COUNTY OF NORTHUMBERLAND

2017 HAZARD MITIGATION PLAN

PREPARED BY:

NORTHUMBERLAND COUNTY

HAZARD MITIGATION PLANNING TEAM

399 STADIUM DRIVE

SUNBURY, PA 17801

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EXECUTIVE SUMMARY

After suffering the effects of floods, windstorms, winter storms, and other natural and human-made hazards, the citizens, business leaders, and officials of Northumberland County recognized the need to develop a long-term approach to reducing their vulnerability to hazards. In 2016, the Northumberland County Department of Public Safety, the agency responsible for hazard mitigation in the County, began a review of the existing hazard mitigation plan, continuing to identify hazards that can affect the County and update or create new strategies to reduce damage from these hazards.

The original Northumberland County Hazard Mitigation Plan of 2012 was created using the contracted services of Delta Development Group. This updated 2017 Hazard Mitigation Plan is being prepared using information provided in the original document and updated information being provided by the Northumberland County Planning Team. This document represents the culmination of the multi-jurisdictional planning process that involves numerous stakeholders across the County. The planning process consisted of the following steps:

- Identification and prioritization of the hazards that may affect the County and its municipalities
- Assessment of the County's and municipalities' vulnerability to these hazards
- Identification of the mitigation actions that can reduce that vulnerability
- Development of a strategy for implementing those actions, including identifying the agency(ies) responsible for that implementation

Throughout the planning process, the general public was given the opportunity to comment on or question the existing Hazard Mitigation Plan (HMP). The Planning Team desired interaction from the general public to not only provide a localized perspective but also as an initial opportunity to educate anyone who may not have knowledge of the HMP. Four formal public meetings as well as many informal planning meeting were advertised and conducted with this intent at the core. The existing plan was also posted

to the Northumberland County Emergency Management Agency's website for any member of the public to independently review.

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

- Flood, flash flood, and ice jam
- Drought
- Winter storms
- Opioids

To mitigate against the effects of these hazards, the Hazard Planning Team identified the following goals for hazard mitigation over the next five years:

- Increase public education and awareness of existing and potential hazards in Northumberland County
- Protect the citizens of Northumberland County as well as public and private property from the impacts of natural and human-caused hazards
- Mitigate the potential for injury/death and damage from natural and human-made hazards in Northumberland County
- Encourage proper information management of data related to natural and human-caused hazards in Northumberland County
- Increase local government awareness of hazard mitigation programs
- Improve emergency services and capabilities in Northumberland County to protect citizens from natural and human-caused hazards

The individual objectives and actions that will be implemented are shown in section 6.4.

RESUMEN EJECUTIVO

Después de sufrir el Efectos De las inundaciones, Tormentas de viento Tormentas de invierno y otro Naturales y hecho por el hombre peligros, los ciudadanos, líderes empresariales, y Funcionarios de El condado de Northumberland reconoció la la necesidad de desarrollar a largo plazo Enfoque para reducir su Vulnerabilidad a peligros. En el año 2016, el Northumberland Departamento del condado de Seguridad Pública, el agencia responsable de peligro Mitigación en el Condado, comenzó una revisión del plan de mitigación de riesgos existentes, sin dejar de identificar los peligros que puede afectar el Condado y Actualizar o crear nuevas estrategias para reducir dañar de Estos peligros.

El Plan de Mitigación de Riesgos condado de Northumberland original de 2012 fue creado usando los servicios contratados de Delta Development Group. Esta actualización 2017 de Peligros Plan de Mitigación se prepara utilizando la información proporcionada en el documento original y la información actualizada que suministra el equipo de planificación del condado de Northumberland.Este documento representa la culminación del proceso de planificación multi-jurisdiccional que involucra a numerosas partes interesadas en todo el Condado. El proceso de planificación consistió en la siguientes pasos:

- Identificación y Priorización de los peligros ese mayo afectar el Condado y su Municipios
- Evaluación de el Condado 's y los municipios' vulnerabilidad a estas peligros
- Identificación de el acciones de mitigacion que ueden reducir ese vulnerabilidad
- Desarrollo de una estrategia para Implementar esos comportamiento, Incluyendo la identificación el agencia (s) responsable para que la implementación

A lo largo del proceso de planificación, el público en general tuvo la oportunidad de comentar o cuestionar el Plan de Mitigación de Riesgos (HMP, por sus siglas en inglés) existente. El equipo de planificación deseaba que la interacción del público en general no sólo proporcionara una perspectiva localizada, sino también como una oportunidad inicial para educar a cualquier persona que no tuviera conocimiento del PGH. Se anunciaron y llevaron a cabo cuatro reuniones públicas formales, así como

muchas reuniones informales de planificación, con esta intención en el centro.El plan existente también fue publicado en el sitio web de la Agencia de Manejo de Emergencias del Condado de Northumberland para que cualquier miembro del público lo revise de manera independiente.

Los siguientes peligros fueron identificados por el Equipo de Planificación como los de mayor riesgo para el Condado y sus municipios:

- Inundación, inundación repentina y mermelada de hielo
- Sequía
- Tormentas de invierno
- Opioides

Para mitigar los efectos de estos peligros, el Equipo de Planificación de Peligros identificó los siguientes objetivos para la mitigación de peligros durante los próximos cinco años:

- Incrementar público la educación y el conocimiento de Existentes y potenciales peligros en Northumberland Condado
- proteger el los ciudadanos del condado de Northumberland como bien como públicos Y privado propiedad de la Impactos de natural y Causado por el hombre peligros
- Mitigar el potencial para Lesión / muerte y dañar de natural y hecho por el hombre peligros en Condado de Northumberland
- Alentar apropiado gestión de la información de los datos relacionado con natural Y humanos peligros en el condado de Northumberland
- Incrementar local gobierno conciencia de peligrosidad Programas de mitigación
- Mejorar emergencia servicios y capacidades en el Condado de Northumberland para proteger los ciudadanos de natural Y humanos peligros

Los objetivos individuales y las acciones que se implementarán se muestran en la sección 6.4.

SECTION 1. INTRODUCTION

1.1 BACKGROUND

Across the United States, natural and human-caused disasters have led to an increased level of deaths, injuries, property damage and interruption of business and government services. The time, money and efforts to recover from these disasters exhaust resources, diverting attention from important public programs and private agendas. After suffering the effects of many natural hazards and acknowledging the risk of human-made hazards, and with over 100 statewide or county-specific gubernatorial and presidential disaster declarations since 1954, Northumberland County recognized the need to develop a long-term approach to reducing its vulnerability to hazards.

In 2012, Delta Development Group, Inc. was contracted to create the 2012 Northumberland County Hazard Mitigation Plan. In 2016, under the direction of the Northumberland County Department of Public Safety, the Northumberland County Planning Team (comprised of County and local officials) began to review of the 2012 Hazard Mitigation Plan for review and updates. After review, it was determined that it was necessary to create a completely new Northumberland County Hazard Mitigation Plan due to the amount of errors that was found and new information needing to be added. The final plan was created in 2017. This document represents the culmination of the multi-jurisdictional planning process that involved numerous stakeholders across the County. The planning process consisted of the following steps:

- Identification and prioritization of the hazards that may affect any part of the County
- Assessment of the vulnerability of any part of the County to said hazards
- Identification of the mitigation actions that can reduce said vulnerability
- Development of strategies for implementing said actions, including identifying the agency or agencies responsible for that implementation

Federal and state governments have utilized mitigation concepts to minimize environmental degradation and to reduce loss of life and property associated with natural hazards. However, mitigation was most often applied in a post-disaster environment. In an effort to increase public awareness and to reduce the costs associated with disaster preparedness, the Federal Emergency Management Agency (FEMA) developed the National Mitigation Strategy. It represents a sustained effort to reduce hazard vulnerabilities through public outreach and partnership development, and was created with input from federal agencies, state and local governments, and the general public.

Hazard mitigation is a phrase that describes actions taken to prevent or reduce the long-term risks to life and property from hazards. Pre-disaster mitigation actions are taken in advance of a hazard event and are essential to breaking the typical disaster cycle of damage, recovery and repeated damage. With careful selection, mitigation can be long-term, cost-effective means of reducing further loss.

Throughout the review process, the general public was given several opportunities to comment on the existing Hazard Mitigation Plan (HMP) and provide suggestions for the

updated final version. Two public meetings were advertised (see section 3.3) and conducted to give residents an opportunity to provide input directly to the planning team.

The following hazards were identified by the planning team as those which present the highest risk to select municipalities or the entire County:

- Winter storms
- Flood, flash flood and ice jams
- Drought

To mitigate against the effects of these hazards, the planning team identified the following goals for hazard mitigation over the next five years:

- Increase public awareness and education about existing and potential hazards in Northumberland County
- Protect the citizens of Northumberland County from the impacts of natural and human-caused hazards
- Protect public and private property from the impacts of natural and human-caused hazards
- Mitigate the potential for injury/death and damage from natural and human-made hazards in Northumberland County
- Increase local government awareness of hazard mitigation programs
- Improve emergency services and capabilities in Northumberland County to protect citizens from natural and human-caused hazards

This HMP is the result of several months of work by the citizens and officials of Northumberland County to develop a pre-disaster, multi-hazard mitigation plan that will not only guide the County toward greater disaster resistance, but will also respect the character and needs of the community.

1.2 PURPOSE

The purpose of this HMP is to minimize the effects of natural, technological and human-caused hazards on the people, property, environment and business operations within Northumberland County. This document exists to provide the background information and rationale for the mitigation actions that the planning team and municipal representatives have chosen to implement.

This document is governed by the Disaster Mitigation Act of 2000 (DMA 2000) and its implementing regulations (44 CFR §201.6, published on February 26, 2002). Local jurisdictions must comply with the DMA 2000 and these regulations in order to remain eligible for funding and technical assistance from the state and federal hazard mitigation programs. Local mitigation plans must include, at a minimum, (1) an action plan to mitigate hazards, risks and vulnerabilities, and (2) a strategy to implement those actions.

1.3 SCOPE

The implementation actions within this MHP apply to Northumberland County and any municipality that adopts this HMP as their own. However, only those municipalities that have participated in the plan's creation process will remain eligible for state and federal funding for implementing the HMP. For the purpose of this planning process, municipal participation was defined as the submission of municipality-specific information (e.g. completing a Risk Assessment Update Worksheet or Capability Assessment Survey), and attendance by a municipal official at a planning or public meeting conducted as part of the planning process.

1.4 REFERENCES

Existing plans and studies were reviewed and integrated in the updated HMP. The County Comprehensive Plan, located in the Pennsylvania e-Library website, was incorporated into multiple aspects of this HMP. Information from the Comprehensive Plan and other documents were used to formulate the County profile, to identify the history of individualized hazards, and to detail the population projections in Northumberland County. For a list of all resources, refer to Appendix I.

SECTION 2.
COMMUNITY PROFILE

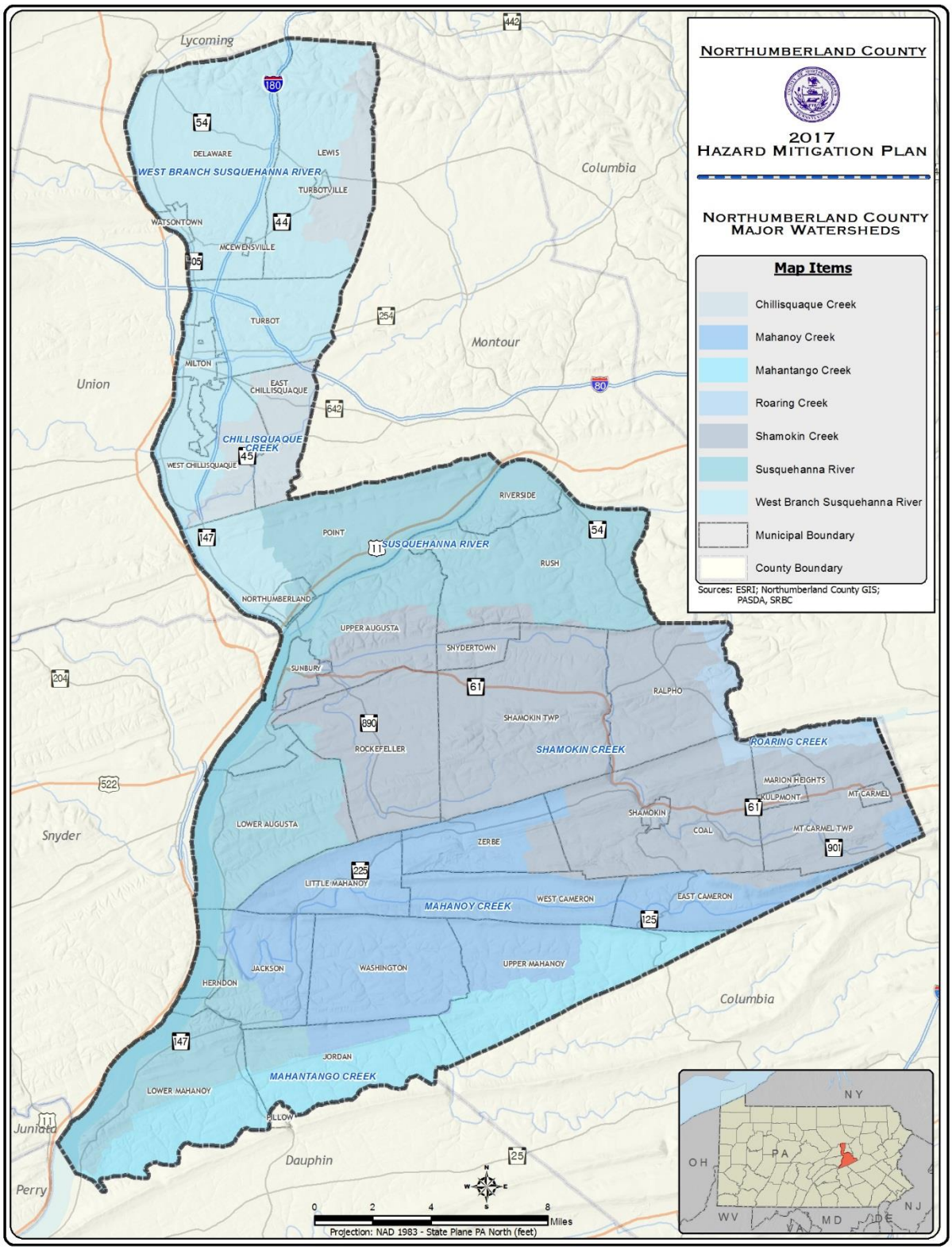
2.1 GEOGRAPHY AND ENVIRONMENT

Northumberland County is centrally located within the Commonwealth of Pennsylvania, covering nearly 478 square miles. It is bordered to the north by Lycoming County, to the northeast by Montour County, to the east by Columbia County, to the southeast by Schuylkill County, to the south by Dauphin County, to the southwest by Perry County, and to the west by Juniata, Snyder and Union Counties.

A diverse assortment of physical and environmental features comprises the entirety of modern day Northumberland County. Stretching nearly 40 miles in length and up to 25 miles in width, you will find a landscape characterized by steep slopes, deep river valleys, and abundant farms and forestlands.

The county lies within the Susquehanna River Basin, whose primary tributaries include, but are not limited to, the West Branch Susquehanna River, and the Chillisquaque, Shamokin and Mahanoy Creeks (figure 2.1-1). Recreational opportunities are abundant along water ways; Milton State Park (82 acres) and Shikellamy State Park (131 acres) are both ample and provide for a variety of outdoor activities: biking, boating, fishing, hiking, picnicking and camping. The county also includes 12,000 acres of State Game Lands accessible from five different locations throughout its entirety. The Anthracite Outdoor Adventure Area, established in 2014, leases approximately 6,500 acres of coal and forest lands in the lower half of Northumberland County for exploration by foot, vehicle or even on horseback.

Figure 2.1-1: Watersheds of Northumberland County (Northumberland County GIS; SRBC, 2017)



2.2 COMMUNITY FACTS

Historically, the settlement of Northumberland County was focused on the proximity to waterways and later by the development of the transportation corridors still utilized today.

Once a system of trade routes, Native American inhabitants carved out the paths that have since been transformed into the well-traveled and interconnected roadways that connect Northumberland County's vast area. By 1885, Susquehanna River Canal and roadway construction was complete, thereby removing much of the heavy, bulky freight from these primary roadways. As the rural areas of Northumberland County grew and prospered, settlements and small towns sprang up. Because Sunbury's location at the fork of the Susquehanna River, it quickly became the hub of Northumberland County and remains the County Seat today.

The demand for anthracite coal led to a booming economy and growing rail system for Northumberland County until the beginning of the twentieth century when, plagued by work strikes and environmental legislation, new energy sources appeared and the anthracite coal industry began a rapid decline. When the demand for coal dropped off, the railroads went into decline and every rail line in the County went bankrupt since there was not enough industry replacing coal to keep up the demand for rail service (adapted from the Northumberland County Comprehensive Plan, 2005).

Today, the County includes 23 townships, 11 boroughs, and the Cities of Shamokin and Sunbury. Transportation routes in the northern portion of the County are concentrated on Interstate 80 and U.S. Route 11 for east and westbound travels, as well as U.S. Route 15 and PA Route 147 for north and south destinations. Southern extents of the County heavily utilize PA Route 54. The major population centers within the County are primarily located at the intersection of at least two major roadways such as U.S. Route 11 and PA Route 147 or PA Routes 61, 125 and 225. The largest of these urbanized areas is the City of Sunbury along the western boundary of the County.

Major population centers outside of Northumberland County include the Williamsport Metropolitan Area, approximately 20 miles north in Lycoming County; the City of Harrisburg, approximately 50 miles south; the Scranton/Wilke Barre Metropolitan Area, 60 miles northeast; and the greater Philadelphia region, located 130 miles southeast.

Service industries such as health services, education services, and other personal and business services are the largest employers in Northumberland County, with manufacturing and retail trade also being strong economic forces.

2.3 POPULATION AND DEMOGRAPHICS

Population and demographic information provides baseline data about residents. Changes in demographics or population are often used to identify higher-risk populations. Maintaining up-to-date data on demographics will allow the County to better assess magnitudes of hazards and develop more specific mitigation plans. Baseline demographic information for Northumberland County is illustrated here in Table 2.3-1.

DEMOGRAPHICS	2010 Census
Total population	94,528
Male	47,195 *(49.9%)*
Female	47,333 *(50.1%)*
Median age (years)	43.4
Under 5 years	5,273 *(5.6%)*
18 years and over	75,085 *(79.4%)*
65 years and over	17,516 *(18.5%)*

Table 2.3-1 Baseline Demographic Information

Based on figures from the 2010 Census, Northumberland County has a population of 94,528 persons. This results in a population density of 206.2 persons per square mile, which is considerably lower than the Pennsylvania statewide average of 283.9 persons per square mile. The population number from the 2010 Census at the municipal level indicates that the most highly populated municipality in Northumberland County is Coal Township (10,383 persons), with Sunbury City (9,905), Shamokin City (7,374), Milton Borough (7,042) and Mount Carmel Borough (5,893) ranking as the next highest in population.

A low population density means that people are dispersed throughout the County rather than being concentrated in a few specific regions. Distributing information, instructions and resources in a low-density area, such as Northumberland County, is more difficult because individuals are not centralized.

However, a low population density also helps prevent hazards from affecting as many people. For example, diseases may not spread as quickly because there is less contact among people. Although, both older and younger populations have higher risks for contracting certain diseases, the dispersed population lowers this risk. The County's combined populations who are under 5 years and over 65 years of age represent approximately 24 percent of its total population.

Similarly, to the above paragraph, fires are less likely to spread to other structures because of the large distances between them. This also causes the same issues with the volunteer responders that are dispatched to these emergencies. Diminishing number of volunteers and consolidations of departments lead to greater distances that the responders must travel to respond to the scene. Fortunately, the magnitude of an event is typically smaller in a less populated area because each event affects fewer people and properties.

The median age for residents is 43.3 years old, and over 18 percent of Northumberland County's population is 65 or older. Some of these elderly residents may have functional needs. For example, many may be unable to drive; therefore, special evacuation plans may need to be created for them. They may also have hearing or vision impairments that could make receiving emergency instructions difficult. Many people even entire

communities rely on the use of older technology such as a phone call or a standard mailing for notification. The use modern technology is growing but can only be used to the extent limited by the end users.

Northumberland County as a whole has seen its population level off between the 2000 and 2010 Censuses, declining by just 28 people (.03%). The population is expected to remain in decline, though at a slightly greater rate. It is projected that by the year 2040, Northumberland County will have a population of just under 93,000, which is approximately 1.65 percent less than the 2010 Census population. Many municipalities are expecting to deal with a substantial population loss (primarily the cities and boroughs), yet the more rural communities within Northumberland County are destined for significant population growth. Some structures may become vacant and infrastructure will age, since there will be little new development that would require infrastructure updates. It is important that the County properly maintains its existing infrastructure and has plans to manage or redevelop vacant properties, focusing on best practices to mitigate potential hazards.

Population By Municipality

	2000 Census	2010 Census	Population Change 2000-2010 (%)	2020 Projection *	2030 Projection *	2040 Projection *	Projected Population Change 2010 - 2040 (%)
COAL Township	10,628	10,383	-2.31%	10,681	10,669	10,835	4.35%
DELAWARE Township	4,341	4,489	3.41%	4,737	4,928	5,151	14.75%
EAST CAMERON Township	686	748	9.04%	797	854	907	21.26%
EAST CHILLISQUAQUE Township	664	668	0.06%	661	660	656	-1.80%
HERNDON Borough	383	324	-15.40%	295	268	240	-25.93%
JACKSON Township	928	875	-5.71%	900	880	886	1.26%
JORDAN Township	761	794	4.34%	759	763	745	-6.17%
KULPMONT Borough	2,985	2,924	-2.04%	2,756	2,649	2,508	-14.23%
LEWIS Township	1,862	1,915	2.85%	1,927	1,962	1,984	3.60%
LITTLE MAHANOY Township	435	479	10.11%	500	534	560	16.91%
LOWER AUGUSTA Township	1,079	1,064	-1.39%	1,089	1,091	1,106	3.95%
LOWER MAHANOY Township	1,586	1,709	7.76%	1,714	1,787	1,821	6.55%
MARION HEIGHTS Borough	735	611	-16.87%	556	506	453	-25.86%
MCEWENSVILLE Borough	314	279	-11.15%	287	271	269	-3.58%
MILTON Borough	6,650	7,042	5.89%	7,155	7,428	7,609	8.05%
MOUNT CARMEL Borough	6,390	5,893	-7.78%	5,363	4,880	4,370	-25.84%
MOUNT CARMEL Township	2,701	3,139	16.22%	3,339	3,675	3,934	25.33%
NORTHUMBERLAND Borough	3,714	3,804	2.42%	3,759	3,791	3,780	-0.63%
POINT Township	3,722	3,685	-0.99%	3,815	3,850	3,940	6.92%
RALPHO Township	3,764	4,321	14.80%	4,639	5,094	5,470	26.59%
RIVERSIDE Borough	1,861	1,932	3.82%	1,888	1,910	1,894	-1.97%
ROCKEFELLER Township	2,221	2,273	2.34%	2,405	2,491	2,604	14.56%
RUSH Township	1,189	1,122	-5.63%	1,146	1,118	1,119	-0.27%
SHAMOKIN City	8,009	7,374	-7.93%	6,710	6,106	5,468	-25.85%
SHAMOKIN Township	2,159	2,407	11.49%	2,777	3,078	3,418	42.00%
SNYDERTOWN Borough	357	339	-5.04%	308	285	258	-23.89%
SUNBURY City	10,610	9,905	-6.64%	9,014	8,202	7,345	-25.85%
TURBOT Township	1,677	1,806	7.69%	1,765	1,821	1,821	0.83%
TURBOTVILLE Borough	691	705	2.03%	720	735	749	6.24%
UPPER AUGUSTA Township	2,556	2,586	1.17%	2,527	2,519	2,483	-3.98%
UPPER MAHANOY Township	599	796	32.89%	868	1,011	1,114	39.95%
WASHINGTON Township	660	746	13.03%	806	880	947	26.94%
WATSONTOWN Borough	2,255	2,351	4.26%	2,361	2,420	2,451	4.25%
WEST CAMERON Township	517	541	4.64%	546	561	571	5.55%
WEST CHILLISQUAQUE Township	2,846	2,627	-7.70%	2,391	2,175	1,948	-25.85%
ZERBE Township	2,021	1,872	-7.37%	1,782	1,658	1,554	-16.99%
NORTHUMBERLAND County	**94,556**	**94,528**	**-0.03%**	**93,743**	**93,510**	**92,968**	**-1.65%**

Table 2.3-2 Northuberland County Population by Municipality

Approximately 4 percent of Northumberland County's population speaks a language other than English (see Table 2.3-3). Hazard mitigation strategies will need to address language barriers to ensure that all residents can receive emergency guidelines.

RACE AND ETHNICITY	2015
One race	99.00%
White	95.40%
Black or African American	2.00%
American Indian and Alaska Native	0.20%
Asian or Pacific Islander	0.40%
Some other race	1.00%
Two or more races	1.00%
Foreign born	1.30%
Speak a language other than English	4.20%
Hispanic or Latino	1.60%

Table 2.3-3 Race and Ethnicity in Northumberland County

Northumberland County has over 45,000 residential properties (see Table 2.3-4). These properties may be vulnerable to various natural hazards, particularly flooding and windstorms. Damage to residential properties is not only expensive to repair, but also devastating to the displaced individuals. Almost 2.3 percent (894) of these occupied residential properties are mobile homes, which can easily become a problem in the event of a flood, especially when considering almost 300 of those homes are located in flood zones.

