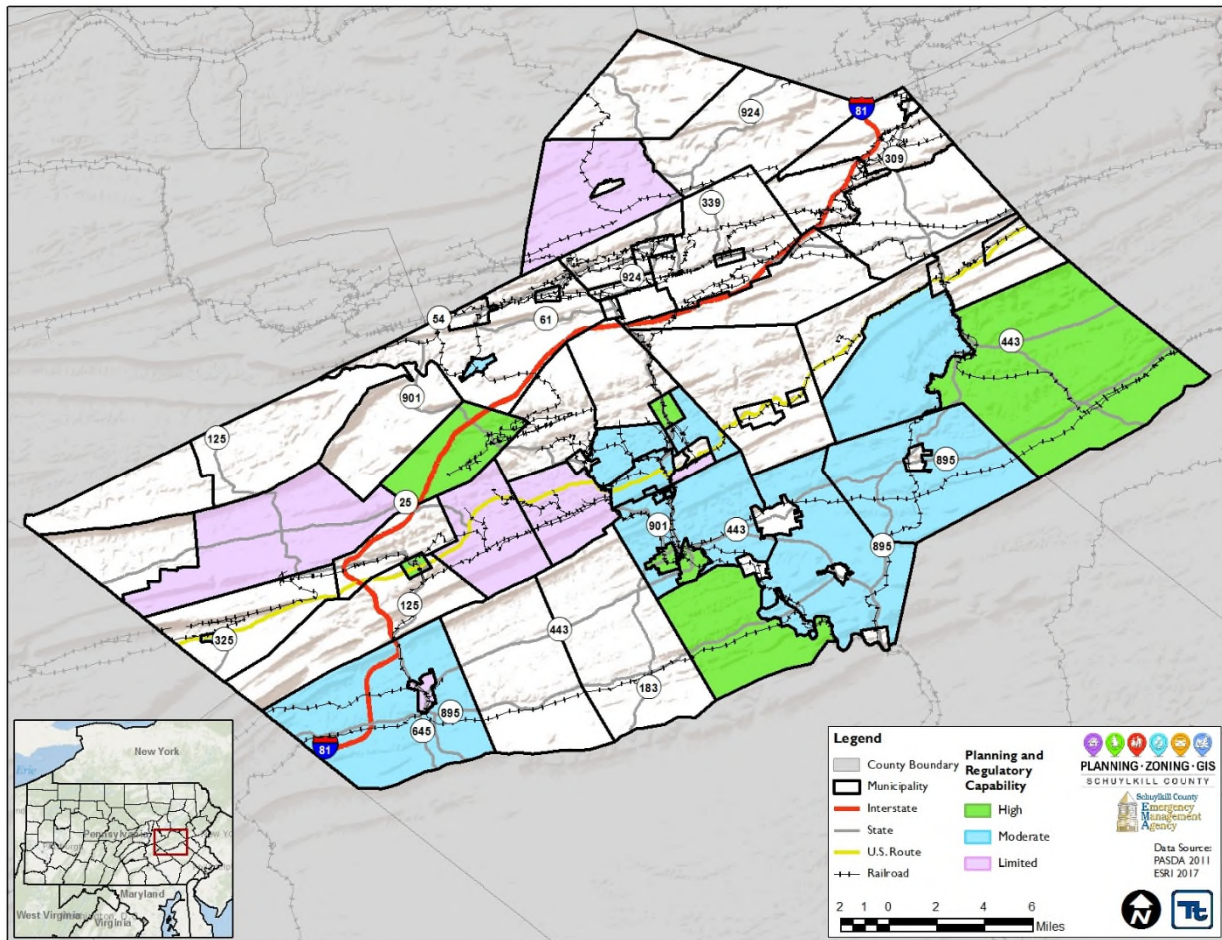
Municipality	Capability Category					
	Planning and Regulatory Capability	Administrative and Technical Capability	Financial Capability	Education and Outreach Capability	Community Political Capability	Community Resiliency Capability
Mahanoy (T)						
Mahanoy City (B)						
McAdoo (B)						
Mechanicsville (B)						
Middleport (B)						
Minersville (B)						
Mount Carbon (B)	High	High	Limited	Limited		
New Castle (T)	High	High	Limited	Limited		
New Philadelphia (B)						
New Ringgold (B)						
North Manheim (T)	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
North Union (T)						
Norwegian (T)	Moderate	Moderate	Moderate	Limited		
Orwigsburg (B)						
Palo Alto (B)	Limited	Limited	Limited	Moderate		
Pine Grove (B)	Limited	Moderate	Moderate	Limited		
Pine Grove (T)	Moderate	High	High	Limited		
Port Carbon (B)						
Port Clinton (B)						
Porter (T)						
Pottsville (C)	Moderate	Moderate	Moderate	Moderate		
Reilly (T)	Limited	Limited	Moderate	Limited		
Ringtown (B)						
Rush (T)						
Ryan (T)						
Saint Clair (B)	High	High	Moderate	Moderate		
Schuylkill (T)						
Schuylkill Haven (B)	High	High	High	Moderate		
Shenandoah (B)						
South Manheim (T)	High	High	Limited	Limited	Moderate	Moderate
Tamaqua (B)						
Tower City (B)	Moderate	Moderate	Limited	Moderate		
Tremont (B)	High	Moderate	Limited	Moderate		
Tremont (T)						
Union (T)	Limited	Limited	Limited	Limited		
Upper Mahantongo (T)						
Walker (T)	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Washington (T)						

Municipality	Capability Category					
	Planning and Regulatory Capability	Administrative and Technical Capability	Financial Capability	Education and Outreach Capability	Community Political Capability	Community Resiliency Capability
Wayne (T)						
West Brunswick (T)	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
West Mahanoy (T)						
West Penn (T)	High	High	High	Moderate		

Note:
Blank space indicates no response was received from the municipality.

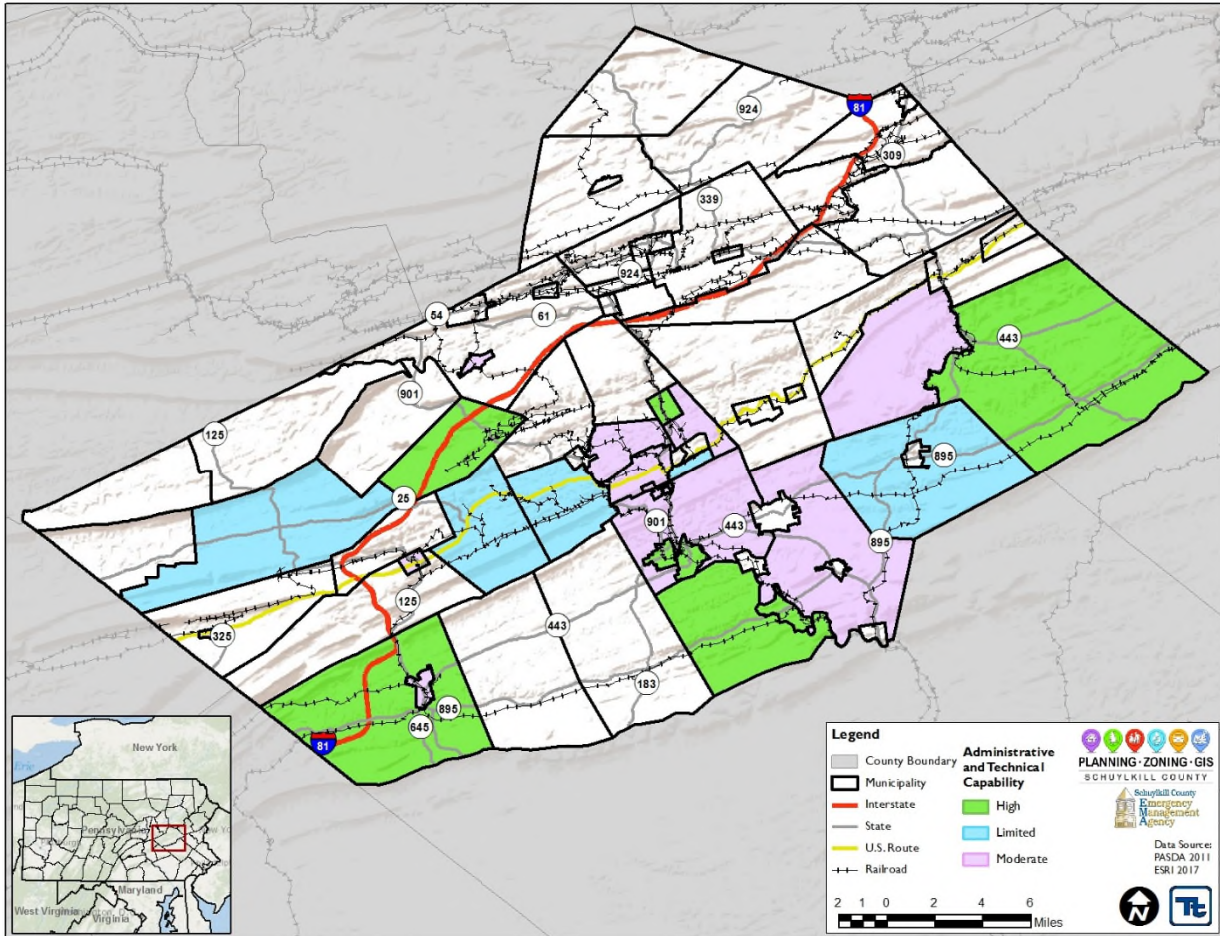
Detailed information regarding the municipalities' capabilities self-assessments can be found in the municipal survey responses provided in Appendix D.

Figure 5-1. Planning and Regulatory Capability Results from the Self-Assessment Exercise



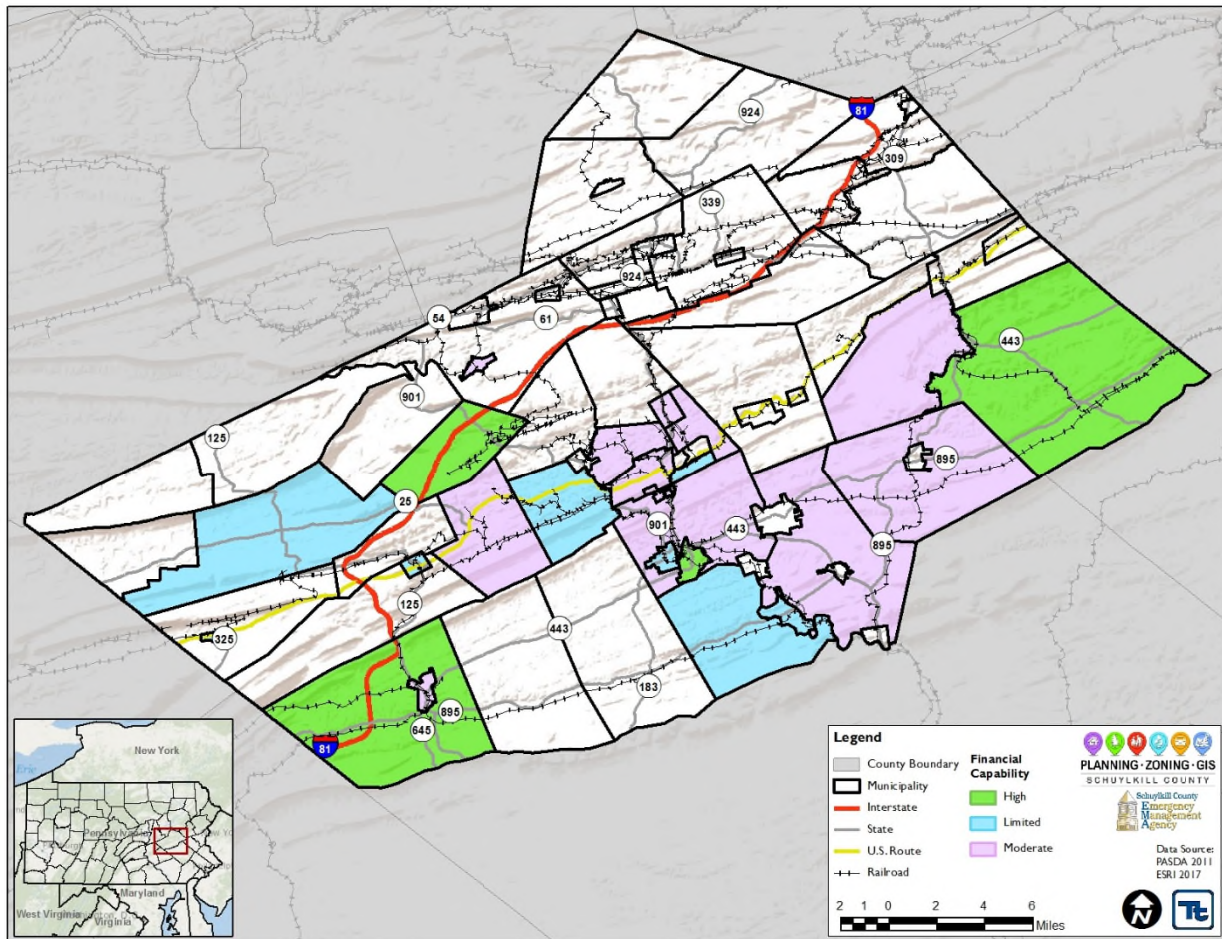
Note: The map is based on the capability self-assessment worksheets received. If a response was not received, the municipality is not assigned a high/moderate/limited category.

Figure 5-2. Administrative and Technical Capability Results from the Self-Assessment Exercise



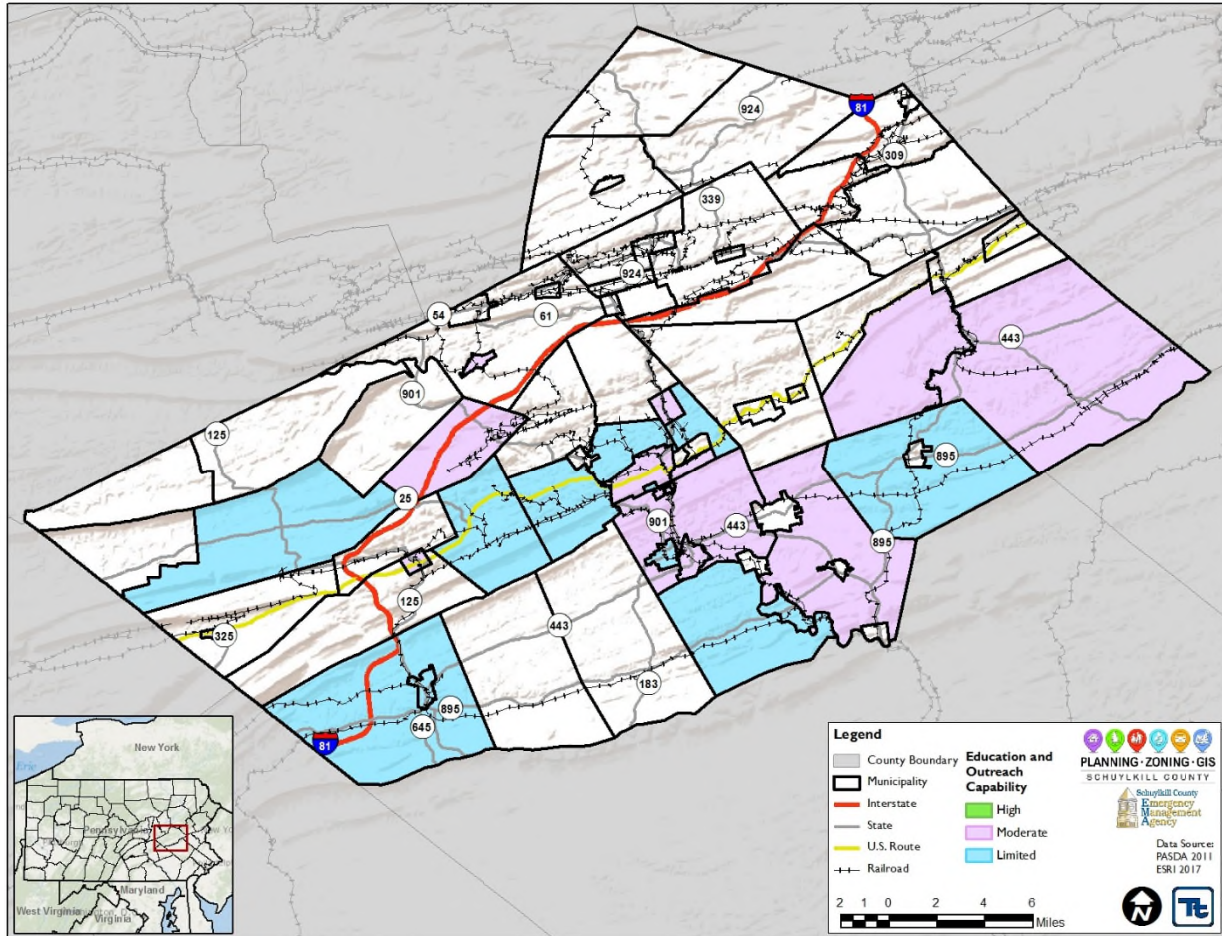
Note: The map is based on the capability self-assessment worksheets received. If a response was not received, the municipality is not assigned a high/moderate/limited category.

Figure 5-3. Financial Capability Results from the Self-Assessment Exercise



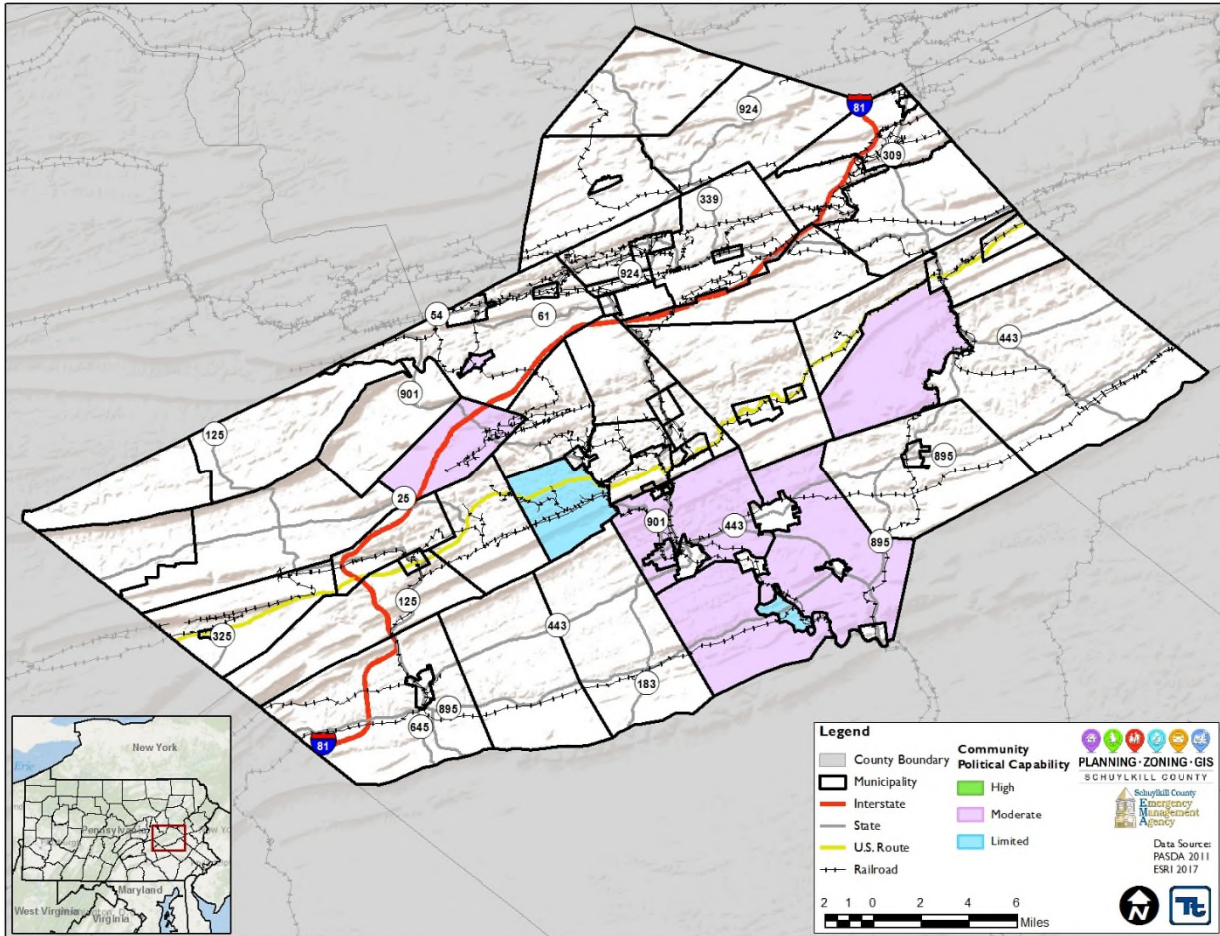
Note: The map is based on the capability self-assessment worksheets received. If a response was not received, the municipality is not assigned a high/moderate/limited category.

Figure 5-4. Education and Outreach Capability Results from the Self-Assessment Exercise



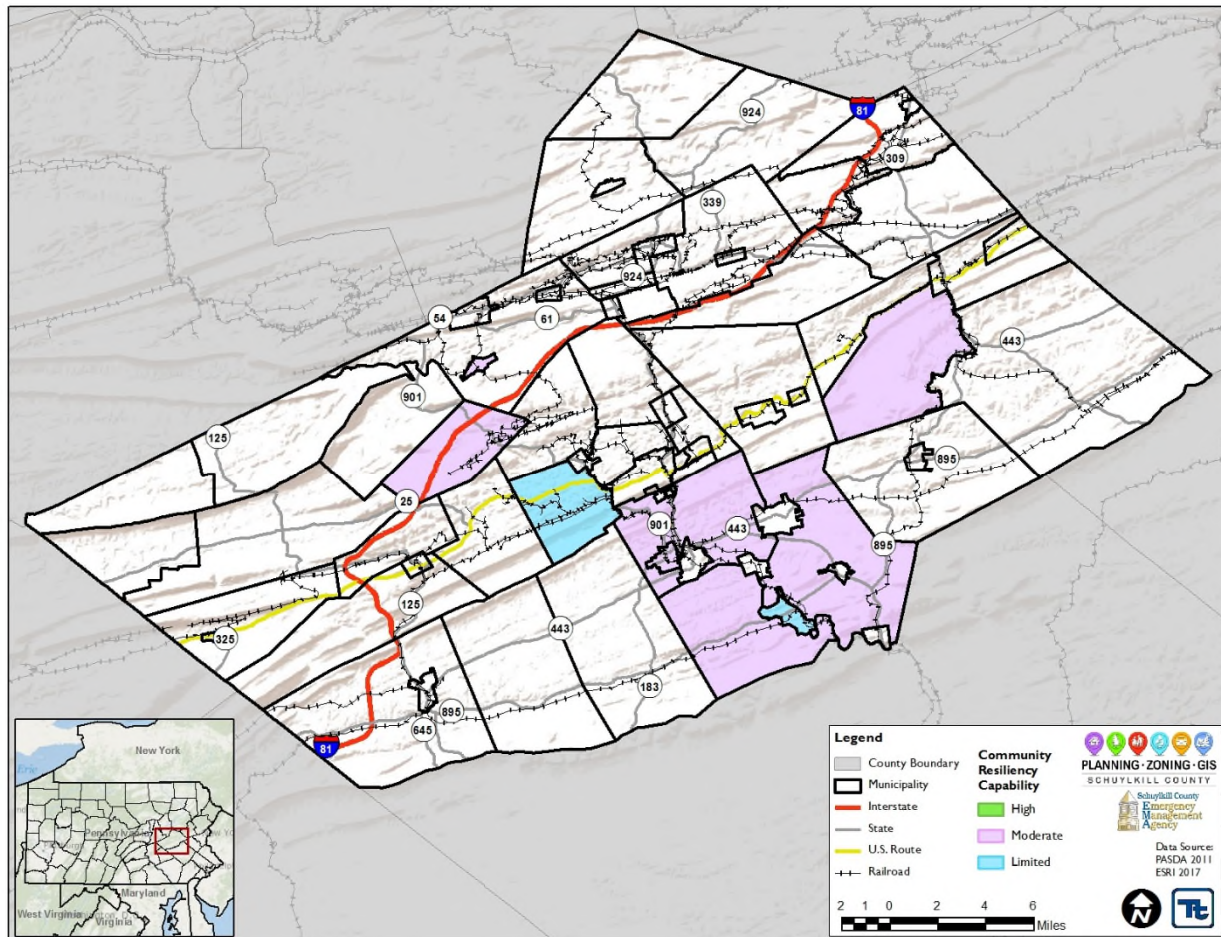
Note: The map is based on the capability self-assessment worksheets received. If a response was not received, the municipality is not assigned a high/moderate/limited category.

Figure 5-5. Community Political Capability Results from the Self-Assessment Exercise



Note: The map is based on the capability self-assessment worksheets received. If a response was not received, the municipality is not assigned a high/moderate/limited category.

Figure 5-6. Community Resilience Capability Results from the Self-Assessment Exercise



Note: The map is based on the capability self-assessment worksheets received. If a response was not received, the municipality is not assigned a high/moderate/limited category.

5.2.6 PLAN INTEGRATION

According to FEMA, plan integration is a process where communities look critically at their existing planning framework and align efforts. Integration of hazard mitigation principles into other local planning mechanisms (comprehensive plans, transportation plans, floodplain ordinances, etc.) and vice versa is vital to build 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.

As demonstrated by the County Planning Department and County EMA’s partnership in leading the HMP update, both departments are dedicated to continuing to integrate hazard mitigation into daily operations at the county and municipal level. It is the intention of Schuykill County and all municipalities to continue to incorporate mitigation planning into its planning tools through the HMP update goals, mitigation actions

identified in this update, and utilization of the risk assessment results to support hazard awareness and risk management approaches.

The Schuylkill County EMA is responsible for preparing and maintaining the County EOP that is inclusive of all 67 municipalities and for its biennial review. The County EMA posts the County EOP online. Municipalities are notified of changes to the EOP and directed to the EOP website. The HMP is referenced as a supporting plan. The risk assessment information presented in the 2019 HMP will be used to update the Hazard Vulnerability Assessment section of the County EOP. Recommended changes to the HMP, based on changes to the EOP, will then be coordinated with the Core Planning Team.

Implementation actions noted in Section 6 (Mitigation Strategy) include incorporating the goals of the HMP into ongoing planning, zoning, building, and engineering activities. As previously discussed, the County has legal authority as it relates to subdivision and zoning for about half of the municipalities. The identified hazard areas as documented in the HMP will continue to be considered and referenced when reviewing changes to these regulations and approving site plans. According to the County Planning Department, the Schuylkill County Comprehensive Plan is scheduled for an update over the performance period of this 2019 HMP update. The HMP update will be utilized to update County Comprehensive Plan.

The Upper Swatara Long Term Recovery Plan identified many mitigation actions; many of which have since been implemented. This Plan was reviewed and any actions in progress or not yet started, have been indicated as high priority mitigation actions in the 2019 HMP update for the municipalities. The County will also support implementation of these actions (action 2019-SC-10 in Table 6-4; Section 6 – Mitigation Strategy).

After the July and August 2018 flood events, the Flood Hot Wash facilitated discussion in terms of what went well and what went wrong during the response and recovery (still in progress) phases. Several mitigation actions were identified as a result of the Flood Hot Wash discussions. The following were identified and have been included in the 2019 updated strategy (refer to Table 6-4 in Section 6):

- Conduct ICS training for local municipal officials and develop template Incident Action Plans. Improve the capabilities of local Emergency Operations Centers, including personnel (staffing) and communications.
- Develop public information templates for use during an event (i.e. press releases, information on mold remediation, social media, etc.)
- Improve situation reporting between county and municipalities during an event.
- Develop a database of local resources from municipalities. Integrate with the fire equipment and personnel database.
- Pool resources to acquire traffic control devices.

As noted earlier, in Schuylkill County the municipalities have the legal authority to enforce compliance with land use planning and development directives; the County has legal authority as it relates to subdivision and zoning for approximately half of the municipalities. Incorporating the goals of the HMP into ongoing planning, zoning, building and engineering activities will continue through the performance period of this plan and beyond. Specifically, the County Planning Department and County EMA 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 grant 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 prior to land use or zoning changes and permitting or development decisions.

The Schuylkill County Planning Department included a new mitigation action (2019-SC-13) to work with the municipalities to integrate the County's Hazard Mitigation Plan into the municipalities' Comprehensive Plans, Subdivision and Land Development Ordinances, and Zoning Ordinances, and other similar documents. This will be completed by advising them on the principles and strategies for safe development to reduce risk to new construction. As examples, Pottsville and Tremont have already adopted the "Quality of Life Ordinance" Code. This is occurring through Act 247 reviews for proposed land use ordinances and proposed subdivisions/land developments.

The Schuylkill County HMP update strived to use the best available technical information, plans, studies and reports throughout the plan process to support hazard profiling; risk and vulnerability assessment; review and evaluation of mitigation capabilities; and the identification, development and prioritization of county and local mitigation strategies. The asset and inventory data used for the risk and vulnerability assessments is presented in the County Profile (Section 2). Schuylkill County GIS data was used as the foundation to the inventory development; however, it was enhanced and corrected as part of the HMP process through surveying the Core and Municipal Planning Team members to provide the County a more robust inventory to utilize moving forward. Section 4.2 describes the best available data used for the risk assessment including the newly released FEMA preliminary DFIRM database in August 2018.

Plans, reports and other technical information were identified and provided directly by the County, participating jurisdictions and numerous stakeholders involved in the planning effort, as well as through independent research by the planning consultant. The County and municipalities were tasked with updating the inventory of their Planning and Regulatory capabilities as presented above and providing relevant planning and regulatory documents as applicable. Relevant documents, including plans, reports, and ordinances were reviewed to identify:

- Existing municipal capabilities;
- Needs and opportunities to develop or enhance capabilities, which may be identified within the County or local mitigation strategies;
- Mitigation-related goals, considered during the development of the overall Goals (see Section 6);
- Proposed, in-progress, or potential mitigation projects, actions and initiatives to be incorporated into the updated County and local mitigation strategies.

In terms of project implementation, the County and its jurisdictions will consider multiple grant sources to fund eligible projects. As noted in Section 6 (Mitigation Strategy) the County and municipalities have leveraged funding from all levels of government to implement mitigation measures. These opportunities may include, but are not limited to the grant funding sources summarized earlier in this section.

SECTION 6. MITIGATION STRATEGY

Section 6 describes the process by which Schuylkill County will reduce or eliminate potential losses from the natural and non-natural hazards identified in Section 4.2 (Hazard Identification) of this HMP. The mitigation strategy focuses on existing and potential future mitigation actions to alleviate the effects of hazards on Schuylkill County’s population, economy, environment and general building stock.

This section provides a summary of the 2019 HMP mitigation strategy update process, outlines the mitigation goals set forth in the 2019 HMP update, describes the process for identifying and analyzing mitigation techniques, and provides the mitigation action plan.

6.1 Update Process Summary

The 2013 HMP mitigation strategy, inclusive of the 2013-identified goals, objectives and mitigation actions, was first examined at the November 2018 kickoff meetings through the distribution of the Mitigation Strategy 5-Year Plan Review Worksheet. During the 2019 HMP update planning process, the Core and Municipal Planning Team members were provided the opportunity to comment on the goals, objectives, and actions that were listed in the existing 2013 HMP via submission of worksheets and participation at Core and Municipal Planning Team meetings.

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,” as well as (2) the Pennsylvania All-Hazard Mitigation Planning Standard Operating Guide (SOG). The following summarizes the mitigation strategy update process for the 2019 HMP update which is discussed further throughout this section.