HOUSING CHARACTERISTICS	2015
Total housing units	45,125
Owner-occupied housing units	28,413
Renter-occupied housing units	10,829
Vacant housing units	5,883
Median value (dollars)	82,300

Table 2.3-4 Housing Charateristics in Northumberland County

Approximately 13 percent of the County's residential properties are vacant. Vacant buildings are particularly vulnerable to arson and criminal activity. Since most vacant properties are not maintained, many are structurally deficient and potentially hazardous at both the municipal and county levels.

An estimated 24 percent of the County's population are renters and are typically more transient homeowners; therefore, communicating with renters may be more problematic. Similarly, tourists would be a more difficult population cluster to connect with during an emergency event. Communication strategies should be developed to ensure that these populations are given proper and timely notice.

ECONOMIC CHARACTERISTICS	2015
Median household income	$42,406
Median family income	$55,138
Per capita income	$23,291

Table 2.3-5 Economic Charateristics

The median household income in the County is $42,406 (see Table 2.3-5), which is 21% lower than the Commonwealth of Pennsylvania's median household income of $53,599. The County's per capita income of $23,291 is nearly 22% lower than the Commonwealth's per capita income of $29,291. The Commonwealth has a poverty rate of 13.5%; in Northumberland County alone, 13.8% of individuals are at poverty level.

2.4 LAND USE AND DEVELOPMENT

The population of Northumberland County is currently in decline at the same time housing units are increasing. This indicates sprawl, from what is historically the more densely populated hubs outward, as these cities and boroughs are certainly the most emigrated areas.

The County's 2005 Comprehensive Plan details its land use goals and objectives. The following goals and objectives are most closely related to HMP activities.

Environmental and Open Space Goal: Preserve natural features and conserve environmental resources throughout Northumberland County, to protect and improve environmental quality, and to preserve open space in suitable locations and quantities.

Objectives:

- Preserve and protect wetlands and floodplains.
- Conserve forested lands and steep slopes.
- Use natural features, environmental and physical factors, and development boundaries.
- Establish a continuous, interconnected network of stream valleys, slopes, and wooded areas in an open space system.
- Provide adequate open space in residential areas, particularly in densely settled communities.

Community Facilities Goal: Provide facilities and services to Northumberland County residents in the areas of health, protection, cultural enrichment, education, recreation and social services, commensurate with the needs of the population.

Objectives:

- Increase and maintain health service and emergency facilities to meet the present and future needs of the population.
- Develop and maintain modern fire, police and emergency medical service systems.
- Increase educational opportunities to meet the need for skilled and professional workers.
- Provide recreation facilities in types and abundance to meet the needs of County residents.
- Implement the Rails to Trails program.
- Support the changing social services needs of the diverse population.
- Expand, improve and maintain the water supply, sanitary sewerage, storm water management and solid waste systems to serve present and future development.
- Expand public utility systems in accordance with economic and environmental constraints and needs.
- Utilize multiple use right of ways to minimize land consumption.
- Preserve land/sites of historic and architectural value in the County.

Figure 2.4-1: Northumberland County Land Use 2005

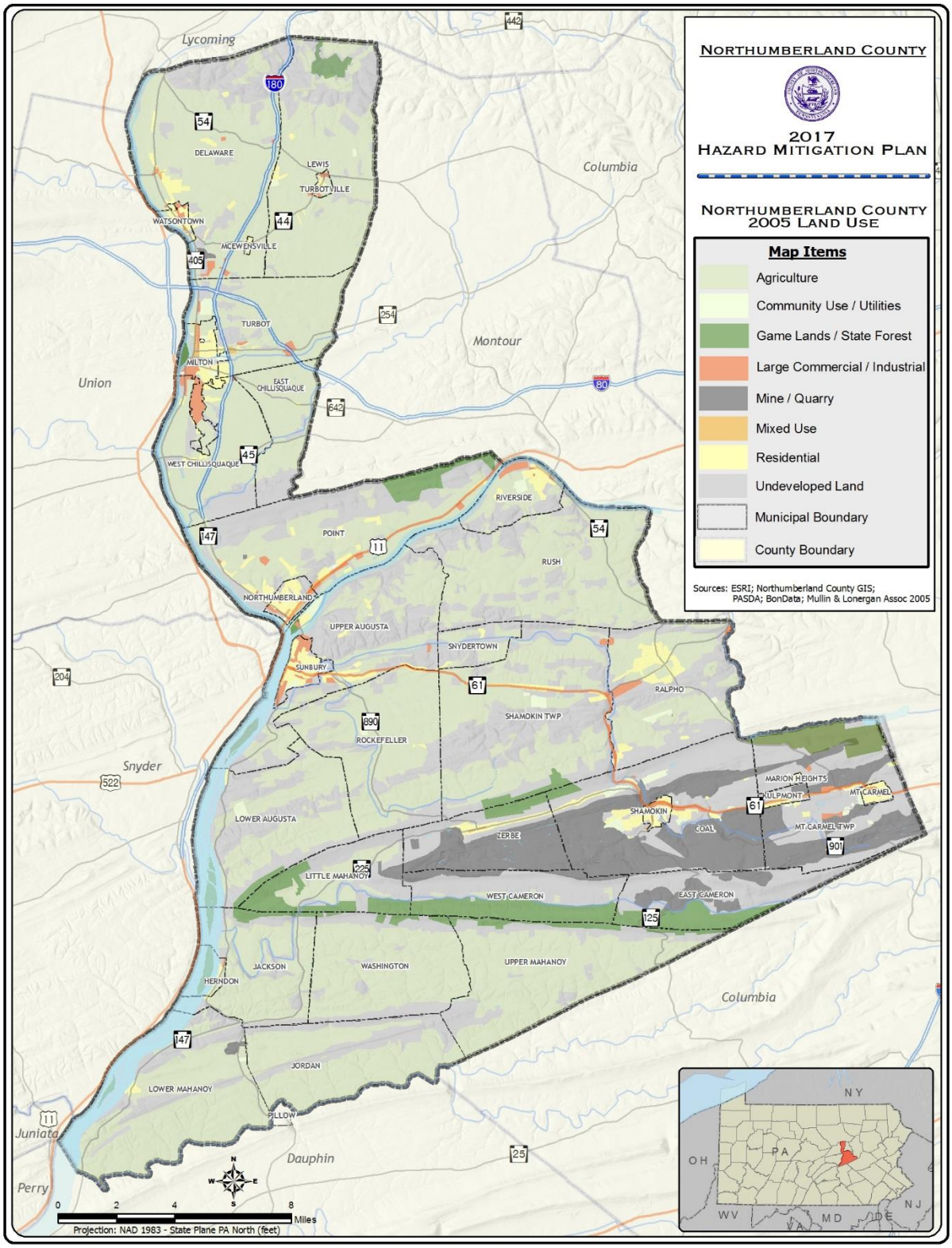
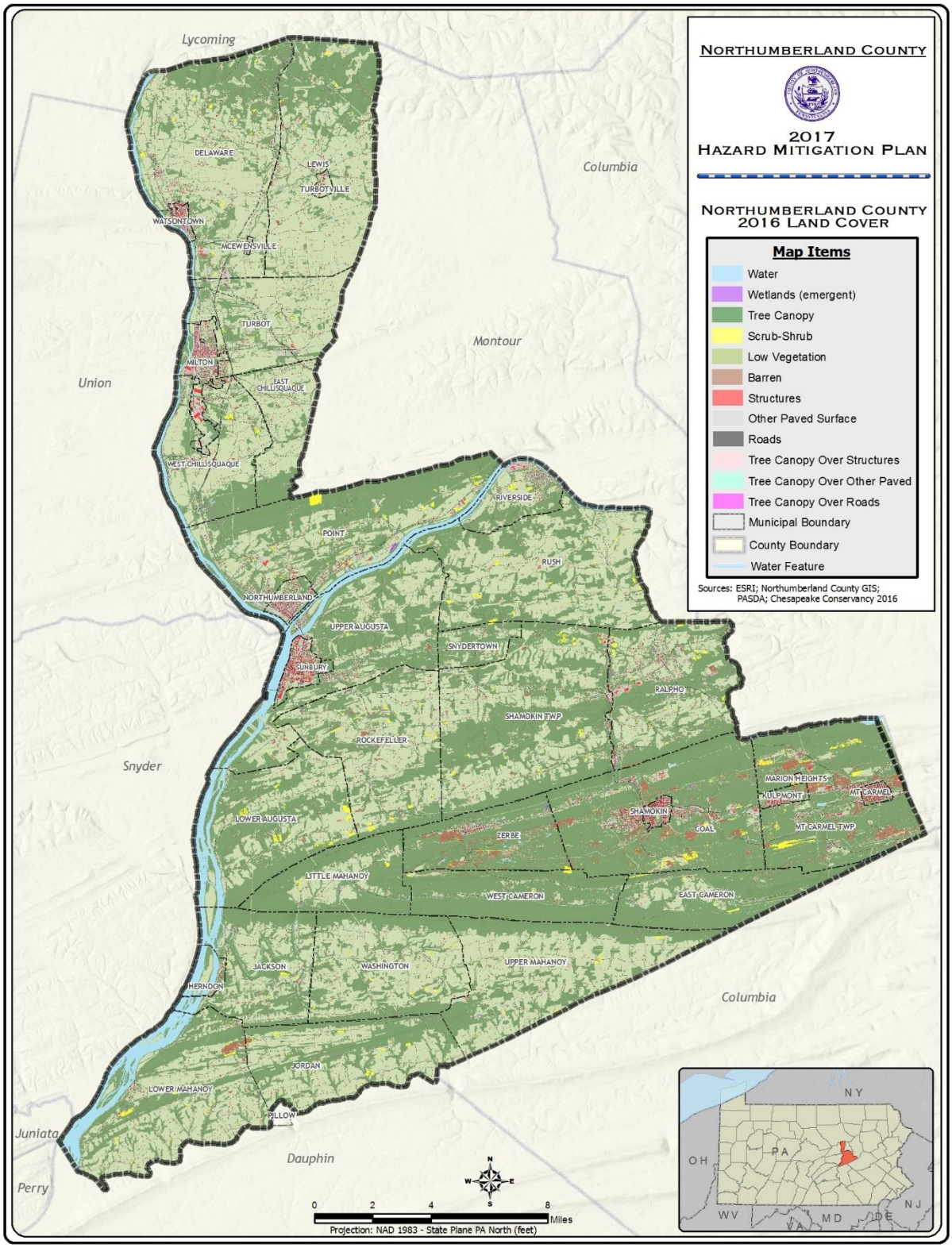


Figure 2.4-2: Northumberland County Land Cover 2016



SECTION 3. PLANNING PROCESS

3.1 PROCESS AND PARTICIPATION SUMMARY

A successful planning process builds partnerships and brings together members representing government agencies, the public and other stakeholders to reach a consensus on how the community will prepare for and respond to the hazards that are most likely to occur. Applying a comprehensive and transparent process adds validity to the HMP. Those involved gain a better understanding of the problem or issue and how solutions and actions were developed. The result is a revised set of common community values and widespread support for directing financial, technical and human resources to an agreed upon action. The planning process was an integral part of creating and revising the HMP. This section describes the planning process used to revise the Northumberland County HMP. The Planning Team sent a capability assessment survey, a modified version of the survey used to create the original plan, to 36 municipalities and two independent sewer authorities (Sunbury Municipal Authority and Milton Regional Sewer Authority) located in the County. This modified survey still included a portion that measures participation in the National Flood Insurance Program. Of the 38 surveys sent, 21 entities responded by the advertised due date.

To create the original Northumberland County HMP, the County contracted with Delta Development Group, Inc., who in turn contracted Michael Baker, Jr., Inc. for specific data. During the revision, the County assembled a planning team that carried out the functions previously outsourced by contract.

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

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

The standard planning process used in Pennsylvania to create and update HMP's is described in the Pennsylvania's All-Hazard Mitigation Planning Standard Operating Guide and was referenced or used during the review of the existing Northumberland County HMP.

Public participation and planning meetings served as the main forums for gathering information to update the HMP. The Planning Team afforded access to the information in relevant and approved plans, policies and procedures for Northumberland County. Opportunities for public participation included attending public meetings, completing written surveys, and reviewing and commenting on the existing plan and other documents. Meeting, surveys and teleconferences were used to gather input from County, municipal and other stakeholders to update all sections of the HMP. Through this process, the County was able to establish a comprehensive approach to reducing the effects of hazards on the County and its municipalities.

3.2 THE PLANNING TEAM

The County's Planning Team consists of the following members:

- Eric Wendt, Northumberland County Department of Information Technology
- Keith Ayers, Northumberland County GIS
- Douglas Diehl, Borough of Milton
- Chuck Hopta, Northumberland County Engineer
- Stephen Jeffrey, Northumberland County Department of Public Safety
- Jason Zimmerman, Northumberland County Department of Public Safety
- Lori Smoogen, Northumberland County Department of Finance
- Jane Gaugler, Northumberland County Planning Department
- Tiffany Kaseman, Northumberland County Assessment Bureau

Mr. Wendt and Mr. Ayers served as the County's primary points of contact for the mitigation planning process.

The Planning Team acknowledged that identifying hazards that specifically affect Northumberland County and assessing their likelihood of occurrence, and the potential damage to the people, property and environment of the County, was one of the most important steps in updating the HMP. The Planning Team chose to focus on all-hazards as listed in the Pennsylvania State Hazard Mitigation Plan, as opposed to narrowing its focus on only hazards with moderate to high frequency within the County.

3.3 MEETINGS AND DOCUMENTATION

The Planning Team held the following meetings during the update process of the County HMP.

Each meeting was followed by detailed meeting minutes that documented all discussion, decisions and unmet needs identified during the meetings; these minutes were shared among the Planning Team and can be found in Appendix A. County residents were informed of public meetings through various sources, including newspapers, press releases and announcements on the website. Comments received from the public were incorporated into the updated HMP.

MEETING DATE	PUBLIC OUTREACH MEETING TYPE	DESCRIPTION
9/15/2016	YES - Public Kickoff	Kick-off Meeting: with the Planning Team, municipalities, school districts and other stake-holders
10/20/2016	YES - Public	2nd Meeting: Informational meeting to discuss the update process
12/14/2016	NO - Planning Committee	3rd Meeting: Informational meeting to discuss the update process, progress and document sharing
1/11/2017	NO - Planning Committee	4th Meeting: Informational meeting to discuss the capability assessment surveys recently mailed, update process and future tasks/meeting dates
2/8/2017	NO - Planning Committee	5th Meeting: Informational meeting for municipalities and stakeholders, with particular attention to questions about the capability assessment survey, and review of future meeting dates.
3/8/2017	YES - Planning Committee	6th Meeting: Informational meeting for municipalities and stakeholders, with particular attention to questions about the capability assessment survey, and review of future meeting dates.
3/23/2017	YES - Public Cap. & Risk	7th Meeting: Northern section public meeting to review risk assessment, the HMP update process, and address public concerns or questions
3/30/2017	YES - Public Cap. & Risk	8th Meeting:2017 - Southern section public meeting to review risk assessment, the HMP update process, and address public concerns or questions
4/12/2017	NO - Planning Comm. w/ FEMA	9th Meeting - Planning Review meeting with a FEMA representitive to make sure that our process and direction is correct
5/10/2017	NO - Planning Committee	10th Meeting - Planning Staus\Review
6/7/2017	NO - Planning Committee	11th Meeting - Planning Staus\Review
6/21/2017	YES - Public Review Meeting	12th Meeting - This is the final after business hours public, Stakeholder, and Municipal input and review session before submission
6/28/2017	NO - Planning Committee	13th Meeting - This is the final planning committee meeting to finalize any plan changes before submission. We did open this meeting up to the public, Stakeholders, and Municipalities as a last effort to draw participation.

Table 3.3-1 Public and Planning Meetings

3.4 PUBLIC AND STAKEHOLDER PARTICIPATION

To maximize the effectiveness of the HMP, the Planning Team sought continual public and stakeholder engagement. Public input was encouraged and collected through a variety of methods. A capability assessment survey, a modified version of the survey used to create the original plan, was sent to 36 municipalities and two independent sewer authorities (Sunbury Municipal Authority and Milton Regional Sewer Authority) located in the County. Twenty-One of the municipalities and the two sewer authorities returned updated or new information within the surveys they completed; their input was reviewed and incorporated into the updated HMP.

Local, state and federal agencies, neighboring jurisdictions, local businesses, community leaders, educators, and other relevant private and nonprofit groups that had a vested interest in the development of the HMP were not only given the opportunity to participate in the original planning process, but also the update being conducted by the Planning Team. Appendix A includes copies of public notifications that were distributed. In addition to the local municipalities, school districts and the planning team, representatives were in attendance from the following stakeholder groups:

2017 Update Participants

- Michaels Foods
- Aqua PA
- Merck-Cherokee Pharmaceuticals
- Pennsylvania Department of Transportation
- Sunbury Municipal Authority
- Weis Markets
- Pennsylvania Emergency Management Agency
- American Red Cross
- North Shore Railroad

Through public notices, the above groups and the general public were invited to review the HMP on the project website:
http://publicsafety.norrycopa.net/index.php/ema/hazard-mitigation

Anyone viewing the HMP, or information about the update process, was encouraged to send comments to the Northumberland County EMA. Public meetings were also advertised and held in two convenient locations (Sunbury and Milton) to afford the public a chance to meet team members and become further educated through handouts and agendas. Copies of the advertisements can be found in Appendix A, immediately following the copy of materials used at the respective meetings. Notices for all of the other scheduled Planning Team meetings were advertised on the website mentioned in this section; that site encouraged all stakeholders to attend.

Section 3.5 includes a table showing overall municipal participation in the planning process. As illustrated, the Planning Team felt that jurisdictional and stakeholder participation was critical to the process. The Planning Team met regularly to review the

status of the HMP and strategies to involve the public. The Planning Team also individually contacted various municipalities to elicit feedback on various sections of the HMP.

3.5 MULTI-JURISDICTIONAL PLANNING

Northumberland County took a multi-jurisdictional approach to preparing its HMP, in that the HMP will apply to the County and to all participating municipalities. The County was able to provide resources (data, GIS, surveys, etc.) to which the municipalities may not have had access. However, the County was dependent on the municipal buy-in, since the municipalities have the legal authority to enforce compliance of land use planning and development issues. The County undertook an intensive effort to involve all 36 municipalities in the HMP update process. Each municipality was given the opportunity to participate: municipal officials and representatives were invited to attend meetings, they were asked to comment on the HMP posted on the website listed in section 3.4, and they were provided a capability assessment survey where they could create and prioritize mitigation actions. The Planning Team had an objective to make contact with all municipalities that had not returned the survey; team members contacted those municipalities via telephone in an effort to get a completed survey submitted. Aside from the initial letter inviting the municipalities to attend the kick-off meeting, a letter also accompanied the survey that gave the dates of upcoming meetings they could attend to gain information about the update process and possibly get help for completing the survey. A risk assessment review meeting and public draft review meeting were also advertised by the Planning Team to give all municipalities and stakeholders the chance to review vital data collected and to see the update version of the HMP that would be eligible for adoption.

The Planning Team's multi-jurisdictional approach also cast the net wider, attempting to involve neighboring counties when gathering input and data. The team specifically targeted the Planning, GIS and EMA employees of the seven neighboring counties that are in frequent contact with Northumberland County's similar departments. The Planning Team relied on the existing professional relationships between the counties to provide an easy channel for discussion; many of these departments are in contact daily via email. Although some team members were able to make an on-site visit to Columbia County for review and discussion of their plan, the only other county to make contact constructively was Lycoming County.

Table 3.5-1 reflects the efforts put forth by the Planning Team and the efforts extended by any of the 36 municipalities. This table represents all efforts by which the team made contact but also doubles as showing which municipalities returned viable data which meets requirements the applied to the HMP development and update.

Surveys Completed & Meeting Attendance

Label Meanings
(X) Yes

2017 Participation

	Plan and Regulations Status	Capabilities Assessment	Hazard and Risk Evalution	Mitigation Goals, Objectives, Actions	Kick-Off Meeting September 15, 2016	Mitigation Meeting October 19, 2017	Planning Meeting December 14, 2016	Planning Meeting January 11, 2017	Planning Meeting February 08, 2017	Planning Meeting March 08, 2017	Capability & Risk Assessment Meeting Marc	Capability & Risk Assessment Meeting Marc	Planning Meeting April 12, 2017	Planning Meeting May 10, 2017	Planning Meeting June 07, 2017	Mitigation Action Review Public & Stake Hold	Draft Final Review for Public, Municipalities,	Telephone Meeting	Email Correspondance Participation	Plan Adopted	Adoption Year
COAL Township	X	X	X																	X	2012
DELAWARE Township	X	X	X																		
EAST CAMERON Township																					
EAST CHILLISQUAQUE Township	X	X	X							X										X	2012
HERNDON Borough	X	X	X													X				X	2012
JACKSON Township																				X	2012
JORDAN Township					X	X														X	2012
KULPMONT Borough	X	X	X																	X	2012
LEWIS Township	X	X	X																	X	2012
LITTLE MAHANOY Township	X																				
LOWER AUGUSTA Township	X	X	X																		
LOWER MAHANOY Township																					
MARION HEIGHTS Borough																					
MCEWENSVILLE Borough	X																			X	2012
MILTON Borough	X	X	X		X		X	X	X	X	X	X	X	X	X	X				X	2012
MILTON REGIONAL SEWER AUTHORITY	X	X	X																		
MOUNT CARMEL Borough																					
MOUNT CARMEL Township	X	X																			
NORTHUMBERLAND Borough	X	X	X																	X	2012
POINT Township	X	X	X													X			X	X	2012
RALPHO Township					X												X			X	2012
RIVERSIDE Borough	X																			X	2012
ROCKEFELLER Township																				X	2012
RUSH Township	X	X	X																		
SHAMOKIN City																				X	2012
SHAMOKIN Township	X	X	X		X				X											X	2012
SNYDERTOWN Borough																					
SUNBURY City	X	X	X		X											X			X	X	2012
SUNBURY MUNICIPAL AUTHORITY	X	X	X		X				X											X	2012
TURBOT Township																				X	2012
TURBOTVILLE Borough	X	X	X																	X	2012
UPPER AUGUSTA Township	X	X	X		X											X	X			X	2012
UPPER MAHANOY Township																					
WASHINGTON Township																					
WATSONTOWN Borough	X	X	X														X	X			
WEST CAMERON Township																					
WEST CHILLISQUAQUE Township	X								X											X	2012
ZERBE Township																				X	2012
American Red Cross					X																
North Shore Railroad					X																
FEMA													X								
PEMA					X	X															
Michael Foods					X																
Line Mountain School District					X																
Weis Markets					X	X															
PennDOT					X											X					
MERCK-Cherokee					X																
Sunbury EMA					X																
Sunbury Code Enforcement					X																
Sunbury Council					X																
Northumberland County DPS					X	X	X	X	X	X	X	X	X	X	X	X					
Northumberland County staff					X	X	X	X	X	X	X	X	X	X	X	X					
Shikallemy School District					X																
Lycomming County Planning														X							
Aqua-PA					X																
News Media															X						
Commissioners																X					
Residents															X						

Table 3.5-1: Worksheets | Sureveys Completed Meeting Attendance | Plan Adoption

3.6 FUTURE PLANNING EFFORTS

Along with the Local Agencies and County Department, various Regional Agencies and Authorities were invited the planning process. Action #34 was created to help keep and open dialog with these Agencies as well as focus on reaching out to gather more participation from the ones that did not actively participate.

SECTION 4.
RISK ASSSESSMENT

4.1 UPDATE SUMMARY

The risk assessment provides a factual basis for activities proposed by the County in its mitigation strategy. Hazards that may affect Northumberland County are identified and defined in terms of location and geographic extent, magnitude of impact, previous events and likelihood of future occurrence. The hazard profile structure is similar to that used in the 2012 process, and significant information in the previous plan has been incorporated and/or updated in the 2017 HMP update.

The Planning Team identified natural and human-made hazards that have the potential to impact Northumberland County. The occurrence of a past hazard event in the County provided an indication of future possible incidence, but the fact that a hazard event has not previously occurred did not exclude the hazard for further investigation. Similarly, limited past occurrences of hazard events did not by themselves warrant a hazard's inclusion in the HMP.

Following hazard identification and profiling, a vulnerability assessment was performed to identify the impact of natural or human-caused hazard events on people, buildings, infrastructure and the community. Each natural and human-made hazard is discussed in terms of its potential impact on individual communities in Northumberland County, including the types of parcels and critical facilities that may be at risk. The assessment allows the County and its municipalities to focus on mitigation efforts on areas most likely to be damaged or most likely to require early response to a hazard event.

Section 4.2 provides a summary of previous disaster declarations affecting Northumberland County as well as a review of hazards identified as having the potential to impact the County in 2017. Only the most current and credible sources were used to complete the hazard profiles included in Section 4.3; see citations and Appendix I for source details.

4.2 HAZARD IDENTIFICATION

Table of Presidential Disaster Declarations

Presidential Disaster and Emergency Declarations are issued when it has been determined that state and local governments need assistance in responding to a disaster event. Table 4.2.2-1 identifies 15 Presidential Disaster and Emergency Declarations issued between 1955 and June 2017 that have affected Northumberland County. Additional declarations beyond June 2017 can be found on the FEMA website.