- **Strengths, Weaknesses, Obstacles and Opportunities (SWOO):** After the updated risk assessment was complete, and prior to goal setting, a SWOO session was conducted with the Core Planning Team at the June 27, 2018 meeting. The purposes of this session were to review information garnered from the risk assessment and identify strengths, weaknesses or challenges, obstacles and opportunities through a facilitated brainstorming session on risks, vulnerabilities and capabilities for each high-ranked hazard. The SWOO results were leveraged to revise the 2013 goals, as well as develop the updated mitigation action strategy for the County and participating municipalities.
- **Development of a Vision Statement and Review of Existing Mitigation Plan Goals and Mitigation Action Plan:** Existing mitigation goals and objectives, and the 2013 HMP mitigation actions were first examined at the November 9, 2017 kickoff meetings. These items were distributed to all attending participants via hard copy at the kickoff meetings, and via email in the Lunch & Learns which had hyperlinks to download all worksheets that were distributed throughout the planning process. Members of the Core and Municipal Planning Teams were asked to review and provide input on the goals and provide a status update to their jurisdiction’s 2013 HMP mitigation action plan and return to the County. Plan participants continued to review and provide progress on the 2013 mitigation actions throughout the planning process.

At the June 27, 2018 Core Planning Team Mitigation Strategy Meeting the goals were revisited and a preliminary discussion took place regarding the development of a vision statement. The SWOO results were reviewed and the Schuylkill County HMP Coordinators reviewed and enhanced the proposed 2019 HMP goals further and drafted several draft vision statements for consideration. A Vision and Goal-Setting exercise was developed and distributed to the Core Planning Team to obtain consensus on their development and update.

- **Develop and Update Mitigation Strategies:** Mitigation actions for inclusion in the 2019 HMP update were identified through input from the Core and Municipal Planning Teams and the following sources. For the 2019 HMP update, the County focused on crafting a mitigation strategy that is implementable, action-oriented and clearly connects mitigation actions with general planning activities. The actions selected for inclusion in the 2019 HMP updated mitigation strategy are presented in Table 6-4.
 - **2013 HMP Mitigation Strategy** – Actions that were not completed during the 2013 HMP were reviewed, revised and included as described in Tables 6-2 and 6-4, if still considered a priority to the jurisdiction.
 - **Risk Assessment** – The results of the updated risk assessment were reviewed with the Core and Municipal Planning Teams and problem statements were developed at the May 22, 2018 meetings. Mitigation actions were considered to address identified problems.
 - **Capability Assessment and SWOO session** – Challenges and opportunities identified during the capability assessment update and SWOO session were reviewed. Mitigation actions were considered to address challenges and capture opportunities.
- **Mitigation Strategy Prioritization and Implementation:** The potential mitigation actions were qualitatively evaluated and described in more detail in Section 6.6 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.
- **Document the Mitigation Planning Process:** The entire mitigation planning process is documented throughout this HMP in Section 3.

This section summarizes past mitigation goals, past mitigation action status and provides an update of mitigation strategies, and additional past mitigation accomplishments.

6.2 Summary of Strengths, Weaknesses, Obstacles and Opportunities Session

As summarized above, the Core Planning Team participated in a facilitated SWOO session to identify strengths, weakness or challenges, obstacles and opportunities in hazard mitigation for the County’s seven high-ranked hazards. Each of these hazards were discussed individually and all information shared during the session was recorded to assist with the update to the County’s mitigation strategy. The discussion of each hazard began with identifying County, municipal and stakeholder strengths to mitigate the risk and potential future impacts of these hazards. Next, the weaknesses, challenges and obstacles the planning area faces to reduce each hazard’s risk were identified. To conclude the discussion of each high-ranked hazard, the Core Planning Team

was asked to identify potential opportunities for enhanced mitigation. The following summarizes the five general categories of potential opportunities identified during the session. Refer to Appendix H which provides the information captured for each hazard during the SWOO session.

- Address challenges with financial resources
- Address challenges with staffing resources (both employed or contracted, and volunteer)
- Increase public awareness
- Increase and enhance local capabilities
- Reduce vulnerability

6.3 Review of the Past Mitigation Goals

The mitigation goals identified in the 2013 version of the HMP are listed below:

- **Goal 1:** Create an organizational structure for accountability to follow through with maintenance of the plan.
- **Goal 2:** Maintain a sense of regional accountability, whereas, a hazard in one municipality may affect another.
- **Goal 3:** Promote actions that support economic development and public/private partnerships within Schuylkill County.
- **Goal 4:** Encourage municipalities, through education, to promote public awareness of current and/or potential hazards within their community.
- **Goal 5:** Strengthen land use and zoning ordinances regarding floodplain regulation.
- **Goal 6:** Identify resources within each municipality.
- **Goal 7:** Foster awareness of specific hazards in an area prior to future development.

At the November 9, 2017 Core and Municipal Planning Team Meetings, the 2013 HMP goals were distributed via hardcopy on the Mitigation Strategy 5-Year Mitigation Plan Review worksheet. The meeting attendees were asked to provide early feedback on the goals to incorporate into the update process. They were asked to consider if the goals address current and expected conditions, and whether the goal should be maintained in the updated HMP or changed based on current conditions in the County. At this time, the State HMP was in draft format, and the draft State HMP update goals were provided as a reference. Throughout the planning process, all plan participants were asked to return the Mitigation Strategy 5-Year Mitigation Plan Review worksheet with their input.

The 2013 HMP goals were revisited at the June 27, 2018 Mitigation Strategy meeting with the Core and Municipal Planning Teams. Through a facilitated discussion, each 2013 goal was discussed. It was concluded that a complete update to the 2013 goals was needed for the 2019 HMP. Refer to Section 6.6 below for additional discussion of the 2019 HMP goals.

6.3.1 PAST MITIGATION ACTION STATUS AND UPDATE OF MITIGATION STRATEGIES

In the 2013 HMP, Schuylkill County and municipalities identified 386 actions and initiatives to support an improved understanding of hazard risk and vulnerability and to enhance mitigation capabilities. Of the 386 actions, 38 were countywide actions that range from specialized training for County employees to enforcing floodplain ordinances and data gathering. Progress on the 2013 mitigation actions was evaluated during the 2019 update process.

The Core Planning Team and Municipal Planning Team were provided with a Mitigation Review Worksheet identifying all of the County and municipal actions and initiatives from the 2013 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. 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,” “In Progress/Not Yet Complete,” or “Continuous” have been carried forward in the updated mitigation strategies identified in Table 6-4 (unless otherwise determined by the County to be a discontinued project). The language in some actions being carried over has been adjusted to reflect changes to County and/or municipal needs and capabilities. Some actions were also merged to reduce redundant efforts on behalf of the County and its municipalities.

Table 6-1. Past Mitigation Action Status

Jurisdiction/ Responsible Party	Potential Mitigation Action	Status					Describe Next Steps 1. If including in the 2019 HMP, do you want to revise/reword (e.g., to be more specific or change lead agency?) 2. If discontinued, explain why.
		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?					
		No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	Discontinued	
County Emergency Management Agency	Review mutual aid agreements (municipal as inter county) and recommend changes as required.			X			EMA works with municipal officials on fire related mutual aid agreements as requested or at least on local official election cycles (every 2 years). This is a current capability and will be removed from the mitigation strategy.
County Emergency Management Agency	Review and evaluate facilities, equipment, personnel and other resources needed to support emergency response annually.			X			Utilizes SCEMA website to collect from the Chief Fire Officer on an annual basis: data on personnel, apparatus and equipment. This has been revised in the mitigation strategy to evaluate and develop a database of resources.
County Emergency Management Agency and Planning Department	Establish webpages where presentations, training documents and webinars can be posted. This will allow municipal officials to access to the information at their own schedule and at their own pace.	X					This action has been combined in the updated mitigation strategy and enhanced to include model ordinances and other information to assist municipal officials.
County Emergency Management Agency and Planning Department	Monitor and evaluate mitigation actions annually and update the hazard mitigation plan every five years to reflect changes in development after a major hazard event.					X	This action has been specified as part of updated plan maintenance strategy in Section 7 and is removed from the mitigation strategy.
County Emergency Management Agency, Planning Department	On an annual basis, conduct Municipal Officials Training and/or State-sponsored training courses to address hazard mitigation topics, such as:	X					This action has been combined into an education and outreach training action in the updated mitigation strategy.

Jurisdiction/ Responsible Party	Potential Mitigation Action	Status					Describe Next Steps 1. If including in the 2019 HMP, do you want to revise/reword (e.g., to be more specific or change lead agency?) 2. If discontinued, explain why.
		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	
and Conservation District	damage assessment after natural disasters, stormwater management, mutual aid agreements among emergency providers and municipalities, public disaster assistance, hazard mitigation grant assistance, CIP, and tools to address blight.						
County Grant Writing	Advocate for municipalities to find alternate methods of funding to the Hazard Mitigation Grant Program.					x	This standalone action will be removed and captured as part of the municipal education action in the updated strategy.
County Planning Department	Train additional County personnel on the use of the County's GIS system to support emergency operations.			x			This has occurred but with staff changes is really an annual task. This action has been revised to implement database and ESRI-based solutions; refer to the updated mitigation strategy.
County Tax Assessment Department	Map new developments as plans are approved for the purpose of emergency and land use planning.		x				Staff training has occurred, but the county needs to move from MapInfo software to ArcGIS software for parcel mapping which will require conversion of the parcels to ESRI's parcel fabric. This action has been revised and is included in the updated mitigation strategy under implement database and ESRI-based solutions. Additional staff training required.
County Planning Department	Include language in the County Zoning Ordinance (for 34 municipalities) and the 33 municipal ordinances on measures to: enhance the concept of			x		x	Hazard Mitigation principles are considered when applicable during the review of any municipal zoning amendments

Jurisdiction/ Responsible Party	Potential Mitigation Action	Status					Describe Next Steps 1. If including in the 2019 HMP, do you want to revise/reword (e.g., to be more specific or change lead agency?) 2. If discontinued, explain why.
		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	
	defensible space practice; and minimize impervious surfaces to reduce the impacts of drought.						which are required by the PA Municipalities Planning Code to be reviewed by the County. This action will be removed and combined with the development of resources/model ordinances in the updated mitigation strategy.
County Emergency Management Agency, Planning Department, and Conservation District	Develop an understanding that more clearly lays out responsibilities among County agencies on their roles associated with floodplain management.				x		Land banking is being done, good progress being made - Muni need education that this is available as an option. This action will be combined with the education action in the updated mitigation strategy.
County Emergency Management Agency	Improve real-time information on stream flow (particularly during flood conditions) through placement of additional stream gauges throughout the county. During flood conditions, use this information to project peak flood levels and to warn the public and emergency service providers.					x	Schuykill County is at the head waters. There is enough information available; this action is removed from the mitigation strategy.
County Emergency Management Agency and Department of Planning	Enroll County staff in Hazard Mitigation and Floodplain Management courses, which may include on-line webinars to minimize costs.	x					This action is combined with the education action in the updated mitigation strategy.
County Planning Department	Introduce a virtual one-stop shop for property owners and municipalities who have flooding problems and expand the Department's mission to provide advice to municipalities on flood hazards, availability of flood		x			x	This action is combined with the education action in the updated mitigation strategy.

Jurisdiction/ Responsible Party	Potential Mitigation Action	Status					Describe Next Steps 1. If including in the 2019 HMP, do you want to revise/reword (e.g., to be more specific or change lead agency?) 2. If discontinued, explain why.
		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	
	insurance, and flood protection methods.						
County and All Municipalities	Encourage municipalities to update their stormwater regulations as needed. A model PA DEP stormwater ordinance is available online that can be used.		x				This has been added as a new mitigation action regarding Act 167.
County and All Municipalities	Where acquisition is not feasible advise homeowners of a preferred mitigation alternative such as elevation or flood proofing.					x	The County has conducted outreach to educate residents on mitigation alternatives; acquisitions have taken place post-Tropical Storm Lee.
County and All Municipalities	Enroll municipalities in the Firewise program. Encourage municipalities to reduce the vulnerability of critical facilities to wildfires by: increasing buffers and introducing defensible spaces; identifying farm roads, service roads, and other private access corridors in high hazard areas that could be used as fire breaks; and providing assistance to the County Emergency Management to identify vulnerable structures.					x	A few municipalities have ordinances against brush fire. This is not a county priority at this time.
County and All Municipalities	Cooperate with local water authorities, including mapping water source data and mapping locations of water sources needed during fires (such as ponds and dry hydrants).		x				The Schuylkill Municipal Water Authority plans to finish this; 11 municipalities have been mapped to date with participation from the Boy Scouts.
County and All Municipalities	Partner with the Schuylkill County Board of Realtors to raise awareness on the potential hazard of radon to	x					This is included in the updated mitigation strategy

Jurisdiction/ Responsible Party	Potential Mitigation Action	Status					Describe Next Steps 1. If including in the 2019 HMP, do you want to revise/reword (e.g., to be more specific or change lead agency?) 2. If discontinued, explain why.
		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	
	prospective home buyers in Schuylkill County.						
County Conservation District	Coordinate open space protection efforts with other entities and land protection groups for the preservation of areas where the hazard level is high.					x	This is a current capability of department responsibilities. This action has been removed and open space protection efforts are discussed in the Capability Assessment (Section 5).
County Emergency Management Agency	Assign and train additional County employees to assist the Emergency Operations Center staff, so they can be called upon in the event of major emergencies.		x				This action has been changed to conduct tabletop exercises with County employees; refer to the updated mitigation strategy.
County Emergency Management Agency	Assist municipalities in the preparation and maintenance of Emergency Operations Plans.			x			This is a current capability of the County EMA; this action has been removed.
County Emergency Management Agency	Foster relationships with other counties, so that Schuylkill County may utilize mutual aid in Emergency Operations Center positions, including GIS.			x			This is currently occurring through East Central Taskforce, East Central Taskforce Information Services Committee, County GIS Pros, mutual aid agreements. This action is removed.
County Emergency Management Agency	Determine appropriate methods to conserve water. Initiate a water conservation program.					x	Action is discontinued.
County Emergency Management Agency, Planning Department, and Conservation District	Provide assistance to municipalities in implementing individual hazard mitigation actions. All hazards					x	This is part of the updated plan maintenance strategy (Section 7).
County Planning Department	Develop a GIS Strategic Plan for providing greater access to GIS data					x	This action has been combined into a new GIS action.

Jurisdiction/ Responsible Party	Potential Mitigation Action	Status					Describe Next Steps 1. If including in the 2019 HMP, do you want to revise/reword (e.g., to be more specific or change lead agency?) 2. If discontinued, explain why.
		No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	Discontinued	
	and tools for both emergency and land use planning.						
County Planning Department and municipalities	Work with the municipalities to integrate the County's Hazard Mitigation Plan into the municipalities' Comprehensive Plans, Subdivision and Land Development Ordinances, and Zoning Ordinances, and other similar documents by advising them on the principles and strategies for safe development.			x			This is occurring through Act 247 reviews for proposed land use ordinances and proposed subdivisions/land developments. Code "Quality of life Ordinance" has been adopted by Pottsville and Tremont.
County Conservation District	Use the "Pine Grove Area/Upper Swatara Watershed Recovery Strategy" as a model and example for similar strategies in other watersheds throughout the county.	x					Include Recovery Strategy and Port Carbon Watershed Study which included more of the watershed as models/examples; refer to the updated mitigation strategy.
County Conservation District	Implement the "Pine Grove Area/Upper Swatara Watershed Recovery Strategy".		x				This is in progress and has been included in the updated mitigation strategy.
County Emergency Management Agency and Planning Department	Standardize and improve the system of flood damage reporting. This process should use FEMA's Model Data Capture standards, including use of geographic information systems (GIS, which includes computerized mapping) by the county and municipalities.		x				PEMA has damage reporter and SCEMA developed reporting tool for recent event but could have improved platforms/data integration.
County Planning Department	Amend the County Zoning Ordinance to include measures to: enhance the concept of defensible space practice, and consider requiring applicants with property in the 100 year Floodplain to receive approval for building from the	x					This will follow a County Comprehensive Plan update that is scheduled over the performance period of this plan.

Jurisdiction/ Responsible Party	Potential Mitigation Action	Status					Describe Next Steps 1. If including in the 2019 HMP, do you want to revise/reword (e.g., to be more specific or change lead agency?) 2. If discontinued, explain why.
		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	
	municipality prior to issuance of a County zoning permit application.						
County Planning Department, County Assessment Office, County Emergency Management Agency	Identify, evaluate, and document the condition of blighted properties.	x					This is a data collection effort to improve county data as discussed in the "Next Steps" of the Risk Assessment for each hazard
Municipalities	Ensure the enforcement of municipal Floodplain Ordinances.			x			This is a capability; however this still needs to be improved. The County has created a new action to further enhance NFIP Floodplain Administrator education, compliance with the NFIP and enforcement of the Floodplain Ordinances; refer to Table 6-4.
County Planning Department and Conservation District	Work with the individual municipalities to be firmly committed to continued compliance with the NFIP by regulating development and redevelopment through the adoptions of provisions that meet or exceed the minimum NFIP requirements. Work with municipalities to ensure that there are no deficiencies when the Community Assistance Visits are conducted to ensure continued compliance.					x	This action has been revised and enhanced and included in the updated mitigation strategy.
County Solid Waste Office	Develop a Debris Management Plan to include quick "Help Sheets" built upon various types of events (such as EF 1 or EF 2 tornadoes).	x					Expand for all hazards; refer to the updated mitigation strategy

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County Planning Department	Incorporate local data in HAZUS models.					x	This action has been revised and enhanced and included in the updated mitigation strategy.
County Emergency Management Agency, Planning Department, and Conservation District	Identify and implement incentives to encourage municipal officials to participate in training.					x	This action has been revised and enhanced and included in the updated mitigation strategy.
Municipalities, County Planning Department	Work the municipalities to acquire data on the locations of individual wells.					x	This action has been revised and enhanced and included in the updated mitigation strategy.
Municipalities	Acquire, elevation, relocate or wet or dry proof non-residential structures to mitigate from flood damages.						Put to municipalities
Municipalities	Over the long-term, if funding becomes available, prepare stormwater management plans for watersheds where they have not been completed.						Act 167
Municipalities	Encourage municipalities to enroll in the Community Rating System (CRS). This program offers reduced flood insurance rates within a municipality that takes specific steps to reduce their flood risks.						Evaluation to determine if some capabilities. Action revised; refer to the updated mitigation strategy.
Ashland Borough	No municipal-specific mitigation actions in the 2013 HMP; refer to All Municipalities mitigation action above						
Auburn Borough	Construct additional stormwater inlet(s) on Market Street / move inlet to opposite of the road.	x					Include in 2019 HMP; no changes.
Barry Township	Streambank erosion is threatening the roadway at Lincoln Road. Conduct stream stabilization to restore stream.	Unknown					

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		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	
Barry Township	Streambank erosion is threatening the roadway at Black Creek Road. Conduct stream stabilization to restore stream.	County completed portion (install of rip-rap)					Carry forward the action to the 2019 HMP, conduct stream stabilization to restore stream.
Barry Township	An undersized bridge/culvert causes roadway overtopping at Post Road during flood events. Replace the undersized structure with a larger opening to convey flood flows.						Carry forward the action to the 2019 HMP, replace the undersized structure with larger opening to convey flood flows.
Barry Township	An undersized bridge/culvert causes roadway overtopping at State Route 4004 during flood events. Replace the undersized structure with a larger opening to convey flood flows.	No jurisdiction					Carry forward the action to the 2019 HMP, replace the undersized structure with larger opening to convey flood flows.
Barry Township	An undersized bridge/culvert causes roadway overtopping at Derr Road during flood events. Replace the undersized structure with a larger opening to convey flood flows.	# years ago completed					B Lee funds
Barry Township	An undersized bridge/culvert causes roadway overtopping at Rosies Road during flood events. Replace the undersized structure with a larger opening to convey flood flows.						Carry forward the action to the 2019 HMP, replace the undersized structure with larger opening to convey flood flows. No funding
Barry Township	An undersized bridge/culvert causes roadway overtopping at Maplewood Road during flood events. Replace the undersized structure with a larger opening to convey flood flows.						Carry forward the action to the 2019 HMP, replace the undersized structure with larger opening to convey flood flows. No funding
Barry Township	An undersized bridge/culvert causes roadway overtopping at Fishing Road during flood events. Replace the undersized structure with a larger opening to convey flood flows.						Carry forward the action to the 2019 HMP, replace the undersized structure with larger opening to convey flood flows. No funding

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		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	
Barry Township	An undersized bridge/culvert causes roadway overtopping at Middle Road during flood events. Replace the undersized structure with a larger opening to convey flood flows.						Carry forward the action to the 2019 HMP, replace the undersized structure with larger opening to convey flood flows. No funding
Barry Township	An undersized bridge/culvert causes roadway overtopping at Hill Road during flood events. Replace the undersized structure with a larger opening to convey flood flows.						Carry forward the action to the 2019 HMP, replace the undersized structure with larger opening to convey flood flows. No funding
Barry Township	Frequent fog and low visibility occurs on Weishample Road. Improve signage and install flashing lights.	Unknown					
Barry Township	Hillside washouts occur on Hill Road, resulting in debris and mud accumulation on the roadway. Construct roadside barriers to catch debris.						Carry forward the action to the 2019 HMP, construct roadside barriers to catch debris. Work with engineer to separate on project due to cost
Barry Township	Hillside washouts occur on Hill Road, resulting in debris and mud accumulation on the roadway. Construct roadside barriers to catch debris.						Duplicate
Barry Township	The following roads experience snow drifting: Hill Road, Weishample Road, Middle Road, Orchard Road, Fishing Road, Maplewood Road, Hinkle Road, Beurys Road. Improve roadway plowing and salting operations.						Snow fences are problematic, natural screens (exacerbate?) - to check if keep in next plan
Blythe Township	Remove fallen trees and debris from the River in East Norwegian Township, and remove properties from floodplain as applicable.		x	x			Carry forward the action to 2019 HMP, acquire home and remove trees and debris.

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		No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	Discontinued	
Branch Township	No municipal-specific mitigation actions in the 2013 HMP; refer to All Municipalities mitigation action above.						
Butler Township	Laurel Street does not have an adequate storm drainage system. Improve stormwater drainage facilities.	x due to funding					Carry forward the action to the 2019 HMP, improve stormwater drainage facilities, and upgrade culverts replace pipe with large. Township Engineer will take over.
Butler Township	The bridge at Walnick Drive was washed out. Replace structure with larger opening to convey flood flows.	x due to funding					Carry forward the action to 2019 HMP, replace structure with larger opening to convey flood flows. Township Engineer and roads will take over.
Butler Township	Roads and homes flood near Turnpike Road. Remove properties from floodplain.	x due to funding					Carry forward action to 2019 HMP, acquire and remove properties from floodplain. Township Engineer and roads will take over.
Butler Township	An undersized bridge/culvert causes roadway overtopping at Malones Road during flood events. Replace structure with larger opening to convey flood flows.	x due to funding					Carry forward action to 2019 HMP, replace structure with larger opening to convey flood flows. Township Engineer and roads will take over.
Butler Township	Roads and homes flood near Creek Road. Remove properties from floodplain.	x due to funding					Carry forward action to 2019 HMP, remove properties from floodplain. Township Engineer and roads will take over.
Butler Township	The cross-pipe at Runge Road is damaged. Replace the damaged pipe with an improved/larger structure to convey flood flows.	x due to funding					Carry forward action to 2019 HMP, replace the damaged pipe with an improved/larger structure to convey flood flows. Township Engineer will take over.
Butler Township	Roads and homes flood near Barry Road. Remove properties from floodplain.		x				Carry forward action to 2019 HMP, acquire and remove

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		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	
							properties from floodplain. Have removed one home in 2017.
Cass Township	The Township's Municipal Building floods due to the existing water main that crosses the culvert opening which catches large debris and causes a backwater effect. Consider demolishing and acquiring these structures and maintain the floodplain as open space in perpetuity.						No status provided to date
Cass Township	Valley Road floods periodically due to the undersized pipe. Work with PENNDOT to increase culvert capacity.						No status provided to date
Cass Township	Houses on Oak Lane and Valley Road that lie in the wide floodplain are flooded by the River. Remove sediment and debris from stream to improve channel flow.						No status provided to date
Cass Township	The Oak Hill Mine discharge floods Valley Road. Work with PENNDOT to increase culvert capacity.						No status provided to date
Cass Township	Stream sedimentation and debris clog the channel at Oak Lane. Work with PENNDOT to increase culvert capacity.						No status provided to date
Cass Township	Roadway overtopping occurs due to the undersized channels and cross-pipes on Valley Road. Continue to improve roadway drainage facilities on Schaeffer Hill Road.						No status provided to date
Cass Township	Roadway overtopping occurs due to the undersized channels and culverts on Valley Road. The existing stream channel has been regraded; the pipe under the Minersville Area School						No status provided to date

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	District should be evaluated and cleaned.						
Cass Township	Standing water on Schaeffer Hill Road and icing of the roadway are major issues. Examine and improve roadway drainage facilities on Low Road.						No status provided to date
Cass Township	The stream channel and culvert on Field Road are damaged. Improve roadway drainage facilities on Flag Lane and Condors Lane.						No status provided to date
Cass Township	Poor drainage roadway icing are major issues on Low Road. Replace culvert on Live Avenue to prevent flooding.						No status provided to date
Cass Township	The damaged drainage system results in roadway icing. Designate the Forestville Fire Company as EOC and purchase an emergency backup generator.						No status provided to date
Cass Township	The culvert on Line Avenue has failed. Repair/improve the drainage channel on Woodside Road.						No status provided to date
Cass Township	The Township's Fire Company does not have back-up generator to assist during emergencies. Repair/improve the drainage channel on Woodside Road.						No status provided to date
Cass Township	Woodside Road has flooded in the past. Evaluate and design a proper sized drainage channel from Mulberry Lane to the drainage channel outlet.						No status provided to date
Cass Township	The drainage channel on Woodside Road is damaged. Remove existing trees located within Right of Way and						No status provided to date



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	examine; Examine and improve roadway drainage facilities on White Lane.						
Cass Township	The drainage channel on Mulberry Lane has deeply eroded. Improve roadway drainage facilities and replace the culvert on Thomaston Road.						No status provided to date
Cass Township	Poor drainage and roadway icing are major issues on White Lane. Work with the Conservation District to pursue stream stabilization on Haze Road.						No status provided to date
Cass Township	Poor drainage system and an undersized culvert exist on Thomaston Road. Work with the Conservation District to pursue stream stabilization on Valley Road.						No status provided to date
Cass Township	There is some damage to the streambank on Haze Road. Work with the Conservation District to pursue stream stabilization on Wagner Run.						No status provided to date
Cass Township	There is some damage to the streambank on Valley Road. Work with the dam owner to update/improve Emergency Action Plan for the dam.						No status provided to date
Cass Township	There is some damage to the streambank on Wagner Run. Work with the dam owner to update/improve Emergency Action Plan for the dam.						No status provided to date
Cass Township	The hazardous material containment pond in Minersville poses a potential						No status provided to date

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	contamination threat should the pond breach. Designate the Clover Fire Company as EOC and purchase an emergency backup generator.						
Cass Township	The hazardous material containment pond at Crystal Reservoir poses a potential contamination threat should the pond breach. Designate the South Cass Fire Company as EOC and purchase an emergency backup generator.						No status provided to date
Cass Township	The EOC needs to be upgraded and lacks a backup generator. Work with PENNDOT to maintain and improve roadway drainage facilities on State Route 901; better coordination with PENNDOT and SCEMA during winter weather conditions.						No status provided to date
Cass Township	The EOC needs to be upgraded and lacks a backup generator. Improve evacuation plans/routes and provide educational/outreach materials to schools.						No status provided to date
Cass Township	There are several areas of roadway icing on State Route 901. Conduct an engineering study to investigate the feasibility of a floodwall/levee at E. Phillips Street.						No status provided to date
Cass Township	The evacuation protocols at Minersville High School are in need of reevaluation. Ensure St. Luke's Hospital meets International Building Code specifications for wind and snow loadings.						No status provided to date

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Coaldale Borough	Conduct an engineering study to investigate the feasibility of a floodwall/levee at E. Phillips Street.						No status provided to date
Coaldale Borough	Ensure St. Luke's Hospital meets International Building Code specifications for wind and snow loadings.						No status provided to date
Coaldale Borough	Construct floodwall/levee at the Borough's wastewater treatment plant to alleviate flooding.						No status provided to date
Coaldale Borough	Upgrade the Borough's fire company building and acquire an emergency back-up generator.						No status provided to date
Coaldale Borough	Improve community outreach to Borough residents. Work closely with the County to obtain and distribute materials on what to do before, during, and after a disaster. Also develop a community outreach strategy to include educational seminars, outreach booths at local fairs, mailings, etc.						No status provided to date
Coaldale Borough	Conduct an engineering study to investigate the feasibility of a floodwall/levee at Greenwood Street.						No status provided to date
Coaldale Borough	Improve roadway drainage facilities and replace the culvert on Moser Avenue.						No status provided to date
Coaldale Borough	Remove sediment and debris from Panther Creek to reduce the risk of flooding on State Route 209.						No status provided to date
Cressona Borough	Disallow oversize trucks on Borough roads and designate new routes for oversize trucks.	x					Include in 2019 HMP; no changes.

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Cressona Borough	Designate a new location for the EOC and purchase an emergency back-up generator.	x					Include in 2019 HMP; no changes.
Cressona Borough	Remove sediment and debris from Panther Valley Creek and Beaver Creek.	x					Include in 2019 HMP; no changes.
Deer Lake Borough	Replace bridge/culvert on Dreherstown Road.	x due to funding					Carry forward action to 2019 HMP, replace bridge/culvert on Dreherstown Road. Township engineer and roads will take over.
Deer Lake Borough	Replace culvert on SR61 to prevent flooding.	x due to funding					Carry forward action to 2019 HMP, replace culvert on SR61 to prevent flooding. Township engineer and roads will take over.
Deer Lake Borough	Construct new storm pipes along Dreherstown Road to Lakefront Drive and properly discharge stormwater to Pine Creek.	x due to funding					Carry forward action to 2019 HMP, construct new storm pipes along Dreherstown Road to Lakefront Drive and properly discharge stormwater to Pine Creek. Township engineer and roads will take over.
Deer Lake Borough	Channel storm water through drains and storm water pipes from Coal Mt. road to Lake Front Drive to avoid flooding on borough streets and private property.	x due to funding					Carry forward action to 2019 HMP, channel storm water through drains and storm water pipes from Coal Mt. road to Lake Front Drive to avoid flooding on borough streets and private property. Township engineer and roads will take over.
Delano Township	Enlarge drainage channel near the Township's Fire Company.						No status provided to date

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East Brunswick Township	Construct floodwall/levee to alleviate flooding on Cold Run Road.	x					
East Brunswick Township	Construct floodwall/levee to alleviate flooding on Old Country Lane.	x					
East Brunswick Township	Replace Rauschs Bridge to alleviate flooding of the Little Schuylkill River.				x		
East Brunswick Township	Construct floodwall/levee and replace pipe on Indian Run to alleviate flooding.		x				
East Brunswick Township	Replace cross-pipes on Laurel Road and Beechnut Road with larger pipes to alleviate flooding.				x		
East Brunswick Township	Replace the Wild Turkey Bridge bridge/culvert.				x		
East Brunswick Township	Improve roadway drainage facilities on State Route 443.	x					State Highway
East Brunswick Township	Develop buffer zones around tree farms to prevent the spread of wildfires.				x		
East Brunswick Township	Improve Township Building for use as a 2nd EOC				x		
East Norwegian Township	Fallen tree and debris create backwater flooding on the river. Remove fallen trees and debris from the River.			x			Revise to remove rail road bridge that blocks up
East Union Township	Conduct an engineering study to identify causes of flooding and design drainage improvements for the roads that flood.						No status provided to date
Eldred Township	Remove debris from bridges throughout the Township.				Complete		Maintenance regularly conducted
Foster Township	Replace existing culvert which experiences overtopping/flooding.				Completed in 2016		

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Foster Township	Replace/update stormwater system that is prone to flooding along SR 901.				Completed in 2016		
Foster Township	Lower spillway to reduce potential downstream flooding/damage in the event of a spillway breach.	x					
Frackville Borough	Conduct a study to designate new evacuation/detour routes to serve as a bypass to the Borough.						No status provided to date
Frackville Borough	Determine sheltering needs during emergency situations; retrofit older homes to meet current fire prevention standards per the International Building Code.						No status provided to date
Frailey Township	Remove debris from the bridge on State Route 125.			X - Complete, but ongoing.			1. Yes: PennDOT to remove debris from the bridge on State Route 125.
Frailey Township	Replace the pipe on Maple Street with a larger structure to alleviate flooding.	x					1. Yes: PennDOT to replace and realign the pipe parallel to Maple Street (SR 125) with a larger structure and combine with another downstream pipe crossing to alleviate flooding on Spruce Street, Spring Street and Maple Street.
Frailey Township	Increase the capacity of the drainage channels along Fountain Mountain Road.	x					1. Yes: PennDOT to increase the capacity of the drainage channels and inlet/pipe system along Fountain Mountain Road.
Frailey Township	Increase the capacity of the drainage channels along Middlecreek Road.		x				1. Yes: Frailey Township to increase the capacity of the

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							drainage channels along Middlecreek Road.
Frailey Township	Purchase an emergency back-up generator for the EOC.				X		2. Generator installed in February 2017.
Gilberton Borough	Remove sediment and debris from Mahanoy Creek.						No status provided to date
Gilberton Borough	Conduct an engineering study to improve stormwater drainage facilities throughout the Borough.						No status provided to date
Girardville Borough	Consider demolition and acquisition of properties in floodplain and maintain them as open space in perpetuity.						No status provided to date
Girardville Borough	Install monitoring systems to detect ground movements						No status provided to date
Gordon Borough	There is a lot of debris in Rattling Run channel. Replace the bridge on McKnight Street and improve stormwater drainage facilities.	No progress					Still needed, can't get permission from PADEP to do this work, no way to resume. State Route, no jurisdiction work with state. Does DCED/Consultant have funding.
Gordon Borough	Debris and sediment have reduced the stream capacity of Little Mahanoy Creek. Remove debris from culvert to enhance flow.	X - does not have jurisdiction to conduct this work					State Route, no jurisdiction work with state. Does DCED/Consultant have funding.
Gordon Borough	The bridge on McKnight Street is undersized and the drainage system is inadequate. Repair rip-raps to restore the condition of the streambanks.	X - does not have jurisdiction to conduct this work					Carry forward the action to the 2019 HMP, replace the bridge on McKnight Street and improve stormwater drainage facilities and train bridge. State Route, no jurisdiction work with state. Does DCED/Consultant have funding.

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Gordon Borough	There is blockage in the box culvert. Replace the bridge/culvert on Wood Lane to alleviate flooding.	X - does not have jurisdiction to conduct this work					State Route, no jurisdiction work with state. Does DCED/Consultant have funding.
Gordon Borough	The rip-rap streambanks are in poor condition. Replace the bridge/culvert on Trap Club Road to alleviate flooding.	X - does not have jurisdiction to conduct this work					State Route, no jurisdiction work with state. Does DCED/Consultant have funding.
Hegins Township	Replace the bridge/culvert on Wood Lane to alleviate flooding.	x					
Hegins Township	Replace the bridge/culvert on Trap Club Road to alleviate flooding.					x	Bridge removed
Hegins Township	Conduct a study to determine the feasibility of constructing a floodwall/levee on East Mountain Road.	x					
Hegins Township	Replace the bridge/culvert on Forest Drive to alleviate flooding.		x				
Hegins Township	Replace the bridge/culvert on E. Mountain Road to alleviate flooding.				x		
Hegins Township	Replace the bridge/culvert on Church Road to alleviate flooding.					x	Bridge installed 1991 not undersized
Hegins Township	Replace the bridge/culvert on Forest Drive to alleviate flooding.	x					This is a historical bridge
Hegins Township	Replace the bridge/culvert on Dell Road to alleviate flooding.	x					
Hegins Township	Replace the bridge/culvert on Fountain Road to alleviate flooding.	x					
Hegins Township	Improve roadway drainage facilities on Fountain Road.	x					Maintained by PennDOT; do not have jurisdiction; remove action
Hegins Township	Replace the bridge/culvert on Pine Drive to alleviate flooding.	x					

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		No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	Discontinued	
Hegins Township	Replace the bridge/culvert on Brook Lane to alleviate flooding.				x		Completed 2011
Hegins Township	Conduct a study to determine the feasibility of constructing a floodwall/levee on Pine Drive.	x					
Hegins Township	Replace the bridge/culvert on Grove Drive to alleviate flooding.		x				
Hegins Township	Replace the bridge/culvert on Broad Street to alleviate flooding.				x		
Hegins Township	Replace the bridge/culvert on Gap School Road to alleviate flooding.				x		
Hegins Township	Improve roadway drainage facilities on Bear Valley Road.				x		
Hegins Township	Improve roadway drainage facilities on State Route 25.	x					Maintained by PennDOT
Hegins Township	Improve roadway drainage facilities on State Route 25.	x					Maintained by PennDOT
Hegins Township	Improve signage/flashing lights on State Route 125.		x				
Hegins Township	Improve signage/flashing lights on Grove Drive.		x				
Hegins Township	Improve signage/flashing lights on State Routes 25 and 125.		x				
Hegins Township	Improve roadway plowing/salting services on various roads within the Township to address snow drive after a snowstorm and improve road conditions.		x				
Hubley Township	Conduct a study to determine the feasibility of constructing a floodwall/levee on Church Road.	Lack of funding					Carry forward the action to the 2019 HMP, conduct a study to determine the feasibility of constructing a floodwall/levee on Church Street.

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Hubley Township	Conduct a study to determine the feasibility of constructing a floodwall/levee on Honeymoon Trail Road.	X					Carry forward the action to the 2019 HMP, conduct a study to determine the feasibility of constructing a floodwall/levee on Honeymoon Trail Road.
Hubley Township	Purchase plows and salting equipment.				X		Purchased new plow
Hubley Township	Purchase plows and salting equipment.				X		Carry forward the action to the 2019 HMP,
Hubley Township	Examine and improve roadway drainage facilities on Quaker Drive.	X					Carry forward the action to the 2019 HMP, examine and improve roadway drainage facilities on Quaker Drive. Culverts should be replaced.
Hubley Township	Examine and improve roadway drainage facilities on Church Road.	X					Carry forward the action to the 2019 HMP, examine and improve roadway drainage facilities on Church Road. Culverts should be replaced. Limb removal on church road.
Hubley Township	Examine and improve roadway drainage facilities on Kushwa Road.	X					Carry forward the action to the 2019 HMP, examine and improve roadway drainage facilities on Kushwa Road. Culverts should be replaced. Limb removal needed
Hubley Township	Improve signage/flashing lights on Fear Not Road.	Some complete					Carry forward the action to the 2019 HMP, improve signage/flashing lights on Fear Not Road.
Hubley Township	Conduct stream stabilization to restore stream.	X					Carry forward the action to the 2019 HMP, conduct stream stabilization to restore stream. No outlet road 3-4 houses, talk to state.

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		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	
Hubley Township	Replace the bridge/culvert on Quaker Drive to alleviate flooding.	X					Carry forward the action to the 2019 HMP, replace the bridge/culvert on Quaker Drive to alleviate flooding. Lack of funding.
Hubley Township	Replace the bridge/culvert on Honeymoon Trail Drive to alleviate flooding.	X					Carry forward the action to the 2019 HMP, replace the bridge/culvert on Honeymoon Trail Drive to alleviate flooding.
Hubley Township	Replace the bridge/culvert on Church Road to alleviate flooding.	X					Carry forward the action to the 2019 HMP, replace the bridge/culvert on Church Road to alleviate flooding.
Hubley Township	Replace the bridge/culvert on W. Mountain Road to alleviate flooding.	X					Carry forward the action to the 2019 HMP, replace the bridge/culvert on W. Mountain Road to alleviate flooding. Lack of funding.
Hubley Township	Replace the bridge/culvert on Township Road 880 to alleviate flooding.	X					Carry forward the action to the 2019 HMP, replace the bridge/culvert on Township Road 880 to alleviate flooding. Lack of funding. Deer Lake Bridge/culvert replacement - to be checked on.
Hubley Township	Replace the bridge/culvert on Deep Creek Road to alleviate flooding.	X					Carry forward the action to the 2019 HMP, replace the bridge/culvert on Deep Creek Road to alleviate flooding. Lack of funding.
Hubley Township	Replace the bridge/culvert on Mahantongo Street to alleviate flooding.	X					Carry forward the action to the 2019 HMP, replace the bridge/culvert on Mahantongo Street to alleviate flooding.

Jurisdiction/ Responsible Party	Potential Mitigation Action	Status					Describe Next Steps 1. If including in the 2019 HMP, do you want to revise/reword (e.g., to be more specific or change lead agency?) 2. If discontinued, explain why.
		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	
Hubley Township	Replace the bridge/culvert on Mill Road to alleviate flooding.	X					Carry forward the action to the 2019 HMP, replace the bridge/culvert on Mill Road to alleviate flooding. Lack of funding.
Hubley Township	Replace the bridge/culvert on Fear Not Road to alleviate flooding.	X					Carry forward the action to the 2019 HMP, replace the bridge/culvert on Fear Not Road to alleviate flooding. Lack of funding
Hubley Township	Replace the bridge/culvert on Fear Not Road to alleviate flooding.	X					Carry forward the action to the 2019 HMP, replace the bridge/culvert on Fear Not Road to alleviate flooding. Lack of funding
Hubley Township	Replace the bridge/culvert on State Route 25 to alleviate flooding.	X					Carry forward the action to the 2019 HMP, replace the bridge/culvert on State Route 25 to alleviate flooding. Lack of funding.
Kline Township	Purchase snow removal and salting equipment and designate emergency snow routes throughout Township.	x due to funding					Carry forward the action to the 2019 HMP, purchase snow removal and salting equipment and designate emergency snow routes throughout Township. Township engineer and roads will take over.
Kline Township	Conduct an engineering study to improve stormwater drainage facilities throughout the Township.	x due to funding					Carry forward the action to the 2019 HMP, conduct an engineering study to improve stormwater drainage facilities throughout the Township. Township engineer and roads will take over

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		No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	Discontinued	
Landingville Borough	No municipal-specific mitigation actions in the 2013 HMP; refer to All Municipalities mitigation action above.						
Mahanoy City Borough	Elevate the embankment or install flood wall.						No status provided to date
Mahanoy City Borough	Upgrade 84" CMP conveying North Mahanoy Creek from E. Vine St. and W. Railroad St.						No status provided to date
Mahanoy City Borough	Fill in abandoned channel for Old North Mahanoy Creek between W. Vine St. and W. Railroad St.						No status provided to date
Mahanoy City Borough	Add Trash Rack near 1400 Block of E. Market St.						No status provided to date
Mahanoy City Borough	Create Act 167 Plan						No status provided to date
Mahanoy Township	Wiggans SR54Culvert Backs up causing flooding. Replace or Repair Culvet						No status provided to date
Mahanoy Township	Robinson Road at Park Place -Poor Drainage causes ponding on roadway and icing in the winter. Construct Stormwater Drainage Improvements						No status provided to date
Mahanoy Township	Colesback Rd - Poor Drainage causes ponding on roadway and icing in the winter. Construct Stormwater Drainage Improvements						No status provided to date
Mahanoy Township	White Owl Dr - Poor Drainage causes ponding on roadway and icing in the winter. Construct Stormwater Drainage Improvements						No status provided to date
Mahanoy Township	Buck Mountain Rd. - Poor Drainage causes ponding on roadway and						No status provided to date

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		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	
	icing in the winter. Construct Stormwater Drainage Improvements						
Mahanoy Township	New Boston, Back St. Poor Drainage causes ponding on roadway and icing in the winter. Construct Stormwater Drainage Improvements						No status provided to date
Mahanoy Township	Water Company Road to New Boston - Poor Drainage causes ponding on roadway and icing in the winter. Construct Stormwater Drainage Improvements						No status provided to date
Mahanoy Township	Roosevelt Dr. New Boston - Poor Drainage causes ponding on roadway and icing in the winter. Construct Stormwater Drainage Improvements						No status provided to date
Mahanoy Township	Park Place Rd. at Meyers Crossing - Poor Drainage causes ponding on roadway and icing in the winter. Construct Stormwater Drainage Improvements						No status provided to date
Mahanoy Township	Park Place Rd. At Schoemakers - Poor Drainage causes ponding on roadway and icing in the winter. Construct Stormwater Drainage Improvements						No status provided to date
Mahanoy Township	Roosevelt Dr. near Morea - Poor Drainage causes ponding on roadway and icing in the winter.						No status provided to date

Jurisdiction/ Responsible Party	Potential Mitigation Action	Status					Describe Next Steps 1. If including in the 2019 HMP, do you want to revise/reword (e.g., to be more specific or change lead agency?) 2. If discontinued, explain why.
		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	
	Construct Stormwater Drainage Improvements						
Mahanoy Township	Roosevelt Dr. Morea - Poor Drainage causes ponding on roadway and icing in the winter. Construct Stormwater Drainage Improvements						No status provided to date
Mahanoy Township	Bridge Number 1 at Park Place Provide additional reinforcement						No status provided to date
McAdoo Borough	The flood control project has not been properly maintained in the vicinity of South Madison Street. Purchase snow removal and salting equipment and designate emergency snow routes throughout Borough.						No status provided to date
McAdoo Borough	The flood control project has not been properly maintained in the vicinity of W. Sherman Street.						No status provided to date
McAdoo Borough	The Borough is in a more northerly climate and receives more extreme snowfall than the rest of the County. Conduct a study to determine the feasibility of constructing a floodwall/levee on Lincoln Street and Washington Street.						No status provided to date
Mechanicsville Borough	No municipal-specific mitigation actions in the 2013 HMP; refer to All Municipalities mitigation action above.						
Middleport Borough	Conduct a study to determine the feasibility of constructing a						No status provided to date

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	floodwall/levee on Lincoln Street and Washington Street.						
Middleport Borough	Conduct a study to determine the feasibility of constructing a floodwall/levee on Main Street.						No status provided to date
Minersville Borough	No municipal-specific mitigation actions in the 2013 HMP; refer to All Municipalities mitigation action above.						
Mount Carbon Borough	No municipal-specific mitigation actions in the 2013 HMP; refer to All Municipalities mitigation action above.						
New Castle Township	No municipal-specific mitigation actions in the 2013 HMP; refer to All Municipalities mitigation action above.						
New Philadelphia Borough	No municipal-specific mitigation actions in the 2013 HMP; refer to All Municipalities mitigation action above.						
New Ringgold Borough	Conduct a study to determine the feasibility of constructing a floodwall/levee to protect the Borough.						No status provided to date
New Ringgold Borough	Evaluate potential alternate evacuation routes for Borough egress.						No status provided to date
New Ringgold Borough	Conduct a study to investigate solutions to protect WWTP from flooding.						No status provided to date
North Manheim Township	Replace the bridge/culvert on Green Tree Drive to alleviate flooding.			x			No change - Include in 2019 HMP
North Manheim Township	Conduct a study to determine the feasibility of constructing a floodwall/levee on River Street and Mengle Street.					x	Discontinued - PennDOT reconstructing intersection
North Manheim Township	Replace the bridge/culvert on Antique Lane to alleviate flooding.			x			No change - Include in 2019 HMP
North Manheim Township	Conduct a study to determine the feasibility of constructing a floodwall/levee on Briar Road.		x				Revise for 2019 HMP - Storm sewer was upgraded but drains clog due to debris.
North Manheim Township	Replace the bridge/culvert on Berry Road to alleviate flooding.	x					No change - Include in 2019 HMP

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		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	
North Manheim Township	Construct embankment and spillway to regulate pond outflows.	x					No change - Include in 2019 HMP
North Manheim Township	Conduct an engineering study to design and improve stormwater drainage facilities on Ridge Road.				x		Project completed
North Manheim Township	Conduct an engineering study to design and improve stormwater drainage facilities on Seven Stars Road.	x					No change - Include in 2019 HMP
North Manheim Township	Conduct an engineering study to design and improve stormwater drainage facilities on Hemlock Drive.		x				Revise for 2019 HMP - Drainage installed; catch basins need to be updated.
North Manheim Township	Ensure buildings in the Township meet International Building Code specifications for wind loadings.	x					No change - Include in 2019 HMP
North Manheim Township	construct/upgrade storm sewer to alleviate flooding		x				
North Manheim Township	property should be secured at a minimum and ultimately demolished			x			
North Union Township	Replace the bridge/culvert on Trout Lane to alleviate flooding.						No status provided to date
North Union Township	Replace the bridge/culvert on Millers Road to alleviate flooding.						No status provided to date
North Union Township	Replace the bridge/culvert on Labensberg Road to alleviate flooding.						No status provided to date
Norwegian Township	No municipal-specific mitigation actions in the 2013 HMP; refer to All Municipalities mitigation actions above.						
Orwigsburg Borough	Replace the bridge/culvert on Ridge Road to alleviate flooding.						No status provided to date
Orwigsburg Borough	Conduct stream stabilization to restore stream.						No status provided to date
Orwigsburg Borough	Replace the bridge/culvert on W. Market Street to alleviate flooding.						No status provided to date

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		No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	Discontinued	
Orwigsburg Borough	Conduct an engineering study to design and improve stormwater drainage facilities on Decatur Street.						No status provided to date
Orwigsburg Borough	Conduct an engineering study to design and improve stormwater drainage facilities on S. Wayne Street.						No status provided to date
Palo Alto Borough	No municipal-specific mitigation actions in the 2013 HMP; refer to All Municipalities mitigation actions above.						
Pine Grove Borough	Conduct an engineering study to design and improve stormwater drainage facilities on S. Tulpehocken Street.	x					Grant funding needed; carry forward to 2019 action plan
Pine Grove Borough	Conduct an engineering study to design and improve stormwater drainage facilities on Parallel Road and W. Mill Street.	x					New Bride and Stream
Pine Grove Borough	Conduct a study to determine the feasibility of constructing a floodwall/levee on State Route 895.				x		
Pine Grove Borough	Conduct a study to determine the feasibility of constructing a floodwall/levee on E. Mill Street and Birds Hill Road.		x				
Pine Grove Borough	Conduct a study to determine the feasibility of constructing a floodwall/levee on E. Pottsville Street.			x			
Pine Grove Borough	Acquire the necessary equipment, and designate Borough Hall as the EOC.				x		
Pine Grove Borough	Conduct a study to determine the feasibility of constructing a floodwall/levee on N. Tulpehocken Street.			x			About to start
Pine Grove Borough	Implement regular testing of groundwater wells.			x			Sunoco

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		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	
Pine Grove Borough	Designate new evacuation/detour routes to bypass borough.					x	Not possible
Pine Grove Township	Repair roadway and construct flood protection system.		x				Road repaired but no flood protection, need to work with Penn DOT.
Pine Grove Township	Consider removing flooded properties from the floodplain.		x				Some homes acquired by FEMA funds, more need to be.
Pine Grove Township	Replace the failed pipe on Mexico Road with a larger structure.			x			Township funded
Pine Grove Township	Examine and improve roadway drainage facilities on Sweet Arrow Lake Road.	x					Carry forward the action to the 2019 HMP, examine and improve roadway drainage facilities on Sweet Arrow Lake Road. Penn-DOT road is still a concern
Pine Grove Township	Conduct a study to determine the feasibility of constructing a floodwall/levee on 2 1/2 Mile Road.	x due to funding					Carry forward the action to the 2019 HMP, conduct a study to determine the feasibility of constructing a floodwall/levee on 2 1/2 Mile Road.
Pine Grove Township	Conduct a study to determine the feasibility of constructing a floodwall/levee on Swopes Valley Road.	x due to funding					Carry forward the action to the 2019 HMP, conduct a study to determine the feasibility of constructing a floodwall/levee on Swopes Valley Road.
Pine Grove Township	Replace the bridge/culvert on Old Forge Road to alleviate flooding.	x due to funding					Carry forward the action to the 2019 HMP, replace the bridge/culvert on Old Forge Road to alleviate flooding.
Pine Grove Township	Replace the bridge/culvert on Oak Grove Road to alleviate flooding.		x				The bridge/culvert is being replaced through bridge state funding.
Port Carbon Borough	Replace the damaged pipe on Wood Street with a larger structure.				x		

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		No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	Discontinued	
Port Carbon Borough	Conduct an engineering study to design and improve stormwater drainage facilities on 5th Street.		x				Preliminary engineering
Port Carbon Borough	Remove sediment and debris from stream.			x			
Port Carbon Borough	Conduct an engineering study to design and improve stormwater drainage facilities on Main Street.	x					
Port Carbon Borough	Conduct an engineering study to design and improve stormwater drainage facilities on Lillian Street.	x					
Port Carbon Borough	Conduct an engineering study to design and improve stormwater drainage facilities on 4th Street.						No status provided to date
Port Clinton Borough	Implement FEMA/PEMA funded flood protection project on Rattling Run (ongoing).						No status provided to date
Port Clinton Borough	A forest fire resulted from a fallen power line in the northeastern area of the Borough. Replace the undersized structure with a larger opening to convey flood flows.						No status provided to date
Port Clinton Borough	A forest fire started in West Brunswick Township and spread to the southeastern area of the Borough. Replace the undersized structure with a larger opening to convey flood flows.						No status provided to date
Porter Township	The bridge/culvert at Evangel Park Road is undersized and causes roadway overtopping during flood events. Replace the undersized structure with a larger opening to convey flood flows.						No status provided to date

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		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	
Porter Township	The bridge/culvert at Kalmia Road is undersized and causes roadway overtopping during flood events. Replace the undersized structure with a larger opening to convey flood flows.						No status provided to date
Porter Township	The bridge/culvert at Kalmia Road is undersized and causes roadway overtopping during flood events. Replace the undersized structure with a larger opening to convey flood flows.						No status provided to date
Porter Township	The bridge/culvert at Mt Eagle Trail is undersized and causes roadway overtopping during flood events. Conduct an engineering study to design and construct a stormwater drainage system on Greenland Road.						No status provided to date
Porter Township	The bridge/culvert at Greenwood Road is undersized and causes roadway overtopping during flood events. Conduct an engineering study to design and construct stormwater interception/control facilities along Porter Road.						No status provided to date
Porter Township	Greenland Road does not have a stormwater drainage system which causes flooding of the roadway. Replace the collapsing culvert on Grand Avenue with a larger structure to convey flood flows.						No status provided to date
Porter Township	Uncontrolled runoff from the hillsides along Porter Road is causing roadway washouts. Conduct an engineering						No status provided to date



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		No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	Discontinued	
	study to design and construct improvements to the stormwater drainage system on N 6th Street.						
Porter Township	The culvert at Grand Avenue is collapsing. Improve roadway plowing and salting operations.						No status provided to date
Porter Township	N 6th Street does not have an adequate stormwater drainage system. Conduct an engineering study to design and construct stormwater interception/control facilities along Main Street.						No status provided to date
Porter Township	State Route 209 experiences icing from 12th Street to Terry Street.						No status provided to date
Porter Township	Uncontrolled runoff from the hillsides along Main Street is causing roadway washouts. Remove sediment and debris from Muddy Branch.						No status provided to date
Pottsville City	No municipal-specific mitigation actions in the 2013 HMP; refer to All Municipalities mitigation actions above.						
Reilly Township	Remove sediment and debris from Muddy Branch.		x				Some debris removed; additional funding required
Reilly Township	Implement an Act 167 Stormwater Management Ordinance.		x				Installation of new storm water pipe to comply with ordinance
Ringtown Borough	Conduct an engineering study to investigate potential structural projects to protect WWTP from flooding.						No status provided to date
Ringtown Borough	Establish an early warning/emergency communications system.						No status provided to date
Ringtown Borough	Install emergency backup generator at the water treatment plant.						No status provided to date

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		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	
Rush Township	Conduct an engineering study to design stormwater drainage facilities throughout Township.						No status provided to date
Ryan Township	Conduct a study to determine the feasibility of constructing a floodwall/levee on Barnesville Drive and Williams Street.						No status provided to date
Ryan Township	Remove debris blockage from culvert at State Road and Hamilton Street.						No status provided to date
Ryan Township	Replace the bridge/culvert on Ridge Road to alleviate flooding.						No status provided to date
Ryan Township	Update/Improve Emergency Action Plan for the Hosensock Flood Control Dam.						No status provided to date
Ryan Township	Work with utility company to develop immediate response program in the event of line damage.						No status provided to date
Ryan Township	Replace the bridge/culvert on Back Road to alleviate flooding.						No status provided to date
Ryan Township	Conduct stream stabilization to restore stream.						No status provided to date
Saint Clair Borough	Remove flood debris from the Thwing Street Bridge.			x			Include in 2019 HMP. Thwing St center pier frequently is a catch point for debris during heavy storm events
Saint Clair Borough	Conduct an engineering study to design and construct improvements to the stormwater drainage system on Wade Road.	x					No progress due to lack of funding. Include in the 2019 HMP.
Saint Clair Borough	Repair the floodwalls and install rock protection along Mill Creek.	x					No progress due to lack of funding. Include in the 2019 HMP.
Saint Clair Borough	Repair/Replace the bridge at Lawton Street.		x – in design				Bridge replacement is currently being designed. Construction

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		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	
							expected to be complete 2020. However, still a hazard and should be included in 2019 HMP.
Saint Clair Borough	Repair/Replace the bridge at Carroll Street.	x					No progress due to lack of funding. Include in the 2019 HMP.
Saint Clair Borough	Repair/Replace the bridge at Franklin Street.	x					No progress due to lack of funding. Include in the 2019 HMP.
Saint Clair Borough	Re-grade shoulder areas to insure surface flow enters existing pipe & inlet network; rock-line shoulder swale as needed to avoid inlet debris.	x					Include in 2019 HMP. Insert "of East Hancock St" after "shoulder areas". Hancock St is state highway, but drainage causes problems to Borough residents.
Saint Clair Borough	Rock-line swale and re-grade as necessary to ensure surface flow enters existing drainage network.	x					Include in 2019 HMP. Insert "along Lawton Street" after "Rock-line swale..."
Saint Clair Borough	Clear out dead, dried scrub brush and trees to reduce fire hazard.		x	x			Include in 2019 HMP. Insert "Southward Playground Area - " at beginning. Borough forces address as time permits.
Saint Clair Borough	Remove debris, rock-line banks, and replace the downstream pipe.	x					Include in 2019 HMP. Insert "Wade Road channel - " at beginning. Much of swale is bounded by private property and would require private temporary easements to construct.
Saint Clair Borough	Remove debris from Mill Creek near Lawton Street.		x	x			Include in 2019 HMP. "Lawton Street" should be replaced with "Railroad Street". Bend in stream causes large deposits of debris towards inside and scour hole on outside.

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		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	
							Although Borough addresses when they can, frequent heavy stream flows create issues beyond the Borough's capabilities.
Saint Clair Borough	Work with dam owners to ensure up-to-date Emergency Action Plans are in place for the dams upstream of the Borough.		x	x			On-going.
Schuykill Haven Borough	Remove properties from the floodplain along St. Charles Street and St. James Street.		x				Some properties removed
Schuykill Haven Borough	Remove debris from the Columbia Street Bridge.			x			Bridge to be replaced by PennDOT - Pending
Schuykill Haven Borough	Sediment and debris in the River causes more frequent flooding of the Island Park area. Remove sediment and debris from the River.	x					Still being discussed
Schuykill Haven Borough	The retaining wall on Railroad Street is failing. Repair the retaining wall on Railroad Street.	x					Still being discussed
Schuykill Haven Borough	Repair the retaining wall on Garfield Avenue.						No status provided to date
Schuykill Haven Borough	Repair the retaining wall on St. John Street.						No status provided to date
Schuykill Township	No municipal-specific mitigation actions in the 2013 HMP; refer to All Municipalities mitigation actions above.						
Shenandoah Borough	The existing storm drainage is inadequate and causes flooding of the intersection						No status provided to date
Shenandoah Borough	The Borough has a combined storm and sanitary system. During major storm events, the treatment plant floods and has caused damage to the						No status provided to date

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		No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	Discontinued	
	treatment plant. Install a trash rack on the unnamed stream entering the park, and upgrade the storm drainage system.						
South Manheim Township	No municipal-specific mitigation actions in the 2013 HMP; refer to All Municipalities mitigation actions above.						
Tamaqua Borough	Install a trash rack on the unnamed stream entering the park, and upgrade the storm drainage system.	No progress other than debris removal due to lack of funding.					Carry forward the action to the 2019 HMP, install a trash rack on the unnamed stream entering the park, and upgrade the storm drainage system.
Tamaqua Borough	Continue to pursue the 1980 U.S. Army Corps of Engineers recommendation of building a stream diversion of Wabash Creek directly to the Little Schuylkill River.						Carry forward the action to the 2019 HMP, continue to pursue the 1980 U.S. Army Corps of Engineers recommendation of building a stream diversion of Wabash Creek directly to the Little Schuylkill River.
Tamaqua Borough	Continue to pursue the 1980 U.S. Army Corps of Engineers recommendation of building a dry dam on the unnamed stream to alleviate flooding of the Wabash Creek.						Carry forward the action to the 2019 HMP, continue to pursue the 1980 U.S. Army Corps of Engineers recommendation of building a dry dam on the unnamed stream to alleviate flooding of the Wabash Creek.
Tamaqua Borough	Repair the Wabash Creek Culvert and improve scour protection.	Complete but maintain (on-going) inspections/clean trash-rack upstream of culvert.					Repaired damage sections of culverts, debris removed. Cleaned; Major areas (Borough funded)
Tamaqua Borough	Replace the damaged section of the Wabash Creek Culvert.	Complete but maintain (on-					Repaired damage sections of culverts, debris removed.