DECLARATION NUMBER	DATE	EVENT
3356	29-Oct-12	Hurricane Sandy Response and Recovery
4030	1-Sep-11	Remnants of Tropical Storm Lee
3180	1-Feb-07	Severe Winter Storm
1649	1-Jun-06	Severe Storms, Flooding, and Mudslides
3235	1-Sep-05	Proclamation of Emergency - Hurricane Katrina
1557	1-Sep-04	Tropical Depression Ivan
1298	1-Sep-99	Tropical Depression Dennis, Flash Flooding
1093	1-Jan-96	Flooding
1085	1-Jan-96	Blizzard
1015	1-Mar-94	Winter Storm, Severe Storm
3105	1-Mar-93	Blizzard
737	1-May-85	Tornado
523	1-Oct-76	Severe Storms, Flooding
485	1-Sep-75	Severe Storms, Heavy Rains, Flooding
340	1-Jun-72	Flood, Tropical Storm Agnes

Table 4.2.2-1: Presidental Disaster and Emergency Declarations Affecting Northumberland County

In addition to these federally declared events, 23 events warranted Gubernatorial Proclamations of Emergency, which are listed in table 4.2.2-2.

Northumberland County was also offered Small Business Administration Disaster Assistance for the September 2003 Hurricane Isabell/Henri disaster event. This disaster qualifies communities for affordable, timely and accessible financial assistance.

Since 1955, declarations have been issued for a variety of hazard events, including hurricanes, tornadoes, severe winter storms and flooding. A unique Presidential Emergency Declaration was issued in September 2005; through Emergency Declaration 3235, President George W. Bush

DATE	TYPE
2016	Proclamation of Emergency - Severe Winter Storm
2015	Proclamation of Emergency - Severe Winter Storm
2015	Proclamation of Emergency - Severe Winter Storm
2014	Proclamation of Emergency - Severe Winter Storm
2012	Proclamation of Emergency - Severe Winter Storm
2012	Proclamation of Emergency - Severe Winter Storm
2011	Proclamation of Emergency - Severe Winter Storm
2007	Proclamation of Emergency - Severe Winter Storm
2007	Proclamation of Emergency - Severe Winter Storm
2007	Proclamation of Emergency - Regulations
2006	Proclamation of Emergency - Tropical Depression Ernesto
2003	Hurricane Isabel/Henri , Related Storms and Flooding
1999	Hurricane Floyd
1999	Drought
1995	Drought
1994	Severe Winter Storms
1978	Blizzard
1978	Heavy Snow
1974	Truckers' Strike
1972	Heavy Snow
1966	Heavy Snow
1963	Drought
1955	Drought

Table 4.2.2-2: Northumberland County Gubernatorial of Emergency

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 who were evacuated from their homes due to Hurricane Katrina. All counties within Pennsylvania, including Northumberland County, were indirectly affected by Hurricane Katrina as a result of evacuee assistance.

Summary of Hazards

The Planning Team was provided the Pennsylvania Standard List of Hazards to be considered for evaluation in the update process for the 2017 HMP. The Planning Team decided that the 2017 plan should identify and analyze 33 hazards when surveying Northumberland County municipalities. This a combination of previously analyzed hazards and those included in the most recent survey. Although these hazards appeared in the survey they were not profiled in the updated plan: avalanche, coastal erosion, tsunami and volcano.

The following is a list of the 28 hazards that have the potential to impact Northumberland County as identified through input from those who participated in the 2017 planning process and information available in the 2013 State Hazard Mitigation Plan.

Natural Hazards

Drought – *Drought is a natural climatic condition which occurs in virtually all climates, the consequence of a natural reduction in the amount of precipitation experienced over a long period of time, usually a season or more in length. High temperatures, prolonged winds, and low relative humidity can exacerbate the severity of drought. This hazard is of particular concern in Pennsylvania due to the presence of farms as well as water-dependent industries and recreation areas across the Commonwealth. A prolonged drought could severely impact these sectors of the local economy, as well as residents who depend on wells for drinking water and other personal uses. (National Drought Mitigation Center, 2006*).

Earthquake - *An earthquake is the motion or trembling of the ground produced by sudden displacement of rock usually within the upper 10-20 miles of the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of underground caverns. Earthquakes can affect hundreds of thousands of square miles, cause damage to property measured in the tens of billions of dollars, result in loss of life and injury to hundreds of thousands of persons, and disrupt the social and economic functioning of the affected area. Most property damage and earthquake-related deaths are caused by the failure and collapse of structures due to ground shaking which is dependent upon amplitude and duration of the earthquake. (FEMA, 1997).*

Extreme Temperature - *Extreme cold temperatures drop well below what is considered normal for an area during the winter months and often accompany winter storm events. Combined with increases in wind speed, such temperatures in Pennsylvania can be life threatening to those exposed for extended periods of time. Extreme heat can be described as temperatures that hover 10°F or more above the average high temperature for a region during the summer months. Extreme heat is responsible for more deaths in Pennsylvania than all other natural disasters combined (Lawrence County, PA SSAHMP, 2004)*

Flood, Flash Flood, Ice Jam - *Flooding is the temporary condition of partial or complete inundation on normally dry land and it is the most frequent and costly of all hazards in Pennsylvania. Flooding events are generally the result of excessive precipitation. General flooding is typically experienced when precipitation occurs over a given river basin for an extended period of time. Flash flooding is usually a result of heavy localized precipitation falling in a short time period over a given location, often along mountain streams and in urban areas*

where much of the ground is covered by impervious surfaces. The severity of a flood event is dependent upon a combination of stream and river basin topography and physiography, hydrology, precipitation and weather patterns, present soil moisture conditions, the degree of vegetative clearing as well as the presence of impervious surfaces in and around flood-prone areas. (NOAA, 2009). Winter flooding can include ice jams which occur when warm temperatures and heavy rain cause snow to melt rapidly. Snow melt combined with heavy rains can cause frozen rivers to swell, which breaks the ice layer on top of a river. The ice layer often breaks into large chunks, which float downstream, piling up in narrow passages and near other obstructions such as bridges and dams. All forms of flooding can damage infrastructure (USACE, 2007).

Hailstorm - *In addition to flooding and severe winds, hail is another potential damaging product of severe thunderstorms. Hailstorms occur when ice crystals form within a low pressure front due to the rapid rise of warm air into the upper atmosphere and the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until, having developed sufficient weight, they fall as precipitation in the form of balls or irregularly shaped masses of ice greater than 0.75 inches in diameter (FEMA, 1997). The size of hailstones is a direct function of the size and severity of the storm. High velocity updraft winds are required to keep hail in suspension in thunderclouds. The strength of the updraft is a function of the intensity of heating at the Earth's surface. Damage to crops and vehicles are typically the most significant impacts of hailstorms. Areas in eastern and central Pennsylvania typically experience less than 2 hailstorms per year while areas in western Pennsylvania experience 2-3 annually.*

Hurricane, Tropical Storm, Nor'easter - *Hurricanes, tropical storms, and nor'easters are classified as cyclones and are any closed circulation developing around a low-pressure center in which the winds rotate counter-clockwise (in the Northern Hemisphere) and whose diameter averages 10-30 miles across. While most of Pennsylvania is not directly affected by the devastating impacts cyclonic systems can have on coastal regions, many areas in the state are subject to the primary damaging forces associated with these storms including high-level sustained winds, heavy precipitation, and tornadoes. Areas in southeastern Pennsylvania could be susceptible to storm surge and tidal flooding. The majority of hurricanes and tropical storms form in the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico during the official Atlantic hurricane season (June through November). (FEMA, 1997).*

Invasive Species - *An invasive species is a species that is not indigenous to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. These species can be any type of organism: plant, fish, invertebrate, mammal, bird, disease, or pathogen. Infestations may not necessarily impact human health, but can create a nuisance or agricultural hardships by destroying crops, defoliating populations of native plant and tree species, or interfering with ecological systems (Governor's Invasive Species Council of Pennsylvania, 2009).*

Landslide - *A landslide is the downward and outward movement of slope-forming soil, rock, and vegetation reacting to the force of gravity. Landslides may be triggered by both natural and human-caused changes in the environment, including heavy rain, rapid snow melt, steepening of slopes due to construction or erosion, earthquakes, and changes in groundwater levels. Mudflows, mudslides, rockfalls, rockslides, and rock topples are all forms of a landslide. Areas that are generally prone to landslide hazards include previous landslide areas, the bases of steep slopes, the bases of drainage channels, developed hillsides, and areas recently burned by forest and brush fires. (Delano & Wilshusen, 2001).*

Lightning Strike - *Lightning is a discharge of electrical energy resulting from the build-up of positive and negative charges within a thunderstorm. The flash or "bolt" of light usually occurs within clouds or between clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000°F. On average, 89 people are killed each year by lightning strikes in the United States. Within Pennsylvania, the annual average number of thunder and lightning events a given area can expect ranges between 40-70 events per year (FEMA, 1997).*

Pandemic and Infectious Disease - *A pandemic occurs when infection from of a new strain of a certain disease, to which most humans have no immunity, substantially exceeds the number of expected cases over a given period of time. Such a disease may or may not be transferable between humans and animals. (Martin & Martin-Granel, 2006).*

Radon Exposure - *Radon is a cancer-causing natural radioactive gas that you can't see, smell, or taste. It is a large component of the natural radiation that humans are exposed to and can pose a serious threat to public health when it accumulates in poorly ventilated residential and occupation settings. According to the EPA, radon is estimated to cause about 21,000 lung cancer deaths per year, second only to smoking as the leading cause of lung cancer (EPA 402-R-03-003: EPA Assessment…, 2003). An estimated 40% of the homes in Pennsylvania are believed to have elevated radon levels (Pennsylvania Department of Environmental Protection, 2009).*

Subsidence, Sinkhole - *Subsidence is a natural geologic process that commonly occurs in areas with underlying limestone bedrock and other rock types that are soluble in water. Water passing through naturally occurring fractures dissolves these materials leaving underground voids. Eventually, overburden on top of the voids causes a collapse which can damage structures with low strain tolerances. This collapse can take place slowly over time or quickly in a single event. Karst topography describes a landscape that contains characteristic structures such as sinkholes, linear depressions, and caves. In addition to natural processes, human activity such as water, natural gas, and oil extraction can cause subsidence and sinkhole formations. (FEMA, 1997).*

Tornado, Wind Storm - *A wind storm can occur during severe thunderstorms, winter storms, coastal storms, or tornadoes. Straight-line winds such as a downburst have the potential to cause wind gusts that exceed 100 miles per hour. Based on 40 years of tornado history and over 100 years of hurricane history, FEMA identifies western and central Pennsylvania as being more susceptible to higher winds than eastern Pennsylvania. (FEMA, 1997). A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud extending to the ground. Tornadoes are most often generated by thunderstorm activity (but sometimes result from hurricanes or tropical storms) when cool, dry air intersects and overrides a layer of warm, moist air forcing the warm air to rise rapidly. The damage caused by a tornado is a result of high wind velocities and wind-blown debris. According to the National Weather Service, tornado wind speeds can range between 30 to more than 300 miles per hour. They are more likely to occur during the spring and early summer months of March through June and are most likely to form in the late afternoon and early evening. Most tornadoes are a few dozen yards wide and touch down briefly, but even small, short-lived tornadoes can inflict tremendous damage. Destruction ranges from minor to catastrophic depending on the intensity, size, and duration of the storm. Structures made of light materials such as mobile homes are most susceptible to damage. Waterspouts are weak tornadoes that form over warm water and are relatively uncommon in Pennsylvania. Each year, an average of over 800 tornadoes is reported nationwide, resulting in an average of 80 deaths and 1,500 injuries (NOAA, 2002). Based on NOAA Storm Prediction Center Statistics, the number of recorded F3, F4, & F5 tornadoes between 1950-1998 ranges from <1 to 15 per 3,700 square mile area across Pennsylvania (FEMA, 2009).*

Wildfire - *A wildfire is a raging, uncontrolled fire that spreads rapidly through vegetative fuels, exposing and possibly consuming structures. Wildfires often begin unnoticed and can spread quickly, creating dense smoke that can be seen for miles. Wildfires can occur at any time of the year, but mostly occur during long, dry hot spells. Any small fire in a wooded area, 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 fields, grass, brush, and forests. 98% of wildfires in Pennsylvania are a direct result of people, often caused by debris burns (PA DCNR, 1999).*

Winter Storm - *Winter storms may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. A winter storm can range from a moderate snowfall or ice event over a period of a few hours to blizzard conditions with wind-driven snow that lasts for several days.*

Many winter storms are accompanied by low temperatures and heavy and/or blowing snow, which can severely impair visibility and disrupt transportation. The Commonwealth of Pennsylvania has a long history of severe winter weather. (NOAA, 2009).

Human-made Hazards

Building or Structure Collapse - *Collapse of a building or structure refers to the loss of the load-carrying capacity of a component of the structure or the entire structure itself. The loss of a structure's load carrying capacity occurs when the loads applied to the structure exceed the structure's load-carrying capacity. This can be a result of improper design, lack of maintenance, events from a structure's load history that have gradually reduced its load-carrying capacity, or sudden and severe hazard events such as severe weather or terrorism. (Ratay, 2000).*

Civil Disturbance – *Civil disturbance hazards encompass a set of hazards emanating from a wide range of possible events that cause civil disorder, confusion, strife, and economic hardship. Civil disturbance hazards include the following:*

- ***Famine:*** *involving a widespread scarcity of food leading to malnutrition and increased mortality (Robson, 1981).*
- ***Economic Collapse, Recession:*** *Very slow or negative growth of a territorial economy*
- ***Misinformation****: erroneous information spread unintentionally (Makkai, 1970).*
- ***Public Unrest, Mass Hysteria, Riot****; group acts of violence against property and individuals, for example (18 U.S.C. § 232, 2008).*
- ***Strike, Labor Dispute****; controversies related to the terms and conditions of employment, for example (29 U.S.C. § 113, 2008).*

Dam Failure – *A dam is a barrier across flowing water that obstructs, directs, or slows down water flow. Dams provide benefits such as flood protection, power generation, drinking water, irrigation, and recreation. Failure of these structures results in an uncontrolled release of impounded water. Failures are relatively rare, but immense damage and loss of life is possible in downstream communities when such events occur. Aging infrastructure, hydrologic, hydraulic and geologic characteristics, population growth, and design and maintenance practices should be considered when assessing dam failure hazards. The failure of the South Fork Dam, located in Johnstown, PA, was the deadliest dam failure ever experienced in the United States. It took place in 1889 and resulted in the Johnstown Flood which claimed 2,209 lives (FEMA, 1997). Today there are approximately 3,200 dams and reservoirs throughout Pennsylvania (Pennsylvania Department of Environmental Protection, 2009).*

Drowning – *Drowning is death from suffocation, typically associated with swimming, fishing, boating or bridge accidents, or suicide. It can be a significant hazard in communities with numerous residential pools or water bodies (e.g. ponds, lakes, rivers, etc...) and extensive outdoor recreational activity. Drowning rates are particularly high for children ages 1-14. The Centers for Disease Control and Prevention estimates that drowning is the second leading cause of injury death (after motor vehicle crashes) among children ages 1-14. (CDC, 2008).*

Environmental Hazards – *Environmental hazards are hazards that pose threats to the natural environment, the built environment, and public safety through the diffusion of harmful substances, materials, or products. For the purposes of the SSAHMP, environmental hazards include the following:*

- ***Hazardous material releases:*** *at fixed facilities or in transit; including toxic chemicals, infectious substances, biohazardous waste, and any materials that are explosive, corrosive, flammable, or radioactive (PL 1990-165, § 207(e)).*
- ***Coal mining incidents****: including the release of harmful chemical and waste materials into water bodies or the atmosphere, explosions, fires, and other hazards and threats to life safety stemming from mining (Environmental Protection Agency, Natural Disaster PSAs, 2009).*
- ***Oil and gas well incidents****: including the release of the release of harmful chemical and waste materials into water bodies or the atmosphere, explosions, fires, and other hazards and threats to life safety stemming from oil and gas extraction(Environmental Protection Agency, Natural Disaster PSAs, 2009).*

Levee Failure – *A levee is a human-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding (Interagency Levee Policy Review Committee, 2006). Levee failures or breaches occur when a levee fails to contain the floodwaters for which it is designed to control or floodwaters exceed the height of the constructed levee. 51 of Pennsylvania's 67 counties have been identified as having at least one levee (FEMA Region III, 2013).*

Nuclear Incidents – *Nuclear incidents generally refer to events involving the release of significant levels of radioactivity or exposure of workers or the general public to radiation (FEMA, 1997). Nuclear accidents/incidents can be placed into three categories: 1) Criticality accidents which involve loss of control of nuclear assemblies or power reactors, 2) Loss-of-coolant accidents which result 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, and 3) Loss-of-containment accidents which involve the release of radioactivity. The primary concern following such an incident or accident is the extent of radiation, inhalation, and ingestion of radioactive isotopes which can cause acute health effects (e.g. death, burns, severe impairment), chronic health effects (e.g. cancer), and psychological effects. (FEMA, 1997).*

Opioids – *Opioids are a class of drugs derived from or pharmacologically similar to opiates, and are on the rise as a cause of drug addiction and death in Pennsylvania. While these analgesics are the most effective pharmaceuticals for killing pain, they carry with them a significant risk of addiction (House Majority Policy Committee, 2016). Drug overdose deaths and opioid-involved deaths continue to increase in the United States. The majority of drug overdose deaths (more than six out of ten) involve an opioid (Rudd, Seth, David & Scholl, 2016). Criminal or deadly use of opioids stems from the increase in opioid prescriptions as part of modern pain management.*

Terrorism – *Terrorism is use of force or violence against persons or property with the intent to intimidate or coerce. Acts of terrorism include threats of terrorism; assassinations; kidnappings; hijackings; bomb scares and bombings; cyber-attacks (computer-based); and the use of chemical, biological, nuclear and radiological weapons (FEMA, 2009). Increasingly, cyber-attacks have become a more pressing concern for governments across America.*

Transportation Accident – *Transportation accidents can result from any form of air, rail, water, or road travel. It is unlikely that small accidents would significantly impact the larger community. However, certain accidents could have secondary regional impacts such as a hazardous materials release or disruption in critical supply/access routes, especially if vital transportation corridors or junctions are present. (Research and Innovative Technology Administration, 2009). Traffic congestion in certain circumstances can also be hazardous. Traffic congestion is a condition that occurs when traffic demand approaches or exceeds the available capacity of the road network. This hazard should be carefully evaluated during emergency planning since it is a key factor in timely disaster or hazard response, especially in areas with high population density. (Federal Highway Administration, 2009).*

Urban Fire and Explosion – *An urban fire involves a structure or property within an urban or developed area. For hazard mitigation purposes, major urban fires involving large buildings and/or multiple properties are of primary concern. The effects of a major urban fire include minor to significant property damage, loss of life, and residential or business displacement. Explosions are extremely rapid releases of energy that usually generate high temperatures and often lead to fires. The risk of severe explosions can be reduced through careful management of flammable and explosive hazardous materials. (FEMA, 1997).*

Utility Interruption – *Utility interruption hazards are hazards that impair the functioning of important utilities in the energy, telecommunications, public works, and information network sectors. Utility interruption hazards include the following:*

- ***Geomagnetic Storms**; including temporary disturbances of the Earth's magnetic field resulting in disruptions of communication, navigation, and satellite systems (National Research Council et al., 1986).*
- ***Fuel or Resource Shortage**; resulting from supply chain breaks or secondary to other hazard events, for example (Mercer County, PA, 2005).*
- ***Electromagnetic Pulse**; originating from an explosion or fluctuating magnetic field and causing damaging current surges in electrical and electronic systems (Institute for Telecommunications Sciences, 1996).*
- ***Information Technology Failure**; due to software bugs, viruses, or improper use (Rainer Jr., et al, 1991).*
- ***Ancillary Support Equipment**; electrical generating, transmission, system-control, and distribution-system equipment for the energy industry (Hirst & Kirby, 1996).*
- ***Public Works Failure**; damage to or failure of highways, flood control systems, deepwater ports and harbors, public buildings, bridges, dams, for example (United States Senate Committee on Environment and Public Works, 2009).*
- ***Telecommunications System Failure**; Damage to data transfer, communications, and processing equipment, for example (FEMA, 1997)*
- ***Transmission Facility or Linear Utility Accident**; liquefied natural gas leakages, explosions, facility problems, for example (United States Department of Energy, 2005)*
- ***Major Energy, Power, Utility Failure**; interruptions of generation and distribution, power outages, for example (United States Department of Energy, 2000).*

***War and Criminal Activity -** War and criminal activity hazards are intentional acts of violence, damage to property, and other criminal activities. This category specifically includes the following hazards:*

- ***War, Enemy Attack**; foreign attack on territory of the United States (50 U.S.C., 2008).*
- ***Disinformation, Sabotage**; intentionally spread inaccurate information, for example; interfering or impairing an operator's management or control of an organization (USLegal, Inc., 2008).*
- ***Criminal Activity**; lawlessness, acts committed for which punishment is imposed upon conviction after due process (USLegal, Inc., 2008).*
- ***Physical or Information Security Breach**; contravening security and confidentiality laws and procedures; burglary, unreasonable search and seizure, for example (73 Pa. C.S. § 2303, 2006; Network Associates, Inc., 1998).*
- ***Workplace, School Violence**; some environments are more likely than others to experience violence including occupations involving contact with the public (National Institute for Occupational Safety and Health, 1996).*
- ***Harassment**; a pattern of conduct that causes substantial emotional distress with no legal purpose (18 U.S.C. § 1514, 2008).*
- ***Discrimination**; widespread treatment based on class, category, or prejudice rather than merit, applies extensively to civil and labor law (26 U.S.C. § 62, 2008).*

After considering survey input and data from past occurrences, section 4.3 profiles 15 natural and human-made hazards. In that section, each of the chosen hazards are explored with more detail.

4.3 HAZARD PROFILES AND VULNERABILITY ANALYSIS

Natural Hazards

DROUGHT

Drought is a normal part of virtually all climates. It is the consequences of a natural reduction in the amount of precipitation experienced over a long period of time, usually a season or more in length. Droughts are sometimes characterized by a water shortage,

a dry spell, and/or general dryness in a location. High temperatures, prolonged winds, and low relative humidity can exacerbate the severity of drought.

Location and Extent

Drought is defined as the consequence of a natural reduction in the amount of precipitation expected over an extended period of time, usually a season or more in length. Droughts are regional climatic events, so they typically impact all communities in a relatively uniform fashion with only minor localized variations in rainfall events. Droughts often occur across county boundaries, affecting large areas of Pennsylvania at the same time. The spatial extent for areas of impact can range from localized areas in Pennsylvania to the entire Mid-Atlantic Region.

Areas with extensive agricultural uses are particularly vulnerable to drought; roughly 129,501 acres of Northumberland County – 37 percent of the total land acreage – is held in farms (U.S. Department of Agriculture [USDA], 2012). This agricultural land is spread throughout Northumberland County, with the exception of the coal mining and quarry lands in the southeastern portion.

Range of Magnitude

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

The Commonwealth uses five parameters to assess drought conditions:

- Stream flows (compared to benchmark records)
- Precipitation (measured as the departure from normal, 30-year average precipitation)
- Reservoir storage levels in a variety of locations (especially three New York City reservoirs in the Upper Delaware River Basin)
- Groundwater elevations in a number of counties (compares to past month, past year and historic record)

- The Palmer Drought Severity Index (PDSI) – a soil moisture algorithm calibrated for relatively homogeneous regions that measures dryness based on recent precipitation and temperature

SEVERITY CATEGORY	PDSI VALUE
Extremely wet	4.0 or more
Very wet	3.0 to 3.99
Moderately wet	2.0 to 2.99
Slightly wet	1.0 to 1.99
Incipient wet spell	0.5 to 0.99
Near normal	0.49 to -0.49
Incipient dry spell	-0.5 to -0.99
Mild drought	-1.0 to -1.99
Moderate drought	-2.0 to -2.99
Severe drought	-3.0 to -3.99
Extreme drought	-4.0 or less

Table 4.3.1.1-1: PDSI Classifications

The following phases of drought preparedness in Pennsylvania are listed in order of increasing severity:

- **Drought Watch**: A period to alert government agencies, public water suppliers, water users and the public regarding the potential for future drought-related problems. The focus is on increased monitoring, awareness, and preparation for response if conditions worsen. A request for voluntary water conservation is made. The objective of voluntary water conservation measures during a drought watch is to reduce water uses by 5 percent in the affected areas. Due to varying conditions, individual water suppliers or municipalities may be asking for more stringent conservation actions.
- **Drought Warning**: This phase involves a coordinated response to imminent drought conditions and potential water supply shortages through concerted voluntary conservation measures to avoid or reduce shortages, relieve stressed sources, develop new sources, and if possible forestall the need to impose mandatory water use restrictions. The objective of voluntary water conservation measures during a drought warning is to reduce overall water uses by 10 to 15 percent in the affected areas. Due to varying conditions, individual water suppliers or municipalities may be asking for more stringent conservation actions.
- **Drought Emergency**: This stage is a phase of concerted management operations to marshal all available resources to respond to actual emergency conditions, to avoid depletion of water sources, to ensure at least minimum water supplies to protect public health and safety, to support essential and high-priority water uses, and to avoid unnecessary economic dislocations. It is possible during this phase to impose mandatory restrictions on non-essential water uses that are provided in the Pennsylvania Code (Chapter 119), if deemed necessary and if ordered by the Governor of Pennsylvania. The objective of water use restrictions (mandatory or voluntary) and other conservation measures during this phase is to reduce consumptive water use in the affected area by 15 percent, and to reduce total use to the

extent necessary to preserve public water system supplies, to avoid or mitigate local or area shortages, and to ensure equitable sharing of limited supplies.

- **Local Water Rationing**: Although not a drought phase, local municipalities may, with the approval of the Pennsylvania Emergency Management Council, implement local water rationing to share a rapidly dwindling or severely depleted water supply in designated water supply service areas. These individual water rationing plans, authorized through provisions of the Pennsylvania Code (Chapter 120), will require specific limits on individual water consumption to achieve significant reductions in use. Under both mandatory restrictions imposed by the Commonwealth and local water rationing, procedures are provided for granting of variances to consider individual hardships and economic dislocations.

The effects of a drought can be far-reaching in both the economic and environmental realms. Economic impacts include the reduced productivity of aquatic resources, mandatory water use restrictions, well failures, cutbacks in industrial production, agricultural losses, and limited recreational opportunities. Environmental impacts of drought include the following:

- Hydrologic effects – lower water levels in reservoirs, lakes, and ponds; reduced streamflow; loss of wetlands; estuarine impacts; groundwater depletion and land subsidence; effects on water quality such as increases in salt concentration and water temperature
- Damage to animal species – lack of feed and drinking water; disease; loss of biodiversity; migration or concentration; and reduction and degradation of fish and wildlife habitat
- Damage to plant communities – loss of biodiversity; loss of trees from urban landscapes and wooded conservation areas
- Increased number and severity of fires
- Reduced soil quality
- Air quality effects – dust and pollutants
- Loss of quality in landscape

Based on the County's disaster history and other drought occurrence data, the worst drought event in Northumberland County occurred in the summer of 1999. Extended dry weather spurred Governor Ridge to declare a drought emergency in 55 counties, including Northumberland County. During this event, precipitation deficits for that summer averaged 5 to 7 inches; the Susquehanna River hit record low flows, streams were empty, and wells dried up. Crop damages indicated losses of over $500 million statewide, and crop losses totaled 70 percent to 100 percent. There were additional losses from the decline of milk production due to the drought (National Climatic Data Center [NCDC], 2011). Additionally, during this event, the Commonwealth asked municipal and private water suppliers to cut local water use; this is only one of three occasions in the last 20 years when Northumberland County was asked to do so (*Daily Item*, 2010).

Past Occurrence

The Department of Environmental Protection (PA DEP) maintains the most comprehensive data on drought occurrences across the Commonwealth. Declared drought status from 1988 to 2015 is shown in Table 4.3.1.1-2. Descriptions of drought status categories (e.g., watch, warning, and emergency) are included on the preceding page. Northumberland County's records of drought prior to 1988 are limited, but the County's disaster history indicates that a severe drought occurred in 1963, resulting in a Gubernatorial Proclamation of Disaster.

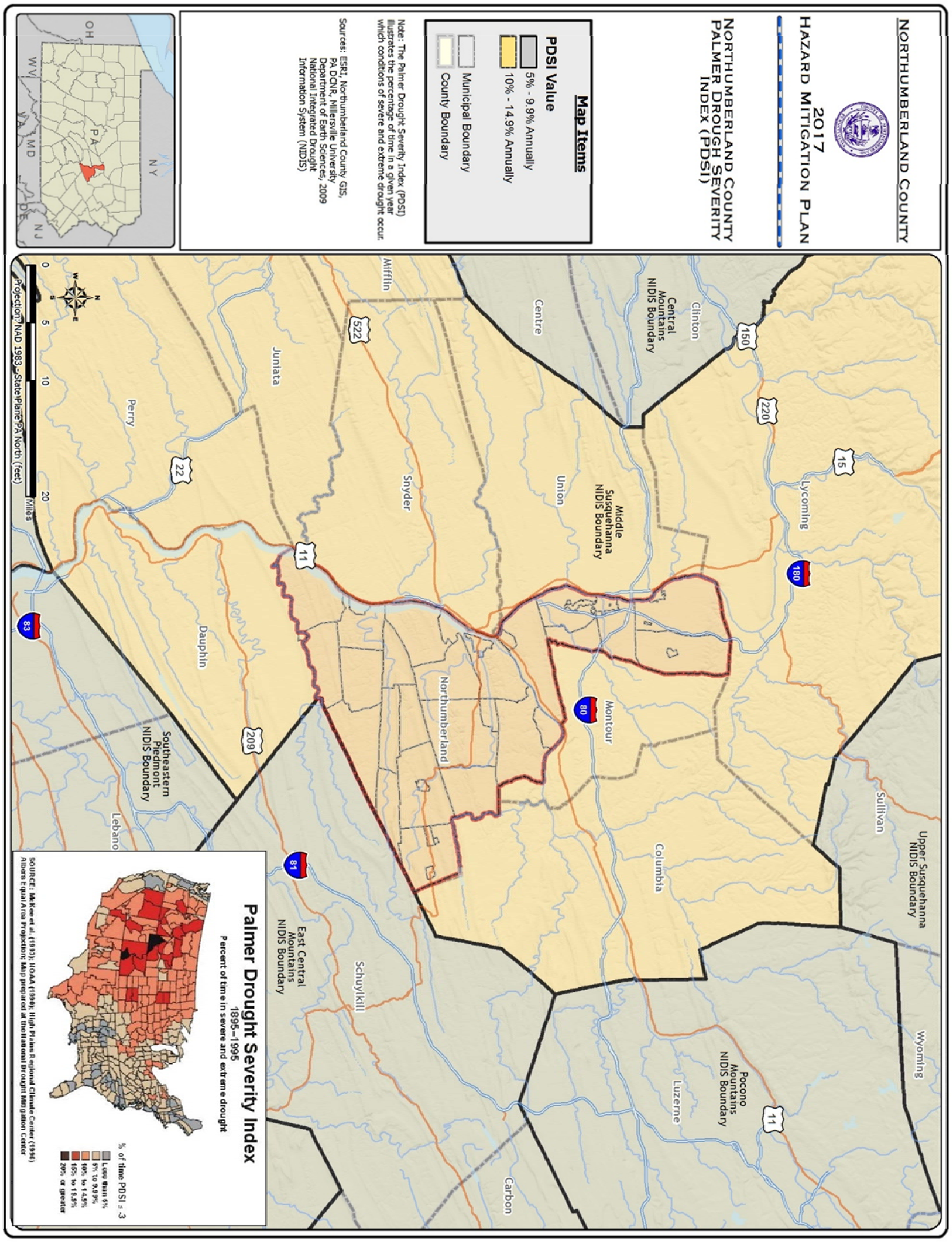
DATE	DROUGHT STATUS	DATE	DROUGHT STATUS
Jul 7, 1988 - Aug 24, 1988	Watch	Jun 10, 1999 - Jun 18, 1999	Warning
Aug 24, 1988 - Dec 12, 1988	Warning	Jun 18, 1999 - Jul 20, 1999	Warning
Jun 28, 1991 - Jul 24, 1991	Warning	Jul 20, 1999 - Sep 30,1999	Emergency
Jul 24, 1991 - Aug 16, 1991	Emergency	Sep 30, 1999 - Dec 16, 1999	Watch
Aug 16, 1991 - Sep 13, 1991	Emergency	Dec 16, 1999 - Feb 25, 2000	Watch
Sep 13, 1991 - Oct 21, 1991	Emergency	Feb 25, 2000 - May 5, 2000	Watch
Oct 21, 1991 - Jan 16, 1992	Warning	Aug 24, 2001 - Nov 6, 2001	Watch
Jan 17, 1992 - Apr 20, 1992	Warning	Nov 6, 2001 - Dec 5, 2001	Watch
Apr 20, 1992 - Jun 23, 1992	Warning	Dec 5, 2001 - Feb 12, 2002	Warning
Sep 1, 1995 - Sep 20, 1995	Warning	Feb 12, 2002 - May 13, 2002	Warning
Sep 20, 1995 - Nov 8, 1995	Emergency	Sep 5, 2002 - Nov 7, 2002	Warning
Nov 8, 1995 - Dec 18, 1995	Warning	Apr 11, 2006 - Jun 30, 2006	Watch
Dec 3, 1998 - Dec 8, 1998	Watch	Aug 8, 2007 - Sep 5, 2007	Watch
Dec 8, 1998 - Dec 14, 1998	Warning	Oct 5, 2007 - Jan 11, 2008	Watch
Dec 14, 1998 - Dec 16, 1998	Warning	Sep 16, 2010 - Nov 10, 2010	Watch
Dec 16, 1998 - Jan 15, 1999	Warning	**Mar 24, 2015 – Jun 17, 2015**	**Watch**
Jan 15, 1999 - Mar 15, 1999	Warning	**Jun 17, 2015 – Jul 10, 2015**	**Watch**
Mar 15, 1999 - Jun 10, 1999	Watch		

Table 4.3.1.1-2: Past Drought Events in Northumberland County

Future Occurrence

It is difficult to forecast the exact severity of future drought events. The impact of shortages on municipal water suppliers is expected to remain minor to moderate, but the impact is expected to become more severe for those living in rural areas. Based on national data from 1895 to 1995, Northumberland County, like the rest of the Middle Susquehanna region, was in severe or extreme drought approximately 10 percent to 14.9 percent of the time (see Map 4.3.1.1-1). This is equivalent to a PDSI value of less than or equal to -3. Therefore, the future occurrence of a drought can be considered *possible* as defined by the Risk Factor Methodology probability criteria.

Map 4.3.1.1-1


NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
NORTHUMBERLAND COUNTY
PALMER DROUGH SEVERITY
INDEX (PDSI)
Map Items
PDSI Value
5% - 9.9% Annually
10% - 14.9% Annually
Municipal Boundary
County Boundary
Note: The Palmer Drought Severity Index (PDSI) illustrates the percentage of time in a given year which conditions of severe and extreme drought occur.
Sources: ESRI; Northumberland County GIS, PA DCNR, Millersville University Department of Earth Sciences, 2009 National Integrated Drought Information System (NIDIS)
Projection: NAD 1983 StatePlane PA North (feet)
Miles
Palmer Drought Severity Index
1895–1995
Percent of time in severe and extreme drought
% of time PDSI ≤ -3
Less than 5%
5% to 9.9%
10% to 14.9%
15% to 19.9%
20% or greater
SOURCE: Idso et al. (1993); NOAA (1994); High Plains Regional Climate Center (1994)
Albers Equal Area Projection; Map prepared at the National Drought Mitigation Center
Clinton
Centre
Mifflin
Juniata
Perry
Snyder
Union
Dauphin
Lebanon
Lycoming
Sullivan
Wyoming
Columbia
Montour
Northumberland
Schuylkill
Luzerne
Carbon
Pocono Mountains NIDIS Boundary
Central Mountains NIDIS Boundary
Middle Susquehanna NIDIS Boundary
Upper Susquehanna NIDIS Boundary
Southeastern Piedmont NIDIS Boundary
East Central Mountains NIDIS Boundary
OH
WV
PA
MD
VA
NY
NJ
DE

Vulnerability Assessment

As indicated in this topical section, the sizeable agricultural economy and community in Northumberland County is most vulnerable to droughts and other water supply deficiencies. Historical losses are usually crop damage and losses and reduced livestock productivity rather than injuries or deaths of individuals. Northumberland County ranks 11th in the total value of agricultural products sold, but it ranks 4th in crops with the top crop items being corn, soybeans, forage (hay, haylage, grass silage, and greenchop), and wheat. The total value of all agricultural products exceeds $154 million annually (USDA, 2012). In Northumberland County, 63 percent of this total is the production and sale of livestock, poultry, and their products; the remaining 37 percent results from crop production and sales.

Water supplies are also vulnerable to the effects of drought, particularly in locations where citizens rely on wells for their fresh drinking water. Future droughts will quickly affect those systems relying on surface supplies while those relying on wells should be able to handle short-term droughts without any major problem. However, longer-term droughts that inhibit recharging of groundwater aquifers will extend the problems of well owners for an undetermined length of time. As a result, Northumberland County residents who use private, domestic wells are more vulnerable to droughts. Table 4.3.1.1-3 shows the number of domestic wells in each municipality. It is important to note that the well data was obtained from the Pennsylvania Groundwater Information System (PaGWIS). **PaGWIS relies on voluntary submissions of well record data by well drillers; as a result, it is not a complete database of all domestic wells in the County.** This is the most complete dataset of domestic wells available.

MUNICIPALITY	NUMBER OF REPORTED DOMESTIC WELLS	MUNICIPALITY	NUMBER OF REPORTED DOMESTIC WELLS
Coal Township	91	Ralpho Township	149
Delaware Township	288	Riverside Borough	179
East Cameron Township	32	Rockefeller Township	198
East Chillisquaque Township	75	Rush Township	132
Herndon Borough	3	Shamokin City	20
Jackson Township	56	Shamokin Township	232
Jordan Township	43	Snydertown Borough	18
Kulpmont Borough	0	Sunbury City	124
Lewis Township	139	Turbot Township	118
Little Mahanoy Township	24	Turbotville Borough	26
Lower Augusta Township	68	Upper Augusta Township	155
Lower Mahanoy Township	38	Upper Mahanoy Township	21
Marion Heights Borough	0	Washington Township	17
McEwensville Borough	3	Watsontown Borough	17
Milton Borough	69	West Cameron Township	22
Mount Carmel Borough	10	West Chillisquaque Township	115
Mount Carmel Township	25	Zerbe Township	22
Northumberland Borough	68	Unknown Municipality	
Point Township	215	*GRAND TOTAL*	*2,812*

Table 4.3.1.1-3: PaGWIS Data For Northumberland County

EARTHQUAKE

An earthquake is the motion or trembling of the ground produced by sudden displacement of rock usually within the upper 10 to 20 miles of the earth's crust. Earthquakes result from crustal strain, volcanism, landslides or the collapse of underground caverns (FEMA, 1997).

Location and Extent

Earthquake events in Pennsylvania do not typically affect areas greater than 100 kilometers from the epicenter of the event and are usually mild events. The Department of Earth Sciences at Millersville University identified relative earthquake hazard zones for Pennsylvania. Northumberland County falls entirely within the "slight" zone, which typically results in an impact that is felt by people resting; like a truck rumbling by according to the Modified Mercalli Intensity Scale.

Range of Magnitude

Earthquake magnitude is often measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake. Table 4.3.1.2-1 summarizes Richter Scale Magnitudes as they relate to the spatial extent of impacted areas. No earthquakes have occurred in Northumberland County, but those located closest to Northumberland County in Lebanon and Centre Counties indicate that earthquakes have generally had magnitudes of between 3 and 4. Statewide, Pennsylvania has not experienced any earthquakes with a magnitude greater than 6.0.

RICHTER MAGITUDES	EARTHQUAKE EFFECTS
Less than 3.5	Generally, not felt, but recorded.
3.5-5.4	Often felt, but rarely causes damage.
Under 6.0	At most, slight damage to well-designed buildings.
6.1-6.9	Can be destructive in areas where people live up to about 100 kilometers across.
7.0-7.9	Major earthquake; can cause serious damage over large areas.
8.0 or greater	Great earthquake; can cause serious damage in areas several hundred kilometers across.

Table 4.3.1.2-1: Richter Scale Magnitudes and Associated Earthquake Size Effects

The Richter Scale does not give any indication of the impact or damage of an earthquake, although it can be inferred that higher magnitude events cause more damage. Instead, the impact of an earthquake event is measured in terms of earthquake intensity, usually measured using the Modified Mercalli Intensity Scale, shown in Table 4.3.1.2-2. Because Northumberland County is not on an active fault line, little or no damage is expected from these earthquake events. However, since the worst earthquake recorded in Pennsylvania was a magnitude 5.2, a worst-case scenario for this hazard would be if an earthquake of similar magnitude occurred in Northumberland County. As described in Tables 4.3.1.2-1 and 4.3.1.2-2, this magnitude of event would be felt and nonstationary objects would shake or fall off

shelves, trees would sway, and suspended objects would swing, but damage would overall be mild and would likely be concentrated in populated areas of the County.

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

Table 4.3.1.2-2: Modified Mercalli Intensity Scal with Associated Impacts

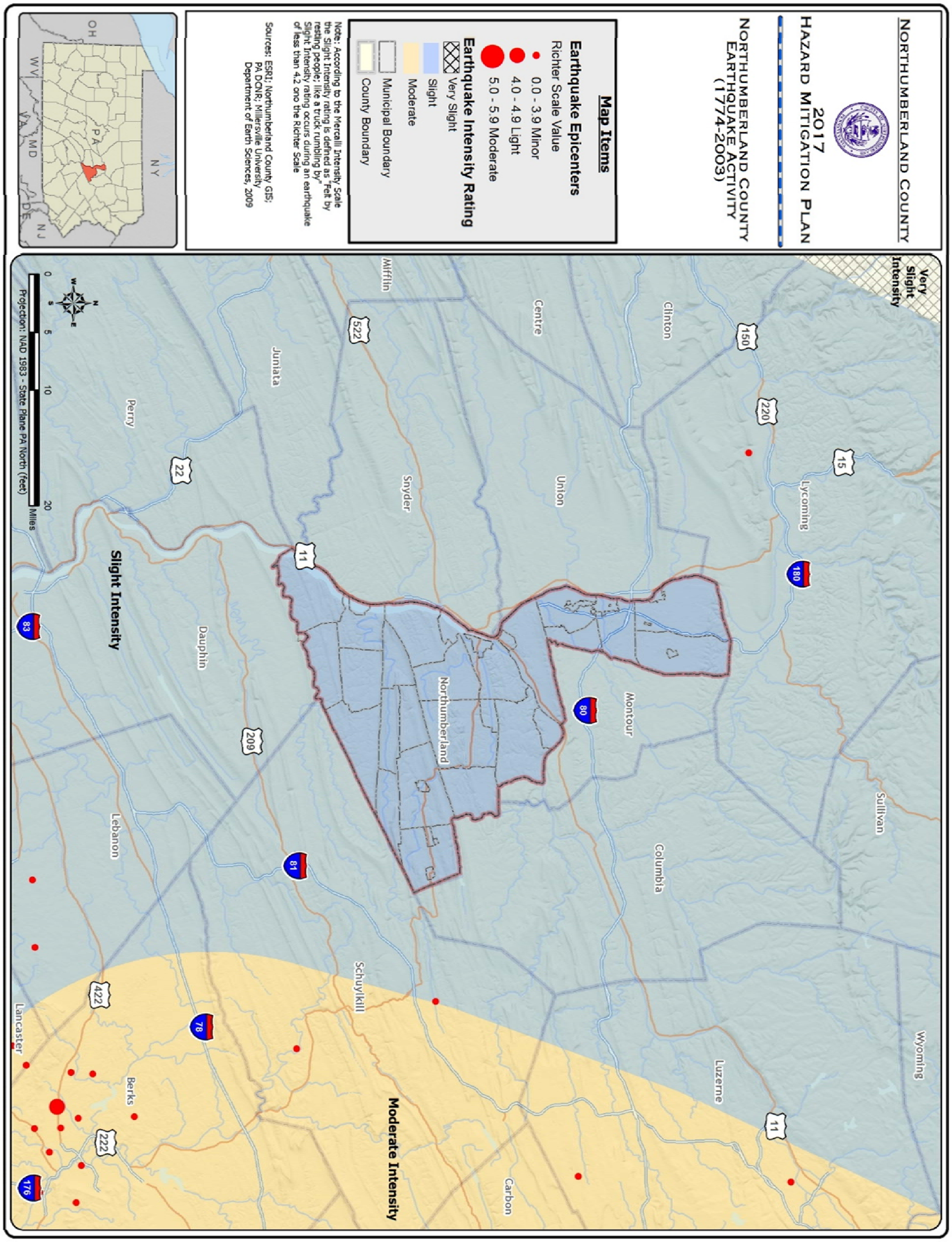
Environmental impacts of earthquakes can be numerous, widespread, and devastating, particularly if indirect impacts like economic impacts are considered. Below are some examples of these impacts, most of which are unlikely to occur in Northumberland County:

- Induced flooding or landslides and avalanches
- Poor water quality
- Damage to vegetation
- Breakage in sewage or toxic material containments

Past Occurrence

According to records maintained by the Pennsylvania Department of Conservation and Natural Resources (DCNR), there has never been an earthquake with its epicenter located within Northumberland County. However, there have been some minor events in Luzerne, Schuylkill, Sullivan, and Lycoming Counties. Overall, though, these have largely been minor events with low magnitudes and intensities. Additionally, DCNR notes that due to the large concentration of mining activities in Northeastern Pennsylvania, many of these nearby events occurring prior to 1965 may have been mine or quarry blasts, not actual seismic events. Map 4.3.1.2-1 below displays the earthquake hazard zones as well as epicenters of historical earthquakes in the Central Susquehanna Valley where Northumberland County lies.

Map 4.3.1.2-1


NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
NORTHUMBERLAND COUNTY
EARTHQUAKE ACTIVITY
(1774-2003)
Map Items
Earthquake Epicenters
Richter Scale Value
0.0 - 3.9 Minor
4.0 - 4.9 Light
5.0 - 5.9 Moderate
Earthquake Intensity Rating
Very Slight
Slight
Moderate
Municipal Boundary
County Boundary
Note: According to the Mercalli Intensity Scale the Slight Intensity rating is defined as "Felt by resting people; like a truck rumbling by" Slight Intensity rating occurs during an earthquake of less than 4.2 on the Richter Scale
Sources: ESRI; Northumberland County GIS; PA DCNR; Millersville University Department of Earth Sciences, 2009
Very Slight Intensity
Slight Intensity
Moderate Intensity
Clinton
Centre
Mifflin
Juniata
Perry
Snyder
Union
Lycoming
Sullivan
Wyoming
Montour
Columbia
Luzerne
Carbon
Northumberland
Dauphin
Lebanon
Schuylkill
Berks
Lancaster
Projection: NAD 1983 - State Plane PA North (feet)
0 5 10 20 Miles

Future Occurrence

One way to express an earthquake's severity is to compare its acceleration to the normal acceleration due to gravity. Peak horizontal ground acceleration (PHGA) measures the strength of ground movements in this manner. PHGA is the percent of *g* (acceleration due to gravity) experienced during the earthquake or the rate in change of motion of the earth's surface during an earthquake as a percent of the established rate of acceleration due to gravity. In general, an acceleration of 10 percent to 15 percent of gravity is associated with structural damage to ordinary buildings not designed to withstand earthquakes, although soil conditions at individual sites will impact the amount of damage.

The U.S. Geologic Survey models contours that represent earthquake ground motions that have a 10 percent probability of being experienced over a 50-year period. The PHGA value for Northumberland County is between two and three. These values correspond to events with low intensities and an expectation of little or no structural damage. Overall, the future occurrence of earthquakes in Northumberland County can be considered *unlikely*, as defined by the Risk Factor methodology probability criteria (see Table 4.4.1-1).

Vulnerability Assessment

Earthquakes of the magnitude seen in Northeast and Central Pennsylvania are small and shallow. Based on the past history of earthquake events near Northumberland County, the County's vulnerability to this hazard is expected to be low. In the event of an earthquake, unanchored objects may be upset, but few damages are expected.

FLOOD, FLASH FLOOD, ICE JAM

Flooding is the temporary condition of partial or complete inundation on normally dry land and it is the most frequent and costly of all hazards in Pennsylvania. Flooding events are generally the result of excessive precipitation over a given river basin and its tributaries for an extended period of time. Flash flooding is usually a result of heavy localized precipitation falling in a short time period over a given location, often along mountain streams and in urban areas where much of the ground is covered by impervious surfaces.

Rescue on 11th Street in Trevorton, 2011

The severity of a flood event is dependent upon a combination of stream and river basin topography and physiography, hydrology, precipitation and weather patterns, present soil moisture conditions, the degree of vegetative clearing as well as the presence of impervious surfaces in and around flood-prone areas. (NOAA, 2009). Winter flooding can include ice jams which occur when warm temperatures and heavy rain cause snow to melt rapidly. Snow melt combined with heavy rains can

cause frozen rivers to swell, which breaks the ice layer on top of a river. The ice layer often breaks into large chunks, which float downstream, piling up in narrow passages and near other obstructions such as bridges and dams. All forms of flooding can damage infrastructure (USACE, 2007).

Location and Extent

Most communities in Northumberland County are located along the river, stream and creek valleys throughout the County, many of which are flood prone as seen in Map 4.3.1.3-1. Excess water from snowmelt or rainfall accumulates and overflows onto stream banks and adjacent floodplains. Floodplains are lowlands adjacent to rivers, streams, and creeks that are subject to recurring floods. The size of the floodplain is described by the recurrence interval of a given flood.

However, in assessing the potential spatial extent of flooding, it is important to know that a floodplain associated with a flood that has a 10 percent chance of occurring in a given year is smaller than the floodplain associated with a flood that has a 0.2 percent annual chance of occurring. Community development of the floodplain has resulted in frequent flooding in these areas.

The NFIP, for which Flood Insurance Rate Maps (FIRMs) are published, identifies the 1 percent annual chance flood. This 1 percent annual chance flood event is used to delineate the Special Flood Hazard Area (SFHA) and identify Base Flood Elevations. Figure 4.3.1.3-1 illustrates these terms. The SFHA serves as the primary regulatory boundary used by FEMA, the Commonwealth of Pennsylvania, and Northumberland County's local governments.