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		No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	Discontinued	
		going) inspections/clean trash-rack upstream of culvert.					Cleaned; Major areas (Borough funded)
Tower City Borough	Improve roadway drainage facilities on Colliery Avenue and Grant Avenue.		In progress (municipal funding)				Carry forward in progress action
Tower City Borough	Replace the undersized bridge on 4th Street.				X Completed by State		
Tower City Borough	Construct culverts on Hand Street to improve flow.				S. Hand Street was redone, 2nd Street updated drainage complete		
Tower City Borough	Conduct an engineering study to improve stormwater drainage facilities on Grant Avenue and 2nd Street.	X					Carry forward the action to the 2019 HMP, conduct an engineering study to improve stormwater drainage facilities on Grant Avenue and 2nd Street but state has jurisdiction.
Tower City Borough	Conduct an engineering study to improve stormwater drainage facilities on Grant Avenue and 7th Street.	X					Carry forward the action to the 2019 HMP, conduct an engineering study to improve stormwater drainage facilities on Grant Avenue and 7th Street.
Tower City Borough	Conduct an effort to remove sediment and debris from streams throughout the Borough.	X					Carry forward the action to the 2019 HMP, conduct an effort to remove sediment and debris from streams throughout the

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		No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	Discontinued	
							Borough. PADEP has jurisdiction. Only 1 stream, (wiconico creek)
Tower City Borough	Establish an early warning/emergency communications system within the Borough.				Complete- County funded (SWIP + 911) - broke into critical CF		
Tower City Borough	Upgrade snow and ice removal equipment for the Borough.				New plow purchased through grants and loans - complete.		
Tower City Borough	Purchase an emergency backup generator and radio equipment for the Borough building.					X	Not needed, we have a separate EOC have radios (EMA radios, EDC staff is licensed). 2 mobile go-packs can set-up operations to communicate and drill regularly (6 drills this year). Twp putting an addition to building with fully functioning EOC-generator not needed.
Tremont Borough	Conduct a study to determine the feasibility of constructing a floodwall/levee on Gold Spring Creek.	x		x			
Tremont Borough	Remove debris and sediment from bridges on Pine Street.			x			Frequent maintenance
Tremont Borough	Replace bridge on Goodsprings Alley.	x	x				
Tremont Borough	Remove debris and sediment from bridge on Line Street.			x			Continued maintenance

Jurisdiction/ Responsible Party	Potential Mitigation Action	Status					Describe Next Steps 1. If including in the 2019 HMP, do you want to revise/reword (e.g., to be more specific or change lead agency?) 2. If discontinued, explain why.
		No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	Discontinued	
Tremont Borough	Conduct stream stabilization to restore Middle Creek.		x				
Tremont Borough	Remove sediment and debris from stream south of Line Street.			x			Continued maintenance
Tremont Borough	Replace culverts from 2nd Street to Line Street.		x				
Tremont Borough	Improve stormwater drainage facilities from Clay Street to Washington Street.	x					
Tremont Borough	Improve stormwater drainage facilities from Middlecreek Road to Clay Street.	x					
Tremont Borough	Repair railroad crossing throughout Borough.					x	Railroad property; Borough does not have jurisdiction
Tremont Township	Construct roadside barriers on Rausch Creek Road to catch debris.	x					Carry forward the action to the 2019 HMP, construct roadside barriers on Rausch Creek Road to catch debris. Removing rocks every week, cannot close road. Road Super will take over
Tremont Township	Conduct a study to determine the feasibility of constructing a floodwall/levee on State Route 4011.	x					Carry forward the action to the 2019 HMP, conduct a study to determine the feasibility of constructing a floodwall/levee on State Route 4011 during periods of heavy rain. Road Super will take over
Tremont Township	Replace bridge on Camp Road.				x		
Tremont Township	Conduct a study to determine the feasibility of constructing a floodwall/levee on Molleystown Road.	x					Carry forward the action to the 2019 HMP, conduct a study to determine the feasibility of constructing a floodwall/levee on Molleystown Road during

Jurisdiction/ Responsible Party	Potential Mitigation Action	Status					Describe Next Steps 1. If including in the 2019 HMP, do you want to revise/reword (e.g., to be more specific or change lead agency?) 2. If discontinued, explain why.
		No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	Discontinued	
							periods of heavy rain. Road Super will take over
Union Township	No municipal-specific mitigation actions in the 2013 HMP; refer to All Municipalities mitigation action above.						
Upper Mahantango Township	Remove sediment and debris from bridge on Spain Road.				Taken care of, County bridge - complete		
Upper Mahantango Township	Remove sediment and debris from bridges on Pine and Mahantango Creek.				Bridge replaced 1.5 years ago, State project - complete		
Upper Mahantango Township	Purchase an emergency backup generator for the Township's Fire Company.	X					Carry forward the action to the 2019 HMP, purchase an emergency backup generator for the Township's Fire Company.
Upper Mahantango Township	Establish an early warning/emergency communications system for the Township.	X					Carry forward the action to the 2019 HMP, establish an early warning/emergency communications system for the Township.
Walker Township	Remove structures from floodplain and acquire and preserve land as open space in perpetuity.	No progress due to lack of funding.					Carry forward the action to the 2019 HMP, remove structures from floodplain and acquire and preserve land as open space in perpetuity. Basement flooding loses utilities, sump pump. Separate septic system - sewage.
Walker Township	Replace pipe with larger structure on Wildcat Road.				Replaced 3 locations on Wildcat Road, up in		

Jurisdiction/ Responsible Party	Potential Mitigation Action	Status					Describe Next Steps 1. If including in the 2019 HMP, do you want to revise/reword (e.g., to be more specific or change lead agency?) 2. If discontinued, explain why.
		No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	Discontinued	
					capacity funded by township		
Walker Township	Replace pipe with larger structure on Wildcat Road.				X		
Walker Township	Replace pipe with larger structure on Wildcat Road.				X		
Walker Township	Replace culverts on Valley Road to alleviate flooding.				X		
Walker Township	Render roadway plowing/salting services immediately after a snow event to improve road conditions.		On going				Revised, conducted but part of operation.
Walker Township	Render roadway plowing/salting services immediately after a snow event to improve road conditions.		On going				Revised, conducted but part of operation.
Washington Township	Remove sediment and debris from bridge on Trophy Drive.						Do they need to be done? RM to take lead. Assumed done but has been 5 years.
Washington Township	Remove sediment and debris from bridge on Covered Bridge Road.	X					Do they need to be done? RM to take lead.
Washington Township	Provide for high speed internet services at the Emergency Operations Center in the Township's municipal building.				Complete, installed generators		
Wayne Township	No municipal-specific mitigation actions in the 2013 HMP; refer to All Municipalities mitigation actions above.						
West Brunswick Township	Pine Creek floods the roadway making it impassable. Restore the flood carrying capacity to Pine Creek.						Meetings will be held in 2018
West Brunswick Township	Pine Creek floods the roadway making it impassable. Replace the bridge/culvert on Frisbee Road to alleviate flooding.						No change

Jurisdiction/ Responsible Party	Potential Mitigation Action	Status					Describe Next Steps 1. If including in the 2019 HMP, do you want to revise/reword (e.g., to be more specific or change lead agency?) 2. If discontinued, explain why.
		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	
West Brunswick Township	Pine Creek floods Dogwood Lane and has caused the roadway to close. Restore the flood carrying capacity to Pine Creek.						No status provided to date
West Brunswick Township	Pine Creek floods the bridge/roadway on Frisbee Road. Improve communications systems and procedures for emergency early warnings and evacuations.						No change
West Brunswick Township	Grist Mill Road has resulted in closure due to flooding. Conduct an engineering study to improve stormwater drainage facilities throughout the Township.				x		Complete
West Brunswick Township	Early warning and evacuation procedures need improvements. Replace the bridge/culvert on Dorset Road to alleviate flooding.						No change
West Mahanoy Township	Conduct an engineering study to improve stormwater drainage facilities throughout the Township.						No status provided to date
West Penn Township	Replace the bridge/culvert on Dorset Road to alleviate flooding.	x due to funding					Carry forward the action to the 2019 HMP, replace the bridge/culvert on Dorset Road to alleviate flooding.
West Penn Township	Replace the bridge/culvert on Retreat Road to alleviate flooding.	x due to funding					Carry forward the action to the 2019 HMP, replace the bridge/culvert on Retreat Road to alleviate flooding.
West Penn Township	Replace pipes on Blue Mountain Drive and Kepners Road to alleviate flooding.	x due to funding					Carry forward the action to the 2019 HMP, replace pipes on Blue Mountain Drive and Kepners Road to alleviate flooding.

Jurisdiction/ Responsible Party	Potential Mitigation Action	Status					Describe Next Steps 1. If including in the 2019 HMP, do you want to revise/reword (e.g., to be more specific or change lead agency?) 2. If discontinued, explain why.
		No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	Discontinued	
West Penn Township	Conduct a study to determine the feasibility of constructing a floodwall/levee on State Route 309.		x				Currently working on raising road with Penn DOT.
West Penn Township	Conduct a study to determine the feasibility of constructing a floodwall/levee on Ridge Road.	x due to funding					Carry forward the action to the 2019 HMP, conduct a study to determine the feasibility of constructing a floodwall/levee on Ridge Road.
West Penn Township	Replace the pipe on Lime Kiln Road to alleviate flooding.	x due to funding					Carry forward the action to the 2019 HMP, replace the pipe on Lime Kiln Road to alleviate flooding.
West Penn Township	Replace pipes on Ash Circle Road to alleviate flooding.	x due to funding					Carry forward the action to the 2019 HMP, replace pipes on Ash Circle Road to alleviate flooding.
West Penn Township	Replace bridge on School Drive to alleviate flooding.	x due to funding					Carry forward the action to the 2019 HMP, replace bridge on School Drive to alleviate flooding.
West Penn Township	Replace bridge with larger structure on School Drive to alleviate flooding.	x due to funding					Carry forward the action to the 2019 HMP, replace bridge with larger structure on School Drive to alleviate flooding.
West Penn Township	Remove structures from floodplain and acquire and preserve land as open space in perpetuity.	x					Carry forward the action to the 2019 HMP, remove structures from floodplain and acquire and preserve land as open space in perpetuity.
West Penn Township	Conduct a study to determine the feasibility of constructing a floodwall/levee on Barry Road.		x				Replaced one bridge but another needs to be done. CDBG to provide money to replace bridge.
West Penn Township	Replace the bridge/culvert on Saint Peters to alleviate flooding.				x		CDBG to provide money to replace bridge.
West Penn Township	Replace the bridge/culvert on Saint Peters to alleviate flooding.	x					Carry forward the action to the 2019 HMP, Replace the

Jurisdiction/ Responsible Party	Potential Mitigation Action	Status					Describe Next Steps 1. If including in the 2019 HMP, do you want to revise/reword (e.g., to be more specific or change lead agency?) 2. If discontinued, explain why.
		1. Please describe what was accomplished and indicate % complete. 2. If there was no progress, indicate what obstacles/delays encountered? 3. If there was progress, how is/was the action being funded (e.g., FEMA HMGP grant, local budget)?	No progress/ Unknown	In Progress/ Not Yet Completed	Continuous	Completed	
							bridge/culvert on Saint Peters to alleviate flooding.
West Penn Township	Replace bridge with larger structure on Dairy Road.	x					Carry forward the action to the 2019 HMP, replace bridge with larger structure on Dairy Road.
West Penn Township	Replace bridge with larger structure on Wash Creek Road.	x					Carry forward the action to the 2019 HMP, replace bridge with larger structure on Wash Creek Road.
West Penn Township	Replace bridge with larger structure on Golf Road.	x					
West Penn Township	Replace bridge with larger structure on Mush Dahl Road.	x due to funding					
West Penn Township	Replace bridge with larger structure Mush Dahl Road.	x due to funding					
West Penn Township	Replace the bridge/culvert on First Street to alleviate flooding.	x due to funding					
West Penn Township	Replace bridge with larger structure on North Hilltop Drive.	x due to funding					
West Penn Township	Improve roadway drainage facilities on State Route 895.	x due to funding					
West Penn Township	Improve roadway drainage facilities on Mush Dahl Road at State Route 309.	x due to funding					
West Penn Township	Improve roadway drainage facilities on State Route 895.	x due to funding					Carry forward action to the 2019 HMP, improve roadway drainage facilities on Snyders Rd.
West Penn Township	Improve roadway drainage facilities on State Route 895.	x due to funding					Carry forward action to the 2019 HMP, improve roadway drainage facilities on Rt 895.

6.3.2 ADDITIONAL PAST MITIGATION ACCOMPLISHMENTS

Schuylkill County and its municipalities are dedicated to mitigation activities and comprehensive all-hazards planning. To that end, the County and municipalities have engaged in mitigation activities beyond those identified in its 2013 HMP. The County and its municipalities have demonstrated a proactive approach, commitment to resiliency, and desire to protect both physical assets and citizens against hazard losses through the following additional accomplishments:

- Since the 2006 devastating floods in Pine Grove Borough, the Borough has utilized FEMA Hazard Mitigation Assistance grant funding to acquire and remove (i.e. demolish) 17 properties; total project cost of buyouts was approximately \$1.4 million dollars.
- The Schuylkill County Planning Department reviews proposed Subdivision and Land Development Plans and started to include in some Plan Review comments and recommendations if proposed development was included in the 1-percent annual chance flood zone, was in the anthracite fields or in a municipality designated by DCNR as medium or high-risk for wildfires. For example, if a proposed development is located in a floodplain, the comment reads *"The Schuylkill County Hazard Mitigation Plan, which was adopted by your municipality via resolution, established a strategy to reduce the impact of hazards throughout the county. Flooding has been identified in the Hazard Mitigation Plan as a high risk/high impact hazard. We recommend that the municipality refer to their Floodplain Ordinance to ensure compliance of the proposed development with the Floodplain Ordinance."*
- The Pine Grove Area/Upper Swatara Watershed Pennsylvania Recovery Strategy was completed in 2012 and set forth a strategic plan to reduce flooding impacts in the 8-municipality region of the Upper Swatara Watershed. These strategies focused on two areas: community capacity building and watershed improvements. The following summarizes completed projects as posted on the Schuylkill County Emergency Management Agency's website in October 2018 and maintained by the Swatara Long Term Recovery Committee.
 - **Michael Coal North Tree Planting Project**
 - 26 acres were planted with 31,000 trees. PA Game Commission donated 2,000 trees. American Chestnut Foundation donated 660 American Chestnut seeds and 600 American Chestnut seedlings. This project was funded through grants received from Rettew Engineering and the Foundation for PA Watersheds.
 - **Michael Coal South Tree Planting Project** - Planted 8 acres with 8000 trees. PA Game Commission donated trees. Volunteers included National Civilian Conservation Corp (NCCC) team members and local citizens.
 - **Tremont North Project Berm Removal & Tree Planting**
 - Planted 8,000 on six acres in 2014; removed a berm in 2013 that consolidated water runoff. PA Game Commission donated trees. Volunteers included NCCC team members, PSU students and local citizens.
 - **Abandoned Waterline Across Swatara Creek Behind Guilford Mills**
 - Concrete center post and water line were removed from stream channel so they could no longer catch debris and back up water.
 - Obstruction behind north end fire house to address pinch point in stream.
 - Abandoned waterline and concrete pillars were removed pro bono by Miller Brothers Construction, Schuylkill Haven, PA.

- **Donaldson North Berm Repair Project** - DEP repaired berm breached on mountainside north of Donaldson to prevent overtopping and flooding homes below.
- **Wide Awake St. Stream Channel Day-Lighting** - Stream was daylighted via buyouts, mostly accomplished; there could be another phase but it would need buy-in from a local business in order to proceed
- **Middle Creek Streambank stabilization** – Stabilized 500 feet of highly eroded streambank – partnered with PA DEP Mining Bond Forfeiture site reclamation to reduce sediment to stream above Tremont.
- **Upper Swatara Creek US Army Corps of Engineers Watershed Flood Study** – Completed for Pine Grove Borough (North Pine Grove) Flood Risk Area.
- **Pine Grove Borough Stormwater System Study Restoration** – Study was completed, grant applied for not funded for implementation. Phase 1 repair of the VFW tunnel was completed but Borough was turned down for phase 2 funding. Street drains were cleaned and repaired. Completed a stream cleanup & berm redesign study. Removed pipe bridge obstruction behind north end fire house to address pinch point in stream.
- **Pine Grove East Mill Street Bridge** – Removal of sediment build up and completed stream channel work in 2015
- **Donaldson Culmbank/Good Spring Creek Restoration Project – Design** – This project was funded through a \$151,022.00 EPA Section 319 Nonpoint Source Program Grant and a \$25,000 National Fish & Wildlife Foundation Grant
- **Swatara Creek Floodplain Restoration Project – Design** –Project will lower area east of Guilford Mills to relieve flooding in North Pine Grove. Final design and permits received and approved; funding through a \$300,700 2014 Growing Greener Grant.
- **Expanded Upper Swatara Creek US Army Corps of Engineers Watershed Flood Study** – The USACE developed a model for the Upper Swatara Creek Watershed (where Swatara Creek passes under I-81 upstream, includes all tributaries to the headwaters).

The following summarizes funded/ongoing projects as posted on the Schuylkill County Emergency Management Agency's website in October 2018 and maintained by the Swatara Long Term Recovery Committee.

- **Donaldson Culmbank/Good Spring Creek Restoration Project Phases 1 & 2**
 - The project which will lower and reconstruct eighteen (18) acres of floodplain along 4,600 feet of Good Spring Creek. This new floodplain will help to capture upstream sediment and also retain floodwaters. The Conservation District was awarded the Abandoned Mine Land (AML) Programs Pilot Project Grant awarded in the amount of \$6,700,000+. The AML grant agreement documents are anticipated by December 2018.
 - Phase 1A will lower and reconstruct six (6) acres of floodplain along 2,100 feet of Good Spring Creek. Construction work has been severely delayed due to rain/weather conditions.
- **Swatara Creek Floodplain Restoration Phase #1 Construction Project** – The project is in-progress and will lower area east of Guilford Mills to relieve flooding in North Pine Grove. Funding is from the Growing Greener Grant, CDBG-DR funding through PA DCED and PPL. Chapter 102 and 105

permitting modifications need to be submitted due to requested/required changes in project design delaying project bidding by 1 to 3 months.

- **Swatara Creek Floodplain Restoration Phase #2 Project** – Currently in progress; Borough recreation plan being developed and moving toward application for Phase 2 design.
 - **Guilford Mills Water Treatment Facilities** - Preliminary modeling shows the greatest positive impact to reducing floodwater height hinges on removal of the Guilford Treatment Plant. Acquired funding needed to develop the concept design plan, permit requirements, funding opportunities, and costs associated with upgrading the Pine Grove Joint Treatment Authority’s (PGJTA) sewer plant to accept the raw wastewater from Guilford Mills. Conceptual design and cost estimates are in progress by the contracted consultant.
 - **Good Spring Creek Bridge** - Wing-wall narrows down the stream channel. Removal is underway by Tremont Borough due to damages sustained to the structure during the 2018 recent flooding.
 - An updated mitigation strategy has been added to the plan to continue to implement the actions/projects identified in the Swatara Long Term Recovery Plan.
- Schuylkill Haven Borough – The Borough completed a five-acre floodplain restoration and flood water storage project is located adjacent to the river in a wooded area and down-gradient of the community. Early in the 1900's coal processing plants and the public had no use for coal fines, thus resulting in thousands or most likely millions of tons floating downstream waiting to be deposited in low lying areas. A 5-acre by 5-foot deep area was excavated by removing nonnative material (i.e., small coal fines and sand) deposited over the last 150-years or so from past flooding events. This generated 1.63 Million gallons of flood water storage. The return-on-investment of this project has already been realized because the Borough saw limited damages as a result of the 2018 flood events (Graver 2018).
 - Port Carbon Watershed Study (2017) – Through a PADEP grant (NE140189) a Watershed Study was developed for the drainage areas located upstream and in the Borough of Port Carbon Borough along the Mill Creek and Schuylkill River; from the Mill Creek and Schuylkill River Watershed headwaters to just downstream of the Port Carbon Borough boundary line. The study provides background information on the entire watershed with a focus on the Port Carbon Borough area and how water quality and quantity issues can be addressed (Benesch 2017).

6.4 2019 HMP Title, Vision and Goals

This section describes the plan vision and mitigation goals set forth in the 2019 HMP update.

6.4.1 2019 HAZARD MITIGATION PLAN TITLE

In August 2017, the Schuylkill County HMP leadership, the Schuylkill County Planning Department and Emergency Management Agency initiated a ‘Lunch & Learn’ email campaign with the Core and Municipal Planning Teams. The Lunch & Learn emails were designed to be a visually-appealing and contain ‘bite-sized’ information pertaining to all phases of emergency management with a focus on mitigation and the HMP update. The purposes of the Lunch & Learn emails were to serve as an education tool for the HMP update,

solicit feedback on various aspects of the planning process, while respecting everyone’s time and the numerous hats they wear.

As part of the Lunch & Learn email campaign, the Schuylkill County Planning Department distributed one that requested the Core Planning Team’s input on a title for the 2019 HMP update. The Core Planning Team was requested to vote on three choices that best matched the County’s mitigation vision. The selected title for the 2019 HMP update that provides insight into the overall vision of the County is:

Planning Together for a Resilient Schuylkill County

6.4.2 2019 VISION STATEMENT

The Schuylkill County HMP Coordinators envisioned having a vision statement for the 2019 HMP update to serve as a guide for plan development and represent what plan participants want to achieve over the performance period of the plan. Initial vision statement discussions took place at the June 2018 Core Planning Team meeting. The Schuylkill County HMP Coordinators continued to draft vision statements and through a vision-setting exercise, the Core Planning Team was surveyed in October 2018 for feedback to ensure consensus. The Core Planning Team selected the following vision statement:

Schuylkill County will be resilient because reducing hazard risk is an integral part of the County’s livability and sustainability.

6.4.3 2019 MITIGATION GOALS

As noted above, at the November 9, 2017 Core and Municipal Planning Team Meetings, the 2013 HMP goals were distributed via hardcopy on the Mitigation Strategy 5-Year Mitigation Plan Review worksheet. The meeting attendees were asked to provide early feedback on the goals to incorporate into the update process. The 2013 HMP goals were revisited at the June 27, 2018 Mitigation Strategy meeting with the Core and Municipal Planning Teams. The Core Planning Team reviewed the 2013 HMP goals during a June 2018 Core Planning Team meeting to determine their continuing applicability to County mitigation needs. At the meeting, it was concluded the 2013 HMP goals needed to be rewritten, several new draft 2019 HMP goals were proposed and that the draft 2019 HMP goals required further development by the County HMP Coordinators before consensus could be achieved.

The Schuylkill County HMP Coordinators continued to update the goals and distributed a complete list of draft 2019 HMP goals to the Core Planning Team via an October 2018 Lunch & Learn email. The Core Planning Team was requested to review and provide comment back on the draft 2019 HMP goals through a questionnaire. Based on the input received, the 2019 HMP goals were finalized in October 2018 and meet the following: 1) align with State mitigation goals; 2) embody the overarching needs and concerns of the County and participating municipalities, and 3) address both natural and non-natural hazard risk reduction. The 2019 County HMP goals are listed below:

- **Goal 1:** Reduce or eliminate the risk to people, property, the economy and the environment from hazards.
- **Goal 2:** Prioritize, seek funding for and implement mitigation and resilience efforts that focus on real, relevant community issues that can be reasonably accomplished in the short-term.

- **Goal 3:** Link natural resource management, land use planning, and watershed planning with hazard mitigation activities to conserve, restore and enhance natural systems and protect water resources and property.
- **Goal 4:** Improve local capabilities, including government, emergency and other critical services, to protect citizens, reduce damage and ensure continuity of services before, during and after disasters.
- **Goal 5:** Incorporate mitigation concepts into County and municipal plans, policies, programs, and regulations. This includes compliance with the NFIP for all participating jurisdictions.

6.5 Identification and Analysis of Mitigation Techniques

Concerted efforts were made to ensure that the County and its municipalities developed updated mitigation strategies. Further, an effort was made to ensure actionable strategies were identified and could be reasonably accomplished in the 5-year performance cycle of the 2019 HMP update. Updated strategies included activities and initiatives covering the range of mitigation action types described in recent FEMA planning guidance, “Local Mitigation Planning Handbook.” 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 man-made structures to reduce the impact of hazards.
3. **Natural Systems Protection:** These are actions that minimize damage and losses and 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 June 27, 2018 Mitigation Strategy Workshop identified actions that relate to the techniques listed above. Table 6-2 identifies which mitigation techniques are applicable for the hazards included in the 2019 HMP.

Table 6-2. Mitigation Technique Matrix

Hazard	Local Plans and Regulations	Structure and Infrastructure Projects	Natural Systems Protection	Education and Awareness Programs
Blight	✓	✓		✓
Dam & Levee Failure	✓	✓		✓
Drought	✓	✓	✓	✓
Flood	✓	✓	✓	✓
HazMat & Transportation	✓	✓	✓	✓
Hurricane & Wind	✓	✓		✓
Mine Subsidence	✓	✓		✓
Nuclear Incident	✓			✓
Radon Exposure	✓			✓
Tornadoes and Windstorms	✓	✓		✓
Wildfire	✓	✓	✓	✓
Winter Storm		✓		✓

6.6 Mitigation Action Plan

To assist with the identification of implementable and action-oriented mitigation actions, a three-step process was followed for the 2019 HMP update: 1) Assemble a ‘mitigation toolbox’; 2) Identify problem statements through ‘mitigation brainstorming’ and 3) Update the mitigation action plan. This section describes the process followed by the County and municipalities to develop the 2019 updated mitigation action plan.



6.6.1 MITIGATION TOOLBOX

The concept of a ‘mitigation toolbox’ was introduced to the Core and Municipal Planning Teams at the May and June 2018 meetings. A mitigation toolbox contains numerous resources available to the County and participating municipalities to assist with the development of an updated mitigation action plan. This toolbox was referred to throughout the 2019 HMP mitigation strategy update and will continue to serve as a resource over the plan performance period. The toolbox contains, but is not limited, to the following and will be continuously added to over time:

- 2019 Goals
- 2013 HMP Mitigation Strategy
- Risk assessment results
- Capability assessment results
- Outcomes of the SWOO
- Outcomes of the Flood Hot Wash
- Subject-matter expertise
- Stakeholder and public input
- Existing plans/policies/programs
- FEMA resources (e.g., Mitigation Ideas).

As discussed in Section 3 (Planning Process) and earlier in this section, the May and June 2018 Core and Municipal Planning Team meetings focused on understanding risk and capabilities and identify gaps in capabilities, challenges and opportunities. This provided context for the next steps in the update of the mitigation strategy and inform the Planning Teams of the available resources in their ‘toolbox.’

6.6.2 PROBLEM STATEMENTS

A facilitated ‘mitigation brainstorming’ session to identify gaps in capabilities and areas of risk/historic impacts (a.k.a. problem areas) was held on May 22, 2018 with the Core and Municipal Planning Teams. Large poster-size sheets were placed on each table and meeting participants were encouraged to capture ‘problem areas’, challenges, questions and/or ideas while listening to the presentation of the updated risk assessment results. After the formal presentation, there was an open forum discussion to expand upon the notes captured. Refer to Appendix H for the problem statements identified by meeting participants and the submitted ‘Mitigation Brainstorming’ worksheets submitted.

Hazard	Problem Areas/ Challenges/Questions/Ideas	Location	Potential Solutions	Lead Jurisdiction/ Department

Problem statement development continued at the June 2018 Core and Municipal Planning Team meetings when the mitigation strategy was discussed.

Table 6-3 lists the problem statements and potential solutions identified during the Core and Municipal Planning Team Meetings to reduce risk. These statements and questions were formed into potential mitigation actions and evaluated to ensure feasibility and determine if they should be included in the 2019 updated mitigation action plan.

A total of 10 criteria were considered to determine feasibility. Each criterion was noted as highly effective/feasible (+), ineffective/not feasible (-) or neutral/not applicable (N). The total of each was summed and if the positives outweighed the negative, the action was deemed potentially feasible based on the qualitative assessment performed. Refer to Table 6-3 for a summary of this evaluation.

The 10 evaluation criteria used to determine feasibility are:

1. Life Safety – How effective will the action be at protecting lives and preventing injuries?
2. Property Protection – How significant will the action be at eliminating or reducing damage to structures and infrastructure?
3. Technical – Is the mitigation action technically feasible? Is it a long-term solution? Eliminate actions that, from a technical standpoint, will not meet the goals.
4. Political – Is there overall public support for the mitigation action? Is there the political will to support it?
5. Legal – Does the municipality have the authority to implement the action?
6. Environmental – What are the potential environmental impacts of the action? Will it comply with environmental regulations?
7. Social – How will the action impact socially vulnerable populations? Will the proposed action assist socially vulnerable populations or adversely affect one segment of the population? Will the action disrupt established neighborhoods, break up voting districts, or cause the relocation of lower income people?
8. Administrative – Does the jurisdiction have the personnel and administrative capabilities to implement the action and maintain it or will outside help be necessary?
9. Local Champion – Is there a strong advocate for the action or project among the jurisdiction’s staff, governing body, or committees that will support the action’s implementation?
10. Other Local Objectives – Does the action advance other local objectives, such as capital improvements, economic development, environmental quality, or open space preservation? Does it support the policies of other plans and programs?

Table 6-3. Problem Statements and Potential Mitigation Actions Identified during Mitigation Brainstorming

Potential Mitigation Action		Evaluation Criteria Considerations										TOTAL	Feasible Action (Yes or No)
		(+) <i> highly effective or feasible</i>											
		(-) <i> ineffective or not feasible</i>											
		(N) <i> Neutral or Not applicable</i>											
Jurisdiction	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Meets Other Community Objectives		
Schuylkill County	Create model templates for model ordinances and policies	+	+	+	+	+	+	+	+	+	+	10 + 0 – 0 N	Yes
Schuylkill County	Create a centralized hazard mitigation position at the County-level to assist with floodplain management and	+	+	+	+	+	+	+	+	+	+	10 + 0 – 0 N	Yes
Schuylkill County	Work with municipalities to assist with becoming BCEGS community	+	+	+	+	+	+	N	+	+	+	9 + 0 – 1 N	Yes
Schuylkill County	Conduct self-assessment of response times, resources, etc. for police and fire and identify solutions to gaps (lack of man-power is a big issue for fire)	+	+	+	+	+	+	N	+	+	+	9 + 0 – 1 N	Yes
Schuylkill County and Fire Companies	Relocate fire companies out of the floodplain	+	+	+	+	+	+	+	+	+	+	10 + 0 – 0 N	Yes
Schuylkill County	Address flooding on St Charles and St James Streets	+	+	+	+	+	+	N	+	+	+	9 + 0 – 1 N	Yes
Schuylkill County	Move toward regionalization of resources police, fire etc.)	+	+	+	+	+	+	+	+	+	+	10 + 0 – 0 N	Yes

Potential Mitigation Action		Evaluation Criteria Considerations										TOTAL	Feasible Action (Yes or No)
		<i>(+) highly effective or feasible</i>											
		<i>(-) ineffective or not feasible</i>											
		<i>(N) Neutral or Not applicable</i>											
Jurisdiction	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Meets Other Community Objectives		
Ashland (B)	\$1.6M Dam inundation project Penvest Municipal Authority Dam breast improvements Intake improvements Calve project Replacement (in-Progress) Funding Ashland Municipal Authority	+	+	+	+	+	+	N	+	+	+	9 + 0 - 1 N	Yes
Ashland (B)	Address basement flooding along Oakland Avenue (Mahanoy Creek and stormwater issues)	+	+	+	+	N	N	+	+	+	+	8 + 0 - 2 N	Yes
Ashland (B)	Rehabilitate or demolish blighted properties in the Borough	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Barry (T)	Stabilize bank along Black Creek Road	+	+	+	+	+	+	N	+	+	+	9 + 0 - 1 N	Yes
Barry (T)	Improve drainage on Hill Road; remove debris	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Barry (T)	Upgrade drainage on Hinkle Road at Dam; insufficient capacity causes roadway flooding	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Blythe (T)	Cumbola Park Water St. floods behind fire house – investigate why this area floods and identify actions	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Blythe (T)	Demolish verified-blighted properties	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes

Potential Mitigation Action		Evaluation Criteria Considerations										TOTAL	Feasible Action (Yes or No)
		<i>(+) highly effective or feasible</i>											
		<i>(-) ineffective or not feasible</i>											
		<i>(N) Neutral or Not applicable</i>											
Jurisdiction	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Meets Other Community Objectives		
Blythe (T)	Address insufficient piping/drainage and/or reconfigure roadways for low-lying developed areas that flood	+	+	+	+	+	+	+	+	+	+	10 + 0 – 0 N	Yes
Branch (T)	Mitigate homes in the floodplain; one resident elevated their home already and paid for it themselves	+	+	+	+	+	+	+	+	+	+	10 + 0 – 0 N	Yes
Butler (T)	Demolish verified-blighted properties	+	+	+	+	+	+	+	+	+	+	10 + 0 – 0 N	Yes
Butler (T)	Address insufficient piping/drainage and/or reconfigure roadways for low-lying developed areas that flood	+	+	+	+	+	+	+	+	+	+	10 + 0 – 0 N	Yes
Deer Lake (B)	Demolish verified-blighted properties	+	+	+	+	+	+	+	+	+	+	10 + 0 – 0 N	Yes
Deer Lake (B)	Address insufficient piping/drainage and/or reconfigure roadways for low-lying developed areas and areas below the dam that flood	+	+	+	+	+	+	+	+	+	+	10 + 0 – 0 N	Yes
Deer Lake (B)	Conduct certified inspections of the dam	+	+	+	+	+	+	+	+	+	+	10 + 0 – 0 N	Yes

Potential Mitigation Action		Evaluation Criteria Considerations										TOTAL	Feasible Action (Yes or No)
		<i>(+) highly effective or feasible</i>											
		<i>(-) ineffective or not feasible</i>											
		<i>(N) Neutral or Not applicable</i>											
Jurisdiction	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Meets Other Community Objectives		
East Norwegian (T)	Address issue at Old Railroad Bridge that is blocking up the Mill Creek near Eagle Hill Road and Spec-Tec trailers; options include bridge elevation; bridge replacement; study to investigate additional alternatives	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Eldred (T)	Increase public awareness of natural gas pipeline and impacts due to road crossings and property erosion	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Gilberton (B)	Increase capacity of stormwater system; improve maintenance cleaning	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Gilberton (B)	Clear Mahanoy Creek to increase flood storage	+	+	+	+	N	+	N	+	+	+	8 + 0 - 2 N	Yes
Gordon (B)	Replace train bridge and add separate drainage area for flood storage and drainage; train track is elevated and creates a dam in town - McKnight Street	+	+	+	+	N	+	+	+	+	+	9 + 0 - 1 N	Yes
Hegins (T)	Replace bridge at Pine Drive (T-520); weight limit may be an issue due to poor condition	+	+	+	+	+	+	N	+	+	+	9 + 0 - 1 N	Yes
Hegins (T)	Demolish verified-blighted properties	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Hegins (T)	Address insufficient piping/drainage and/or reconfigure roadways for low-lying developed areas	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes

Potential Mitigation Action		Evaluation Criteria Considerations										TOTAL	Feasible Action (Yes or No)
		<i>(+) highly effective or feasible</i>											
		<i>(-) ineffective or not feasible</i>											
		<i>(N) Neutral or Not applicable</i>											
Jurisdiction	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Meets Other Community Objectives		
Kline (T)	Demolish verified-blighted properties	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Kline (T)	Address insufficient piping/drainage and/or reconfigure roadways for low-lying developed areas that flood	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
McAdoo (B)	Plant vegetation other than high woods to reduce erosion of inside wall of flood control	+	+	+	+	+	+	N	+	+	+	9 + 0 - 1 N	Yes
McAdoo (B)	Install more catch basins above the flood area or increase capacity of existing stormwater system to reduce flooding in low-lying areas; flooding occurs on Cleveland Street, Sherman Street, Kennedy Drive and others	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
McAdoo (B)	Investigate mitigation options for structures in the floodplain that are experiencing increased insurance costs (e.g., elevation, acquisition)	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Minersville (B)	Regularly remove debris accumulated at railroad trestle (SR 4042) that creates a dam and causes flooding on Penn Street. Work with railroad who owns property to maintain; outside of Borough jurisdiction	+	+	+	+	N	+	+	+	+	+	9 + 0 - 1 N	Yes

Potential Mitigation Action		Evaluation Criteria Considerations										TOTAL	Feasible Action (Yes or No)
		<i>(+) highly effective or feasible</i>											
		<i>(-) ineffective or not feasible</i>											
		<i>(N) Neutral or Not applicable</i>											
Jurisdiction	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Meets Other Community Objectives		
Minersville (B)	Address blighted properties Borough-wide; options include continue working with the Schuylkill Land Bank to demolish properties; stronger code enforcement	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Minersville (B)	Increase capacity of stormwater system; work with Sewer Authority to address	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Minersville (B)	Apply for grant to install sidewalks on the 400-block of Delaware Avenue; property flooding due to lack of curbing	N	+	+	+	+	+	+	+	+	+	9 + 0 - 1 N	Yes
Minersville (B)	Goodwill Hose Fire Company is located in the floodplain and membership has decreased drastically. Consolidate with another fire company.	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Mount Carbon (B)	Demolish verified-blighted properties	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Mount Carbon (B)	Address insufficient piping/drainage and/or reconfigure roadways for low-lying developed areas	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
New Castle (T)	Demolish verified-blighted properties	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes

Potential Mitigation Action		Evaluation Criteria Considerations										TOTAL	Feasible Action (Yes or No)
		<i>(+) highly effective or feasible</i>											
		<i>(-) ineffective or not feasible</i>											
		<i>(N) Neutral or Not applicable</i>											
Jurisdiction	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Meets Other Community Objectives		
New Castle (T)	Address insufficient piping/drainage and/or reconfigure roadways for low-lying developed areas that flood	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Palo Alto (B)	Demolish verified-blighted properties	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Palo Alto (B)	Address insufficient piping/drainage and/or reconfigure roadways for low-lying developed areas that flood	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Palo Alto (B)	Educate all municipal officials on mine subsidence including no advance warning of issues; governmental agency issues	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Pine Grove (T)	Demolish verified-blighted properties	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Pine Grove (T)	Address insufficient piping/drainage and/or reconfigure roadways for low-lying developed areas that flood	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Tamaqua (B)	Wabash Creek Culvert - Increase capacity, clean out sediment and repair damage and install scour protection	+	+	+	+	+	+	N	+	+	+	9 + 0 - 1 N	Yes

Potential Mitigation Action		Evaluation Criteria Considerations										TOTAL	Feasible Action (Yes or No)
		<i>(+) highly effective or feasible</i>											
		<i>(-) ineffective or not feasible</i>											
		<i>(N) Neutral or Not applicable</i>											
Jurisdiction	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Meets Other Community Objectives		
Tamaqua (B)	Wabash Creek - build flood control dam; divert around Borough to Little Schuylkill River	+	+	+	+	N	+	+	+	+	+	9 + 0 - 1 N	Yes
Tamaqua (B)	Investigate options to protect flooding to Tamaqua Community Pool that is vulnerable to flooding from an unnamed stream	N	+	+	+	+	+	N	+	+	+	8 + 0 - 2 N	Yes
Tamaqua (B)	Address basement flooding at the Citizens Fire Company	+	+	+	+	+	+	N	+	+	+	9 + 0 - 1 N	Yes
Tamaqua (B)	Investigate options to address blight in South Ward and Middle Ward neighborhoods	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Treemont (B)	Rehabilitate the creek wall in several locations	+	+	+	+	N	+	+	+	+	+	9 + 0 - 1 N	Yes
Treemont (B)	Bridge wall replacement	+	+	+	+	N	+	+	+	+	+	9 + 0 - 1 N	Yes
Treemont (B)	Install flood walls in known flood areas	+	+	+	+	+	N	+	+	+	+	9 + 0 - 1 N	Yes
Treemont (B)	Remove bridge and widen Good Spring Creek; remove sediment in creek to improve drainage capacity	+	+	+	+	N	+	+	+	+	+	9 + 0 - 1 N	Yes
Treemont (B)	Investigate options and work with neighboring communities to reduce stormwater runoff entering the Borough	+	+	+	N	N	+	+	+	+	+	8 + 0 - 2 N	Yes

Potential Mitigation Action		Evaluation Criteria Considerations										TOTAL	Feasible Action (Yes or No)
		<i>(+) highly effective or feasible</i>											
		<i>(-) ineffective or not feasible</i>											
		<i>(N) Neutral or Not applicable</i>											
Jurisdiction	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Meets Other Community Objectives		
Treemont (T)	Replace guiderail on Molleystown Road to increase life safety and property protection	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Treemont (T)	Address rocks on Rausch Creek Road causing life safety issues, legal and environmental (erosion) problems	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Treemont (T)	Address flooding on State Route 4011 - investigate mitigation options	+	+	+	+	N	+	+	+	+	+	9 + 0 - 1 N	Yes
Port Clinton (B)	Schuylkill and Little Schuylkill continue to flood; investigate options to mitigate	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Washington (T)	At the planning and subdivision stage, understand stormwater management; stormwater management is increasing as development is increasing.	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Washington (T)	Address blighted properties; options include increase enforcement, acquisition, demolition	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Washington (T)	Purchase and install generator at the Township building	+	+	+	+	+	N	N	+	+	+	8 + 0 - 2 N	Yes
Washington (T)	Harden bridges that are experiencing scouring which could lead to failure	+	+	+	+	+	+	N	+	+	+	9 + 0 - 1 N	Yes
West Penn (T)	Demolish verified-blighted properties and update property maintenance ordinance	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes

Potential Mitigation Action		Evaluation Criteria Considerations										TOTAL	Feasible Action (Yes or No)
		<i>(+) highly effective or feasible</i>											
		<i>(-) ineffective or not feasible</i>											
		<i>(N) Neutral or Not applicable</i>											
Jurisdiction	Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Meets Other Community Objectives		
West Penn (T)	Address insufficient piping/drainage and/or reconfigure roadways for low-lying developed areas that flood	+	+	+	+	+	+	+	+	+	+	10 + 0 - 0 N	Yes
Upper Mahantongo	Acquire structures in the floodplain	+	+	+	+	N	+	+	+	+	+	9 + 0 - 1 N	Yes

6.6.3 2019 UPDATED MITIGATION STRATEGY

The third step was for representatives from the County and all participating municipalities to select mitigation strategies and initiatives to pursue until the next plan update. The mitigation toolbox and the mitigation brainstorming session were used to inform this step. In addition, some actions identified during the 2013 update that are still relevant or in progress were included in the 2019 update. Table 6-4 summarizes 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 by each jurisdiction using the Mitigation Action Worksheet distributed at the June 27, 2018 Mitigation Strategy Workshop. Refer to Appendix H for a blank version of the Mitigation Action Worksheet and completed worksheets for new actions identified during the planning process. Specific mitigation actions were identified to prevent future losses; however, current funding is not identified for all these actions at present. 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.

Table 6-4. Hazard Mitigation Strategy

Note: Some of the identified mitigation initiatives in Table 6-4 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 2013 version of the HMP may have been reworded and given a new initiative designation to conform to current needs and procedures.

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority* *	Mitigation Category	CRS Category
Schuylkill County												
2019-SC-01 (New)	Pool resources to acquire traffic devices; there was not enough to go around during the July/August 2018 flood events	N/A	All	1, 4	<u>County EMA</u>	High	Medium	County	Short	High	SIP	PP
2019-SC-02 (New)	Ensure the most accurate road closure data is obtained and is consistent across all platforms and levels of government in a timely fashion through coordination with PennDOT, 911 center, EOC and municipalities; push information to the public	N/A	All	1, 4	<u>County EMA</u>	High	Medium	County	Short	High	SIP	PP
2019-SC-03 (New)	Update Continuity of Operations Plans for all county departments	N/A	All	All	<u>County EMA</u>	High	Low	County	Short	High	LPR	PR
2019-SC-04 (New)	Create a centralized hazard mitigation position at the County-level to assist with floodplain management and NFIP compliance	Both	Flood	All	<u>County EMA and County Planning Department</u>	High	Medium	County	Short	High	LPR	PR
2019-SC-05 (New)	Work with municipalities to assist with becoming BCEGS communities	Both	All	1, 5	<u>County Planning Department</u>	High	Low-Medium	County	Short	High	LPR	PR
2019-SC-06 (New)	Conduct self-assessment of response times, resources, etc. for police and fire and identify	N/A	All	1, 4	<u>County EMA</u>	High	Medium-High	County	Short	High	LRP	PR

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
	solutions to gaps (lack of man-power is a big issue for fire)											
2019-SC-07 (New)	County EMA to work with Fire Companies to relocate fire companies out of the floodplain	Existing	Flood	1, 4	County EMA; Fire Companies	High	High	FEMA HMA	Short	High	SIP	PP
2019-SC-08 (revised 2013 Action)	<p>Implement database and ESRI-based solutions to support emergency management operations, planning/community development and improve situation reporting between county and municipalities during an event.</p> <ul style="list-style-type: none"> • Move from MapInfo software to ESRI ArcGIS software for parcel mapping which will require conversion of the parcels to ESRI's parcel fabric. • Review and evaluate facilities, equipment, resumes, personnel and other resources needed to support emergency response annually. • Develop a database of local resources from municipalities and integrate with the fire equipment and personnel database. • Update utilities, water lines, sewer lines service areas in GIS • Incorporate local data in Hazus models • Standardize and improve the system of flood damage reporting. 	N/A	All hazards	1, 4	County EMA and County Planning Department	High	Staff Time	County	Short	High	LRP	ES

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
2019-SC-9 (2013 Action)	Cooperate with local water authorities, including mapping water source data and mapping locations of water sources needed during fires (such as ponds and dry hydrants). The boy scouts have mapped 11 municipalities for water to date.	N/A	Drought and Water Deficiencies; Wildfire	1, 4	<u>Schuylkill Municipal Water Authority</u>	High	Low	Staff Time	Short	High	LPR	PR
2019-SC-10 (2013 Action)	Continue to implement the mitigation actions outlined in the "Pine Grove Area/Upper Swatara Watershed Recovery Strategy". Refer to Appendix J for the Recovery Strategy and all mitigation measures identified.	Both	Flood	All	<u>County EMA and Planning Departments with municipalities</u>	High	High	Federal, State, Local	Long	High	SIP	PP
2019-SC-11 (2013 Action)	Develop a Debris Management Plan to include quick "Help Sheets" built upon various types of events (all hazards).	N/A	All hazards	2, 3, 5	<u>County Solid Waste Office</u>	High	\$50,000	County	Short	High	LPR	PR
2019-SC-12 (revised 2013 Action)	Conduct a capability assessment to determine which municipalities are capable to enroll and sustain participation in the Community Rating System (CRS).	N/A	Flood	4, 5	<u>County Planning Department and CRS-interested municipalities</u>	High	Low	County	Short	High	LPR	PR
2019-SC-23 (New)	Raise electrical components (i.e. control panels) and generators above the base flood elevation and dry floodproof Schuylkill Municipal Authority pump stations.	Existing	Flood	1,2	<u>Schuylkill Municipal Authority</u>	High	High	FEMA HMGP	Long	High	SIP	PP
All Municipalities and Schuylkill County												
2019-SC-13 (2013 Action)	Work with the municipalities to integrate the County's Hazard Mitigation Plan into the municipalities' Comprehensive Plans, Subdivision and Land	Both	All hazards	All	<u>County Planning Department and</u>	High	Low	Staff Time	Long	High	LRP	PR

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
	Development Ordinances, and Zoning Ordinances, and other similar documents by advising them on the principles and strategies for safe development. Pottsville and Tremont have already adopted the "Quality of Life Ordinance" Code. This is occurring through Act 247 reviews for proposed land use ordinances and proposed subdivisions/land developments.				municipalities							
2019-SC-14 (revised 2013 Action)	<p>Increase capabilities by preparing templates for municipal officials to access the information on their own schedule and pace so that it is ready when needed. Offer training on these new templates to municipalities for future use.</p> <ul style="list-style-type: none"> • Establish webpages with presentations, training documents and webinars. • Draft templates for use during a disaster event (i.e. press releases, information on mold remediation, social media, etc.) • Create templates for model ordinances and policies (e.g., include language in the County Zoning Ordinance (for 34 municipalities) and the 33 municipal ordinances on measures to: enhance the concept of defensible space practice; and minimize impervious surfaces to reduce the impacts of drought) • Develop template Incident Action Plans 	Both	All	1,3,4,5	County Planning Department and County EMA and all municipalities	High	Low	County	Short	High	LPR	PR

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
2019-SC-015 (New)	<p>Conduct education and training to improve capabilities of municipal officials and staff at local emergency operation centers, including personnel (staffing) and communications as follows. This may be part of the 'Mitigation Day' as described in Section 7 (Plan Maintenance).</p> <ul style="list-style-type: none"> • ICS training • Hazard mitigation topics, such as: damage assessment after natural disasters, stormwater management, mutual aid agreements, public disaster assistance, hazard mitigation grant assistance, CIP, and tools to address blight. • Certified Floodplain Manager course • National Environmental Policy Act (NEPA) • Mitigation grant funding availability • Mitigation strategies • NFIP insurance and flood protection • Land banking • Tabletop exercises with County employees • Partner with realtors 	N/A	All hazards	4, 5	<u>County EMA, County Planning Department and municipalities</u>	High	Medium	County	Short	High	LPR	ES
2019-SC-16 (New)	Work with the municipalities to use the "Pine Grove Area/Upper Swatara Watershed Recovery Strategy" and Port Carbon Water Study as models and examples for planning documents, similar flood mitigation strategies and funding sources.	Both	Flood	4, 5	<u>County EMA, County Planning Department and municipalities</u>	High	Medium	County	Short	High	LPR	ES
2019-SC-17 (New)	The Schuylkill County Planning Department will work with all	Both	Flood	4, 5	<u>County EMA, County</u>	High	Medium	County	Short	High	LPR	ES

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
	municipalities and NFIP Floodplain Administrators to conduct targeted education and outreach regarding NFIP Floodplain Administrator roles, responsibilities, NFIP compliance and flood damage prevention ordinance update and enforcement. As part of this outreach, the FEMA NFIP Survey (refer to Appendix H) will be used to document information captured for each municipality. This education and outreach may become part of the proposed 'Mitigation Day' discussed in Section 7 (Plan Maintenance).				<u>Planning Department and municipalitie</u> §							
2019-SC-18 (New)	Schuylkill Planning Department will work with the municipalities to strengthen the mitigation strategy, specifically the linkage to mitigation action implementation with emphasis on available HMA funding.	Both	All	All	<u>County Planning Department, Municipalitie</u> §	High	Low	FEMA PDM and FMA	Short	High	LPR	PR
2019-SC-19 (New)	Mitigate hazard-prone properties, to include the following mitigation options: acquisition, elevation, relocation and mitigation reconstruction (i.e., demolition of a structure in the floodplain and rebuild on a portion of the property not located in the floodplain)	Existing	All	1, 2	<u>County Planning Department, Municipalitie</u> §	High	High	FEMA HMA; local match	Short	High	SIP	PP
2019-SC-20 (New)	Protect critical facilities from damage by installing quick-connect emergency generator hook-ups for critical facilities and acquiring generators.	Existing	All	1, 2	<u>County Planning Department, County EMA, Municipalitie</u> §	High	High	FEMA HMA; local match	Short	High	SIP	PP
2019-SC-21 (New)	Dry floodproof non-residential structures by strengthening walls, sealing openings, or using	Existing	Flood	1, 2	<u>County Planning Department,</u>	High	High	FEMA HMA; local match	Short	High	SIP	PP

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
	waterproof compounds or plastic sheeting on walls to keep water out.				<u>County EMA, Municipalities</u>							
2019-SC-22 (New)	Protect critical facilities from flood events by raising electrical components above the base flood elevation.	Existing	Flood	1, 2	<u>County Planning Department, County EMA, Municipalities</u>	High	High	FEMA HMA; local match	Short	High	SIP	PP
Ashland (B)												
2019-Ashland-01 (New)	\$1.6M Dam inundation project Penvest Municipal Authority Dam breast improvements Intake improvements Calve project Replacement (in-Progress) Funding Ashland Municipal Authority	Both	Flood	1	<u>Borough Engineer</u>	High	High	FEMA HMA; CDBG-DR; State grant programs	Short	High	SIP	PP
2019-Ashland-02 (New)	Address basement flooding along Oakland Avenue (Mahanoy Creek and stormwater issues)	Existing	Flood	1, 2	<u>Borough Engineer</u>	High	High	FEMA HMA; CDBG-DR	Short	High	SIP	PP
2019-Ashland-03 (New)	Rehabilitate or demolish blighted properties in the Borough	Existing	Blight	1, 2	<u>Borough</u>	High	High	PA DCED	Short	High	SIP	PP
Auburn (B)												
2019-Auburn – 01 (2013 Action)	The stormwater inlet on Market Street at the railroad surcharges and floods road. Construct additional stormwater inlet(s) on Market Street /move inlet to opposite of the road.	Existing	Flooding	1,2	<u>Borough Engineer</u>	High	Medium (\$55,000)	FEMA HMA	Short term	High	SIP	PP
Barry (T)												
2019-Barry-01 (New – Problem Statement)	Upgrade drainage on Hinkle Road at Dam; insufficient capacity causes roadway flooding	Existing	Flooding	1,2	<u>Township Engineer</u>	High	High	FEMA HMA	Short	High	SIP	PP

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
2019- Barry-02 (2013 Action)	Streambank erosion is threatening the roadway at Black Creek Road. Conduct stream stabilization to restore stream.	County completed portion	Flooding	1, 2, 3	<u>Township Engineer</u>	High	High (\$10,000 - \$100,000)	FEMA HMA	Short term	High	NSP	NR
2019- Barry-03 (2013 Action)	An undersized bridge/culvert causes roadway overtopping at the following locations during flood events. Replace the undersized structure with a larger opening to convey flood flows. - Post Road - State Route 4004 - Rosies Road - Maplewood Road - Fishing Road - Middle Road - Hill Road	Existing	Flooding	1, 2	<u>Township Engineer</u>	High	High (\$1,000,000 each location)	FEMA HMA	Medium	High	SIP	PP
2019- Barry-04 (2013 Action)	Hillside washouts occur on Hill Road, resulting in debris and mud accumulation on the roadway. Construct roadside barriers to catch debris.	Existing	Landslide	1, 2	<u>Township Engineer</u>	High	High (\$100,000)	FEMA HMA	Medium	High	SIP	PP
2019- Barry-05 (2013 Action)	The following roads experience snow drifting: Hill Road, Weishample Road, Middle Road, Orchard Road, Fishing Road, Maplewood Road, Hinkle Road, Beurys Road. Snow fences are problematic, natural screens Improve roadway plowing and salting operations.	Existing	Winter Weather		<u>Township Engineer</u>	High	Medium – High (\$50,000)	Local	Short	High	SIP	PP
Blythe (T)												
2019- Blythe-01 (Problem Statement – New)	Cumbola Park Water St. floods behind fire house; investigate why this area floods and identify appropriate mitigation actions	Existing	Flood	1,2,4	<u>Township Engineer</u>	High	High	FEMA HMA; local match	Short	High	SIP	PP

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
2019-Blythe-02 (2013 Action)	Roads and homes flood near State Route 209 and Trolley Street. Remove fallen trees and debris from the River in East Norwegian Township, and remove properties from floodplain as applicable. Acquire home and remove trees and debris.	Existing	Flood	1,2	<u>Township Engineer</u>	High	High	FEMA HMA; local match	Long Term	High	SIP	PP
2019-Blythe-03 (Problem Statement – New)	Demolish verified blighted properties	Existing	Blight	1,2	<u>Township Engineer</u>	High	High	State; local match	Short	High	SIP	PP
2019-Blythe-04 (Problem Statement – New)	Address insufficient pipe size/drainage and/or reconfigure roadways for low-lying developed areas in the Township	Existing	Flood	1,2	<u>Township Engineer</u>	High	High	FEMA HMA; local match	Short	High	SIP	PP
Branch (T)												
2019-Branch-01 (Problem Statement – New)	Mitigate homes located in the floodplain; one home has already been elevated paid for by homeowner	Existing	Flood	1	<u>Township Engineer</u>	High	High	FEMA HMA; local match	Short	High	SIP	PP
Butler (T)												
2019-Butler-01 (2013 Action)	Laurel Street does not have an adequate storm drainage system. Improve stormwater drainage facilities.	Existing	Flood	1,2	<u>Township engineer and roads</u>	High	High (\$100,000)	FEMA HMA; local match	Short	Medium	SIP	PP
2019-Butler-02 (2013 Action)	The bridge at Walnick Drive was washed out. Replace structure with larger opening to convey flood flows.	Existing	Flood	1,2	Township engineer and roads	High	High (\$1,000,000)	FEMA HMA; local match	Short	Medium	SIP	PP
2019-Butler-03 (2013 Action)	Roads and homes flood near Turnpike Road, Barry Road and Creek Road. Remove properties from floodplain.	Existing	Flood	1,2	<u>Township engineer and roads</u>	High	High	FEMA HMA	Long	High	SIP	PP

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
2019-Butler-04 (2013 Action)	An undersized bridge/culvert causes roadway overtopping at Malones Road during flood events. Replace structure with larger opening to convey flood flows.	Existing	Flood	1,2	<u>Township engineer and roads</u>	High	\$1,000,000	FEMA HMA	Medium	High	SIP	PP
2019-Butler-05 (2013 Action)	The cross-pipe at Runge Road is damaged. Replace the damaged pipe with an improved/larger structure to convey flood flows.	Existing	Flood	1,2	<u>Township engineer and roads</u>	High	\$100,000	FEMA HMA	Medium	High	SIP	PP
2019-Butler-06 (Problem Statement – New)	Demolish verified-blighted properties	Existing	Blight	1,2	<u>Township Engineer</u>	High	High	State; local match	Short	High	SIP	PP
2019-Butler-07 (Problem Statement – New)	Address insufficient piping/drainage and/or reconfigure roadways for low-lying developed areas that flood	Existing	Flood	1,2	<u>Township Engineer</u>	High	High	FEMA HMA; local match	Short	High	SIP	PP
Cass (T)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											
Coaldale (T)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											
Cressona (B)												
2019-Cressona-01 (2013 Action)	Traffic jams regularly due to oversize trucks on Borough roads leading to evacuation concerns during emergencies. Disallow oversize vehicles on Borough roads and designate new routes for oversize vehicles	Existing	Hazardous Materials and Transportation Incidents	1, 2	Borough Engineer	High	Medium (\$30,000)	DOT	Long	Medium	LPR	PR
2019-Cressona-	Designate a new location for the EOC and purchase an emergency back-up generator	Existing	All Hazards	1,2,4	Borough EMA Coordinator	High	Medium-Low (\$25,000)	FEMA HMA; local match	Short	High	SIP	PP

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
02 (2013 Action)												
2019-Cressona-03 (2013 Action)	Panther Valley Creek and Beaver Creek are filled with sediment causing flooding. Remove sediment and debris from Panther Valley Creek and Beaver Creek	Existing	Flood	1, 3	Borough	High	Medium (\$55,000)	Local	Short	High	NSP	NR
Deer Lake (B)												
2019-Deer Lake-01 (2013 Action)	The bridge on Drehersville Road is damaged. Replace bridge/culvert on Drehersville Road.	Existing	Flood	1,2,4	<u>Township engineer and roads</u>	High	High (\$1,000,000)	FEMA HMA	Long	High	SIP	PP
2019-Deer Lake-02 (2013 Action)	The culvert at SR61 is undersized and causes flooding. Replace culvert on SR61 to prevent flooding.	Existing	Flood	1,2,4	<u>Township engineer and roads</u>	High	High (\$1,000,000)	FEMA HMA	Long	High	SIP	PP
2019-Deer Lake-03 (2013 Action)	Excessive storm water from West Brunswick Twp. roadway on Drehersville road during heavy downfall enters storm water drains and storm pipes causing flooding on streets in Deer Lake and private property. Construct new storm pipes along Drehersville Road to Lakefront Drive and properly discharge stormwater to Pine Creek.	Existing	Flood	1, 2, 4	<u>Township engineer and roads</u>	High	High (\$100,000)	FEMA HMA	Short	High	SIP	PP
2019-Deer Lake-04 (2013 Action)	Storm water overflow from Coal Mt. Road and Rt. 61 berm runs onto real estate and adjoining streets connected to Deer Lake Borough. Damage of private property and erosion of borough streets result from this flooding. Channel storm water through drains and storm water pipes from	Existing	Flooding	1, 2	<u>Township engineer and roads</u>	High	High (\$100,000)	FEMA HMA	Short	High	SIP	PP

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
	Coal Mt. road to Lake Front Drive to avoid flooding on borough streets and private property.											
2019-Deer Lake-05 (Problem Statement - New)	Demolish verified-blighted properties	Existing	Blight	1,2	<u>Township Engineer</u>	High	High	State; local match	Short	High	SIP	PP
2019-Deer Lake-06 (Problem Statement - New)	Address insufficient piping/drainage and/or reconfigure roadways for low-lying developed areas and areas below the dam that flood	Existing	Flood, Dam and Levee Failure	1,2	<u>Township Engineer</u>	High	High	FEMA HMA; local match	Short	High	SIP	PP
2019-Deer Lake-07 (Problem Statement - New)	Conduct certified inspections of the dam	Existing	Dam and Levee Failure	1,2	<u>Township Engineer</u>	High	High	FEMA HMA; local match	Short	High	SIP	PP
Delano (T)												
2019-Delano-01 (New)	Acquire properties in the township that are blighted and/or located in the floodplain.	Existing	Blight, Flood	1,2	Township	High	High	FEMA HMA; local match	Short	High	SIP	PP
East Brunswick (T)												
2019-EBrunswick-01 (2013 Action)	Cold Run Creek floods roadway (Cold Run Rd). Construct floodwall/levee to alleviate flooding on Cold Run Rd and Old Country Lane	Existing	Flood	1	<u>Township Engineer</u>	High	High (\$100,000)	USACE	Long	High	SIP	PP

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
2019-EBrunswick-02 (2013 Action)	Indian Run floods roadway (Pine Valley Rd); damaged pipe. Construct floodwall/levee and replace pipe on Indian Run to alleviate flooding	Existing	Flood	1	Township Engineer	High	High (\$100,000)	FEMA HMA	Long	High	SIP	PP
2019-EBrunswick-03 (2013 Action)	State Route 443 ices due to steep hills. Improve roadway drainage facilities on State Route 443; work with State DOT to address.	Existing	Winter Weather	1	State DOT; Township Engineer	High	High (\$100,000)	State DOT	Short	High	SIP	PP
East Norwegian (T)												
2019-ENorwegian-01 Problem Statement - New	Address issue at Old Railroad Bridge that is blocking up the Mill Creek near Eagle Hill Road and Spec-Tec trailers; options include bridge elevation; bridge replacement; study to investigate additional alternatives	Existing	Flood	1	Township Engineer	High	High (\$100,000)	FEMA HMA	Long	High	SIP	PP
East Union (T)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											
Eldred (T)												
2019-Eldred-01 (Problem Statement - New)	Increase public awareness of natural gas pipeline and impacts due to road crossings and property erosion	Existing	Hazardous Materials and Transportation Incidents	1	Township Engineer	High	High	Local	Short	High	EAP	PI
Foster (T)												
2019-Foster-01 (2013 Action)	Lower spillway to reduce potential downstream flooding/damage in the event of a spillway breach.	Existing	Flood	1	Township	High	High	Local	Short	High	SIP	PP
Frackville (B)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-18.											