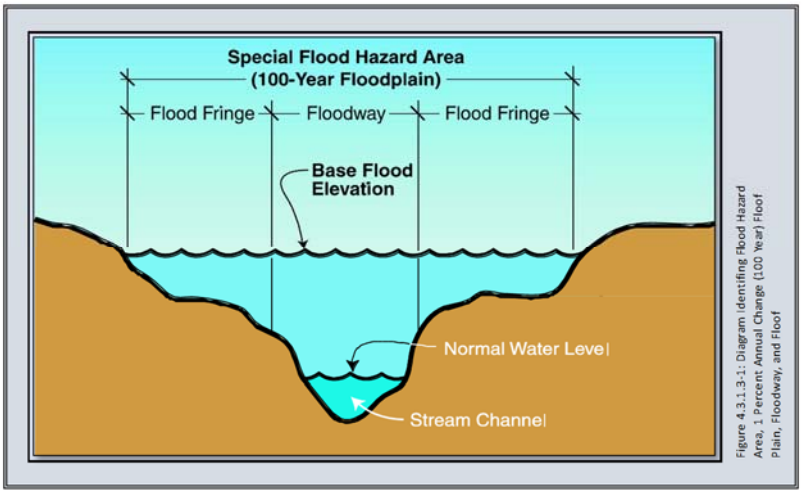


Figure 4.3.1.3-1: Diagram identifing Flood Hazard Area, 1 Percent Annual Change (100 Year) Floof Plain, Floodway, and Floof

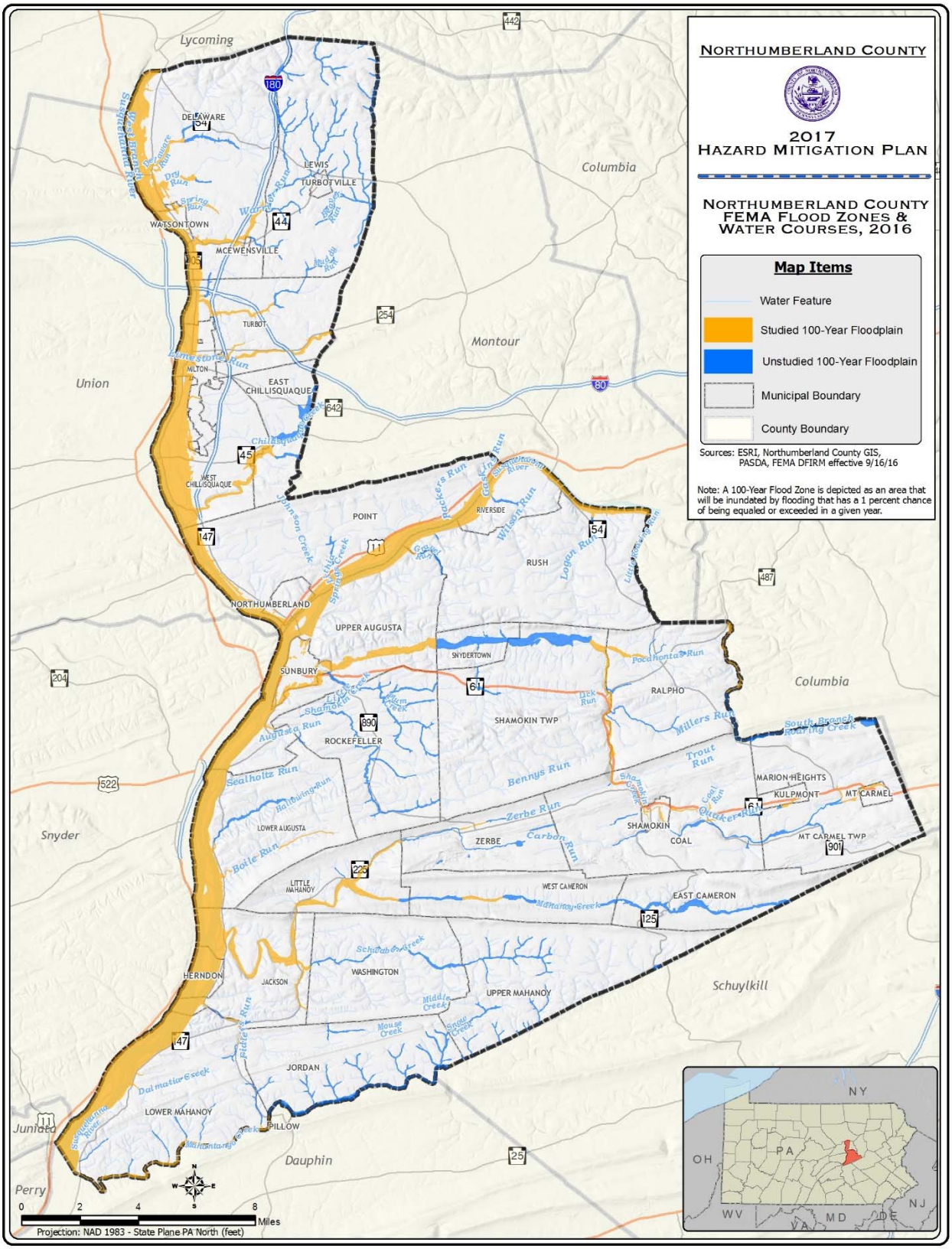
The Effective Countywide DFIRMs were released for Northumberland County and all communities on July 16, 2008. All communities within the County are now shown on a single set of countywide FIRMs. Prior to the publication of this digital data, flood hazard information from FEMA was available through paper FIRMs and Q3 data. The final FIRMs and DFIRM data for Northumberland County can be obtained from the FEMA Map Service Center (http://www.msc.fema.gov). These maps can be used to identify the expected spatial extent and elevation of flooding from a 1 percent and 0.2 percent annual chance event. All of the municipalities in the County except Marion Heights Borough and Turbotville Borough are flood prone. Because they have no SFHAs, these two jurisdictions do not participate in the NFIP.

Map 4.3.1.3-1 shows the location of watercourses and flood zones in Northumberland County as identified in the DFIRM database. The location of approximate and detailed (including Base Flood Elevations) Special Flood Hazard Areas (1 percent annual chance zones) are shown. Flooding occurs in the major watersheds and along the major waterways in Northumberland County.

According to DCNR, Northumberland County has the second-highest river acreage in the Commonwealth, with 11,540 acres of rivers and streams (Tiney, 1990). The North Branch of the Susquehanna River meets the West Branch of the Susquehanna River at Sunbury; these are the largest waterways in the County. Other major waterways and flooding sources include Chillisquaque Creek, Mahanoy Creek, Mahantongo Creek, Mudd Run, Schwaben Creek, and Shamokin Creek. Additionally, flooding from short, localized thunderstorms is more severe on smaller streams, particularly the Mahantongo Creek, Dalmatia Creek, and Fidlers Run. Backwater flooding from the Susquehanna River is a concern on Limestone Run.

Knoebel's Amusement Resort, Ralpho Township 2011

Map 4.3.1.3-1


NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
NORTHUMBERLAND COUNTY
FEMA FLOOD ZONES &
WATER COURSES, 2016
Map Items
Water Feature
Studied 100-Year Floodplain
Unstudied 100-Year Floodplain
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
Note: A 100-Year Flood Zone is depicted as an area that will be inundated by flooding that has a 1 percent chance of being equaled or exceeded in a given year.
Lycoming
Columbia
Montour
Union
Snyder
Juniata
Perry
Dauphin
Schuylkill
DELAWARE
LEWIS
TURBOTVILLE
WATSONTOWN
MCEWENSVILLE
TURBOT
MILTON
EAST CHILLISQUAQUE
WEST CHILLISQUAQUE
POINT
RIVERSIDE
RUSH
NORTHUMBERLAND
UPPER AUGUSTA
SUNBURY
SNYDERTOWN
RALPHO
SHAMOKIN TWP
ROCKEFELLER
LOWER AUGUSTA
ZERBE
SHAMOKIN
COAL
MARION HEIGHTS
KULPMONT
MT CARMEL
MT CARMEL TWP
LITTLE MAHANOY
WEST CAMERON
EAST CAMERON
HERNDON
JACKSON
WASHINGTON
UPPER MAHANOY
JORDAN
LOWER MAHANOY
PILLOW
NY
PA
OH
WV
VA
MD
DE
NJ
0 2 4 8 Miles
Projection: NAD 1983 - State Plane PA North (feet)

Range of Magnitude

Floods are considered hazards when people and property are affected. Most injuries and deaths from flooding happen when people are swept away by flood currents, and most property damage results from inundation by sediment-filled and polluted water. A large amount of rainfall over a short time span can result in flash flood conditions. Small amounts of rain can result in floods in locations where the soil is frozen or saturated from a previous wet period or if the rain is concentrated in an area of impermeable surfaces such as large parking lots, paved roadways, or other impervious, developed areas. Flooding can occur in individual municipalities within Northumberland County or it can have a countywide effect, involving multiple sites and streams. In this portion of the Susquehanna River Basin, flooding occurs most frequently in spring and early summer.

Several factors determine the severity of floods, including rainfall intensity and duration, topography, ground cover and rate of snowmelt. Water runoff is greater in areas with steep slopes and little to no vegetative ground cover. Also, urbanization typically results in the replacement of vegetative ground cover with asphalt and concrete, increasing the volume of surface runoff and stormwater, particularly in areas with poorly planned stormwater drainage systems.

In the winter and early spring (February to April), major flooding has occurred as a result of heavy rainfall on dense snowpack throughout contributing watersheds. Summer floods have occurred from intense rainfall on previously saturated soils. Summer thunderstorms deposit large quantities of rainfall over a short period of time that can result in flash flood events, when the velocity of floodwaters has the potential to amplify the impacts of a flood event.

Winter floods also have resulted from runoff of intense rainfall on frozen ground, and, on rare occasions, local flooding has been exacerbated by ice jams in rivers. Ice jam floods occur on rivers that are totally or partially frozen. A rise in stream stage will break up a totally frozen river and create ice flows that can pile up on channel obstructions such as shallow riffles, log jams, or bridge piers. The jammed ice creates a dam across the channel over which the water and ice mixture continues to flow, allowing for more jamming to occur.

Hurricane Agnes' floodwaters were within inches of overtopping Sunbury's flood wall
(Photo courtesy SRBC archives)

The worst-case scenario for flooding in Northumberland County was Hurricane Agnes in June 1972. This early season hurricane came up from the Gulf of Mexico and brought heavy rain that exceeded the carrying capacity of streams and rivers from southern New York to Virginia from June 22 to June 25 (Gelber, 2002). Hurricane Agnes caused the most damage in Central Pennsylvania and remains the highest recorded peak flood stage in Northumberland

County at 35.80 feet. Agnes also yielded the highest recorded peak discharge at Sunbury at 620,000 cubic feet per second. The Susquehanna River and its major tributaries flooded across the region; in Northumberland County, flooding occurred on Boile Run, Chillisquaque Creek, Coal Fun, Dalmatia Creek, Delaware Run, Fidlers Run, Hallowing Run, Kips Run, Little Shamokin Creek, Mahanoy Creek, Mouse Run, North Branch, Quake Run, Spring Run, and Zerbe Run (FEMA, 2008). The flooding resulted in evacuations, economic losses, and casualties in many communities and major cities, including Harrisburg, Wilkes-Barre, and York. The flooding from Hurricane Agnes caused $2.8 billion in economic losses and 48 deaths in Pennsylvania.

While Hurricane Agnes can be considered the flood of record for Northumberland County, Tropical Storm Lee in September 2011 was an important flood event. This storm developed as a tropical disturbance in the Gulf of Mexico and was a particularly large and slow-moving storm. By the time it reached Pennsylvania, the storm had lost its tropical characteristics and merged with an upper level trough positioned over the eastern third of the United States, resulting in a storm of renewed strength. The storm dumped record rainfall in the Susquehanna River Valley – 10 to 15 inches in the County.

The flooding was exacerbated by the fact that in many areas, the ground was still saturated from Hurricane Irene's rains during the previous week. During Lee, the Susquehanna River crested at a record high of 32.75 feet, but the crest was 31.66 feet at Sunbury – less than five inches lower than the top of the floodwall. The County declared a state of emergency on September 7, 2011, enacting evacuations and school closings. Pennsylvania Governor Tom Corbett declared a Level 1 emergency in the Commonwealth for this event. It was the first time that level of emergency had been declared since September 11, 2001.

Lower Augusta Township, 2011

Although floods can cause damage to property and loss of life, floods are naturally occurring events that benefit riparian systems that have not been disrupted by human actions. Such benefits include groundwater recharge and the introduction of nutrient-rich sediment that improves soil fertility.

However, the destruction of riparian buffers, changes to land use and land cover throughout a watershed, and the introduction of chemical or biological contaminants that often accompany human presence cause environmental harm when floods occur. Hazardous material facilities are potential sources of contamination during flood events. Other negative environmental impacts of flooding include waterborne diseases, heavy siltation, damage or loss of crops, and drowning of both humans and animals.

Past Occurrence

Northumberland County has a long history of flooding events. Eight of the eleven Presidential Disaster and Emergency Declarations affecting Northumberland County have been in response to hazard events related to flooding (see page 3 of Section 4: Table of Presidential Disaster Declarations). Table 4.3.1.3-1 lists flood event information from 1970 to 2013 obtained from the NCDC database as well as Spatial Hazard Events and Losses Database for the United States (SHELDUS) records for flood events occurring before 1993.

DATE	LOCATION AND DESCRIPTION
4/2/1970	Countywide. Heavy rain and flooding reported.
6/26/1972	Countywide. Heavy rain and flooding reported.
6/29/1973	Countywide. Heavy rain, flooding, hail, wind, and funnel clouds reported.
9/28/1975	Countywide. Heavy rain and flooding reported.
1/27/1976	Countywide. Snow and flooding reported.
1/21/1979	Countywide. Ice storm, rain, and flooding reported.
1/26/1979	Countywide. Wind, rain, and flooding reported.
2/26/1979	Countywide. Heavy rain and flooding reported.
2/4/1982	Countywide. Flooding reported.
6/6/1983	Countywide. Wind and flash flooding reported.
3/14/1986	Countywide. Small stream flooding reported.
4/13/1993	Countywide. Flooding reported.
11/28/1993	Multiple Counties. Widespread heavy rains as well as gusty showers with torrential downpours accompanied the storm system and resulted in a combination of long term flooding as well as flash flooding events
9/26/1994	Countywide. Torrential downpours caused small stream flooding and mudslides. Augusta, Dalmatia, Herndon, Jackson, and Mahoney Townships were particularly hard-hit. Rock, water, and mud closed roads throughout the affected area.
6/11/1995	Countywide. Thunderstorms with heavy rain caused drainage-related and small stream flooding countywide.
6/11/1995	Southern half of County. Thunderstorms with heavy rain caused poor drainage, small stream, and basement flooding in Southern Northumberland County.
10/21/1995	Countywide. Flooding and flash flooding occurred countywide, with many small streams going out of their banks. Numerous roads flooded.
1/19/1996	Multiple Counties. No description reported.
12/1/1996	Countywide. Flash flooding reported
12/13/1996	Countywide. Flash flooding reported.
1/8/1998	Countywide. Flash flooding reported.
1/18/1999	Countywide. Basements and roads flooded.
1/24/1999	Countywide. Flash flooding reported.
8/20/1999	Northern portion of County. Small stream and poor draining caused flash flooding.
9/7/1999	Watsontown and Milton. Tropical Depression Dennis caused flooding in Watsontown and Milton in the early morning.
9/16/1999	Countywide. Flash flooding reported.
12/17/2000	Countywide. Flash flooding reported.
9/24/2001	Countywide. Heavy rain from thunderstorms caused small stream flooding.
3/20/2003	Northern portion of County. West Branch Susquehanna River exceeded flood stage because of ¾ - 1 inch of rain. River crested at 18.5 feet.
9/17/2004	Multiple Counties. The remnants of Hurricane Ivan moved in during Friday, September 17th, and led to a large swath of excessive rainfall across central Pennsylvania as the system weakened to a tropical depression. Rainfall amounts of 3 to 6 inches were common, with some localized amounts exceeding 8 inches within a 12 hour period. As a result of this excessive rainfall, many smaller creeks and streams overflowed their banks by Friday evening, while many larger tributaries of the Susquehanna River experienced moderate to major flooding from Saturday into Sunday.
9/18/2004	Sunbury. Heavy rain caused the Susquehanna to exceed its flood stage of 24 feet.
9/18/2004	Milton. Heavy rain caused the West Branch of the Susquehanna River at Milton to exceed its flood stage of 19 feet.
9/18/2004	Watsontown. Heavy rain caused the West Branch of the Susquehanna River at Watsontown to exceed its flood stage of 23 feet.

Table 4.3.1.3-1: Flood and flash Flood Events Impacting Northumberland County (Part 1)

DATE	LOCATION AND DESCRIPTION
3/29/2005	Multiple Counties. This storm produced very heavy rainfall across the middle and upper Susquehanna Valley from Monday afternoon into early Tuesday morning. Rainfall amounts from 1 to 3 inches, combined with rapid snowmelt to produce widespread flooding across the region. Numerous roadways were reported closed due to flooding.
3/29/2005	Danville and Riverside Borough. Heavy rain caused the Susquehanna River to flood.
4/2/2005	Multiple Counties. A low pressure system slowly tracked into Pennsylvania, causing widespread heavy rains in the Susquehanna Valley. Route 11 between Shamokin Dam and Northumberland Borough was closed due to flooding.
4/3/2005	Danville and Riverside Borough. Heavy rain caused the Susquehanna River to flood.
4/3/2005	Milton. Heavy rain caused the West Branch of the Susquehanna River at Milton to exceed its flood stage of 19 feet.
4/3/2005	Sunbury. Heavy rain caused the Susquehanna River to flood and exceed its flood stage of 24 feet.
6/27/2006 – 6/28/2006	Countywide. Heavy rain associated with a weak tropical storm interacting with a stalled frontal boundary caused countywide flash flooding on June 27 and 28. In Northumberland County, flood waters closed numerous bridges and roads and damaged a bridge in Uthia Springs. Approximately 30 people were evacuated from Knoebels Camp Ground. Flash flooding ended early on the 28th, but flooding persisted throughout the afternoon.
6/28/2006	Sunbury. Heavy rain caused the Susquehanna River to flood and exceed its flood stage of 24 feet.
11/16/2006	Turbotville. A strong cold front crossing the region triggered widespread precipitation and flash flooding. Streams flooded roads in Turbotville.
12/1/2006	Countywide. A strong cold front with short lines of convection initiated severe weather that included thunderstorms, strong winds, and rain. Heavy rain caused flash flooding and led to multiple road closures countywide.
7/31/2009	Watsontown. Heavy rain produced flash flooding just north of Watsontown in Delaware Township along Route 405. A trailer park was inundated by up to six feet of water with at least ten trailers flooded. One resident was temporarily evacuated.
12/1/2010	Watsontown, Milton, West Chillisquaque Township, Turbot Township. Heavy rainfall amounts between 2 and 4 inches produced significant flooding. Several roads were closed as a result of the flooding including SR 405 between SR 17 and 45 in West Chillisquaque Township, Housels Run Road, Susquehanna Trail in Turbot Township and Brimmer Avenue in Watsontown.
3/6/2011	East Chillisquaque Township. Flooding closed Shakespeare road from Route 45 to Hobbes Road.
3/10/2011	Sunbury, Northumberland Borough, Upper Augusta Township, Elysburg. Heavy rainfall between 2 to 4 inches across central and eastern Pennsylvania combined with snowmelt in the northern mountains to produce significant flooding. Several roads were closed due to flooding, including SR 11 between Duke Street in Northumberland Borough and the Routes 11-15 split at Shamokin Dam. SR 4004 (Mile Post Road) in Upper Augusta Township, between Sunbury and Mount Pleasant Road, was also closed. Knoebels Resort near Elysburg also reported flood damage.
3/11/2011	Sunbury. Heavy rainfall between 2 to 4 inches across central and eastern Pennsylvania combined with snowmelt in the northern mountains to produce significant flooding. The Susquehanna River at Sunbury crested at 26.03 feet. This is categorized as a moderate flood. At 26.0 feet high water affects a number of homes and businesses in areas not protected by the flood wall and levee system.
9/8/2011	Countywide. Heavy rainfall from the remnants of Tropical Storm Lee produced widespread flooding, flash flooding and river flooding mainly near and to the east of the Susquehanna Valley from September 4-10. Several locations in the Susquehanna Basin came close to records set by Hurricane Agnes (June 1972). A preliminary total of 15 buildings were destroyed, 407 suffered major damage and 339 suffered minor damage, with a total of 1116 structures impacted by the flooding. Damages were reported at $604,957 for public facilities. Fortunately, no injuries or fatalities were reported in Northumberland County.
5/8/2013	Sunbury. Several locations around the Lewisburg, Selinsgrove and Sunbury areas picked up between 2-3 inches of rain over a short duration. Urbanization combined with the intense rains lead to flash flooding along SR 11 and the closure of Reagan/Hamilton underpasses near Sunbury.

Flood Insurance Policy Data

Each municipality that has floodplain within its boundaries is required to participate in the National Flood Insurance Program (NFIP). The NFIP and FEMA then tracks the amount of active, cancelled, and expired NFIP flood insurance policies for each of the participating municipalities. The data is used for statistical comparisons, trending and future policy

purchasing projections, and promotional advertisements. Table 4.3.1.3-2 provides flood Insurance data from the FEMA for the municipalities of Northumberland County.

Property Loss

In addition to the aforementioned past flood events, the NFIP identifies properties that frequently experience flooding. ***Repetitive loss properties*** are structures insured under the NFIP that have had at least two paid flood losses of more than $1,000 over any 10-year period since 1978. A property is classified a ***severe repetitive loss property*** either when there are at least four losses (each exceeding $5,000) or when there are two or more losses where the building payments exceed the property value.

As of February 2016, the FEMA Repetitive Lost Listing shows there were 40 repetitive loss properties in Northumberland County. These repetitive loss properties are located in 12 of the 36 municipalities in Northumberland County: Delaware Township, Herndon Borough, Little Mahanoy Township, Lower Mahanoy Township, Milton Borough, Northumberland Borough, Point Township, Ralpho Township, Shamokin, Turbot Township, Upper Augusta Township, and West Chillisquaque Township. The most repetitive loss properties in a municipality are located in Point Township, with 30% of all repetitive loss properties. Table 4.3.1.3-3 shows the number of repetitive loss

Flood Insurance Policy Data by Municipality

	ACTIVE POLICIES	CANCELLED POLICIES	EXPIRED POLICIES
COAL Township	32	34	242
DELAWARE Township	32	110	371
EAST CAMERON Township	**0**	**0**	**0**
EAST CHILLISQUAQUE Township	3	4	22
HERNDON Borough	15	38	322
JACKSON Township	13	0	158
JORDAN Township	4	4	36
KULPMONT Borough	1	0	7
LEWIS Township	1	1	9
LITTLE MAHANOY Township	4	0	29
LOWER AUGUSTA Township	8	21	53
LOWER MAHANOY Township	9	24	47
MARION HEIGHTS Borough	**0**	**0**	**0**
MCEWENSVILLE Borough	0	5	0
MILTON Borough	260	927	2892
MOUNT CARMEL Borough	40	26	426
MOUNT CARMEL Township	1	0	13
NORTHUMBERLAND Borough	21	41	283
POINT Township	34	95	625
RALPHO Township	22	54	260
RIVERSIDE Borough	9	37	173
ROCKEFELLER Township	6	21	61
RUSH Township	9	0	26
SHAMOKIN City	33	27	674
SHAMOKIN Township	19	8	118
SNYDERTOWN Borough	0	7	12
SUNBURY City	218	351	1985
TURBOT Township	15	27	308
TURBOTVILLE Borough	**0**	**0**	**0**
UPPER AUGUSTA Township	55	109	477
UPPER MAHANOY Township	1	1	26
WASHINGTON Township	6	0	12
WATSONTOWN Borough	36	127	255
WEST CAMERON Township	**0**	**0**	**0**
WEST CHILLISQUAQUE Township	90	221	966
ZERBE Township	6	5	63

Source: FEMA Community Listing for Pennsylvania dated Dec. 31, 2016

Table 4.3.1.3-2: Summary of Flood Insurance Policies by Municipality

properties by type per municipality and Table 4.3.1.3-4 shows the number of severe repetitive loss properties by type per municipality. This municipal data is provided to that specific municipality for review, focused mitigation planning and mitigation efforts. The mitigation effort can be from smart flood proofing measures to structural elevation, relocation or demolition.

Summary of the Number and Type of Repetitive Loss Properties by Municipality

	NON-RESIDENTIAL	2-4 FAMILY	SINGLE FAMILY	CONDO	OTHER RESIDENTIAL		TOTAL
COAL Township	0	0	0	0	0		0
DELAWARE Township	0	0	1	0	0		1
EAST CAMERON Township	0	0	0	0	0		0
EAST CHILLISQUAQUE Township	0	0	0	0	0		0
HERNDON Borough	0	0	2	0	0		2
JACKSON Township	0	0	0	0	0		0
JORDAN Township	0	0	0	0	0		0
KULPMONT Borough	0	0	0	0	0		0
LEWIS Township	0	0	0	0	0		0
LITTLE MAHANOY Township	0	0	2	0	0		2
LOWER AUGUSTA Township	0	0	0	0	0		0
LOWER MAHANOY Township	0	0	2	0	0		2
MARION HEIGHTS Borough	0	0	0	0	0		0
MCEWENSVILLE Borough	0	0	0	0	0		0
MILTON Borough	0	0	2	0	0		2
MOUNT CARMEL Borough	0	0	0	0	0		0
MOUNT CARMEL Township	0	0	0	0	0		0
NORTHUMBERLAND Borough	0	0	1	0	0		1
POINT Township	3	0	8	1	0		12
RALPHO Township	0	0	5	1	0		6
RIVERSIDE Borough	0	0	0	0	0		0
ROCKEFELLER Township	0	0	0	0	0		0
RUSH Township	0	0	0	0	0		0
SHAMOKIN City	0	0	1	0	0		1
SHAMOKIN Township	0	0	0	0	0		0
SNYDERTOWN Borough	0	0	0	0	0		0
SUNBURY City	0	0	0	0	0		0
TURBOT Township	4	0	0	0	0		4
TURBOTVILLE Borough	0	0	0	0	0		0
UPPER AUGUSTA Township	0	0	2	0	0		2
UPPER MAHANOY Township	0	0	0	0	0		0
WASHINGTON Township	0	0	0	0	0		0
WATSONTOWN Borough	0	0	0	0	0		0
WEST CAMERON Township	0	0	0	0	0		0
WEST CHILLISQUAQUE Township	3	0	1	1	0		5
ZERBE Township	0	0	0	0	0		0
TOTAL PROPERTIES	10	0	27	3	0		40

Table 4.3.1.3-3: Summary of the Number and Type of Repetitive Loss Properties by Municipality

Source: FEMA Repetitive Loss Listing date February 2016

Summary of the Number and Type of SEVERE Repetitive Loss Properties by Municipality

	NON-RESIDENTIAL	2-4 FAMILY	SINGLE FAMILY	CONDO	OTHER RESIDENTIAL		TOTAL
COAL Township	0	0	0	0	0		0
DELAWARE Township	0	0	1	0	0		1
EAST CAMERON Township	0	0	0	0	0		0
EAST CHILLISQUAQUE Township	0	0	0	0	0		0
HERNDON Borough	0	0	0	0	0		0
JACKSON Township	0	0	0	0	0		0
JORDAN Township	0	0	0	0	0		0
KULPMONT Borough	0	0	0	0	0		0
LEWIS Township	0	0	0	0	0		0
LITTLE MAHANOY Township	0	0	0	0	0		0
LOWER AUGUSTA Township	0	0	0	0	0		0
LOWER MAHANOY Township	0	0	0	0	0		0
MARION HEIGHTS Borough	0	0	0	0	0		0
MCEWENSVILLE Borough	0	0	0	0	0		0
MILTON Borough	0	0	2	0	0		2
MOUNT CARMEL Borough	0	0	0	0	0		0
MOUNT CARMEL Township	0	0	0	0	0		0
NORTHUMBERLAND Borough	0	0	1	0	0		1
POINT Township	2	0	12	0	1		15
RALPHO Township	0	0	1	0	0		1
RIVERSIDE Borough	0	0	0	0	0		0
ROCKEFELLER Township	0	0	0	0	0		0
RUSH Township	0	0	0	0	0		0
SHAMOKIN City	0	0	0	0	0		0
SHAMOKIN Township	0	0	0	0	0		0
SNYDERTOWN Borough	0	0	0	0	0		0
SUNBURY City	0	0	0	0	0		0
TURBOT Township	2	0	0	0	2		4
TURBOTVILLE Borough	0	0	0	0	0		0
UPPER AUGUSTA Township	0	0	1	0	0		1
UPPER MAHANOY Township	0	0	0	0	0		0
WASHINGTON Township	0	0	0	0	0		0
WATSONTOWN Borough	0	0	0	0	0		0
WEST CAMERON Township	0	0	0	0	0		0
WEST CHILLISQUAQUE Township	1	0	0	0	0		1
ZERBE Township	0	0	0	0	0		0
TOTAL PROPERTIES	5	0	18	0	3		26

Table 4.3.1.3-4: Summary of the Number and Type of SEVERE Repetitive Loss Properties by Municipality

Source: FEMA Severe Repetitive Loss Listing date February 2016

Table 4.3.1.3-5 is a summary of property loss per municipality. FEMA provided all data except for the number of single time losses. The number of single time loss properties, and the costs of single time losses, which were simply derived by subtracting the total repetitive & severe repetitive loss numbers and costs from the total loss numbers and

costs. It is noted that Point Township has a negative amount shown in the "costs of single time losses" column because the total cost of all loses is less than the combined repetitive & severe repetitive loss costs, thus giving us a negative cost. FEMA will be checking into their data for a possible error.

As one can see from Table 4.3.1.3-5, the Total Costs of Repetitive & Severe Repetitive Losses far exceed the costs of single time losses. For this reason it is relatively easy to understand why it is of high importance to mitigate the Repetitive & Severe Repetitive Loss properties. Pure and simple they have the repeating cycle of "damage - claim – payout" thus causing a drain on the NFIP. The insurance companies basically depend on a high ratio of new and existing policies that have little to no claims to offset a lower base of policies with claims. This is true whether it is flood insurance, home, fire, vehicle, boat, etc. However, when the reverse starts to happen, either from losing policies to the private market, or existing policy cancelations due to mortgage payoffs, or "self-insuring" by canceling a policy and making the canceled policy payment to a dedicated savings account to be used when an event happens. The usual result is increased policy costs and total risk coverage, thus the Biggert-Waters Act was born in 2012.

The Biggert-Waters legislation sought end the subsidized Flood Insurance Policies by raising the Policy Premiums to reflect the actual risk. This was to help recover the deficit of approximately 24 Billion Dollars by increasing the Flood Insurance Policy Premiums over a several year period. After much intense debate within the Federal Government, the Homeowner Flood Insurance Act of 2014 was created to indefinitely suspend the Biggert-Waters Act. The 2014 Act sought to keep Flood Insurance affordable. Policies will continue to be corrected to cover the actual risk when a new policy is purchased. Time will tell what is next for policy holders due to the ongoing evolution of the NFIP Flood Insurance.

Going forward, it is also important to make the statement that "Every owner of a property that exists in the 100 Year Floodplain should have a Flood Insurance Policy to cover the loss of their property and their contents. It is the owner who shall take responsibility to do so and not depend on the Government to bail them out because they chose to gamble against any damage and lost." The same could be said about a person who did not insure their car against collision, who had an accident and damaged their vehicle far beyond their ability to pay for repairs, and now wants the state to pay for the damage.

The paragraphs following Table 4.3.1.3-5 help describe the NFIP Flood Insurance more in detail. Not only does Table 4.3.1.3-5 Indicate Loss Costs but it also indicated occurrence. Emergency Management can use this table to help plan disaster response and evacuation planning by reviewing the areas of Repetitive & Severe Repetitive Loss within each municipality for the most frequent flooding.

Floods are the most common and costly natural catastrophe in the United States. In terms of economic disruption, property damage, and loss of life, floods are "nature's number-one disaster." For that reason, flood insurance is almost never available under industry-

Summary of Property Loss Data per Municipality

	# of Repetitive Losses	# of Repetitive Properties	Costs of Repetitive Losses	# of Severe Repetitive Losses	# of Severe Repetitive Loss Properties	Cost of Severe Repetitive Losses	Total of Rep. and Severe Rep. Losses	Total Costs of Rep. and Severe Rep. Losses	# of Single Time Losses	# of Single Time Loss Properties	Cost of Single Time Losses	Total # of Single, Rep. and Severe Rep. Losses	Total Cost of Single, Rep, and Severe Rep Losses
COAL Township	10	5	$81,849.54	0	0	$0.00	5	81,849.54	16	16	$115,539.46	21	$197,389.00
DELAWARE Township	31	10	$609,344.89	0	0	$0.00	10	609,344.89	68	68	$203,857.11	78	$813,202.00
EAST CAMERON Township	0	0	$0.00	0	0	$0.00	0	0.00	0	0	$0.00	0	$0.00
EAST CHILLISQUAQUE Township	0	0	$0.00	0	0	$0.00	0	0.00	1	1	$9,173.00	1	$9,173.00
HERNDON Borough	20	9	$407,994.96	0	0	$0.00	9	407,994.96	47	47	$353,533.04	56	$761,528.00
JACKSON Township	9	4	$281,862.18	0	0	$0.00	4	281,862.18	21	21	$94,430.82	25	$376,293.00
JORDAN Township	0	0	$0.00	0	0	$0.00	0	0.00	1	1	$0.00	1	$0.00
KULPMONT Borough	0	0	$0.00	0	0	$0.00	0	0.00	1	1	$241.00	1	$241.00
LEWIS Township	0	0	$0.00	0	0	$0.00	0	0.00	1	1	$3,554.00	1	$3,554.00
LITTLE MAHANOY Township	0	0	$0.00	0	0	$0.00	0	0.00	0	0	$0.00	0	$0.00
LOWER AUGUSTA Township	2	1	$15,129.38	0	0	$0.00	1	15,129.38	0	0	$20,553.62	1	$35,683.00
LOWER MAHANOY Township	5	2	$133,038.75	0	0	$0.00	2	133,038.75	7	7	$18,596.25	9	$151,635.00
MARION HEIGHTS Borough	0	0	$0.00	0	0	$0.00	0	0.00	0	0	$0.00	0	$0.00
MCEWENSVILLE Borough	0	0	$0.00	0	0	$0.00	0	0.00	0	0	$5.00	0	$5.00
MILTON Borough	191	78	$2,838,236.95	5	1	$54,264.58	83	2,892,501.53	371	371	$1,118,148.47	454	$4,010,650.00
MOUNT CARMEL Borough	16	5	$708,990.14	0	0	$0.00	5	708,990.14	42	42	$30,822.86	47	$739,813.00
MOUNT CARMEL Township	0	0	$0.00	0	0	$0.00	0	0.00	3	3	$1,272.00	3	$1,272.00
NORTHUMBERLAND Borough	16	5	$299,377.53	7	1	$128,890.28	12	428,267.81	33	33	$274,302.19	45	$702,570.00
POINT Township	160	43	$3,428,234.69	51	7	$945,843.54	94	4,374,078.23	143	143	-$535,574.23	237	$3,838,504.00
RALPHO Township	16	8	$684,212.40	2	1	$172,780.31	10	856,992.71	40	40	$846,622.29	50	$1,703,615.00
RIVERSIDE Borough	4	2	$83,248.47	0	0	$0.00	2	83,248.47	31	31	$237,599.53	33	$320,848.00
ROCKEFELLER Township	4	1	$25,187.70	0	0	$0.00	1	25,187.70	12	12	$187,697.30	13	$212,885.00
RUSH Township	2	1	$53,502.98	0	0	$0.00	1	53,502.98	4	4	$34,325.02	5	$87,828.00
SHAMOKIN City	14	5	$124,061.77	0	0	$0.00	5	124,061.77	76	76	$425,830.23	81	$549,892.00
SHAMOKIN Township	5	2	$396,569.27	0	0	$0.00	2	396,569.27	25	25	$58,903.73	27	$455,473.00
SNYDERTOWN Borough	0	0	$0.00	0	0	$0.00	0	0.00	0	0	$0.00	0	$0.00
SUNBURY City	6	2	$23,076.13	0	0	$0.00	2	23,076.13	74	74	$608,565.87	76	$631,642.00
TURBOT Township	59	21	$2,466,621.90	0	0	$0.00	21	2,466,621.90	92	92	$724,395.10	113	$3,191,017.00
TURBOTVILLE Borough	0	0	$0.00	0	0	$0.00	0	0.00	0	0	$0.00	0	$0.00
UPPER AUGUSTA Township	60	20	$1,510,079.24	0	0	$0.00	20	1,510,079.24	88	88	$589,737.76	108	$2,099,817.00
UPPER MAHANOY Township	0	0	$0.00	0	0	$0.00	0	0.00	0	0	$0.00	0	$0.00
WASHINGTON Township	0	0	$0.00	0	0	$0.00	0	0.00	0	0	$0.00	0	$0.00
WATSONTOWN Borough	0	0	$0.00	0	0	$0.00	0	0.00	26	26	$312,579.00	26	$312,579.00
WEST CAMERON Township	0	0	$0.00	0	0	$0.00	0	0.00	0	0	$0.00	0	$0.00
WEST CHILLISQUAQUE Township	56	25	$1,823,413.04	0	0	$0.00	25	1,823,413.04	158	158	$995,719.96	183	$2,819,133.00
ZERBE Township	0	0	$0.00	0	0	$0.00	0	0.00	4	4	$13,509.00	4	$13,509.00

Source: FEMA Community Listing for PA dated Dec. 31st 2016 and FEMA Repetitive Loss and Severe Repetitive. Loss Listing dated June 2016

Table 4.3.1.3-5: Summary of Property Loss Data per Municipality

standard homeowner and renter policies. The best way for citizens to protect their property against flood losses is to purchase flood insurance through the NFIP.

Congress established the NFIP in 1968 to help control the growing cost of federal disaster relief. The NFIP is administered by FEMA, part of the U.S. Department of Homeland Security. The NFIP offers federally backed flood insurance in communities that adopt and enforce effective floodplain management ordinances to reduce future flood losses.

Since 1983, the chief means of providing flood insurance coverage has been a cooperative venture of FEMA and the private insurance industry known as the Write Your Own (WYO) Program. This partnership allows qualified property and casualty insurance companies to "write" (i.e., issue) and service the NFIP's Standard Flood Insurance Policy (SFIP) under their own names.

Today, nearly 90 WYO insurance companies issue and service the SFIP under their own names. More than 4.4 million federal flood insurance policies are in force. These policies represent $650 billion in flood insurance coverage for homeowners, renters, and business owners throughout the United States and its territories.

The NFIP provides flood insurance to individuals in communities that are members of the program. Membership in the program is contingent on the community adopting and enforcing floodplain management and development regulations.

The NFIP is based on the voluntary participation of communities of all sizes. In the context of this program, a "community" is a political entity – whether an incorporated city, town, township, borough, village, or an unincorporated area of a county or parish – that has legal authority to adopt and enforce floodplain management ordinances for the area under its jurisdiction.

National Flood Insurance is available only in communities that apply for participation in the NFIP and agree to implement prescribed flood mitigation measures. Newly participating communities are admitted to the NFIP's Emergency Program. Most of these communities quickly earn "promotion" to the Regular Program.

The Emergency Program is the initial phase of a community's participation in the NFIP. In return for the local government's agreeing to adopt basic floodplain management standards, the NFIP allows local property owners to buy modest amounts of flood insurance coverage.

In return for agreeing to adopt more comprehensive floodplain management measures, an Emergency Program community can be "promoted" to the Regular Program. Local policyholders immediately become eligible to buy greater amounts of flood insurance coverage. All municipalities in Northumberland County are in the Regular Program.

The minimum floodplain management requirements include the following:

- Review and permit all development in the SFHA
- Elevate new and substantially improved residential structures above the Base Flood Elevation (BFE)
- Elevate or dry flood proof new and substantially improved nonresidential structures

- Limit development in floodways
- Locate or construct all public utilities and facilities so as to minimize or eliminate flood damage
- Anchor foundation or structure to resist floatation, collapse or lateral movement

In addition, Regular Program communities are eligible to participate in the NFIP's Community Rating System (CRS). Under the CRS, policyholders can receive premium discounts of 5 to 45 percent as their cities and towns adopt more comprehensive flood mitigation measures. Currently, six communities in Northumberland County participate in CRS. CRS rewards those communities that establish floodplain management programs that go beyond NFIP minimum requirements by providing discounts on flood insurance premiums. Under the CRS, communities receive credit for activities falling into four categories: public information, mapping and regulations, flood damage reduction, and flood preparedness.

The CRS was implemented in 1990 to recognize and encourage community floodplain management activities that exceed the minimum NFIP standards. Section 541 of the 1994 Act amends Section 1315 of the 1968 Act to codify the CRS in the NFIP, and expands the CRS goals to specifically include incentives to reduce the risk of flood-related erosion and to encourage measures that protect natural and beneficial floodplain functions. These goals have been incorporated into the CRS, and communities now receive credit toward premium reductions for activities that contribute to them.

There are 10 CRS classes that provide varied reductions in insurance premiums. Class 1 requires the most credit points and gives the largest premium reduction; Class 10 receives no premium reduction. CRS premium discounts on flood insurance range from 5 percent for Class 9 communities up to 45 percent for Class 1 communities. Table 4.3.1.3-6 lists the Northumberland County CRS communities.

Table 4.3.1.3-6: Northumberland County CRS Participation

COMMUNITY NUMBER	COMMUNITY NAME	CRS ENTRY DATE	CURRENT EFFEDTIVE DATE	CRS CLASS	% DISCOUNT FOR SFHA	DISCOUNT FOR NON-SFHA	STATUS
420735	Herndon Borough	10/1/2007	10/1/2007	8	10%	5%	C
425384	Milton Borough	10/1/1992	5/1/2013	7	15%	5%	C
420739	Northumberland Borough	10/1/2007	10/1/2007	8	10%	5%	C
421026	Point Township	10/1/2007	10/1/2010	10	0%	0%	R
420743	Sunbury City	10/1/2007	10/1/2007	8	10%	5%	C
420745	Upper Augusta Township	10/1/2007	10/1/2007	8	10%	5%	C

C = Current R = Rescinded

Source: Community Rating System (CRS) Communities and their Classes document dated October 01, 2016 (last update October 12, 2016)
Table 3 Community Rating System Communities page CRS 30 as found on the FEMA Website on January 19, 2017.

Table 4.3.1.3-7 lists the Northumberland County municipalities participating in the NFIP along with the date of the initial FIRM and the current effective map date. Thirty-four of 36 jurisdictions in the County participate in the NFIP; Marion Heights Borough and

Turbotville Borough are not participating, as they are not flood prone. West Cameron Township was suspended on July 17, 2008, for failing to adopt the new floodplain maps.

COMMUNITY NUMBER	COMMUNITY NAME	ENTRY DATE	PARTICIPATING STATUS	INITIAL FIRM IDENTIFIED	CURRENT EFFECTIVE DATE	INITIAL FHBM IDENTIFIED	EMER DATE
421936	Coal Township	07/03/90	PARTICIPATING	07/23/90	07/16/08	09/20/74	08/12/74
421963	Delaware Township	12/04/85	PARTICIPATING	11/19/80	07/16/08	08/05/77	09/10/75
421937	East Cameron Township	09/01/86	PARTICIPATING	07/16/08	07/16/08	10/06/74	09/03/75
422599	East Chillisquaque Township	05/04/87	PARTICIPATING	05/04/87	07/16/08	02/07/75	10/15/75
420735	Herndon Borough	08/01/79	PARTICIPATING	08/01/79	07/16/08	01/23/74	12/06/73
421938	Jackson Township	08/15/79	PARTICIPATING	08/15/79	07/16/08	09/20/74	09/24/74
421939	Jordan Township	04/01/86	PARTICIPATING	04/01/86	07/16/08	09/20/74	11/03/75
420736	Kulpmont Borough	05/01/78	PARTICIPATING	05/01/78	07/16/08	05/31/74	02/01/74
421940	Lewis Borough	04/01/86	PARTICIPATING	04/01/86	07/16/08	01/31/75	03/08/76
421015	Little Mahanoy Township	09/05/79	PARTICIPATING	09/05/79	07/16/18	09/13/74	01/30/74
421015	Lower Augusta Township	08/01/79	PARTICIPATING	08/01/79	09/16/16	05/17/74	01/28/74
421017	Lower Mahanoy Township	08/02/82	PARTICIPATING	08/02/82	07/16/08	09/20/74	07/25/25
421941	Marion Heights Borough	NP	NOT-PARTICIPATING (NP)	NP	NP	NP	NP
422720	McEwensville Borough	09/01/86	PARTICIPATING	09/11/86	07/16/08	12/27/74	02/14/83
421935	Milton Borough	03/10/72	PARTICIPATING	03/10/72	07/16/08	03/10/72	04/09/71
425384	Mount Carmel Borough	07/17/78	PARTICIPATING	07/17/78	07/16/08	01/14/77	12/17/73
420738	Mount Carmel Township	05/03/90	PARTICIPATING	05/03/90	07/16/08	09/06/74	10/24/74
421942	Northumberland Borough	12/02/77	PARTICIPATING	02/02/77	09/16/16	06/28/74	06/06/74
420739	Point Township	05/02/77	PARTICIPATING	05/02/77	09/16/16	03/15/74	11/19/73
421027	Ralpho Township	02/15/79	PARTICIPATING	02/15/79	07/16/08	06/28/74	11/19/73
420740	Riverside Borough	04/15/77	PARTICIPATING	04/15/77	07/16/08	03/29/74	11/19/73
421152	Rockefeller Township	04/01/86	PARTICIPATING	04/01/86	09/16/16	08/09/74	04/12/74
421943	Rush Township	01/28/77	PARTICIPATING	01/28/77	07/16/08	09/06/74	11/11/74
420741	Shamokin City	12/16/80	PARTICIPATING	12/16/80	07/16/08	05/10/74	04/05/74
421159	Shamokin Township	03/05/90	PARTICIPATING	03/05/90	07/16/08	09/20/74	04/23/74
420742	Snydertown Borough	09/01/86	PARTICIPATING	09/01/86	07/16/08	10/21/77	05/27/75
420743	Sunbury City	07/18/77	PARTICIPATING	07/18/77	09/16/16	07/27/73	09/03/71
420744	Turbot Township	08/15/79	PARTICIPATING	08/15/79	07/16/08	06/15/73	03/16/73
422721	Turbotville Borough	NP	NOT-PARTICIPATING (NP)	NP	NP	NP	NP
420745	Upper Augusta Township	05/02/77	PARTICIPATING	05/02/77	09/16/16	01/04/74	01/19/73
421944	Upper Mahanoy Township	09/01/86	PARTICIPATING	09/01/86	07/16/08	09/20/74	10/24/75
421945	Washington Township	12/15/78	PARTICIPATING	12/15/78	07/16/08	11/01/74	11/07/75
420746	Watsontown Borough	01/02/80	PARTICIPATING	01/02/80	07/16/08	03/08/74	11/19/73
421946	West Cameron Township	01/17/90	SUSPENDED	01/17/90	07/16/08	09/20/74	10/15/75
421033	West Chillisquaque Township	04/15/77	PARTICIPATING	04/15/77	07/16/08	05/10/74	11/28/74
421947	Zerbe Township	01/17/90	PARTICIPATING	01/17/90	07/16/08	09/20/74	08/20/74

Table 4.3.1.3-7: Northumberland County NFIP Participation

Source: FEMA Community Status Book Report for Pennsylvania Communities Participating in the National Flood Program dated January 21, 2017, and from the NFIP BureauNet Pennsylvania Community Status Information dated January 16, 2017.

Future Occurrence

In Northumberland County, flooding occurs commonly and can occur during any season of the year. Therefore, the future occurrence of floods in Northumberland County can be considered *highly likely* as defined by the Risk Factor Methodology probability criteria (see Table 4.4.1-1). Floods are described in terms of their extent (including the horizontal area affected and the vertical depth of floodwaters) and the related probability of occurrence. The NFIP uses historical records to determine the probability of occurrence for different extents of flooding. The probability of occurrence is expressed in percentages as the chance of a flood of a specific extent occurring in any given year.

The NFIP recognizes the 1 percent annual chance flood, also known as the *base flood*, as the standard for identifying properties subject to federal flood insurance purchase requirements. A one percent annual chance flood is a flood that has a one percent chance of occurring over a given year. The DFIRMs are used to identify areas subject to the one and 0.2 percent annual chance flooding. Areas subject to two percent and ten percent annual chance events are not shown on maps; however, water surface elevations associated with these events are included in the flood source profiles contained in the Flood Insurance Study Report.

Table 4.3.1.3-8: Recurrance Intervals and Associated Probabilities

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

Table 4.3.1.3-8 shows a range of flood recurrence intervals and associated probabilities of occurrence.

Vulnerability Assessment

Northumberland County is vulnerable to flooding that causes loss of lives, property damage, and road closures. Floodwater damages that occur to agricultural, urban, and other properties such as roads, bridges, and utilities will ultimately increase with increased development in flood-prone lands. For purposes of assessing vulnerability, the County focused on community assets that are located in the 1 percent annual chance floodplain. While greater and smaller floods are possible, information about the extent and depths for this floodplain is available for all municipalities countywide, thus providing a consistent basis for analysis. Flood vulnerability maps for each applicable local municipality, showing the 1 percent annual chance flood hazard area and addressable structures, and critical facilities and transportation routes within it, are included in **Appendix D (REDACTED)**. These maps were created using FEMA Countywide Effective digital data.

Table 4.3.1.3-9 displays the number of addressable structures, parcels, and populations intersecting the SFHA in each municipality. The number of vulnerable addressable

structures was calculated by overlaying the addressable structures with the SFHA. Employing the U.S. Census Bureau's American Community Survey 5-Year Estimate, the estimated population in the SFHA was formulated using the average household size in Northumberland County of 2.27 people per housing unit in conjunction with addressed structures in the SFHA. The value of addressed structures located in the SFHA was determined by pulling the corresponding Northumberland County Tax Assessment building assessed value from intersecting parcel data. Northumberland County's assessed values are used for ad valorem taxation purposes only. They are a market value derived from our base year cost tables; Northumberland County currently has a base year of 1972. Current assessed values cannot be considered true market value because of the difference between base year and current/actual year. The State provides each assessment office with a common level ratio to apply to assessed values in order to equate them to a more realistic, market based value. If assessments were used to represent loss without applying the common level ratio, totals would be considerably skewed away from values that would represent true loss. The common level ratio for 2016-2017 for Northumberland County is 25.6%; the ratio is used to explain that after all valid sales in our county are reviewed and compared against the assessment for the corresponding parcel, the average assessment represents 25.6% of what a property could possibly sell for on an open market. For these reasons, we have applied the common level ratio in order to produce implied values for estimated building valued losses per municipality.

Hamilton Underpass, Sunbury 2011

Overall, 5.5 percent of the addressable structures and six percent of the population of the County are most at risk to the one percent annual chance flood zone. Milton Borough has the highest number of structures located in the SFHA with 737; this equates to approximately 27 percent of all structures in that jurisdiction. Other jurisdictions with high numbers of structures in the SFHA include West Chillisquaque Township and Mount Carmel Borough. Proportionally, West Chillisquaque Township has the highest percentage of structures in the SFHA with 31.7 percent of all structures in the municipality located in the SFHA. Other jurisdictions with a comparatively higher proportion of addressable structures in the SFHA include Milton Borough, Snydertown Borough, and Herndon Borough. These jurisdictions also have proportionally more populations vulnerable to flooding; approximately one-third of the total population of both West Chillisquaque Township and Milton Borough is flood prone.