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
Frailey (T)												
2019-Frailey-01 (2013 Action)	An undersized stormwater pipe is causing flooding on Maple Street. Replace the pipe on Maple Street with a larger structure to alleviate flooding.	Existing	Flood	1	<u>Township Engineer</u>	High	High	FEMA HMA	Short	High	SIP	PP
2019-Frailey-02 (2013 Action)	Increase the capacity of the drainage channels along Fountain Mountain Road. The stormwater drainage channels along Fountain Mountain Road is undersized, causing roadway flooding.	Existing	Flood	1	<u>Township Engineer</u>	High	High	FEMA HMA	Short	High	SIP	PP
2019-Frailey-03 (2013 Action)	Poor stormwater drainage is causing roadway washouts on Middlecreek Road. Increase the capacity of the drainage channels along Middlecreek Road.	Existing	Flood	1	<u>Township Engineer</u>	High	High	FEMA HMA	Short	High	SIP	PP
Gilberton (B)												
2019-Gilberton-01 (Problem Statement – New)	Increase capacity of stormwater system; improve maintenance cleaning	Both	Flood	1	<u>Borough Engineer</u>	High	High	FEMA HMA	Short	High	SIP	PP
2019-Gilberton-02 (Problem Statement – New)	Clear Mahanoy Creek	Both	Flood	1, 3	<u>Borough Engineer</u>	High	High	PADEP; Local	Short	High	NSP	NR
2019-Gilberton-03 (New)	Acquire pumps to empty the mine pools. The mine pools (flooding of) cause the flooding within and damage to property within Gilberton Borough.	Both	Flood	1	<u>Borough Engineer</u>	High	High	FEMA HMA	Short	High	SIP	PP
Girardville (B)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
Gordon (B)												
2019-Gordon-01 (2013 Action)	Remove sediment and debris from stream. State Route, no jurisdiction work with state. Coordinate with PADEP and PADOT	Existing	Flood	1	PADEP, PA DOT, Borough Officials	High	Medium (\$50,000)	PADEP; DOT	Short	High	NSP	NR
2019-Gordon-02 (2013 Action)	Debris and sediment have reduced the stream capacity of Little Mahanoy Creek. Remove sediment and debris from stream.	Existing	Flood	1	PADEP, PA DOT, Borough Officials	High	Medium (\$50,000)	PADEP; DOT	Short	High	NSP	NR
2019-Gordon-03 (2013 Action)	The bridge on McKnight Street is undersized and the drainage system is inadequate. Replace the bridge on McKnight Street and improve stormwater drainage facilities.	Existing	Flood	1	PA DOT, Borough Engineer and elected officials	High	High (\$1,000,000)	PA DOT	Medium	High	SIP	PP
2019-Gordon-04 (2013 Action)	There is blockage in the box culvert. Remove debris from culvert to enhance flow. Work with State to alleviate flooding.	Existing	Flood	1	PA DEP, Borough Engineer and elected officials	High	High	PADEP	Short	High	SIP	PP
2019-Gordon-05 (2013 Action)	The rip-rap streambanks are in poor condition. Repair rip-raps to restore the condition of the streambanks.	Existing	Flood	1	PA DEP, Borough Engineer and elected officials	High	High (\$100,000)	PADEP	Short	High	NSP	NR
Hegins (T)												
2019-Hegins-01 (Problem statement – New)	Replace bridge at Pine Drive (T-520); weight limit may be an issue due to poor condition	Existing	Hazardous Materials and Transportation Incidents	1	Township Engineer	High	High	Federal/State Transportation grants	Short	High	SIP	PP
2019-Hegins-	Replace the bridges and culverts/pipes that are undersized and cause flood roadway in the	Existing	Flood	1	Township Engineer	High	High	FEMA HMA	Short	High	SIP	PP

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
02 (2013 Action)	Township. Locations identified at this time: <ul style="list-style-type: none"> • Wood Lane • Old Mill Road • Dell Road • Fountain Road • Pine Drive 											
2019-Hegins-03 (2013 Action)	Conduct a feasibility studies to determine if constructing a floodwall/levee on East Mountain Road (from Deep Creek) and Pine Drive will alleviate flooding	Existing	Flood	1	Township Engineer	High	High	FEMA HMA	Short	High	LPR	PR
2019-Hegins-04 (Problem statement – New)	Demolish verified blighted properties	Existing	Blight	1,2	Township Engineer	High	High	State; local match	Short	High	SIP	PP
Hubley (T)												
2019-Hubley-01 (2013 Action)	Honeymoon Trail and Church Road experience frequent overtopping from flooding. Conduct a study to determine the feasibility of constructing a floodwall/levee.	Existing	Flood	1, 3	Township Engineer	High	High (\$80,000 each location)	USACE	Short	High	SIP	PP
2019-Hubley-02 (2013 Action)	Poor drainage roadway icing are major issues on the following roads. Examine and improve roadway drainage facilities on Culverts should be replaced. Limbs removed. <ul style="list-style-type: none"> - Quaker Drive - Kushwa Road - Church Road 	Existing	Winter Weather	1	Township Engineer	High	\$100,000 each road	FEMA HMA	Medium	High	SIP	PP
2019-Hubley-03 (2013 Action)	Vehicular accidents occur on Fear Not Road due to a sharp turn and poor signage. Improve signage/flashing lights on Fear Not Road.	Existing	Hazardous Materials and Transportation Incidents	1	Township Engineer	High	Medium (\$25,000)	Local	Short	High	SIP	PP

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
2019-Hubley-04 (2013 Action)	Pine Creek Road is in danger of washing out to due streambank erosion. Conduct stream stabilization to restore stream. No outlet road 3-4 houses, coordinate with the State.	Existing	Flood	1, 3	<u>Township Engineer</u>	High	High (\$100,000)	FEMA HMA; PADEP; local match	Short	High	SIP	PP
2019-Hubley-05 (2013 Action)	There is an undersized bridge/culvert on the following roads that floods the roadway. Increase capacity of bridge/culverts to alleviate flooding. - Quaker Drive - Honeymoon Trail Drive - Church Road - W. Mountain Road - Township Road 880 - Deer Lake Bridge culvert - Mahantongo Street - Mill Road - Fear Not Road - State Route 25	Existing	Flood	1	<u>Township Engineer</u>	High	High (\$1,000,000 each location)	FEMA HMA	Long	High	SIP	PP
Kline (T)												
2019-Kline-01 (2013 Action)	The Township is in a more northerly climate and receives more extreme snowfall than the rest of the County. Purchase snow removal and salting equipment and designate emergency snow routes throughout Township.	Both	Winter Weather	<u>1, 4</u>	<u>Township Engineer</u>	High	High (\$250,000)	State; Local	Short	High	SIP	PP
2019-Kline-02 (2013 Action)	The Township's stormwater drainage systems and/or roadway configurations are inadequate. Conduct an engineering study to improve road and/or stormwater drainage facilities throughout the Township.	Existing	Flood	1	<u>Township Engineer</u>	High	High (\$80,000)	FEMA HMA	Short	High	SIP	PP

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
2019-Kline-03 (Problem Statement - New)	Demolish verified blighted properties	Existing	Blight	1,2	<u>Township Engineer</u>	High	High	State; local match	Short	High	SIP	PP
Landingville (B)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											
Mahanoy (T)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											
Mahanoy City (B)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											
McAdoo (B)												
2019-McAdoo-01 (Problem statement – New)	Plant vegetation other than high woods to reduce erosion of inside wall of flood control	Existing	Flood	1, 3	<u>Township Engineer</u>	High	Medium	PADEP; FEMA HMA	Short	High	NSP	SR
2019-McAdoo-02 (Problem statement – New)	Install more catch basins above the flood area or increase capacity of existing stormwater system to reduce flooding in low-lying areas; flooding occurs on Cleveland Street, Sherman Street, Kennedy Drive and others	Existing	Flood	1	<u>Township Engineer</u>	High	High	FEMA HMA	Short	High	SIP	PP
Mechanicsville (B)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											
Middleport (B)												

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											
Minersville (B)												
2019- Minersville e-01 (Problem statement – New)	Regularly remove debris accumulated at railroad trestle (SR 4042) that creates a dam and causes flooding on Penn Street. Work with railroad who owns property to maintain; outside of Borough jurisdiction	Existing	Flood	1	<u>State DOT; Rail Company;</u> Borough Engineer	High	High	State; Private	Long	High	SIP	PP
2019- Minersville e-02 (Problem statement – New)	Address blighted properties Borough-wide; options include continue working with the Schuylkill Land Bank to demolish properties; stronger code enforcement	Existing	Blight	1, 2, 5	<u>Borough Engineer;</u> <u>Code Enforcement Officer</u>	High	High	PA DCED	Short	High	SIP	PP
2019- Minersville e-03 (Problem statement – New)	Increase capacity of stormwater system; work with Sewer Authority to address	Existing	Flood	1	<u>Sewer Authority;</u> Borough Engineer	High	High	FEMA HMA	Short	High	SIP	PP
2019- Minersville e-04 (Problem statement – New)	Apply for grant to install sidewalks on the 400-block of Delaware Avenue; property flooding due to lack of curbing	Existing	Flood	1	<u>Borough Engineer</u>	High	High	FEMA HMA	Short	High	SIP	PP
2019- Minersville e-05 (Problem statement – New)	Goodwill Hose Fire Company is located in the floodplain and membership has decreased drastically. Consolidate with another fire company.	Existing	Flood	1, 4	<u>Borough Engineer</u>	High	High	FEMA HMA	Short	High	SIP	PP
Mount Carbon (B)												
2019- Mount Carbon-01 (Problem	Demolish verified blighted properties	Existing	Blight	1,2	<u>Township Engineer</u>	High	High	State; local match	Short	High	SIP	PP

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
statement – New)												
2019-Mount Carbon-02 (Problem statement – New)	Address insufficient pipe size/drainage and/or reconfigure roadways for low-lying developed areas in the Township	Existing	Flood	1,2	<u>Township Engineer</u>	High	High	FEMA HMA; local match	Short	High	SIP	PP
New Castle (T)												
2019-New Castle-01 (Problem statement – New)	Demolish verified blighted properties	Existing	Blight	1,2	<u>Township Engineer</u>	High	High	State; local match	Short	High	SIP	PP
2019-New Castle-02 (Problem statement – New)	Address insufficient pipe size/drainage and/or reconfigure roadways for low-lying developed areas in the Township	Existing	Flood	1,2	<u>Township Engineer</u>	High	High	FEMA HMA; local match	Short	High	SIP	PP
New Philadelphia (B)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											
New Ringold (B)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											
North Manheim (T)												
2019-NManhei m-01 (2013 Action)	Stormwater drainage on Woodland Drive is inadequate which leads to flooding. Construct/upgrade storm sewer to alleviate flooding	Existing	Flood	1	<u>Borough Engineer</u>	High	High (\$90,000)	FEMA HMA	Short	High	SIP	PP
2019-NManhei m-02 (2013 Action)	Safety hazard due to blight at 1476 Route 61 South Vacant hotel is a public nuisance/hazard. Property should be secured at a minimum and ultimately demolished.	Existing	Blight	1,2	<u>Code Enforcement Officer; Borough Engineer</u>	High	High (\$25-100,000)	PA DCED	Short	High	SIP	PP

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
2019-NManhei m-03 (2013 Action)	Replace the bridge/culvert on Green Tree Drive, Berry Road, and Antique Lane to alleviate flooding.	Existing	Flood	1	<u>Borough Engineer</u>	High	High (\$1,000,000)	FEMA HMA	Short	High	SIP	PP
2019-NManhei m-04 (2013 Action)	Briar Road experiences frequent overtopping from flooding due to debris build up; revise maintenance schedule to clean up debris more frequently	Existing	Flood	1	<u>Borough Engineer</u>	High	Low	Local	Short	High	SIP	PP
2019-NManhei m-05 (2013 Action)	The pond near Old Mill Road overflows during rainfall events and floods Old Mill Road. Construct embankment and spillway to regulate pond outflows.	Existing	Flood	1	<u>Borough Engineer</u>	High	High	FEMA HMA	Short	High	SIP	PP
2019-NManhei m-06 (2013 Action)	Seven Stars Road does not have an adequate stormwater drainage system. Conduct an engineering study to design and improve stormwater drainage facilities on Seven Stars Road.	Existing	Flood	1	<u>Borough Engineer</u>	High	High	FEMA HMA	Short	High	SIP	PP
2019-NManhei m-07 (2013 Action)	Install catch basins on Hemlock Drive now that a drainage system has been installed.	Existing	Flood	1	<u>Borough Engineer</u>	High	High	FEMA HMA	Short	High	SIP	PP
2019-NManhei m-08 (2013 Action)	Ensure buildings in the Township meet International Building Code specifications for wind loadings.	Existing	Hurricane and Windstorm	1	High	High	FEMA HMA	Short	High	SIP	PP	High
North Union (T)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											
Norwegian (T)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
Orwigsburg (B)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											
Palo Alto (B)												
2019-Palo Alto-01 (New)	Enhance all hazard education and outreach (e.g. "safety day 0")	N/A	All	2,4,5	Council	High	Low	General Fund	Short	Medium	EAP	PR
2019-Palo Alto-02 (New)	Demolish verified blighted properties	Existing	Blight	1,2	<u>Township Engineer</u>	High	High	State; local match	Short	High	SIP	PP
2019-Palo Alto-03 (New)	Address insufficient pipe size/drainage and/or reconfigure roadways for low-lying developed areas in the Township	Existing	Flood	1,2	<u>Township Engineer</u>	High	High	FEMA HMA; local match	Short	High	SIP	PP
2019-Palo Alto-04 (New)	Educate municipal officials on mine subsidence hazard (e.g., there is no advanced warning of issues; government agency issues)	Both	Mine subsidence	2,4,5	Council	High	Low	General Fund	Short	Medium	EAP	PR
Pine Grove (B)												
2019-Pine Grove B – 01 (2013 Action)	Conduct an engineering study to design and improve stormwater drainage facilities on S. Tulpehocken Street.	Existing	Flood	1	Engineer	High	High	FEMA HMA; Local	Short	High	SIP	PP
2019-Pine Grove B – 02 (2013 Action)	Conduct a study to determine the feasibility of constructing a floodwall/levee on N. Tulpehocken Street.	Existing	Flood	1	Engineer	High	High	FEMA HMA; Local	Short	High	SIP	PP
2019-Pine Grove B – 03 (New)	Dry floodproof the Armory & Pool Pumphouse	Existing	Flood	1	Engineer	High	High	FEMA HMA; Local	Short	High	SIP	PP
Pine Grove (T)												
2019-Pine Grove T-01 (2013 Action)	Poor drainage roadway icing are major issues on Sweet Arrow Lake Road. Examine and improve roadway drainage facilities on Sweet Arrow Lake Road. Penn-DOT road is still a concern.	Existing	Flood	1	<u>PA DOT; Borough Engineer</u>	High	High (\$100,000)	FEMA HMA	Medium	High	SIP	PP

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
2019-Pine Grove T-02 (2013 Action)	2 1/2 Mile Road and Swopes Valley Road experience flooding and portions of the roadways are washed out. Conduct a study to determine the feasibility of constructing a floodwall/levee or other mitigation alternatives	Existing	Flood	1	Engineer	High	High (\$80,000 each location)	FEMA HMA; DOT; local match	Short	High	SIP	PP
2019-Pine Grove T-03 (2013 Action)	There is an undersized bridge/culvert on Old Forge Road that floods the roadway. Replace the bridge/culvert on Old Forge Road to alleviate flooding.	Existing	Flood	1	Engineer	High	High (\$1,000,000)	FEMA HMA	Short	High	SIP	PP
2019-Pine Grove T-04 (Problem statement – New)	Demolish verified blighted properties	Existing	Blight	1,2	<u>Township Engineer</u>	High	High	State; local match	Short	High	SIP	PP
2019-Pine Grove T-05 (Problem statement – New)	Address insufficient pipe size/drainage and/or reconfigure roadways for low-lying developed areas in the Township	Existing	Flood	1,2	<u>Township Engineer</u>	High	High	FEMA HMA; local match	Short	High	SIP	PP
Port Carbon (B)												
2019-Port Carbon-01 (New)	Continue to implement mitigation actions identified in the Port Carbon Flood Study	Both	Flood	All	Port Carbon Borough Council	High	High	State and local grant funding	Long	High	LPR	PR
2019-Port Carbon-02 (New)	Education for the public and municipal officials on mitigation	Both	Flood	All	Borough Council	High	Low	General Fund	Short (Ongoing)	Medium	EAP	PI
Port Clinton (B)												
2019-Port Clinton-01 (Problem statement – New)	Schuylkill and Little Schuylkill continue to flood; investigate options to mitigate	Existing	Flood	1,2	Borough Council and Engineer	High	Medium	General fund	Short	High	LPR	PR
Porter (T)												

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-18.											
Pottsville (C)												
2019-Pottsville-01 (New)	Demolition Ordinance for blighted properties	Existing	Blight	1,4,5	Administrator	High	Low	General Fund	Short	Medium	LPR	PR
2019-Pottsville-02 (New)	Comprehensive Plan update and integrate hazard areas from mitigation plan update	Both	All	4,5	Planner	High	Medium	General Fund	Short	High	LPR	PR
2019-Pottsville-03 (New)	Completion of Sharp Mtn mine reclamation.	Existing	Mine Subsidence	1	Administrator	High	High	Growing Greener (grants)	Short	High	NSP	NR
2019-Pottsville-04 (New)	Seven Arch Street	Ongoing	TBD	TBD	TBD	TBD	TBD	GPASA/ Grants	TBD	High and Medium	TBD	TBD
Reilly (T)												
2019-Reilly-01 (2013 Action)	Remove sediment and debris from Muddy Branch	N/A	Flood	2, 3	Township	High	Medium	State, local	Short	High	NSP	NR
Ringtown (B)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											
Rush (T)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											
Ryan (T)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											
Saint Clair (B)												

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
2019-Saint Clair – 01 (2013 Action)	Thwing Street center pier frequently is a catch point for debris during heavy storm events; remove debris and investigate options to alleviate catch point	Existing	Flood, Hurricane and Wind	1,2	<u>Borough Engineer</u>	High	High	FEMA HMA; Local	Short	High	SIP	PP
2019-Saint Clair – 02 (2013 Action)	Conduct an engineering study to design and construct improvements to the stormwater drainage system on Wade Road.	Existing	Flood, Hurricane and Wind	1,2	<u>Borough Engineer</u>	High	High	FEMA HMA; Local	Short	High	SIP	PP
2019-Saint Clair – 03 (2013 Action)	Repair the floodwalls and install rock protection along Mill Creek.	Existing	Flood, Hurricane and Wind	1,2	<u>Borough Engineer</u>	High	High	FEMA HMA; Local	Short	High	SIP	PP
2019-Saint Clair – 04 (2013 Action)	Repair/Replace the bridge at the following locations: - Lawton Street (currently in the design phase) - Carroll Street - Franklin Street	Existing	Flood, Hurricane and Wind	1,2	<u>Borough Engineer</u>	High	High	Local	Short	High	SIP	PP
2019-Saint Clair – 05 (2013 Action)	Re-grade shoulder areas of East Hancock Street (State Highway) to insure surface flow enters existing pipe & inlet network; rock-line shoulder swale as needed to avoid inlet debris.	Existing	Flood, Hurricane and Wind	1,2	<u>Borough Engineer, PennDOT</u>	High	High	State, Local	Short	High	SIP	PP
2019-Saint Clair – 06 (2013 Action)	Rock-line swale along Lawson Street and re-grade as necessary to ensure surface flow enters existing drainage network.	Existing	Flood, Hurricane and Wind	1,2	<u>Borough Engineer</u>	High	High	FEMA HMA; Local	Short	High	SIP	PP
2019-Saint Clair – 07 (2013 Action)	Southward Playground Area - Clear out dead, dried scrub brush and trees to reduce fire hazard.	Existing	Wildfire	1, 2	<u>Borough</u>	High	Low	Local	Short	High	SIP	PP
2019-Saint Clair – 08	Wade Road Channel - Remove debris, rock-line banks, and replace the downstream pipe. Much of the swale is bound by private	Existing	Flood	1,2	<u>Borough, Private Residents</u>	High	High	FEMA HMA; Local	Short	High	SIP	PP

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
(2013 Action)	property and would require private temporary easements to construct.											
2019- Saint Clair – 09 (2013 Action)	Remove debris from Lawton Street. Bend in stream causes large deposits of debris towards inside and scour hole on outside. Although Borough addresses when they can, frequent heavy stream flows create issues beyond the Borough's capabilities.	Existing	Flood, Hurricane and Wind	1,2	<u>Borough Engineer</u>	High	High	FEMA HMA; Local	Short	High	SIP	PP
Schuylkill (T)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											
Schuylkill Haven (B)												
2019- Schuylkill Haven B-01 (2013 Action)	Remove properties from the floodplain along St. Charles Street and St. James Street.	Existing	Flood	1	Borough	High	High	FEMA HMA	Long	High	SIP	PP
2019- Schuylkill Haven B-02 (2013 Action)	Sediment and debris in the River causes more frequent flooding of the Island Park area. Remove sediment and debris from the River.	Both	Flood, Hurricane and Windstorm	1,3	Borough	High	High	State, Local	Short	High		
2019- Schuylkill Haven B-03 (2013 Action)	The retaining wall on Railroad Street is failing. Repair the retaining wall on Railroad Street.	Existing	HazMat and Transportation	1	Borough	High	High	FEMA HMA	Long	High	SIP	PP
2019- Schuylkill Haven B-04 (New)	Replace existing influent pumps with submersible pumps and electrical components above the base flood elevation.	Existing	Flood	1	Borough	High	High	FEMA HMA	Long	High	SIP	PP
Shenandoah (B)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
South Manheim (T)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											
Tamaqua (B)												
2019-Tamaqua-01 (2013 Action)	Poor drainage and debris accumulation on the unnamed stream entering the H.D. Buehler Memorial Pool and Community Park property causes flooding. Install a trash rack on the unnamed stream entering the park, and upgrade the storm drainage system.	Existing	Flood	1	<u>Borough Engineer</u>	High	High	FEMA HMA	Short	High	SIP	PP
2019-Tamaqua-02 (2013 Action; revised)	Increase capacity of the Wabash Creek Culvert and improve scour protection.	Existing	Flood	1	<u>Borough Engineer</u>	High	High (\$552,000)	FEMA HMA	Short	High	SIP	PP
2019-Tamaqua-03 (Problem statement – New)	Wabash Creek - build flood control dam; divert around Borough to Little Schuylkill River	Both	Flood	1	<u>Borough Engineer</u>	High	High	USACE; PADEP	Long	High	SIP	PP
2019-Tamaqua-04 (Problem statement – New)	Address basement flooding at the Citizens Fire Company	Existing	Flood	1,4	<u>Borough Engineer</u>	High	High	FEMA HMA	Short	High	SIP	PP

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
2019-Tamaqua-05 (Problem statement – New)	Investigate options to address blight in South Ward and Middle Ward neighborhoods; may include policy; acquisition/demolition	Existing	Blight	1,2	<u>Borough Code Enforcement</u> ; <u>Council</u>	High	High	PA DCED	Short	High	SIP	PP
Tower City (B)												
2019-Tower City-01 (2013 Action)	The drainage system on Grand Avenue and 2nd Street, and Grand Avenue and 7 th Street is inadequate. Conduct an engineering study to improve stormwater drainage facilities. Work with State because they have jurisdiction.	Existing	Flood	1	State DOT	High	High (\$80,000 each intersection)	FEMA HMA	Short	High	SIP	PP
2019-Tower City-02 (2013 Action)	There is a need for Borough-wide debris removal and storm drainage upgrade. Conduct an effort to remove sediment and debris from streams throughout the Borough. Borough to coordinate with PADEP who has jurisdiction. Only 1 stream, (Wiconico creek).	N/A	Flood	1,3	<u>PA DEP</u>	High	High (\$250,000)	PADEP	Short	High	NSP	NR
Tremont (B)												
2019-Tremont B-01 (Problem statement – New)	Rehabilitate the creek wall in several locations	Existing	Flood	1	<u>Borough Engineer</u>	High	High	PADEP; FEMA HMA	Short	High	SIP	PP
2019-Tremont B-02 (Problem statement – New)	Bridge wall replacement	Existing	Flood	1	<u>Borough Engineer</u>	High	High	FEMA HMA	Short	High	SIP	PP
2019-Tremont B-03 (Problem statement – New)	Install flood walls in known flood areas	Existing	Flood	1	<u>Borough Engineer</u>	High	High	USACE; FEMA HMA	Short	High	SIP	PP

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
statement – New)												
2019-Tremont B-04 (Problem statement – New)	Remove bridge and widen Good Spring Creek; remove sediment in creek to improve drainage capacity	Existing	Flood	1	<u>Borough Engineer</u>	High	High	PADEP; FEMA HMA	Short	High	SIP	PP
2019-Tremont B-05 (Problem statement – New)	Investigate options and work with neighboring communities to reduce stormwater runoff entering the Borough	Existing	Flood	1	<u>Borough Engineer</u> ; Neighboring Communities	High	High	FEMA HMA	Short	High	SIP	PP
Tremont (T)												
2019-Tremont T-01 (2013 Action)	Rocks fall from steep face on to Rausch Creek Road making it hazardous for vehicles. Construct roadside barriers on Rausch Creek Road to catch debris. Removing rocks every week, cannot close road.	Existing	Flood	1	<u>Road Supervisor</u>	High	High (\$100,000)	FEMA; State	Short	High	NSP	NR
2019-Tremont T-02 (2013 Action)	There is overbank flooding along roadway on State Route 4011. Conduct a study to determine the feasibility of constructing a floodwall/levee on State Route 4011 during periods of heavy rain.	Existing	Flood	1	<u>Road Supervisor</u>	High	Medium (\$80,000)	FEMA HMA	Short	High	LPR	PR
2019-Tremont T-03 (2013 Action)	The guardrail along Molleystown Road is failing from flood washouts. Conduct a study to determine the feasibility of constructing a floodwall/levee on Molleystown Road during periods of heavy rain.	Existing	Flood	1	<u>Road Supervisor</u>	High	Medium (\$80,000)	USACE	Short	High	LPR	PR
Union (T)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
Upper Mahantongo (T)												
2019-Upper Mahantongo-01 (2013 Action)	Purchase an emergency backup generator for the Township's Fire Company.	Existing	All	1,4	Township Engineer	High	Medium (\$25,000)	FEMA HMA	Short	High	SIP	PP
2019-Upper Mahantongo-02 (2013 Action)	Establish an early warning/emergency communications system for the Township.	Existing	All	1,4	Township Emergency Coordinator	High	Medium (\$50,000)	EMPG	Short	High	LPR	ES
2019-Upper Mahantongo-03 (New – Problem Statement)	Acquire structures in the floodplain	Existing	Flood	1	Township Council	High	High	FEMA HMA	Short	High	SIP	PP
Walker (T)												
2019-Walker-01 (2013 Action)	Remove structures from floodplain and acquire and preserve land as open space in perpetuity. Basement flooding loses utilities, sump pump. Separate septic system - sewage.	Existing	Flood	1	Township Engineer	High	High	FEMA HMA	Long	High	SIP	PP
Washington (T)												
2019-Washington-01 (2013 Action)	The bridge at Covered Bridge Road filled with debris. Remove sediment and debris from bridge on Covered Bridge Road	Existing	Flood	1	<u>Township Engineer</u>	High	High (\$25,000)	Local	Short	High	NSP	NR
2019-Washington-02 (New – Problem)	At the planning and subdivision stage, understand stormwater management; stormwater management is increasing as development is increasing.	Both	Flood	1,4,5	<u>Township Planner;</u> <u>County Planning Department</u>	High	Low	Local	Short	High	LPR	PR

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
Statement)												
2019-Washingt on-03 (New – Problem Statement)	Address blighted properties; options include increase enforcement, acquisition, demolition	Existing	Blight	1	<u>Township Code Enforcement</u>	High	High	PA DCED	Short	High	SIP	PP
2019-Washingt on-04 (New – Problem Statement)	Purchase and install generator at the Township building	Existing	All	1,4	<u>Township Emergency Manager</u>	High	Medium	FEMA HMA	Short	High	SIP	PP
2019-Washingt on-05 (New – Problem Statement)	Harden bridges that are experiencing scouring which could lead to failure	Existing	All	1,4	<u>Township Emergency Manager</u>	High	High	FEMA HMA	Short	High	SIP	PP
Wayne (T)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											
West Brunswick (T)												
2019-West Brunswick -01 (2013 Action)	Restore the flood carrying capacity to Pine Creek and increase capacity of bridge/culvert on Frisbee Road; when Pine Creek floods it makes roadways impassable (River Road, Fork Mountain Road, Frisbee Road)	Both	Flood	1,2	<u>Township</u>	High	High	FEMA HMA	Short	High	SIP	PP
2019-West Brunswick -02 (2013 Action)	Improve communications systems and procedures for emergency early warnings and evacuations.	N/A	All	4	<u>Township</u>	High	Low	Local	Short	High	PR	EAS

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
West Mahanoy (T)												
	No Municipal-Specific Updated Actions Provided to Date; refer to actions 2019-SC-13 to 2019-SC-22.											
West Penn (T)												
2019- West Penn-01 (New)	Increase capacity of the following culverts/pipes/drainage system and reconfigure roadways to alleviate flooding in developed low-lying areas. Locations identified at this time: -Chain Circle Culvert - Quarry Rd Culvert - Anduas Culvert Bridge	Existing	Flood	1	<u>Township Engineer</u>	High	Medium	FEMA HMA	Short	Medium	SIP	PP
2019- West Penn-02 (New)	Park East Imp project	Existing	Flood	1	<u>Board of Supervisors</u>	High	High	Grant	Short	Medium	NSP	NR
2019- West Penn-03 (New)	Update Comprehensive Plan and integrate hazards from the hazard mitigation plan update	Both	All	1,4,5	<u>Planning</u>	High	Medium	Local	Short	High	LPR	PR
2019- West Penn-04 (2013 Action)	Lizard Creek floods roadway due to the undersized bridge and culvert on Dorset Road and Retreat Road. Replace the bridges/culverts to alleviate flooding.	Existing	Flood	1	<u>Township Engineer</u>	High	High (\$1,000,000 each location)	FEMA HMA	Long	High	SIP	PP
2019- West Penn-05 (2013 Action)	Indian Run floods Blue Mountain Dr. and Kepners Road due to undersized pipes on these roads. Replace pipes on Blue Mountain Drive and Kepners Road to alleviate flooding.	Existing	Flood	1	<u>Township Engineer</u>	High	High (\$1,000,000 each location)	FEMA HMA	Long	High	SIP	PP
2019- West Penn-06 (2013 Action)	Lizard Creek floods Ridge Road. Conduct a study to determine the feasibility of constructing a floodwall/levee on Ridge Road.	Existing	Flood	1	<u>Township Engineer</u>	High	High (\$80,000 each location)	FEMA HMA	Short	High	SIP	PP

Initiative	Mitigation Initiative	Applies to New and/or Existing Structures*	Hazard(s) Mitigated	Goals Met	Lead and Support Agencies	Estimated Benefits	Estimated Cost	Sources of Funding	Timeline	Priority*	Mitigation Category	CRS Category
2019-West Penn-07 (2013 Action)	Lime Kiln Drive floods due to an undersized pipe. Replace the pipe on Lime Kiln Road to alleviate flooding.	Existing	Flood	1	<u>Township Engineer</u>	High	High (\$100,000 each location)	FEMA HMA	Long	High	SIP	PP
2019-West Penn-08 (2013 Action)	Two undersized pipes on Ash Circle cause the roadway to flood. Replace pipes on Ash Circle Road to alleviate flooding.	Existing	Flood	1	<u>Township Engineer</u>	High	High (\$100,000 each location)	FEMA HMA	Long	High	SIP	PP
2019-West Penn-09 (2013 Action)	An undersized bridge on the following roads causes the roadways to flood. Replace bridges with larger structures to alleviate flooding. - School Drive - Saint Peters Road - Dairy Road - Wash Creek Road	Existing	Flood	1	<u>Township Engineer</u>	High	High (\$1,000,000)	FEMA HMA	Long	High	SIP	PP
2019-West Penn-10 (2013 Action)	Mahoning Creek near SR 443 is a flood zone. Remove structures from floodplain and acquire and preserve land as open space in perpetuity.	Existing	Flood	1	<u>Township Engineer</u>	High	High	FEMA HMA	Long	High	SIP	PP
2019-West Penn-11 (2013 Action)	Snyders road and State Route 895 ice in the winter due to poor drainage. Improve roadway drainage facilities	Existing	Winter Weather	1	Township Engineer	High	High (\$100,000 each location)	FEMA HMA	Long	High	SIP	PP
2019-West Penn-12 (Problem Statement – New)	Demolish verified-blighted properties and update property maintenance ordinance	Existing	Blight	1,2	<u>Township Engineer</u>	High	High	State; local match	Short	High	SIP	PP

Notes:

* Does this mitigation initiative reduce the effects of hazards on new and/or existing buildings and/or infrastructure? Not applicable (N/A) is inserted if this does not apply.

** Priority indicates the prioritization identified by the lead agency. This priority may differ from the County prioritization on municipal actions because the municipal priority may be of higher ranking than the County priority. Further explanations are provided at the end of this section.

- CDBG = Community Development Block Grant
- CRS = Community Rating System
- DCED = Department of Community and Economic Development
- DOT = Department of Transportation
- EMA = Emergency Management Agency
- EOC = Emergency Operations Center
- FEMA = Federal Emergency Management Agency
- HMA = Hazard Mitigation Assistance
- NFIP = National Flood Insurance Program
- PA = Pennsylvania
- PADEP = Pennsylvania Department of Environmental Protection
- PEMA = Pennsylvania Emergency Management Agency
- SFHA = Special Flood Hazard Area
- TBD = To Be Determined

Mitigation Category:

- Education and Awareness Programs (EAP) - 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 StormReady and Firewise Communities.
- Local Plans and Regulations (LPR) - Actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Natural Systems Protection (NSP) - Actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Structure and Infrastructure Project (SIP) - Actions that involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This 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.

CRS Category:

- Preventative Measures (PR) - Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP) - These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI) - Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR) - Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Flood Control Projects (SP) - Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- Emergency Services (ES) - Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities

Costs:

These rough estimates should be used where actual project costs cannot reasonably be established at this time:

- Low = < \$10,000
- Medium = \$10,000 to \$100,000
- High = > \$100,000

Potential FEMA HMA Funding Sources:

- DOF = Depending on funding
- HMA = Hazard Mitigation Assistance Grant Program
- HMGP = Hazard Mitigation Grant Program

Timeline:

Short Term = 1 to 5 years. Long Term = 5 years or greater. OG = Ongoing program.

Priority:

- H = High
- M = Medium
- L = Low

Prioritization of Mitigation Actions

Once the mitigation actions were evaluated, the Core and Municipal Planning Teams set about prioritizing them to create an implementation strategy. 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.

Recent FEMA planning guidance (March 2013) identifies a modified STAPLEE (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) mitigation action evaluation methodology that uses a set of 10 evaluation criteria suited to the purposes of hazard mitigation strategy evaluation. This method provides a systematic approach that considers the opportunities and constraints of implementing a particular mitigation action. A similar method was used to determine the feasibility of potential mitigation actions as captured in Table 6-3 in accordance with the PEMA SOG.

The Schuylkill County HMP Coordinators consulted with PEMA and received approval in September 2017 to utilize an expanded STAPLEE methodology to prioritize mitigation strategies. An expanded set of fourteen (14) criteria to include all criteria to determine feasibility earlier, but also considers cost-effectiveness, availability of funding, anticipated timeline, and if the action addresses multiple hazards was applied. The 14 evaluation/prioritization criteria used in the 2019 update process are:

1. Life Safety – How effective will the action be at protecting lives and preventing injuries?
2. Property Protection – How significant will the action be at eliminating or reducing damage to structures and infrastructure?
3. Cost-Effectiveness – Are the costs to implement the project or initiative commensurate with the benefits achieved?
4. Technical – Is the mitigation action technically feasible? Is it a long-term solution? Eliminate actions that, from a technical standpoint, will not meet the goals.
5. Political – Is there overall public support for the mitigation action? Is there the political will to support it?
6. Legal – Does the municipality have the authority to implement the action?
7. Fiscal - Can the project be funded under existing program budgets (i.e., is this initiative currently budgeted for)? Or would it require a new budget authorization or funding from another source such as grants?
8. Environmental – What are the potential environmental impacts of the action? Will it comply with environmental regulations?

9. Social – Will the proposed action adversely affect one segment of the population? Will the action disrupt established neighborhoods, break up voting districts, or cause the relocation of lower income people?
10. Administrative – Does the jurisdiction have the personnel and administrative capabilities to implement the action and maintain it or will outside help be necessary?
11. Multi-hazard – Does the action reduce the risk to multiple hazards?
12. Timeline - Can the action be completed in less than 5 years (within our planning horizon)?
13. Local Champion – Is there a strong advocate for the action or project among the jurisdiction’s staff, governing body, or committees that will support the action’s implementation?
14. Other Local Objectives – Does the action advance other local objectives, such as capital improvements, economic development, environmental quality, or open space preservation? Does it support the policies of other plans and programs?

The County and municipalities were asked to use these criteria to assist them in evaluating and prioritizing mitigation actions. Specifically, for each mitigation action, the jurisdictions were asked to assign a numeric rank (-1, 0, or 1) for each of the 14 evaluation criteria, defined as follows:

- 1 = Highly effective or feasible
- 0 = Neutral
- -1 = Ineffective or not feasible

The numerical results of this exercise were then used by each jurisdiction to help prioritize the action or strategy as “Low”, “Medium,” or “High.” While this provided a consistent, systematic methodology to support the evaluation and prioritization of mitigation actions, jurisdictions may have additional considerations that could influence their overall prioritization of mitigation actions.

It is noted that jurisdictions may be carrying forward mitigation actions and initiatives from prior mitigation strategies that were prioritized using a different prioritization methodology. At their discretion, jurisdictions carrying forward prior initiatives were encouraged to re-evaluate their priority, particularly if conditions that would affect the prioritization criteria had changed. Their updated priority ranking is indicated on the prioritization table.

For the plan update there has been an effort to develop more clearly defined and action-oriented mitigation strategies. These local strategies include projects and initiatives that have been well-vetted, and are seen by the community as the most effective approaches to advance their local mitigation goals and objectives within their capabilities. As such, many of the initiatives in the updated mitigation strategy were ranked as “high” or “medium” priority, as reflective of the community’s clear intent to implement, available resources notwithstanding. In general, initiatives that would have had “low” priority rankings were appropriately screened out during the local action evaluation process.

Cost Effectiveness

The benefit/cost review applied for the evaluation and prioritization of projects and initiatives in this plan update process was qualitative; that is, it does not include the level of detail required by FEMA for project grant eligibility under the Hazard Mitigation Assistance (HMA) grant programs. For all actions identified in the local strategies, jurisdictions have identified both the costs and benefits associated with project, action or initiative.

Costs are the total cost for the action or project, and may include administrative costs, construction costs (including engineering, design and permitting), and maintenance costs.

Benefits are the savings from losses avoided attributed to the implementation of the project, and may include life-safety, structure and infrastructure damages, loss of service or function, and economic and environmental damage and losses.

When available, jurisdictions were asked to identify the actual or estimated dollar value for project costs and associated benefits. Having defined costs and benefits allows a direct comparison of benefits versus costs, and a quantitative evaluation of project cost-effectiveness. Often, however, numerical costs and/or benefits have not been identified, or may be impossible to quantitatively assess.

For the purposes of this planning process, jurisdictions were tasked with evaluating project cost-effectiveness with both costs and benefits assigned to “High”, “Medium” and “Low” ratings. Where quantitative estimates of costs and benefits were available, ratings/ranges were defined as:

Low = < \$10,000 Medium = \$10,000 to \$100,000 High = > \$100,000

Where quantitative estimates of costs and/or benefits were not available, qualitative ratings using the following definitions were used:

Table 6-5. Qualitative Cost and Benefit Ratings

Costs	
High	Existing funding levels are not adequate to cover the costs of the proposed project, and implementation would require an increase in revenue through an alternative source (e.g., bonds, grants, and fee increases).
Medium	The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
Low	The project could be funded under the existing budget. The project is part of or can be part of an existing, ongoing program.
Benefits	
High	Project will have an immediate impact on the reduction of risk exposure to life and property.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property or will provide an immediate reduction in the risk exposure to property.
Low	Long-term benefits of the project are difficult to quantify in the short term.

Using this approach, projects with positive benefit versus cost ratios (such as high over high, high over medium, medium over low, etc.) are considered cost-effective. For some of the initiatives identified, the planning partnership may seek financial assistance under FEMA’s HMA programs. These programs require detailed

benefit/cost analysis as part of the application process. These analyses will be performed when funding applications are prepared, using the FEMA BCA model process. The planning partnership is committed to implementing mitigation strategies with benefits that exceed costs. For projects not seeking financial assistance from grant programs that require this sort of analysis, the planning partnership reserves the right to define “benefits” according to parameters that meet its needs and the goals and objectives of this plan.

Table 6-6. Analysis of Mitigation Actions

Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2019-SC-01 (New)	Pool resources to acquire traffic devices; there was not enough to go around during the July/August 2018 flood events	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 0 0	High
2019-SC-02 (New)	Ensure the most accurate road closure data is obtained and is consistent across all platforms and levels of government in a timely fashion through coordination with PennDOT, 911 center, EOC and municipalities; push information to the public	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 0 0	High
2019-SC-03 (New)	Update Continuity of Operations Plans for all county departments	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 0 0	High
2019-SC-04 (New)	Create a centralized hazard mitigation position at the County-level to assist with floodplain management	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 1 0	High
2019-SC-05 (New)	Work with municipalities to assist with becoming BCEGS communities	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 0 0	High
2019-SC-06 (New)	Conduct self-assessment of response times, resources, etc. for police and fire and identify solutions to gaps (lack of man-power is a big issue for fire)	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 0 0	High
2019-SC-07 (New)	County EMA to work with Fire Companies to relocate fire companies out of the floodplain	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 1 0	High
2019-SC-8 (revised 2013 Action)	Implement database and ESRI- based solutions to support emergency management operations, planning/community development and improve	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 0 0	High

Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
	<p>situation reporting between county and municipalities during an event.</p> <ul style="list-style-type: none"> • Move from MapInfo software to ESRI ArcGIS software for parcel mapping which will require conversion of the parcels to ESRI's parcel fabric. • Review and evaluate facilities, equipment, resumes, personnel and other resources needed to support emergency response annually. • Develop a database of local resources from municipalities and integrate with the fire equipment and personnel database. • Use the "Pine Grove Area/Upper Swatara Watershed Recovery Strategy" and Port Carbon Water Study as models and examples for similar strategies • Update utilities, water lines, sewer lines service areas in GIS • Incorporate local data in Hazus models <p>Standardize and improve the system of flood damage reporting.</p>																
2019-SC-9 (2013 Action)	Cooperate with local water authorities, including mapping water source data and mapping locations of water sources needed during fires (such as ponds and dry hydrants). The boy scouts have mapped 11 municipalities for water and the rest will be completed by the Schuylkill Municipal Water Authority.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 0 0	High
2019-SC-10 (2013 Action)	Continue to implement the mitigation actions outlined in the "Pine Grove Area/Upper Swatara Watershed Recovery Strategy". Refer to Appendix J for the Recovery Strategy and all mitigation measures identified.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 0 0	High

Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2019-SC-11 (2013 Action)	Develop a Debris Management Plan to include quick "Help Sheets" built upon various types of events (all hazards).	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 0 0	High
2019-SC-12 (revised 2013 Action)	Conduct a capability assessment to determine which municipalities are capable to enroll and sustain participation in the Community Rating System (CRS).	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 0 0	High
2019-SC-13 (2013 Action)	Work with the municipalities to integrate the County's Hazard Mitigation Plan into the municipalities' Comprehensive Plans, Subdivision and Land Development Ordinances, and Zoning Ordinances, and other similar documents by advising them on the principles and strategies for safe development. Pottsville and Tremont have already adopted the "Quality of Life Ordinance" Code. This is occurring through Act 247 reviews for proposed land use ordinances and proposed subdivisions/land developments.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 0 0	High
2019-SC-14 (revised 2013 Action)	Increase capabilities by preparing templates for municipal officials to access the information on their own schedule and pace that is ready when needed – <ul style="list-style-type: none"> • Establish webpages where presentations, training documents and webinars. • Templates for use during a disaster event (i.e. press releases, information on mold remediation, social media, etc.) • Create model templates for model ordinances and policies (e.g., include language in the County Zoning Ordinance (for 34 municipalities) and the 33 municipal ordinances on measures to: enhance the concept of defensible space practice; and minimize impervious surfaces to reduce the impacts of drought) 	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 0 0	High

Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low	
	Develop template for Incident Action Plans																	
2019-SC-015 (New)	<p>Conduct education and training to improve capabilities of municipal official and at local emergency operation centers, including personnel (staffing) and communications as follows. This may be part of the ‘Mitigation Day’ as described in Section 7 (Plan Maintenance).</p> <ul style="list-style-type: none"> • ICS training • Hazard mitigation topics, such as: damage assessment after natural disasters, stormwater management, mutual aid agreements, public disaster assistance, hazard mitigation grant assistance, CIP, and tools to address blight. • Certified Floodplain Manager course • National Environmental Policy Act (NEPA) • Mitigation grant funding availability • Mitigation strategies • NFIP insurance and flood protection • Land banking • Tabletop exercises with County employees <p>Partner with realtors</p>	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 0 0	High	
2019-SC-16 (New)	Work with the municipalities to use the “Pine Grove Area/Upper Swatara Watershed Recovery Strategy” and Port Carbon Water Study as models and examples for planning documents, similar flood mitigation strategies and funding sources.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	13 + 1 - 0 0	High
2019-SC-17 (New)	The Schuylkill County Planning Department will work with all municipalities and NFIP Floodplain Administrators to conduct targeted education and outreach regarding roles, responsibilities, NFIP compliance and flood damage prevention ordinance enforcement. As part of this outreach, the FEMA NFIP Survey (refer to Appendix H) will be used to document information captured for each municipality. This education and outreach may become part of the proposed ‘Mitigation Day’ discussed in Section 7 (Plan Maintenance).	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	13 + 1 - 0 0	High

Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2019-SC-18 (New)	Schuylkill Planning Department will work with the municipalities to strengthen the mitigation strategy, specifically the linkage to mitigation action implementation with emphasis on available HMA funding.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 00	High
2019-SC-19 (New)	Mitigate hazard-prone properties, to include the following mitigation options: acquisition, elevation, relocation and mitigation reconstruction (i.e., demolition of a structure in the floodplain and rebuild on a portion of the property not located in the floodplain)	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 00	High
2019-SC-20 (New)	Protect critical facilities from damage by installing quick-connect emergency generator hook-ups for critical facilities and acquiring generators.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 00	High
2019-SC-21 (New)	Dry floodproof non-residential structures by strengthening walls, sealing openings, or using waterproof compounds or plastic sheeting on walls to keep water out.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 00	High
2019-SC-22 (New)	Protect critical facilities from flood events by raising electrical components above the base flood elevation.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 00	High
2019-SC-23 (New)	Raise electrical components (i.e. control panels) and generators above the base flood elevation and dry floodproof Schuylkill Municipal Authority pump stations.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 00	High
2019-Ashland-01 (New)	\$1.6M Dam inundation project Municipal Authority	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Ashland-02 (New)	Address basement flooding along Oakland Avenue (Mahanoy Creek and stormwater issues)	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Ashland-03 (New)	Rehabilitate or demolish blighted properties in the Borough	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High

Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2019-Auburn – 01 (2013 Action)	The stormwater inlet on Market Street at the railroad surcharges and floods road. Construct additional stormwater inlet(s) on Market Street /move inlet to opposite of the road.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Barry-01 (New – Problem Statement)	Upgrade drainage on Hinkle Road at Dam; insufficient capacity causes roadway flooding	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Barry-02 (2013 Action)	Streambank erosion is threatening the roadway at Black Creek Road. Conduct stream stabilization to restore stream.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Barry-03 (2013 Action)	An undersized bridge/culvert causes roadway overtopping at the following locations during flood events. Replace the undersized structure with a larger opening to convey flood flows.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Barry-04 (2013 Action)	Hillside washouts occur on Hill Road, resulting in debris and mud accumulation on the roadway. Construct roadside barriers to catch debris.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Barry-05 (2013 Action)	The following roads experience snow drifting: Hill Road, Weishample Road, Middle Road, Orchard Road, Fishing Road, Maplewood Road, Hinkle Road, Beurys Road. Snow fences are problematic, natural screens	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Blythe-01 (Problem Statement – New)	Cumbola Park Water St. floods behind fire house; investigate why this area floods and identify appropriate mitigation actions	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Blythe-02 (2013 Action)	Remove fallen trees and debris from the River in East Norwegian Township, and remove properties from floodplain as applicable. Acquire home and remove trees and debris.	+	+	+	+	+	+	-	+	+	+	0	-	+	+	11 + 2 – 10	High

Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2019-Blythe-03 (Problem Statement – New)	Demolish verified blighted properties	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Blythe-04 (Problem Statement – New)	Address insufficient pipe size/drainage and/or reconfigure roadways for low-lying developed areas in the Township	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Branch-01 (Problem Statement – New)	Mitigate homes located in the floodplain; one home has already been elevated paid for by homeowner	+	+	+	+	+	0	-	+	+	+	1	-	+	+	11 + 2 – 10	High
2019-Butler-01 (2013 Action)	Laurel Street does not have an adequate storm drainage system. Improve stormwater drainage facilities.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Butler-02 (2013 Action)	The bridge at Walnick Drive was washed out. Replace structure with larger opening to convey flood flows.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Butler-03 (2013 Action)	Roads and homes flood near Turnpike Road, Barry Road and Creek Road. Remove properties from floodplain.	+	+	+	+	+	+	-	+	+	+	0	-	+	+	11 + 2 – 10	High
2019-Butler-04 (2013 Action)	An undersized bridge/culvert causes roadway overtopping at Malones Road during flood events. Replace structure with larger opening to convey flood flows.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Butler-05 (2013 Action)	The cross-pipe at Runge Road is damaged. Replace the damaged pipe with an improved/larger structure to convey flood flows.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Butler-06 (Problem Statement – New)	Demolish verified blighted properties	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High

Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2019-Butler-07 (Problem Statement – New)	Address insufficient pipe size/drainage and/or reconfigure roadways for low-lying developed areas in the Township	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Cressona-01 (2013 Action)	Traffic jams regularly due to oversize trucks on Borough roads leading to evacuation concerns during emergencies. Disallow oversize vehicles on Borough roads and designate new routes for oversize vehicles	+	+	+	+	+	+	-	+	+	+	0	-	+	+	11 + 2 – 10	High
2019-Cressona-02 (2013 Action)	Designate a new location for the EOC and purchase an emergency back-up generator	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 – 00	High
2019-Cressona-03 (2013 Action)	Panther Valley Creek and Beaver Creek are filled with sediment causing flooding. Remove sediment and debris from Panther Valley Creek and Beaver Creek	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Deer Lake-01 (2013 Action)	The bridge on Dreherstown Road is damaged. Replace bridge/culvert on Dreherstown Road.	+	+	+	+	+	+	-	+	+	+	0	-	+	+	11 + 2 – 10	High
2019-Deer Lake-02 (2013 Action)	The culvert at SR61 is undersized and causes flooding. Replace culvert on SR61 to prevent flooding.	+	+	+	+	+	+	-	+	+	+	0	-	+	+	11 + 2 – 10	High
2019-Deer Lake-03 (2013 Action)	Excessive storm water from West Brunswick Twp. roadway on Dreherstown road during heavy downfall enters storm water drains and storm pipes causing flooding on streets in Deer Lake and private property. Construct new storm pipes along Dreherstown Road to Lakefront Drive and properly discharge stormwater to Pine Creek.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	11 + 2 – 10	High

Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2019-Deer Lake-04 (2013 Action)	Storm water overflow from Coal Mt. Road and Rt. 61 berm runs onto real estate and adjoining streets connected to Deer Lake Borough. Damage of private property and erosion of borough streets result from this flooding.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Deer Lake-05 (Problem Statement - New)	Demolish verified-blighted properties	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Deer Lake-06 (Problem Statement - New)	Address insufficient piping/drainage and/or reconfigure roadways for low-lying developed areas and areas below the dam that flood	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Deer Lake-07 (Problem Statement - New)	Conduct certified inspections of the dam	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Delano-01 (New)	Acquire properties in the township that are blighted and/or located in the floodplain.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 00	High
2019-EBrunswick-01 (2013 Action)	Cold Run Creek floods roadway (Cold Run Rd). Construct floodwall/levee to alleviate flooding on Cold Run Rd and Old Country Lane	+	+	+	+	+	+	-	+	+	+	0	-	+	+	11 + 2 - 10	High
2019-EBrunswick-02 (2013 Action)	Indian Run floods roadway (Pine Valley Rd); damaged pipe. Construct floodwall/levee and replace pipe on Indian Run to alleviate flooding	+	+	+	+	+	+	-	+	+	+	0	-	+	+	11 + 2 - 10	High
2019-EBrunswick-03 (2013 Action)	State Route 443 ices due to steep hills. Improve roadway drainage facilities on State Route 443; work with State DOT to address.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	11 + 2 - 10	High

Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2019-ENorwegian-01 (Problem Statement – New)	Address issue at Old Railroad Bridge that is blocking up the Mill Creek near Eagle Hill Road and Spec-Tec trailers; options include bridge elevation; bridge replacement; study to investigate additional alternatives	+	+	+	+	+	+	-	+	+	+	0	-	+	+	11 + 2 – 10	High
2019-Eldred-01 (Problem Statement – New)	Increase public awareness of natural gas pipeline and impacts due to road crossings and property erosion	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Foster-01 (2013 Action)	Lower spillway to reduce potential downstream flooding/damage in the event of a spillway breach.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Frailey-01 (2013 Action)	An undersized stormwater pipe is causing flooding on Maple Street. Replace the pipe on Maple Street with a larger structure to alleviate flooding.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Frailey-02 (2013 Action)	Increase the capacity of the drainage channels along Fountain Mountain Road. The stormwater drainage channels along Fountain Mountain Road is undersized, causing roadway flooding.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Frailey-03 (2013 Action)	Poor stormwater drainage is causing roadway washouts on Middlecreek Road. Increase the capacity of the drainage channels along Middlecreek Road.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Gilberton-01 (Problem Statement – New)	Increase capacity of stormwater system; improve maintenance cleaning	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Gilberton-02 (Problem Statement – New)	Clear Mahanoy Creek	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High

Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2019-Gilberton-03 (New)	Acquire pumps to empty the mine pools. The mine pools (flooding of) cause the flooding within and damage to property within Gilberton Borough.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Gordon-01 (2013 Action)	Remove sediment and debris from stream. State Route, no jurisdiction work with state. Coordinate with PADEP and PADOT	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Gordon-02 (2013 Action)	Debris and sediment have reduced the stream capacity of Little Mahanoy Creek. Remove sediment and debris from stream.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Gordon-03 (2013 Action)	The bridge on McKnight Street is undersized and the drainage system is inadequate. Replace the bridge on McKnight Street and improve stormwater drainage facilities.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Gordon-04 (2013 Action)	There is blockage in the box culvert. Remove debris from culvert to enhance flow. Work with State to alleviate flooding.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Gordon-05 (2013 Action)	The rip-rap streambanks are in poor condition. Repair rip-raps to restore the condition of the streambanks.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Hegins-01 (Problem statement – New)	Replace bridge at Pine Drive (T-520); weight limit may be an issue due to poor condition	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Hegins-02 (2013 Action)	Replace the bridges and culverts/pipes that are undersized and cause flood roadway in the Township. Locations identified at this time: <ul style="list-style-type: none"> • Wood Lane • Old Mill Road • Dell Road • Fountain Road Pine Drive 	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High

Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2019-Hegins-03 (2013 Action)	Conduct a feasibility studies to determine if constructing a floodwall/levee on East Mountain Road (from Deep Creek) and Pine Drive will alleviate flooding	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 1 0	High
2019-Hegins-04 (Problem statement – New)	Demolish verified blighted properties	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 1 0	High
2019-Hubley-01 (2013 Action)	Honeymoon Trail and Church Road experience frequent overtopping from flooding. Conduct a study to determine the feasibility of constructing a floodwall/levee.	+	+	+	+	+	+	-	+	+	+	0	-	+	+	12 + 1 - 1 0	High
2019-Hubley-02 (2013 Action)	Poor drainage roadway icing are major issues on the following roads. Examine and improve roadway drainage facilities on Culverts should be replaced. Limbs removed. - Quaker Drive - Kushwa Road - Church Road	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 1 0	High
2019-Hubley-03 (2013 Action)	Vehicular accidents occur on Fear Not Road due to a sharp turn and poor signage. Improve signage/flashing lights on Fear Not Road.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 1 0	High
2019-Hubley-04 (2013 Action)	Pine Creek Road is in danger of washing out to due streambank erosion. Conduct stream stabilization to restore stream. No outlet road 3-4 houses, coordinate with the State.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 1 0	High

Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2019-Hubley-05 (2013 Action)	There is an undersized bridge/culvert on the following roads that floods the roadway. Increase capacity of bridge/culverts to alleviate flooding. - Quaker Drive - Honeymoon Trail Drive - Church Road - W. Mountain Road - Township Road 880 - Deer Lake Bridge culvert - Mahantongo Street - Mill Road -Fear Not Road	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Kline-01 (2013 Action)	The Township is in a more northerly climate and receives more extreme snowfall than the rest of the County. Purchase snow removal and salting equipment and designate emergency snow routes throughout Township.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Kline-02 (2013 Action)	The Township's stormwater drainage systems and/or roadway configurations are inadequate. Conduct an engineering study to improve road and/or stormwater drainage facilities throughout the Township.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Kline-03 (Problem Statement - New)	Demolish verified blighted properties	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-McAdoo-01 (Problem statement - New)	Plant vegetation other than high woods to reduce erosion of inside wall of flood control	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High

Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2019-McAdoo-02 (Problem statement – New)	Install more catch basins above the flood area or increase capacity of existing stormwater system to reduce flooding in low-lying areas; flooding occurs on Cleveland Street, Sherman Street, Kennedy Drive and others	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Minersville-01 (Problem statement – New)	Regularly remove debris accumulated at railroad trestle (SR 4042) that creates a dam and causes flooding on Penn Street. Work with railroad who owns property to maintain; outside of Borough jurisdiction	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Minersville-02 (Problem statement – New)	Address blighted properties Borough-wide; options include continue working with the Schuylkill Land Bank to demolish properties; stronger code enforcement	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Minersville-03 (Problem statement – New)	Increase capacity of stormwater system; work with Sewer Authority to address	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Minersville-04 (Problem statement – New)	Apply for grant to install sidewalks on the 400-block of Delaware Avenue; property flooding due to lack of curbing	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Minersville-05 (Problem statement – New)	Goodwill Hose Fire Company is located in the floodplain and membership has decreased drastically. Consolidate with another fire company.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Mount Carbon-01 (Problem statement – New)	Demolish verified blighted properties	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High

Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2019-Mount Carbon-02 (Problem statement – New)	Address insufficient pipe size/drainage and/or reconfigure roadways for low-lying developed areas in the Township	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-New Castle-01 (Problem statement – New)	Demolish verified blighted properties	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-New Castle-02 (Problem statement – New)	Address insufficient pipe size/drainage and/or reconfigure roadways for low-lying developed areas in the Township	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-NManheim-01 (2013 Action)	Stormwater drainage on Woodland Drive is inadequate which leads to flooding. Construct/upgrade storm sewer to alleviate flooding	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-NManheim-02 (2013 Action)	Safety hazard due to blight at 1476 Route 61 South Vacant hotel is a public nuisance/hazard. Property should be secured at a minimum and ultimately demolished.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-NManheim-03 (2013 Action)	Replace the bridge/culvert on Green Tree Drive, Berry Road, and Antique Lane to alleviate flooding.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-NManheim-04 (2013 Action)	Briar Road experiences frequent overtopping from flooding due to debris build up; revise maintenance schedule to clean up debris more frequently	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-NManheim-05 (2013 Action)	The pond near Old Mill Road overflows during rainfall events and floods Old Mill Road. Construct embankment and spillway to regulate pond outflows.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High

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2019-NManheim-06 (2013 Action)	Seven Stars Road does not have an adequate stormwater drainage system. Conduct an engineering study to design and improve stormwater drainage facilities on Seven Stars Road.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-NManheim-07 (2013 Action)	Install catch basins on Hemlock Drive now that a drainage system has been installed.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-NManheim-08 (2013 Action)	Ensure buildings in the Township meet International Building Code specifications for wind loadings.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Palo Alto-01 (New)	Enhance all hazard education and outreach (e.g. "safety day 0")	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	Medium
2019-Palo Alto-02 (New)	Demolish verified blighted properties	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Palo Alto-03 (New)	Address insufficient pipe size/drainage and/or reconfigure roadways for low-lying developed areas in the Township	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Palo Alto-04 (New)	Educate municipal officials on mine subsidence hazard (e.g., there is no advanced warning of issues; government agency issues)	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	Medium
2019-Pine Grove B – 01 (2013 Action)	Conduct an engineering study to design and improve stormwater drainage facilities on S. Tulpehocken Street.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Pine Grove B – 02 (2013 Action)	Conduct a study to determine the feasibility of constructing a floodwall/levee on N. Tulpehocken Street.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High

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2019-Pine Grove B – 03 (New)	Dry floodproof the Armory & Pool Pumphouse	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Pine Grove T-01 (2013 Action)	Poor drainage roadway icing are major issues on Sweet Arrow Lake Road. Examine and improve roadway drainage facilities on Sweet Arrow Lake Road. Penn-DOT road is still a concern.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Pine Grove T-02 (2013 Action)	2 1/2 Mile Road and Swopes Valley Road experience flooding and portions of the roadways are washed out. Conduct a study to determine the feasibility of constructing a floodwall/levee or other mitigation alternatives	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Pine Grove T-03 (2013 Action)	There is an undersized bridge/culvert on Old Forge Road that floods the roadway. Replace the bridge/culvert on Old Forge Road to alleviate flooding.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Pine Grove T-04 (Problem statement – New)	Demolish verified blighted properties	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Pine Grove T-05 (Problem statement – New)	Address insufficient pipe size/drainage and/or reconfigure roadways for low-lying developed areas in the Township	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High
2019-Port Carbon-01 (New)	Port Carbon Flood Study	+	+	+	+	+	+	-	+	+	+	0	-	+	+	11 + 2 – 10	High
2019-Port Carbon-02 (New)	Education for the public and municipal officials on mitigation	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High

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2019-Port Clinton-01 (New)	Schuylkill and Little Schuylkill continue to flood; investigate options to mitigate	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Pottsville-01 (New)	Demolition Ordinance for blighted properties	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Pottsville-02 (New)	Comprehensive Plan update and integrate hazard areas from mitigation plan update	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 00	High
2019-Pottsville-03 (New)	Completion of Sharp Mtn mine reclamation.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Pottsville-04 (New)	Seven Arch Street	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Saint Clair – 01 (2013 Action)	Thwing Street center pier frequently is a catch point for debris during heavy storm events; remove debris and investigate options to alleviate catch point	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 00	High
2019-Saint Clair – 02 (2013 Action)	Conduct an engineering study to design and construct improvements to the stormwater drainage system on Wade Road.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 00	High
2019-Saint Clair – 03 (2013 Action)	Repair the floodwalls and install rock protection along Mill Creek.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 00	High
2019-Saint Clair – 04 (2013 Action)	Repair/Replace the bridge at the following locations: - Lawton Street (currently in the design phase) - Carroll Street - Franklin Street	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High

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2019-Saint Clair – 05 (2013 Action)	Re-grade shoulder areas of East Hancock Street (State Highway) to insure surface flow enters existing pipe & inlet network; rock-line shoulder swale as needed to avoid inlet debris.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 0 0	High
2019-Saint Clair – 06 (2013 Action)	Rock-line swale along Lawson Street and re-grade as necessary to ensure surface flow enters existing drainage network.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 0 0	High
2019-Saint Clair – 07 (2013 Action)	Southward Playground Area - Clear out dead, dried scrub brush and trees to reduce fire hazard.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 1 0	High
2019-Saint Clair – 08 (2013 Action)	Wade Road Channel - Remove debris, rock-line banks, and replace the downstream pipe. Much of the swale is bound by private property and would require private temporary easements to construct.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 0 0	High
2019-Saint Clair – 09 (2013 Action)	Remove debris from Lawton Street. Bend in stream causes large deposits of debris towards inside and scour hole on outside. Although Borough addresses when they can, frequent heavy stream flows create issues beyond the Borough's capabilities.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 0 0	High
2019-Schuylkill Haven B-01 (2013 Action)	Remove properties from the floodplain along St. Charles Street and St. James Street.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 0 0	High
2019-Schuylkill Haven B-02 (2013 Action)	Sediment and debris in the River causes more frequent flooding of the Island Park area. Remove sediment and debris from the River.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 0 0	High
2019-Schuylkill Haven B-03 (2013 Action)	The retaining wall on Railroad Street is failing. Repair the retaining wall on Railroad Street.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 0 0	High



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2019-Schuylkill Haven B-04 (New)	Replace existing influent pumps with submersible pumps and electrical components above the base flood elevation.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 00	High
2019-Tamaqua-01 (2013 Action)	Poor drainage and debris accumulation on the unnamed stream entering the H.D. Buehler Memorial Pool and Community Park property causes flooding. Install a trash rack on the unnamed stream entering the park, and upgrade the storm drainage system.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Tamaqua-02 (2013 Action; revised)	Increase capacity of the Wabash Creek Culvert and improve scour protection.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Tamaqua-03 (Problem statement – New)	Wabash Creek - build flood control dam; divert around Borough to Little Schuylkill River	+	+	+	+	+	+	-	+	+	+	0	-	+	+	12 + 1 - 10	High
2019-Tamaqua-04 (Problem statement – New)	Address basement flooding at the Citizens Fire Company	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Tamaqua-05 (Problem statement – New)	Investigate options to address blight in South Ward and Middle Ward neighborhoods; may include policy; acquisition/demolition	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Tower City-01 (2013 Action)	The drainage system on Grand Avenue and 2nd Street, and Grand Avenue and 7 th Street is inadequate. Conduct an engineering study to improve stormwater drainage facilities. Work with State because they have jurisdiction.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High

Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2019-Tower City-02 (2013 Action)	There is a need for Borough-wide debris removal and storm drainage upgrade. Conduct an effort to remove sediment and debris from streams throughout the Borough. Borough to coordinate with PADEP who has jurisdiction. Only 1 stream, (Wiconico creek).	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Tremont B-01 (Problem statement – New)	Rehabilitate the creek wall in several locations	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Tremont B-02 (Problem statement – New)	Bridge wall replacement	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Tremont B-03 (Problem statement – New)	Install flood walls in known flood areas	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Tremont B-04 (Problem statement – New)	Remove bridge and widen Good Spring Creek; remove sediment in creek to improve drainage capacity	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Tremont B-05 (Problem statement – New)	Investigate options and work with neighboring communities to reduce stormwater runoff entering the Borough	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Tremont T-01 (2013 Action)	Rocks fall from steep face on to Rausch Creek Road making it hazardous for vehicles. Construct roadside barriers on Rausch Creek Road to catch debris. Removing rocks every week, cannot close road.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High

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2019-Tremont T-02 (2013 Action)	There is overbank flooding along roadway on State Route 4011. Conduct a study to determine the feasibility of constructing a floodwall/levee on State Route 4011 during periods of heavy rain.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Tremont T-03 (2013 Action)	The guardrail along Molleystown Road is failing from flood washouts. Conduct a study to determine the feasibility of constructing a floodwall/levee on Molleystown Road during periods of heavy rain.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Upper Mahantongo-01 (2013 Action)	Purchase an emergency backup generator for the Township's Fire Company.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 00	High
2019-Upper Mahantongo-02 (2013 Action)	Establish an early warning/emergency communications system for the Township.	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 - 00	High
2019-Upper Mahantongo-03 (New – Problem Statement)	Acquire structures in the floodplain	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Walker-01 (2013 Action)	Remove structures from floodplain and acquire and preserve land as open space in perpetuity. Basement flooding loses utilities, sump pump. Separate septic system - sewage.	+	+	+	+	+	+	-	+	+	+	0	-	+	+	12 + 1 - 10	High
2019-Washington-01 (2013 Action)	The bridge at Covered Bridge Road filled with debris. Remove sediment and debris from bridge on Covered Bridge Road	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-Washington-02	At the planning and subdivision stage, understand stormwater management; stormwater management is increasing as development is increasing.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High

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(New – Problem Statement)																	
2019-Washington-03 (New – Problem Statement)	Address blighted properties; options include increase enforcement, acquisition, demolition	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 1 0	High
2019-Washington-04 (New – Problem Statement)	Purchase and install generator at the Township building	+	+	+	+	+	+	-	+	+	+	+	+	+	+	13 + 1 – 0 0	High
2019-Washington-05 (New – Problem Statement)	Harden bridges that are experiencing scouring which could lead to failure	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 1 0	High
2019-West Penn-01 (New)	Increase capacity of the following culverts: -Chain Circle Culvert - Quarry Rd Culvert - Anduas Culvert Bridge	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 1 0	High
2019-West Penn-02 (New)	Park East Imp Project	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 1 0	High
2019-West Penn-03 (New)	Update Comprehensive Plan and integrate hazards from the hazard mitigation plan update	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 1 0	High

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2019-West Penn-04 (2013 Action)	Lizard Creek floods roadway due to the undersized bridge and culvert on Dorset Road and Retreat Road. Replace the bridges/culverts to alleviate flooding.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-West Penn-05 (2013 Action)	Indian Run floods Blue Mountain Dr. and Kepners Road due to undersized pipes on these roads. Replace pipes on Blue Mountain Drive and Kepners Road to alleviate flooding.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-West Penn-06 (2013 Action)	Lizard Creek floods Ridge Road. Conduct a study to determine the feasibility of constructing a floodwall/levee on Ridge Road.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-West Penn-07 (2013 Action)	Lime Kiln Drive floods due to an undersized pipe. Replace the pipe on Lime Kiln Road to alleviate flooding.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-West Penn-08 (2013 Action)	Two undersized pipes on Ash Circle cause the roadway to flood. Replace pipes on Ash Circle Road to alleviate flooding.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-West Penn-09 (2013 Action)	An undersized bridge on the following roads causes the roadways to flood. Replace bridges with larger structures to alleviate flooding. - School Drive - Saint Peters Road - Dairy Road - Wash Creek Road	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-West Penn-10 (2013 Action)	Mahoning Creek near SR 443 is a flood zone. Remove structures from floodplain and acquire and preserve land as open space in perpetuity.	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High
2019-West Penn-11 (2013 Action)	Snyders Road and State Route 895 ice in the winter due to poor drainage. Improve roadway drainage facilities	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 - 10	High

Number	Mitigation Action/Initiative	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2019-West Penn-12 (Problem Statement – New)	Demolish verified-blighted properties and update property maintenance ordinance	+	+	+	+	+	+	-	+	+	+	0	+	+	+	12 + 1 – 10	High

Notes:

B = Borough

T = Township

Fiscal: - was noted if the municipality does not have funding to support action implementation and grant funding is needed.