The only other jurisdictions with over ten percent of the population at risk to the one percent annual chance flood zone are Snydertown Borough and Delaware Township. Of all the flood-prone jurisdictions, Kulpmont Borough, Mount Carmel Township, East Cameron Township, Northumberland Borough, McEwensville Borough, and Sunbury City have comparatively lower structure vulnerability; less than 1 percent of the total addressable structures in those jurisdictions are located in the SFHA. Most of the addressable structures in Sunbury are protected by a levee system that, if it were to fail, would cause widespread flooding in that community. For more information on levee failure, see **LEVEE FAILURE** under Human-made Hazards in Section 4. Table 4.3.1.3-10 displays the number of critical facilities that are located in the SFHA by jurisdiction according

Structure and Population Vunerability to Floods in Northumberland County

	TOTAL ADDRESSABLE STRUCTURES	TOTAL ADDRESSABLE STRUCTURES IN SFHA	% OF TOTAL ADDRESSABLE STRUCTURES IN SFHA	PARCELS IN SFHA WITH ADDRESSED STRUCTURE	TOTAL ASSESSED BUILDING VALUE OF STRUCTURES IN SFHA	TOTAL POPULATION (2010 CENSUS)	ESTIMATED POPULATION IN SFHA (2.27 PER HOUSEHOLD)	% POPULATION IN SFHA
COAL Township	4,466	79	1.77%	77	$3,242,143	10,383	179	1.72%
DELAWARE Township	1,996	154	7.72%	139	$9,569,029	4,489	350	7.79%
EAST CAMERON Township	329	1	0.30%	1	$28,867	748	2	0.27%
EAST CHILLISQUAQUE Township	297	9	3.03%	9	$426,093	668	20	3.06%
HERNDON Borough	187	27	14.44%	25	$969,609	324	57	17.51%
JACKSON Township	522	33	6.32%	25	$1,425,820	875	57	6.48%
JORDAN Township	368	8	2.17%	8	$1,134,259	794	18	2.29%
KULPMONT Borough	1,453	2	0.14%	2	$85,898	2,924	5	0.17%
LEWIS Township	798	10	1.25%	8	$534,688	1,915	41	2.10%
LITTLE MAHANOY Township	196	17	8.67%	15	$606,837	479	39	8.06%
LOWER AUGUSTA Township	481	9	1.87%	8	$487,462	1,064	20	1.92%
LOWER MAHANOY Township	818	28	3.42%	24	$1,103,045	1,709	64	3.72%
MARION HEIGHTS Borough	365	0	0.00%	0	$0.00	611	0	0.00%
MCEWENSVILLE Borough	146	1	0.68%	1	$29,297	279	2	0..72 %
MILTON Borough	2,820	745	26.42%	573	$52,159,218	7,042	1,691	24.02%
MOUNT CARMEL Borough	3,531	209	5.92%	192	$3,831,020	5,893	474	8.05%
MOUNT CARMEL Township	1,455	5	0.34%	4	$172,109	3,139	11	0.36%
NORTHUMBERLAND Borough	1,717	11	0.64%	11	$2,307,226	3,804	25	0.66%
POINT Township	1,885	73	3.87%	64	$3,175,356	3,685	166	4.50%
RALPHO Township	2,202	61	2.77%	47	$4,928,908	4,321	138	3.20%
RIVERSIDE Borough	880	22	2.50%	12	$869,396	1,932	50	2.58%
ROCKEFELLER Township	1,040	24	2.31%	24	$1,566,719	2,273	54	2.40%
RUSH Township	506	12	2.37%	12	$634,729	1,122	27	2.43%
SHAMOKIN City	4,182	179	4.28%	173	$3,441,915	7,374	406	5.51%
SHAMOKIN Township	1,172	24	2.05%	16	$4,291,760	2,407	54	2.26%
SNYDERTOWN Borough	156	10	6.41%	9	$359,336	339	23	6.70%
SUNBURY City	4,308	48	1.11%	29	$11,434,180	9,905	109	1.10%
TURBOT Township	825	32	3.88%	30	$1, 515,510	1,806	73	4.02%
TURBOTVILLE Borough	324	0	0.00%	0	$0.00	705	0	0.00%
UPPER AUGUSTA Township	1,260	51	4.05%	42	$2,758,318	2,586	116	4.48%
UPPER MAHANOY Township	303	17	5.61%	38	$728,907	796	39	4.85%
WASHINGTON Township	337	11	3.26%	10	$478,476	746	25	3.35%
WATSONTOWN Borough	1,028	86	8.37%	74	$6,596,528	2,351	195	8.30%
WEST CAMERON Township	245	3	1.22%	3	$78,282	541	7	1.26%
WEST CHILLISQUAQUE Township	1,446	443	30.64%	358	$12,955,776	2,627	1,005	38.28%
ZERBE Township	942	20	2.12%	18	$636,250	1,872	45	2.43%
TOTAL	44,986	2,464	5.48%	2,081	$112,885,536	94,528	5,587	5.91%

Table 4.3.1.3-9: Structure and Population Vunerability to Floods in Northumberland County

Critical Facilities Vulnerable to Flood by Municipality

	TOTAL CRITICAL FACILITIES	TOTAL CRITICAL FACILITIES IN SFHA
COAL Township	51	1
DELAWARE Township	18	1
EAST CAMERON Township	8	0
EAST CHILLISQUAQUE Township	13	3
HERNDON Borough	3	0
JACKSON Township	6	1
JORDAN Township	4	0
KULPMONT Borough	14	0
LEWIS Township	12	0
LITTLE MAHANOY Township	7	1
LOWER AUGUSTA Township	7	0
LOWER MAHANOY Township	16	0
MARION HEIGHTS Borough	3	0
MCEWENSVILLE Borough	1	0
MILTON Borough	28	9
MOUNT CARMEL Borough	25	0
MOUNT CARMEL Township	23	0
NORTHUMBERLAND Borough	24	2
POINT Township	24	0
RALPHO Township	21	1
RIVERSIDE Borough	10	1
ROCKEFELLER Township	13	1
RUSH Township	6	0
SHAMOKIN City	36	3
SHAMOKIN Township	13	0
SNYDERTOWN Borough	2	0
SUNBURY City	62	2
TURBOT Township	7	0
TURBOTVILLE Borough	5	0
UPPER AUGUSTA Township	14	2
UPPER MAHANOY Township	4	0
WASHINGTON Township	3	0
WATSONTOWN Borough	13	4
WEST CAMERON Township	4	0
WEST CHILLISQUAQUE Township	18	5
ZERBE Township	15	0
TOTAL	533	37

Table 4.3.1.3-10: Critical Facilities Vulnerable to Flood by Municipality

to Northumberland County GIS and Public Safety records. Thirty-seven critical facilities are located in the SFHA, representing about 7 percent of the County's total critical facilities. Milton Borough has the highest number of flood-prone critical facilities with nine; West Chillisquaque Township has five flood-prone critical facilities and the Borough of Watsontown has four. Other jurisdictions with critical facilities located in the SFHA include Coal, Delaware, East Chillisquaque, Jackson, Little Mahanoy, Ralpho, Rockefeller, Turbot, Upper Augusta Townships, the Cities of Shamokin and Sunbury, as well as the Boroughs of Northumberland, Riverside and Snydertown.

Additional information on flood vulnerability and losses in Northumberland County, including the 1%-annual chance flood event results derived from data provide by the Northumberland County GIS Department, the number of parcels vulnerable to flood hazards and the assessed value of vulnerable parcels, is provided in Section 4.4 under Potential Loss Estimates.

As previously described, another pertinent threat falling into the flooding category, but presents its own various risks is flash flooding. Please refer to **APPENDIX H** as we identify specific risks and locations within each municipality.

LANDSLIDE

A landslide is the downward and outward movement of slope-forming soil, rock, and vegetation reacting to the force of gravity. Landslides may be triggered by both natural and human-caused changes in the environment, including heavy rain, rapid snow melt, steepening of slopes due to construction or erosion, earthquakes, and changes in groundwater levels. Mudflows, mudslides, rockfalls, rockslides, and rock topples are all forms of a landslide. Areas that are generally prone to landslide hazards include previous landslide areas, the bases of steep slopes, the bases of drainage channels, developed hillsides, and areas recently burned by forest and brush fires (Delano and Wilshusen, 2001).

Location and Extent

Rockfalls, rockslides, block glide, debris slide, earth flow, mud flow, and other slope failures usually occur in areas of Northumberland County with moderate to steep slopes and high precipitation. Many slope failures are associated with precipitation events – periods of sustained above-average precipitation, specific rainstorms, or snowmelt events. Areas experiencing erosion, decline in vegetation cover, and earthquakes are also susceptible to landslides. Human activities that contribute to slope failure include altering the natural slope gradient, increasing soil water content, and removing vegetation cover.

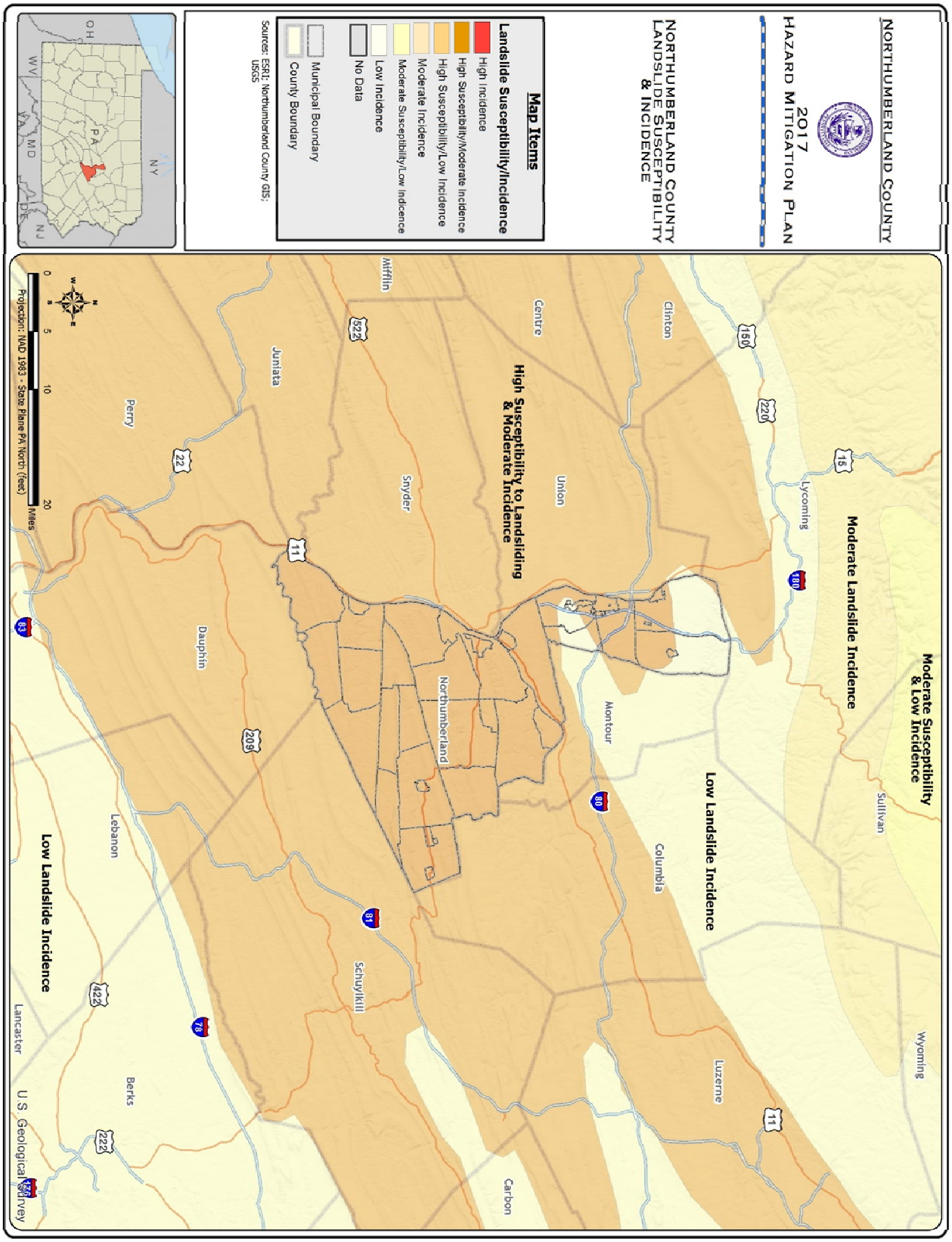
The U.S. Geological Survey (USGS) identifies Northumberland County as falling into three distinct zones of landslide susceptibility and incidence. Map 4.3.1.4-1 shows areas of low, moderate, and high landslide susceptibility as determined by the USGS. Table 4.3.1.5 shows the number of addressable structures and critical facilities vulnerable to landslides. The majority of Northumberland County has a Combo-High susceptibility to landslides, as all jurisdictions have at least land area contained within the Combo-High landslide zone. Small parts of the northernmost portion of the County in Delaware, Lewis, East Chillisquaque, and West Chillisquaque have low susceptibility to landslides.

Addressable Structures and Critical Facilities Vulnerable to Lanslides

	TOTAL ADDRESSABLE STRUCTURES WITHIN LANDSLIDE COMBO-HIGH ZONES	TOTAL CRITICAL FACILITIES WITHIN LANDSLIDE COMBO-HIGH ZONES
COAL Township	4554	29
DELAWARE Township	711	10
EAST CAMERON Township	329	6
EAST CHILLISQUAQUE Township	102	0
HERNDON Borough	192	3
JACKSON Township	524	7
JORDAN Township	363	4
KULPMONT Borough	1486	8
LEWIS Township	261	5
LITTLE MAHANOY Township	193	4
LOWER AUGUSTA Township	475	6
LOWER MAHANOY Township	817	16
MARION HEIGHTS Borough	391	3
MCEWENSVILLE Borough	124	0
MILTON Borough	2764	18
MOUNT CARMEL Borough	3655	18
MOUNT CARMEL Township	1498	22
NORTHUMBERLAND Borough	1712	19
POINT Township	1844	13
RALPHO Township	2169	18
RIVERSIDE Borough	843	10
ROCKEFELLER Township	1021	11
RUSH Township	508	5
SHAMOKIN City	4497	34
SHAMOKIN Township	1133	12
SNYDERTOWN Borough	154	2
SUNBURY City	4364	48
TURBOT Township	806	8
TURBOTVILLE Borough	291	4
UPPER AUGUSTA Township	1252	12
UPPER MAHANOY Township	299	4
WASHINGTON Township	331	3
WATSONTOWN Borough	1020	10
WEST CAMERON Township	242	1
WEST CHILLISQUAQUE Township	1033	3
ZERBE Township	934	15
TOTAL	42,892	391

Table 4.3.1.5: Addressable Structures and Critical Facilities Vulnerable to Landslide

Map 4.3.1.4-1


NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
NORTHUMBERLAND COUNTY
LANDSLIDE SUSCEPTIBILITY
& INCIDENCE
Map Items
Landslide Susceptibility/Incidence
High Incidence
High Susceptibility/Moderate Incidence
High Susceptibility/Low Incidence
Moderate Incidence
Moderate Susceptibility/Low Incidence
Low Incidence
No Data
Municipal Boundary
County Boundary
Sources: ESRI; Northumberland County GIS; USGS
Moderate Susceptibility & Low Incidence
Moderate Landslide Incidence
Low Landslide Incidence
High Susceptibility to Landsliding & Moderate Incidence
Low Landslide Incidence
Projection: NAD 1983 - State Plane PA North (feet)
Miles
Wyoming
Sullivan
Lycoming
Clinton
Centre
Union
Mifflin
Snyder
Juniata
Perry
Dauphin
Northumberland
Montour
Columbia
Luzerne
Carbon
Schuylkill
Lebanon
Berks
Lancaster
U.S. Geological Survey

Range of Magnitude

Landslides cause damage to transportation routes, utilities, and buildings and create travel delays and other side effects. Fortunately, deaths and injuries due to landslides are rare in Pennsylvania and no deaths have been reported in Northumberland County. Almost all of the known deaths due to landslides have occurred when rockfalls or other slides along highways have involved vehicles. Storm-induced debris flows are the only other type of landslide likely to cause injury and/or death. As residential and recreational development increases on and near steep mountain slopes, the hazard from these rapid events will also increase. Most Pennsylvania landslides are moderate to slow moving and damage property rather than cause injury to people.

The Pennsylvania Department of Transportation and large municipalities incur substantial costs due to landslide damage, and also extra construction costs for new roads in known landslide-prone areas. A 1991 estimate showed an average of $10 million per year is spent on landslide repair contracts across the Commonwealth and a similar amount is spent on mitigation costs for grading projects (DCNR, 2010).

A worst-case scenario for a landslide incident in Northumberland County would be for debris to slide onto State Route 11, along the Susquehanna River, during peak hours. This road has an average annual daily traffic volume of 6,330 to 10,990 vehicles. This could result in major backups and possibly traffic accidents.

Past Occurrence

No comprehensive list of landslide incidents is available at this time, as there is no formal reporting system in place in the County or the Commonwealth. Based on anecdotal information from the County and municipal officials, minor landslides occur each year, typically during periods of heavy rains. These events have caused minor damages and personal injuries, but no deaths. Landslide prone locations in the County include:

- Route 11 – South of the Montour County line
- Route 147 – South of Sunbury
- Route 54 – Between Riverside and Elysburg
- Route 4012 – East of Sunbury

Landslide on St. Rte. 4012, January 2016

Future Occurrence

Based on historical events, landslide events resulting in loss of life and property damage are unlikely in Northumberland County. However, with mixed susceptibility to landslides, the probability of landslides occurring in the County is *possible*. Mismanaged, intense development in steeply sloped areas could increase the frequency of occurrence.

Vulnerability Assessment

With the exception of the areas such as those mentioned in the Past Occurrence Section above, communities in Northumberland County are not particularly vulnerable to landslides. However, transportation routes throughout the County located at the base or crest of cliffs should be considered vulnerable to this hazard.

In terms of identifying jurisdictions that are vulnerable to landslides, addressable structures and critical facilities located in areas rated Combo-High are most at risk to landslides. Because the Combo-High zone covers most of the County, every municipality has over 100 addressable structures vulnerable to landslides, but Coal Township has the highest number of vulnerable addressable structures with 4,554. Sunbury has 48 critical facilities vulnerable to landslides. Site-specific conditions such as proximity to steep hills, steep road cuts, excavations, run-off channels, and past occurrences of sliding are key to identifying individual structures vulnerable to landslides.

RADON EXPOSURE

Radon is a cancer-causing natural radioactive gas that you cannot see, smell, or taste. It is a large component of the natural radiation that humans are exposed to and can pose a serious threat to public health when it accumulates in poorly ventilated residential and occupation settings. According to the EPA, radon is estimated to cause about 21,000 lung cancer deaths per year, second only to smoking as the leading cause of lung cancer (EPA 402-R-03-003: EPA Assessment, 2003).

Location and Extent

Radioactivity caused by airborne radon has been recognized for many years as an important component in the natural background radioactivity exposure of humans, but it was not until the 1980s that the wide geographic distribution of elevated values in houses and the possibility of extremely high radon values in houses were recognized. In 1984, routine monitoring of employees leaving the Limerick nuclear power plant near Reading, Pennsylvania, while it was still under construction and not yet functional, showed that readings on a construction worker at the plant frequently exceeded expected radiation levels. However, only natural, nonfission-product radioactivity was detected on the worker.

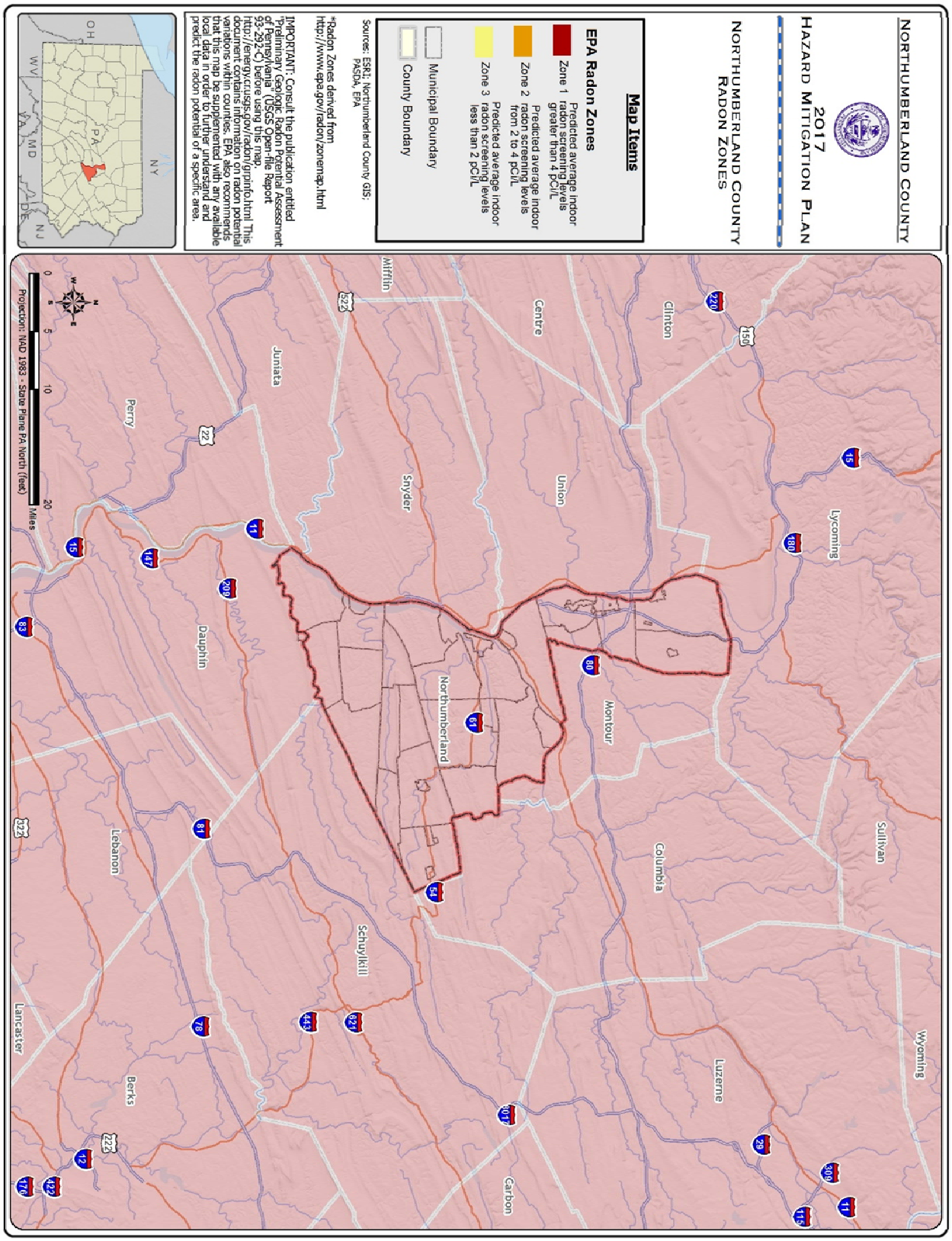
Subsequent testing of the employee's home in the Reading Prong section of Pennsylvania showed extremely high radon levels around 2,500 pCi/L (pico Curies per Liter). To put this amount in perspective, the Environmental Protection Agency (EPA) guidelines state that actions should be taken if radon levels exceed 4 pCi/L in a home, and uranium miners have a maximum exposure of 67 pCi/L. As a result of this event, the Reading Prong became the focus of the first large-scale radon scare in the world.

Radon is a gas that cannot be seen or smelled. It is a noble gas that originates from the natural radioactive decay of uranium and thorium. Like other noble gases (e.g., helium, neon, and argon), radon forms essentially no chemical compounds and tends to exist as a gas or as a dissolved atomic constituent in groundwater. Two isotopes of radon are

significant in nature, 222Rn and 220Rn, formed in the radioactive decay series of 238U and 232Th, respectively. The isotope thoron (i.e., 220Rn) has a half-life (time for decay of half of a given group of atoms) of 55 seconds, barely long enough for it to migrate from its source to the air inside a house and pose a health risk. However, radon (i.e., 222Rn), which has a half-life of 3.8 days, is a widespread hazard. The distribution of radon is correlated with the distribution of radium (i.e., 226Ra), its immediate radioactive parent, and with uranium, its original ancestor. Due to the short half-life of radon, the distance that radon atoms can travel from their parent before decay is generally limited to distances of feet or tens of feet. Each county in Pennsylvania is classified as having a *low*, *moderate*, or *high* radon hazard potential.

Northumberland County is classified as having a high hazard, meaning there is a predicted indoor radon level greater than 4 pCi/L (see Map 4.3.1.5-1).