Timeline: - was noted if the estimated timeline for completion is greater than 5 years

Multi-Hazard: 0 was noted if it is not clear the action will address more than one hazard

SECTION 7. PLAN MAINTENANCE

This section describes the system that Schuylkill County and all participating jurisdictions have established to monitor, evaluate and update the HMP (Section 7.1); implement the mitigation plan through existing programs (Section 7.2); and solicit continued public involvement for plan maintenance (Section 7.3).

7.1 Update Process Summary

Monitoring, evaluating and updating the HMP is critical to maintaining its value and success in Schuylkill County's hazard mitigation efforts. Ensuring effective implementation of mitigation activities paves the way for continued momentum in the planning process and gives direction for the future. This section explains who will be responsible for maintenance activities and what those responsibilities entail. It also provides a methodology and schedule of maintenance activities including a description of how the public will be involved on a continued basis.

To the best of the knowledge of the Schuylkill County HMP Coordinators and Core and Municipal Planning Teams, no HMP progress reports were submitted from municipalities for the period of 2013 to 2018; however, some mitigation actions were accomplished during this period and reported during the 2019 HMP planning process (refer to Section 6). The 2013 HMP Plan Maintenance section indicated that following disasters, the HMP will be reviewed and as necessary in response to any "lessons learned" or to address specific circumstance arising from the event. During the update of the 2019 HMP, as described earlier, Schuylkill County was impacted by two back-to-back flood events in July and August of 2018. As a result, the HMP Coordinators (Schuylkill County Planning Department and Schuylkill County Emergency Management Agency) organized a '2018 Flood Hot Wash' to discuss lessons learned, best practices and identify problem areas and mitigation strategies for this HMP update. These items are discussed further in Section 3 (Planning Process) and Section 6 (Mitigation Strategy).

The Core Planning Team reviewed the 2013 plan maintenance section and updated the maintenance procedures making it more specific and detailed in several aspects. For example, the County Planning Department and County EMA will be holding quarterly municipal meetings with the theme of 'Mitigation Day'; tying quarter 3 with Preparedness Month in September. These meetings will be held either as stand-alone meetings or scheduled as part of a regularly-scheduled meeting such as the Emergency Management Coordinator quarterly meetings and/or the Schuylkill County Planning Commission meetings to ensure greater participation and feedback. In addition, the plan will continue to be available on the County Emergency Management website. The 2019 plan maintenance procedures also elaborate on how this plan may be integrated into other planning mechanisms in the County as described below.

7.2 Monitoring, Evaluating, and Updating the Plan

The Schuylkill County Planning Department and the Schuylkill County Emergency Management Agency will continue to work jointly on mitigation in the County. The HMP Coordinator from the Planning Department,

Ms. Susan Smith, shall assume the lead for planning efforts, including being responsible for monitoring, evaluating, and updating this plan. Ms. Susan Smith will continue to coordinate with Mr. John Matz the County Emergency Management Coordinator on various aspects of the plan maintenance as described herein. The Core Planning Team will be retained and each participating jurisdiction is expected to retain a municipal hazard mitigation representative on the Municipal Planning Team to support the jurisdiction’s input to the monitoring, evaluating, and updating responsibilities identified in this section.

Table 7-1 identifies the county and municipal members of the Municipal Planning Team as of the date of this HMP. Understanding that individual commitments change over time, each jurisdiction and its representatives are responsible for informing the Schuylkill County HMP Coordinators of any changes in representation by formal letter. The HMP Coordinator will strive to keep the Municipal Planning Team makeup as a uniform representation of planning partners in the planning area.

The following sections describe the monitoring, evaluating, and updating process and protocols for the Schuylkill County HMP.

Table 7-1. Municipal Planning Team Members

Jurisdiction	Primary Point of Contact		Secondary Point of Contact	
	Name	Title	Name	Title
Ashland (B)	Raymond Jones Jr	Borough Manager		
Auburn (B)	Zachary Sullivan	Engineer	Steve Moyer	Engineer
Barry (T)	David Miller	Engineer	Daniel J. Hepler	Supervisor/EMC
Blythe (T)	Bill Anders	Engineer	Adam Nothstein	Township Chairman
Branch (T)	John Andruczek	Zoning		
Butler (T)	Paul Fetterolf	Supervisor	Kate Staudenmeier	Secretary
Cass (T)				
Coaldale (B)				
Cressona (B)	Steve Moyer	Engineer	Erin Hossler	Secretary
Deer Lake (B)	William Anders	Engineer	Dave Crouse	Council President
Delano (T)	Ken Karlavage*	Delano Township Supervisor		
East Brunswick (T)	John Heim	Supervisor/EMC/Floodplain	Kelly Coldren	Secretary
East Norwegian (T)	Kevin Davenport	Road Foreman	James Tohill, PE	Township Engineer
East Union (T)	Bill McMullen	Engineer	Kyle Mummey	EMC
Eldred (T)	Dan Dietrich	Supervisor		
Foster (T)	Christopher Rowlands	Supervisor	G. Robert Sterling	Supervisor
Frackville (B)	Helen Miernicki*	Councilperson/Realtor		
Frailey (T)	Donald Allar	Supervisor Chair	Keith Allar	Supervisor/Roadmaster
Gilberton (B)	Mark Keirse	Borough Council Member		
Girardville (B)	Dan Heiser	Borough Council Member	Fred McDonald	Borough Council Member
Gordon (B)	Jason Quick	Borough Manager/EMC	George Brocious	Mayor
Hegins (T)	Gary Hornberger	Secretary	Allan Swab	Zoning Officer
Hubley (T)	Keith Masser	Supervisor Chair	Kathy Krammes	Secretary
Kline (T)				
Landingville (B)				

Jurisdiction	Primary Point of Contact		Secondary Point of Contact	
	Name	Title	Name	Title
Mahanoy (T)				
Mahanoy City (B)	Bill Killian*	Code Enforcement Officer		
McAdoo (B)				
Mechanicsville (B)				
Middleport (B)				
Minersville (B)	Eric Eichenberg	Minersville Fire Chief	James O'Brien	Minersville Fire Chief, 1st Assistant
Mount Carbon (B)				
New Castle (T)	William Anders	Township Engineer	Kimberly Lutzkanin	Secretary, Building Code Enforcement Officer
New Philadelphia (B)				
New Ringgold (B)				
North Manheim (T)	Steve Moyer	Engineer	Wayne Bowen	Supervisor
North Union (T)	Steve Motil	EMC	Clyde Spiece	Supervisor
Norwegian (T)	Mike Miller	Manager	Stan Petchulis	Chairman of Supervisors
Orwigsburg (B)	Robert Williams*	Borough Manager		
Palo Alto (B)				
Pine Grove (B)	Thomas Fickinger*	Borough Council Vice President	Anthony Gurski	Borough Council Member
Pine Grove (T)				
Port Carbon (B)	Andy Palokas*	Borough Council Member		
Port Clinton (B)	John Blackwell	Borough Council Member	Paul Naftzinger	Borough Council President
Porter (T)	Gary Bender	Supervisor Chair	Ryan Fasnacht	Engineer
Pottsville (B)	Richard Wojciechowsky*	Pottsville Police Chief		
Reilly (T)	James Diechert	Public Works Administrator/EMC	Robert Butensky	Supervisor
Ringtown (B)				
Rush (T)				
Ryan (T)	William McMullen	Permit Officer	Franklin Fetter	Supervisor

Jurisdiction	Primary Point of Contact		Secondary Point of Contact	
	Name	Title	Name	Title
Saint Clair (B)	Roland Price	Secretary	Brian Baldwin	Engineer
Schuylkill (T)	Charles Fayash	Supervisor Chair	Charles Hosler	Supervisor
Schuylkill Haven (B)	Scott Graver	Borough Manager	Michael Paulin	Code Enforcement Officer
Shenandoah (B)	Leo Pietkiewicz	President of Council	Joseph Palubinsky	Secretary/Treasurer
South Manheim (T)	Steve Moyer	Zoning Officer	Kelly Handling	Secretary
Tamaqua (B)	Kevin Steigerwalt	Borough Manager	Robert Jones	Public Works Director/EMC
Tower City (B)	Stephen Bohr	EMC	Irene Dubbs	Secretary
Tremont (B)	Pryce Parker	EMC	James Scheibley	Council President
Tremont (T)				
Union (T)	Robert Murray	Supervisor	Darrell Laudeman	Supervisor Chair
Upper Mahantongo (T)	Dave Miller	Engineer	Kyle Brown	Supervisor Chair
Walker (T)	Chad Felty	Roadmaster/EMC	Ann Osterguaard	Secretary
Washington (T)	Dawn Koch	Township Manager	Lynn Brown	Roadmaster
Wayne (T)	Paul Moyer Sr	EMC	Randall Moyer	Zoning Officer
West Brunswick (T)	Jason Stoudt	Supervisor		
West Mahanoy (T)				
West Penn (T)	Katie Orlick	Secretary	Herb Woodring	Assistant Secretary

*Core Planning Team Member

Blank Field in Table – Point of contact not provided by municipality to date

7.2.2 MONITORING

Both the Core Planning Team and the Municipal Planning Team shall be responsible for assisting with the monitoring of the HMP. This shall include (1) monitoring progress on, and evaluating the effectiveness of, the HMP, and (2) documenting this progress in a progress report.

Prior to the 'Mitigation Day' meeting scheduled to be dedicated to plan maintenance (detailed below and scheduled concurrent with an already scheduled County meeting), Core and Municipal Planning Team representatives may collect information from county and municipal departments, agencies, and organizations involved with the mitigation activities identified in Section 6 (Mitigation Strategy) of this plan. As needed, the representatives will make phone calls and conduct meetings with persons responsible for initiating and/or overseeing the mitigation projects to obtain progress information. Copies of any grant applications filed on behalf of any of the participating jurisdictions shall be provided to the Municipal Planning Team point of contact and shared with the HMP Coordinators. Further, the municipal representatives shall obtain any public comments made on the HMP from their municipal supervisor, mayor, or councilperson, and provide public comments to the HMP Coordinators for inclusion in the progress report.

The planning partnership may refer to the worksheets available to assist in the evaluation process and maintenance of the HMP (Appendix I). The Municipal Planning Team representatives shall be expected to document the following, as needed and as appropriate using the referenced forms and submit to the HMP Coordinator, Ms. Susan Smith prior to the annual meeting:

- Hazard events and losses occurring in their jurisdiction including their nature and extent, and the effects that hazard mitigation actions have had on impacts and losses
- Progress on the implementation of mitigation actions, including efforts to obtain outside funding for mitigation actions
- Any obstacles or impediments to the implementation of actions
- Additional mitigation actions believed to be appropriate and feasible
- Public and stakeholder input and comment on the HMP

7.2.3 EVALUATING

The evaluation of the HMP is an assessment of whether the planning process and actions have been effective, whether the HMP's goals are being reached, and whether 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.

The status of the HMP will be discussed and documented at the 'Mitigation Day' plan review meeting with the Core and Municipal Planning Teams. The outcomes of this meeting will be reported out at regularly-scheduled public meetings; either the Local Emergency Management Coordinator quarterly meetings, the Schuylkill County Planning Commission meeting or the Schuylkill County Board of Commissioners meeting. The annual plan review meeting will be advertised using the Schuylkill County Emergency Management Agency social media and website. At least one month before the progress plan review meeting, the Schuylkill County HMP

Coordinator, Ms. Susan Smith, will advise Core and Municipal Planning Team members of the meeting date, agenda, and expectations of the members. The Schuylkill County HMP Coordinator may also distribute additional materials including mitigation project opportunity forms for jurisdictions that may have new information.

The Schuylkill County HMP Coordinator, Ms. Susan Smith, will be responsible for calling and coordinating the progress plan review meeting with Mr. John Matz, and assessing progress toward achieving plan goals. These evaluations will assess whether:

- Goals 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 and if 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 incorporated, including other local governments as defined under Title 44 of the Code of Federal Regulations (CFR), Section 201.6
- Documentation has been completed for any hazards that occurred during the last year

Specifically, the Core Planning Team will review the mitigation goals and strategies using performance-based indicators, including:

- New agencies/departments created that have authority to implement mitigation actions or are required to meet goals and actions
- Project evaluation based on current needs of the mitigation plan
- Project completion regarding progress of proposed or ongoing actions
- Under/over spending regarding proposed mitigation action budgets
- Achievement of the vision and goals
- Resource allocation to note if resources are required to implement mitigation activities
- Timeframe comments on whether proposed schedules are sufficient to address actions
- Budget notes (in other words, if budget basis should be changed or is sufficient)
- Lead/support agency commitment notes (if there is a lack of commitment on the part of lead or support agencies)
- Resource comments regarding whether resources are available to implement actions
- Feasibility comments regarding whether certain goals or actions prove to be unfeasible

Finally, the Core Planning Team, along with partnering with the Schuylkill County Planning Commission, will evaluate the ways other programs and policies have conflicted or augmented planned or implemented measures, and shall identify policies, programs, practices, and procedures that could be modified to accommodate hazard mitigation actions (described further under the “Implementation of Mitigation Plan through Existing Programs” subsection presented below in Section 7.2). Other programs and policies can include those that address:

- Economic development
- Environmental preservation and permitting
- Historic preservation
- Redevelopment
- Health and/or safety
- Recreation
- Land use/zoning
- Public education and outreach
- Transportation

The Schuylkill County HMP Coordinator, Ms. Susan Smith, shall be responsible for coordinating with Mr. John Matz and preparing an HMP Annual Progress Report and if needed, a report after a major declaration. The HMP Annual Progress Report will be based on the provided local progress reports from each jurisdiction, information presented at the Municipal Planning Team meeting, and other information as appropriate and relevant. These reports will provide data for the 5-year update of this HMP and will assist in pinpointing implementation challenges. By monitoring the implementation of the HMP, the Municipal Planning Team will be able to assess which projects are completed, which projects are no longer feasible, and which projects may require additional funding. The progress reports will be submitted to PEMA and FEMA Region 3.

This progress report shall apply to all planning partners who have provided input, and as such, shall be developed according to an agreed-upon format and with adequate allowance for input and comment of each planning partner prior to completion and submission to the State Hazard Mitigation Officer. Each planning partner will be responsible for providing this report to its governing body for their review.

During the meeting, the Core Planning Team shall establish a schedule for the draft development, review, comment, amendment, and submission of the HMP progress report to the State Hazard Mitigation Officer.

The HMP will also be evaluated and revised following any major disasters to determine whether the recommended actions remain relevant and appropriate. The risk assessment will also be revisited to see if any changes are necessary based on the pattern of disaster damages or if data listed in the Section 4.3 (Hazards of Concern) of this HMP have been collected to facilitate the risk assessment. These revisions are opportunities 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 that local hazard mitigation plans be reviewed, revised as appropriate, and resubmitted for approval in order to remain eligible for benefits awarded under the Disaster Mitigation Act of

2000 (DMA 2000). The Schuylkill County has updated this HMP on a 5-year cycle from the date of initial plan adoption. This update to the HMP shows changes since the 2013 version. The next update to the HMP will occur in 2024.

To facilitate the update process, the Schuylkill County HMP Coordinator (Ms. Susan Smith)—with support from the Schuylkill County Emergency Management Agency, Core Planning Team and Municipal Planning Team—shall hold a meeting 3 years from the date of plan approval to develop and commence with the implementation of a detailed plan update program. Ms. Smith shall invite representatives from the PEMA to this meeting to provide guidance on plan update procedures. This program shall, at a minimum, establish the parties responsible for managing and completing the HMP update effort, features needed to be included in the updated plan, and a detailed timeline with milestones to ensure that the update is completed according to regulatory requirements.

At this meeting, the Core Planning Team shall determine the resources needed to complete the update. The Schuylkill County HMP Coordinator, Ms. Smith, shall be responsible for ensuring that needed resources are secured (e.g., grant funding).

Following each 5-year update of the mitigation plan, the updated plan will be distributed for public comment. After all comments are addressed, the HMP will be revised and distributed to all Municipal Planning Team members and the Pennsylvania State Hazard Mitigation Officer. During this update process, the HMP Coordinator will invite jurisdictions that were nonparticipating (if applicable) during the last update or not as involved in the planning process, as well as additional relevant stakeholders and outside agencies, to join the Municipal Planning Team to ensure as comprehensive inclusion as possible.

Addition of a Non-Participating Municipality

As discussed in Section 1 (Introduction), plan participation requirements were outlined at the beginning of the 2019 HMP update planning process. There are municipalities that did not meet the full participation requirements. If these municipalities decide to fully participate during the performance period of this plan (2019 to 2024), their outstanding participation requirements must be met. The plan participation requirements are as follows:

1. Submit a Letter of Intent to Participate (LOIP) to the County identifying primary and secondary points of contact and the NFIP Floodplain Administrator
2. Provide data and information about your community as requested by the County Mitigation Coordinators (i.e., worksheets)
3. Attend the annual mitigation review meetings organized by the Schuylkill County HMP Coordinators
4. Adopt the plan through formal resolution once the above three requirements are met

The Schuylkill County HMP Coordinators will document these additions and revisions to the plan in the annual HMP Progress Report submitted to PEMA and FEMA. As outlined throughout this section, all municipalities that participate must also assist with the implementation of the plan maintenance strategy.

7.2.5 IMPLEMENTATION OF MITIGATION PLAN THROUGH EXISTING PROGRAMS

The intention of the County and participating jurisdictions is to incorporate mitigation planning as an integral component of daily government operations. Municipal 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) 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 Core and Municipal Planning Teams anticipate 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 Comprehensive Plans for Schuylkill County and its municipalities, and County and municipal Emergency Operations Plans (EOP) 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.
- 5) Model documents will be developed and made available to streamline processes including draft press releases, Incident Action Plans, ordinances and language for comprehensive plans.

Integration of Mitigation into Ongoing and Future Planning Mechanisms

It is the intent of the County and its participating municipalities to strengthen the focus on mitigation by continuing existing policies, and by further implementing the mitigation policies and strategies contained in this HMP. Implementation actions will include incorporating the goals of the HMP into ongoing planning, zoning, building, and engineering activities.

The County Planning Department and Planning Commission play a significant role with leading the County Comprehensive Plan and through governance of the zoning and subdivision of about half of the municipalities in the County. Therefore, the County Planning Department and Planning Commission will lead and urge municipalities to do the same, as appropriate:

- Notify other municipalities about grant and other funding opportunities as they arise
- Evaluate whether all construction projects meet hazard mitigation goals
- Use data and maps from this HMP as supporting documentation in grant applications
- Ensure local planning or economic development groups identify hazard areas when assisting new businesses in finding a location
- Look at mitigation actions when allocating funding for the municipal budgets
- Incorporate hazard mitigation actions in daily operations and on all projects
- Include hazard mitigation when updating municipal ordinances
- Identify hazard areas in updates of comprehensive plans to identify land use issues
- Review the hazard mitigation plan prior to land use or zoning changes, and permitting or development decisions

The information on hazard, risk, vulnerability, and mitigation contained in this HMP is based on the best science and technology available at the time of the HMP's preparation. 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. Existing processes and programs through which the mitigation plan should be implemented are described below.

The 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 county departmental or organizational work plans, policies, or procedural changes, which could be addressed by the following departments:

- Planning, Zoning and GIS
- Emergency Services
- Economic Development
- Real Estate/Engineering
- Conservation District

Additional administrative measures may integrate the HMP into county-level plans and any municipal updates to comprehensive plans as noted in Section 6.

Budgetary

In terms of budgetary processes, the County will review budgets and, if funding is available, include a line item for mitigation actions. In addition, the County will maximize mitigation aspects of proposed projects, and will encourage municipalities to do likewise.

Regulatory

Regulatory measures—such as the creation of 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
- Subdivision and Land Development
- Floodplain Ordinance
- Building Codes - Enforcement of codes or higher standards in hazard areas
- Capital Improvements Plan – Consider projects identified in the HMP and include hazard mitigation in the design of new construction.
- National Flood Insurance Program (NFIP) – Continue participation in this program and explore participation in Community Rating System (CRS) Program.

- Prior to formal changes (amendments) to master plans, zoning, ordinances, capital improvement plans, or other mechanisms that control development, all above-mentioned plans will be reviewed to ensure they are consistent with the hazard mitigation plan.

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
 - Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation Program (PDM)
 - 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. Economic Development Administration (EDA) Public Works Program
- State
 - Pennsylvania Department of Transportation (PennDOT) Pennsylvania Infrastructure Bank
 - Pennsylvania Dirt, Gravel and Low Volume Roads program
 - Growing Greener Watershed Protection Grant
- 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 a broader support and understanding of hazard mitigation:

- Existing neighborhood communities
- Creative Partnership Opportunities for Funding and Incentives
 - Public-Private Partnerships including utilities and businesses
 - State cooperation
 - In-kind resources
- Partnership Opportunities with other Federal, State, and Local Agencies
 - American Red Cross (ARC)
 - 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 (PA DEP)
- Pennsylvania State Police (PSP)
- United States Department of Agriculture (USDA)
- United States Department of Transportation (USDOT)
- United States Geological Service (USGS)
- Watershed Associations
- Fire Chiefs Association
- Schuylkill County Volunteer Firefighters Association
- Schuylkill County Board of Realtors
- Schuylkill County LEPC
- Schuylkill County Chamber of Commerce

During the HMP evaluation process, the Core 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.

7.3 Continued Public Involvement

Schuylkill County and participating jurisdictions are committed to the continued involvement of the public in the hazard mitigation process. Therefore, the HMP will remain posted on the Schuylkill County Emergency Management Agency website (<http://www.scema.org/hazard-mitigation-plan-update-2019/>) during the five-year cycle.

A link will be posted to accept and track public comments via a Survey Monkey or equivalent surveying site. The Schuylkill County HMP Coordinator, Ms. Smith, will be responsible for receiving, tracking, and filing public comments regarding this HMP. The public will have an opportunity to comment on the HMP at the 3-year review meeting for the HMP and during the 5-year plan update.

The Schuylkill County HMP Coordinator is responsible for coordinating the HMP evaluation portion of the meeting, soliciting feedback, collecting and reviewing the comments, and ensuring their incorporation in the 5-year plan update, as appropriate. Additional meetings may also be held as deemed necessary by the Core and Municipal Planning Teams. The purpose of these meetings would be to provide an opportunity for the public to express concerns, opinions, and ideas about the mitigation plan.

The Municipal Planning Team representatives shall be responsible to ensure that:

- Solicit public comment and input on the HMP, and hazard mitigation in general. An opportunity to comment on the HMP will be provided directly on the project website, and provisions for public comment, in writing, will also be made.

- The Executive Summary will be made available as hard copies at County municipal buildings along with instructions to facilitate public input and comment on the HMP.
- Schuylkill County Emergency Management Agency HMP web page (<http://www.scema.org/hazard-mitigation-plan-update-2019/>) is being maintained throughout the 2019 update period of performance. A draft copy of the HMP will be posted for public comment. Upon conclusion of the HMP 2019 update, appropriate notifications and links to the FEMA-approved HMP will be maintained on the website (<http://www.scema.org/hazard-mitigation-plan-update-2019/>).
- Public notices will be made, as appropriate, to inform the public of the availability of the HMP, particularly during plan update cycles.

The Schuylkill County HMP Coordinators, Ms. Smith and Mr. Matz, shall ensure that:

- Public comment and input on the HMP (and hazard mitigation in general) are recorded and addressed, as appropriate;
- The Schuylkill County Emergency Management Agency website is maintained and updated with information on the plan updates and grant opportunities, as appropriate;
- All public and stakeholder comments received are documented and maintained;
- Public notices (including media releases) are made, as appropriate, to inform the public of the availability of the HMP, particularly during plan update cycles.

SECTION 8. PLAN ADOPTION

By adopting the Schuylkill County HMP, local governing bodies demonstrate their commitment to fulfill the mitigation goals outlined in the plan. Adoption of the HMP by Schuylkill County and each participating jurisdiction legitimizes the HMP and authorizes responsible agencies to execute their responsibilities.

Each participating jurisdiction will continue with formal adoption proceedings upon conditional approval of this HMP from the FEMA, known as Approval Pending Adoption (APA). Each participating jurisdiction understands that conditional approval of the HMP will be provided for those municipalities that meet the planning requirements with the exception of the adoption requirement, as stated above.

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 (acceptance) of the HMP to the Schuylkill County Hazard Mitigation Coordinators (Susan Smith, Schuylkill County Planning Department and John Matz, Schuylkill County Emergency Management Agency). Schuylkill County will forward the executed resolutions to PEMA, who will subsequently forward the resolutions to FEMA. Each participating jurisdiction understands that FEMA will transmit acknowledgement of verification of formal HMP adoption and the official approval of the HMP to the Hazard Mitigation Coordinators. 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 pages.

Schuylkill County Hazard Mitigation Plan County Adoption Resolution

Resolution No. _____
Schuylkill County, Pennsylvania

WHEREAS, the municipalities of Schuylkill County, Pennsylvania, are most vulnerable to natural and human-made hazards, which may result in loss of life and property, economic hardship, and threats to public health and safety, and

WHEREAS, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) requires state and local governments to develop and submit for approval to the President a mitigation plan that outlines processes for identifying their respective natural hazards, risks, and vulnerabilities, and

WHEREAS, Schuylkill County acknowledges the requirement of Section 322 of DMA 2000 to have an approved Hazard Mitigation Plan as a prerequisite to receiving post-disaster Hazard Mitigation Grant Program funds, and

WHEREAS, the Schuylkill County Hazard Mitigation Plan has been developed jointly by the Schuylkill County Planning and GIS Department and Emergency Management Agency, Core Planning Team, Municipal Planning Team, local municipal officials and the citizens of Schuylkill County, and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted to develop the Schuylkill County Hazard Mitigation Plan, and

WHEREAS, the Schuylkill County Hazard Mitigation Plan recommends mitigation activities that will reduce losses to life and property affected by both natural and human-made hazards that face the County and its municipal governments,

NOW THEREFORE BE IT RESOLVED by the governing body for the County of Schuylkill that:

- The 2019 Schuylkill County Hazard Mitigation Plan is hereby adopted as the official Hazard Mitigation Plan of the County and
- The respective officials and agencies identified in the implementation strategy of the 2019 Schuylkill County Hazard Mitigation Plan are hereby directed to implement the recommended activities assigned to them

ADOPTED, this _____ day of _____, 2019

ATTEST:

SCHUYLKILL COUNTY COMMISSIONERS

By _____

By _____

By _____

Schuylkill County Hazard Mitigation Plan Municipal Adoption Resolution

Resolution No. _____

< Municipality Name >, Schuylkill County, Pennsylvania

WHEREAS, the <Municipality Name>, Schuylkill County, Pennsylvania, is most vulnerable to natural and human-made hazards, which may result in loss of life and property, economic hardship, and threats to public health and safety, and

WHEREAS, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) requires state and local governments to develop and submit for approval to the President a mitigation plan that outlines processes for identifying their respective natural hazards, risks, and vulnerabilities, and

WHEREAS, the <Municipality Name> acknowledges the requirement of Section 322 of DMA 2000 to have an approved Hazard Mitigation Plan as a prerequisite to receiving post-disaster Hazard Mitigation Grant Program funds, and

WHEREAS, the Schuylkill County Hazard Mitigation Plan has been developed jointly by the Schuylkill County Planning and GIS Department and Emergency Management Agency, Core Planning Team, Municipal Planning Team, local municipal officials and the citizens of <Municipality Name>, and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted to develop the Schuylkill County Hazard Mitigation Plan, and

WHEREAS, the Schuylkill County Hazard Mitigation Plan recommends mitigation activities that will reduce losses to life and property affected by both natural and human-made hazards that face the County and its municipal governments,

NOW THEREFORE BE IT RESOLVED by the governing body for the <Municipality Name>:

- The 2019 Schuylkill County Hazard Mitigation Plan is hereby adopted as the official Hazard Mitigation Plan of the <Municipality Name>, and
- The respective officials and agencies identified in the implementation strategy of the 2019 Schuylkill County Hazard Mitigation Plan are hereby directed to implement the recommended activities assigned to them.

ADOPTED, this _____ day of _____, 2019

ATTEST:

< MUNICIPALITY NAME > REPRESENTATIVES

By _____

By _____

By _____