Map 4.3.1.5-1


NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
NORTHUMBERLAND COUNTY
RADON ZONES
Map Items
EPA Radon Zones
Zone 1
Predicted average indoor radon screening levels greater than 4 pCi/L
Zone 2
Predicted average indoor radon screening levels from 2 to 4 pCi/L
Zone 3
Predicted average indoor radon screening levels less than 2 pCi/L
Municipal Boundary
County Boundary
Sources: ESRI; Northumberland County GIS; PASDA; EPA
*Radon Zones derived from http://www.epa.gov/radon/zonemap.html
IMPORTANT: Consult the publication entitled "Preliminary Geologic Radon Potential Assessment of Pennsylvania" (USGS Open-file Report 93-292-C) before using this map. http://energy.cr.usgs.gov/radon/grpinfo.html This document contains information on radon potential variations within counties. EPA also recommends that this map be supplemented with any available local data in order to further understand and predict the radon potential of a specific area.
OH
WV
PA
MD
NY
NJ
DE
Northumberland
Montour
Columbia
Union
Snyder
Juniata
Perry
Dauphin
Lebanon
Berks
Lancaster
Schuylkill
Carbon
Luzerne
Wyoming
Sullivan
Lycoming
Clinton
Centre
Mifflin
Projection: NAD 1983 - State Plane PA North (feet)
Miles

Three sources of radon in houses are now recognized (shown in Figure 4.3.1.5-1):

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

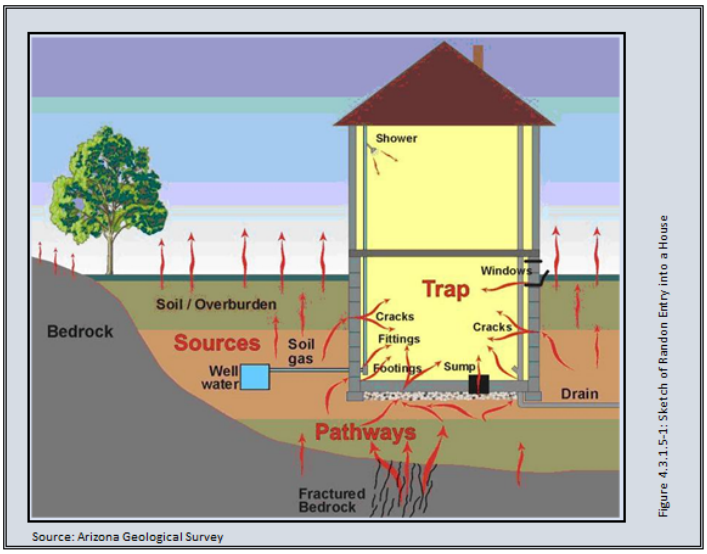


Figure 4.3.1.5-1: Sketch of Randon Entry into a House

High radon levels were initially thought to be exacerbated in houses that are tightly sealed, but it is now recognized that rates of air flow into and out of houses, plus the location of air inflow and the radon content of air in the surrounding soil, are key factors in radon concentrations. Outflows of air from a house, caused by a furnace, fan, thermal "chimney" effect, or wind effects, require that air be drawn into the house to compensate. If the upper part of the house is tight enough to impede influx of outdoor air (radon concentration generally <0.1 pCi/L), then an appreciable fraction of the air may be drawn in from the soil or fractured bedrock through the foundation and slab beneath the house, or through cracks and openings for pipes, sumps, and similar features (see Figure 4.3.1.5-1). Soil gas typically contains from a few hundred to a few thousand pCi/L of radon; therefore, even a small rate of soil gas inflow can lead to elevated radon concentrations in a house.

The radon concentration of soil gas depends upon a number of soil properties, the importance of which is still being evaluated. In general, 10 to 50 percent of newly formed radon atoms escape the host mineral of their parent radium and gain access to the air-filled pore space. The radon content of soil gas clearly tends to be higher in soils containing higher levels of radium and uranium, especially if the radium occupies a site on or near the surface of a grain from which the radon can easily escape. The amount of pore space in the soil and its permeability for air flow, including cracks and channels, are important factors determining radon concentration in soil gas and its rate of flow into a house. Soil depth and moisture content, mineral host and form for radium, and other soil properties may also be important. For houses built on bedrock, fractured zones may supply air having radon concentrations similar to those in deep soil.

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

- *Areas of very elevated uranium content (>50 ppm) around uranium deposits and prospects.* Although very high levels of radon can occur in such areas, the hazard normally is restricted to within a few hundred feet of the deposit. In Pennsylvania, such localities occupy an insignificant area.

- *Areas of common rocks having higher than average uranium content (5 to 50 ppm).* In Pennsylvania, such rock types include granitic and felsic alkali igneous rocks and black shales. In the Reading Prong, high uranium values in rock or soil and high radon levels in houses are associated with Precambrian granitic gneisses commonly containing 10 to 20 ppm uranium, but locally containing more than 500 ppm uranium. In Pennsylvania, elevated uranium occurs in black shales of the Devonian Marcellus Formation and possibly the Ordovician Martinsburg Formation. High radon values are locally present in areas underlain by these formations.
- *Areas of soil or bedrock that have normal uranium content but properties that promote high radon levels in houses.* This group is not completely understood at present. Relatively high soil permeability can lead to high radon, the clearest example being houses built on glacial eskers. Limestone-dolomite soils also appear to be predisposed for high radon levels in houses, perhaps because of the deep clay-rich residuum in which radium is concentrated by weathering on iron oxide or clay surfaces, coupled with moderate porosity and permeability. The importance of carbonate soils is indicated by the fact that radon contents in 93 percent of a sample of houses built on limestone-dolomite soils near State College, Centre County, exceeded 4 pCi/L, and 21 percent exceeded 20 pCi/L, even though the uranium values in the underlying bedrock are all in the normal range of 0.5 to 5 ppm uranium.

The second factor listed above is most likely the cause of high radon levels in Northumberland County (DCNR, 2007). The majority of Northumberland County has high radon level test results. The areas and test results are shown in more detail in table 4.3.1.5-2.

Range of Magnitude

Exposure to radon is the second leading cause of lung cancer after smoking. It is the number-one cause of lung cancer among nonsmokers. National estimates show radon exposure is responsible for about 21,000 lung cancer deaths every year; approximately 2,900 of which occur among people who have never smoked. Lung cancer is the only known effect on human health from exposure to radon in the air and thus far, there is no evidence that children are at greater risk of lung cancer than are adults (EPA, March 2010). The main hazard is actually from the radon daughter products (218Po, 214Pb, 214Bi), which may become attached to lung tissue and induce lung cancer by their radioactive decay.

RADON LEVEL (pCi/L)	IF 1000 PEOPLE WERE EXPOSED TO THIS LEVEL OVER A LIFE TIME... **	RISK OF CANCER FROM RADON EXPOSURE COMPARES TO.. **	ACTION THRESHOLD
SMOKERS			
20	About 260 people could get lung cancer	250 times the risk of drowning	Fix Structure
10	About 150 people could get lung cancer	200 times the risk of dying in a home fire	
8	About 120 people could get lung cancer	30 times the risk of dying in a fall	
4	About 62 people could get lung cancer	5 times the risk of dying in a car crash	
2	About 32 people could get lung cancer	6 times 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 2pCi/L is difficult
0.4	About 3 people could get lung cancer	(Average outdoor radon level)	
NON-SMOKERS			
20	About 36 people could get lung cancer	35 times the risk of drowning	Fix Structure
10	About 18 people could get lung cancer	20 times the risk of dying in a home fire	
8	About 15 people could get lung cancer	4 times the risk of dying in a fall	
4	About 7 people could get lung cancer	The risk of dying in a car crash	
2	About 4 people could get lung cancer	The risk of dying from poison	Consider fixing structure between 2 and 4 pCi/L
1.3	About 2 people could get lung cancer	(Average indoor radon level)	Reducing radon levels below 2pCi/L is difficult
0.4	-	(Average outdoor radon level)	

Source: EPA

Table 4.3.1.5-1: Radon Risk for Smokers and Non-Smokers

**** Lifetime risk of lung cancer deaths from EPA Assessment of Risks from Radon in Homes (EPA 402-R-03-003)***

***** Comparison data calculated using the Centers for Disease Control and Prevention's 1999-2001 National Center for Injury Prevention and Control Reports***

According to the EPA, the average radon concentration in the indoor air of homes nationwide is about 1.3 pCi/L. The EPA recommends homes be fixed if the radon level is 4 pCi/L or more. However, because there is no known safe level of exposure to radon, the EPA also recommends that Americans consider fixing their home for radon levels between 2 pCi/L and 4 pCi/L. Table 4.3.1.5-1 shows the relationship between various radon levels, probability of lung cancer, comparable risks from other hazards, and action thresholds. As is shown in that table, a smoker exposed to radon has a much higher risk of lung cancer.

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

Past Occurrence

Current data on abundance and distribution of radon as it affects individual houses in Pennsylvania in general and Northumberland County specifically is considered incomplete and potentially biased. 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 the EPA has estimated that the average indoor concentration in Pennsylvania basements is about 7.1 pCi/L, and 3.6 pCi/L on the first floor (PA DEP, 2011).

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

In Northumberland County, 15 zip codes had sufficient tests reported to the Bureau to report their findings, which are shown in Table 4.3.1.5-2.

ZIP CODE	AREA OF NORTHUMBERLAND COUNTY	LOCATION	NUMBER OF TESTS	MAXIUM RESULT (pCi/L)	AVERAGE RESULT (pCi/L)
17857	Northumberland Borough and Point Township	Basement	457	315.8	13.6
17857	Northumberland Borough and Point Township	First Floor	39	10.5	3.51
17801	Sunbury City and Upper Augusta Township	Basement	522	206.3	13.9
17801	Sunbury City and Upper Augusta Township	First Floor	103	55.2	4.05
17860	Ralpho and Shamokin Townships	Basement	77	358.1	30.6
17866	Shamokin City and Coal Township	Basement	104	22.9	3.9
17872	Shamokin, Coal, Zerbe, and Rockefeller Townships	Basement	130	86.7	10.23
17872	Shamokin, Coal, Zerbe, and Rockefeller Townships	First Floor	35	60.1	3.74
17017	Lower Mahanoy Township	Basement	35	83.1	16.67
17772	Turbotville Borough and Lewis Township	Basement	75	43.1	6.13
17777	McEwensville Borough, Delaware Township, and Watsontown Borough	Basement	286	219.3	9.04
17777	McEwensville Borough, Delaware Township, and Watsontown Borough	First Floor	51	57.7	4.93
17821	Rush Township, Riverside Borough, and Point Township	Basement	1585	620	10.6
17821	Rush Township, Riverside Borough, and Point Township	First Floor	256	165.5	4.45
17823	Jackson, Washington, and Little Mahanoy Townships	Basement	32	184.9	30.8
17824	Mount Carmel and Ralpho Townships	Basement	302	280.8	13.43
17824	Mount Carmel and Ralpho Townships	First Floor	42	94.9	6.72
17830	Jordan, Washington, and Jackson Townships and Herndon Borough	Basement	53	177.1	28.11
17834	Kulpmont and Marion Heights Boroughs and Mount Carmel Township	Basement	87	153.3	9.29
17847	Milton Borough, Torbot, East Chillisquaque, and West Chillisquaque Townships	Basement	701	324.4	9.09
17847	Milton Borough, Torbot, East Chillisquaque, and West Chillisquaque Townships	First Floor	103	55.6	3.39
17851	Mount Carmel and Marion Heights Boroughs and Mount Carmel Township	Basement	73	54.8	4.15

Source: PA DEP

Table 4.3.1.5-2: Radon Level Tests and Results in Northumberland County Zip Codes

Future Occurrence

Radon exposure is inevitable, given the present soil, geologic, and geomorphic factors in Northumberland County. Future occurrence of high radon level hazards can be considered *highly likely* as defined by the Risk Factor Methodology probability criteria (see Table 4.4.1-1).

Development in areas where previous radon levels have been significantly high will continue to be more susceptible to exposure. However, new incidents of concentrated exposure may occur with future development or deterioration of older structures. Exposure can be limited with proper testing for both past and future development and appropriate mitigation measures.

Vulnerability Assessment

As Table 4.3.1.5-2 shows, houses in Northumberland County, especially in Ralpho and Shamokin Townships, which had the highest average levels of radon and in Rush and Point Townships and Riverside Borough, which had the highest maximum level, could be susceptible to high levels of radon. Smokers can be up to 10 times more vulnerable to lung cancer from high levels of radon, depending on the level of radon they are exposed to (see Table 4.3.1.5-1). Older houses that have crawl spaces or unfinished basements are more vulnerable as well because of the increased exposure to soils that could be releasing higher levels of radon gas. Additionally, houses that rely on wells for their water may face an additional risk, although this type of exposure is low and rare in Pennsylvania.

Proper testing for radon levels should be completed across Northumberland County, especially in the areas of higher incidence levels and for those individuals and households that face the contributing risks described above. This testing will determine the level of vulnerability that residents face in their homes, as well as in their businesses and schools. The PA DEP Bureau of Radiation Protection provides short- and long-term tests to determine radon levels as well as information on how to mitigate high levels of radon in a building. According to the EPA, repairs to houses to protect against radon can cost on average the same as regular house repairs (EPA, October 2010).

SUBSIDENCE, SINKHOLE

Subsidence is a natural geologic process that commonly occurs in areas with underlying limestone bedrock and other rock types that are soluble in water. Water passing through naturally occurring fractures dissolves these materials leaving underground voids. Eventually, overburden on top of the voids causes a collapse, which can damage structures with low strain tolerances. This collapse can take place slowly over time or quickly in a single event, but in either case is characteristic in areas of karst topography. Karst topography describes a landscape that contains characteristic structures such as sinkholes, linear depressions, and caves. In addition to natural processes, human activity such as water, natural gas, and oil extraction can cause subsidence and sinkhole formations (FEMA, 1997).

Location and Extent

There are two common causes of subsidence in Northumberland County: (1) dissolution of carbonate rock such as limestone or dolomite and (2) mining activity. In the first case, water passing through naturally occurring fractures and bedding planes dissolves bedrock, leaving voids below the surface. Eventually, overburden on top of the voids

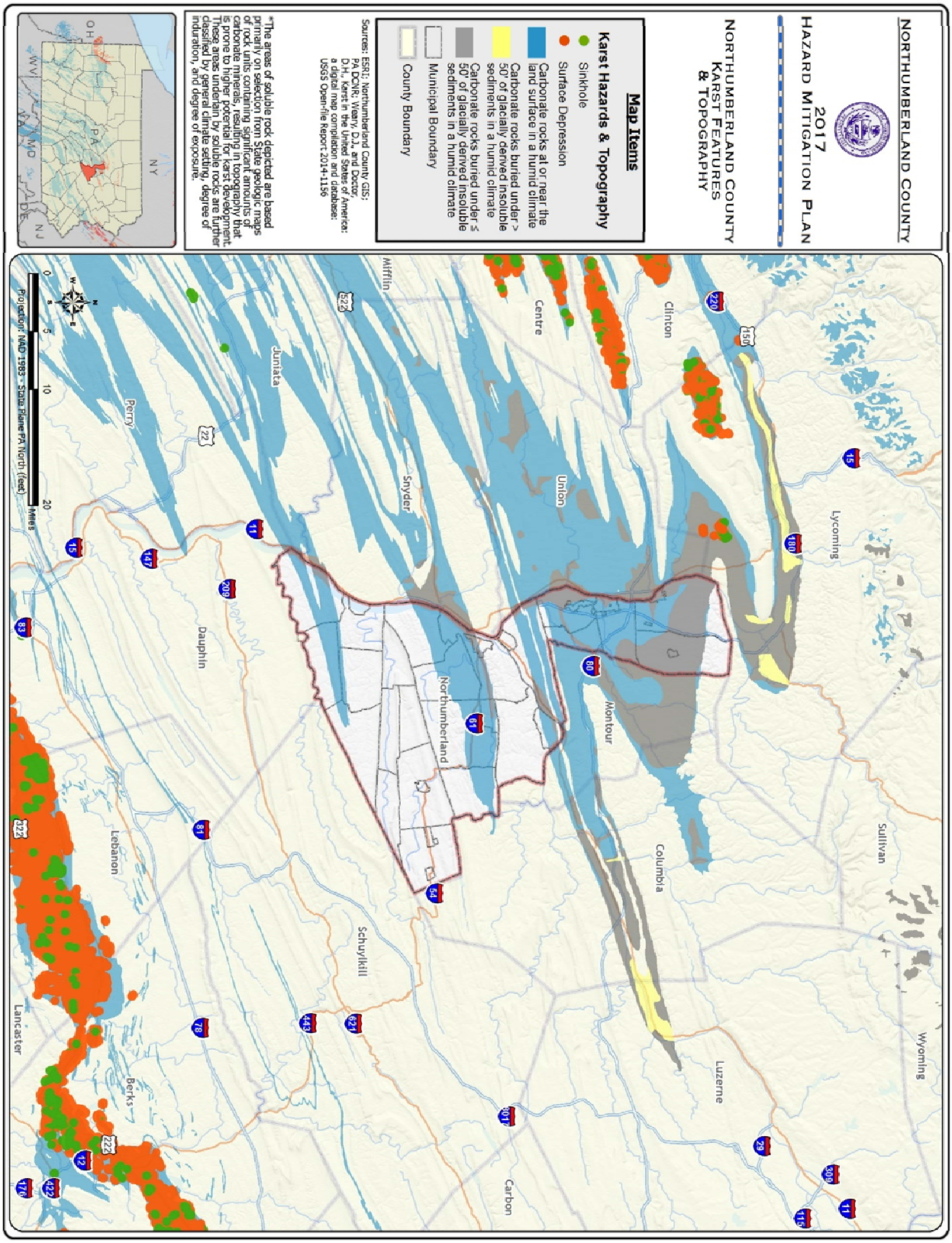
collapses, leaving surface depressions resulting in karst topography. Characteristic structures associated with karst topography include sinkholes, linear depressions, and caves. Often, subsurface solution of limestone will not result in the immediate formation of karst features. Collapse sometimes occurs only after a large amount of activity, or when a heavy burden is placed on the overlying material. Map 4.3.1.6-1 shows the distribution of general karst areas in Northumberland County.

Karst features are defined as pockets of limestone or dolomite bedrock located within more stable geological formations that could cause subsidence or sinkholes. The density of karst features ranges from 0 to 600 features per square mile, with wide variations in size. Fewer karst features have been mapped in existing urban areas; however, this is likely a result of development activities that disguise, cover, or fill existing features rather than an absence of the features themselves (DCNR, 2003).

Human activity can also result in subsidence or sinkhole events. Leaking water pipes or structures that convey storm water runoff may also result in areas of subsidence as the water dissolves substantial amounts of rock over time. In some cases, construction, land grading, or earthmoving activities that cause changes in storm water flow can trigger sinkhole events. Subsidence or sinkhole events may occur in the presence of mining activity, even in areas where bedrock is not necessarily conducive to their formation. Subsurface (i.e., underground) extraction of materials such as oil, gas, coal, metal ores (i.e., copper, iron, and zinc), clay, shale, limestone, or water may result in slow- moving or abrupt shifts in the ground surface. See **Environmental Hazards** in this section for information on where these activities occur or have occurred in Northumberland County.

Sinkholes generally develop where the cover above a mine is thin. Piggott and Eynon (1978) indicated that sinkhole development normally occurs where the interval to the ground surface is less than three to five times the thickness of the extracted seam, and the maximum interval is up to 10 times the thickness of the extracted seam. There have been no documented sinkhole incidents in Northumberland County (DCNR Sinkhole Inventory website).

Table 4.3.1.6-1


NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
NORTHUMBERLAND COUNTY
KARST FEATURES
& TOPOGRAPHY
Map Items
Karst Hazards & Topography
Sinkhole
Surface Depression
Carbonate rocks at or near the land surface in a humid climate
Carbonate rocks buried under > 50' of glacially derived insoluble sediments in a humid climate
Carbonate rocks buried under ≤ 50' of glacially derived insoluble sediments in a humid climate
Municipal Boundary
County Boundary
Sources: ESRI; Northumberland County GIS; PA DCNR; Wagner, D.L. and Doctor, D.H., Karst in the United States of America: a digital map compilation and database: USGS Open-file Report 2014-1156
*The areas of soluble rock depicted are based primarily on selection from State geologic maps of rock units containing significant amounts of carbonate minerals, resulting in topography that is prone to higher potential for karst development. These areas underlain by soluble rocks are further classified by general climate setting, degree of induration, and degree of exposure.
OH
WV
PA
MD
NY
NJ
DE
Projection: NAD 1983 - State Plane PA North (feet)
Miles
Mifflin
Juniata
Perry
Dauphin
Snyder
Union
Centre
Clinton
Lycoming
Sullivan
Wyoming
Columbia
Montour
Northumberland
Luzerne
Carbon
Schuylkill
Lebanon
Berks
Lancaster

Range of Magnitude

No two subsidence areas or sinkholes are exactly alike. Variations in size and shape, time period under which they occur (i.e., gradually or abruptly), and their proximity to development ultimately determine 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. If long-term subsidence or sinkhole formation is not recognized and mitigation measures are not implemented, fractures or the complete collapse of building foundations and roadways may result. If mitigation measures are not taken, the cost to fill in and stabilize sinkholes can be significant, although sinkholes are limited in extent. The image below shows a significant sinkhole that opened next to a heavily traveled state route in Coal Township.

Sinkhole along State Route 125 in Coal Township, 2011

Past Occurrence

No subsidence due to dissolution of carbonate rock such as limestone or dolomite has occurred or been documented in Northumberland County. Subsidence due to mining is discussed later in Section 4 under Environmental Hazards.

Future Occurrence

Based on geological conditions and current mining activity in Northumberland County, the annual occurrence of subsidence and sinkhole events in areas of the Commonwealth underlain by carbonate rock or where mining occurs is considered *unlikely*, however they cannot be ruled out.

Vulnerability Assessment

Northumberland County is part of the Anthracite Region. This region is located in the Valley and Ridge Province of the Appalachian Mountains. The northeast-trending valleys of the Valley and Ridge Province are more desirable than adjacent ridges as sites for homes, farms, industry, and transportation routes. The residual soil in these valleys is excellent for agriculture, and in many places, the carbonate rock is a valuable mineral resource and is a host rock for some metallic ore deposits. However, these areas are where most subsidence events occur.

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

Careful planning is the least costly and most effective method for reducing vulnerability to subsidence hazards. Municipalities could minimize the potential for sinkhole development through proper maintenance and updating of water utility lines. Zoning laws can also be enacted to regulate development within highly karst areas. The Surface Mining Control and Reclamation Act of 1977 imposes land use controls on active mines. This law requires an evaluation of whether subsidence could occur and cause material damage or diminution of use of structures or renewable resource lands. If there is potential for damage, a plan to prevent or mitigate the damage is required.

TORNADO, WINDSTORM

A windstorm can occur during severe thunderstorms, winter storms, coastal storms, or tornadoes. Straight-line winds such as a downburst have the potential to cause wind gusts that exceed 100 miles per hour. Based on 40 years of tornado history and over 100 years of hurricane history, FEMA identifies western and central Pennsylvania as being more susceptible to higher winds than eastern Pennsylvania (FEMA, 1997). A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud extending to the ground. Tornadoes are most often generated by thunderstorm activity (but sometimes result from hurricanes or tropical storms) when cool, dry air intersects and overrides a layer of warm,

moist air forcing the warm air to rise rapidly. The damage caused by a tornado is a result of high wind velocities and wind-blown debris. According to the National Weather Service, tornado wind speeds can range between 30 to more than 300 miles per hour. Destruction ranges from minor to catastrophic depending on the intensity, size, and duration of the storm. Structures made of light materials such as mobile homes are most susceptible to damage.

Location and Extent

Tornadoes and windstorms can occur throughout Northumberland County, though events are usually localized. However, severe thunderstorms 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, and most likely to occur during the spring and early summer months of March through June. Tornado movement is characterized in two ways: direction and speed of spinning winds, and forward movement of the tornado, also known as the storm track.

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 they 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 are experienced on a more regional scale. While such winds usually accompany tornadoes, straight-line winds are caused by the movement of air from areas of higher pressure to areas of lower pressure. Stronger winds are the result of greater differences in pressure. Windstorms are generally defined with sustained wind speeds of 40 mph or greater lasting for one hour or longer, or winds of 58 mph or greater for any duration.

Range of Magnitude

Each year, tornadoes account for $1.1 billion in damages and cause over 80 deaths nationally (NCAR, 2001). While the extent of tornado damage is usually localized, the vortex of extreme wind associated with a tornado can result in some of the most destructive forces on Earth. Rotational wind speeds can range from 100 mph to more than 250 mph. In addition, the speed of forward motion can range from 0 to 50 mph. Therefore, some estimates place the maximum velocity (combination of ground speed, wind speed, and upper winds) of tornadoes at about 300 mph. The damage caused by a tornado is a result of the high wind velocity and windblown debris, also accompanied by lightning or large hail. The most violent tornadoes have rotating winds of 250 miles per hour or more and are capable of causing extreme destruction and turning normally harmless objects into deadly missiles.

Damages and deaths can be especially significant when tornadoes move through populated, developed areas. The destruction caused by tornadoes ranges from minor to extreme, depending on the intensity, size, and duration of the storm. Typically, tornadoes cause the greatest damages to structures of light construction such as

mobile homes. The Enhanced Fujita Scale, also known as the EF-Scale, measures tornado strength and associated damages. The EF-Scale is an update to the earlier Fujita Scale, also known as the F-Scale, which was published in 1971. It classifies U.S. tornadoes into six intensity categories, as shown in Table 4.3.1.7-1, based upon the estimated maximum winds occurring within the wind vortex.

Since its implementation by the National Weather Service in 2007, the EF-Scale has become the definitive metric for estimating wind speeds within tornadoes based upon damage to buildings and structures. F-Scale categories with corresponding EF-Scale wind speeds are provided in Table 4.3.1.7- 1, since the magnitude of previous tornado occurrences is based on the F-Scale.

EF-SCALE NUMBER	WIND SPEED (mph)	F-SCALE NUMBER	TYPE OF DAMAGE POSSIBLE
EF0	65–85	F0-F1	**Minor damage**: Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e., those that remain in open fields) are always rated EF0.
EF1	86-110	F1	**Moderate damage**: Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111–135	F1-F2	**Considerable damage**: Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136–165	F2-F3	**Severe damage**: Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166–200	F3	**Devastating damage**: Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	>200	F3-F6	**Extreme damage**: Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (300 ft); steel reinforced concrete structure badly damaged; high-rise buildings have significant structural deformation.

Table 4.3.1.7-1: Enhanced Fujita Scale (EF-Scale) Categories with Associated Wind Speed and Description of Damages

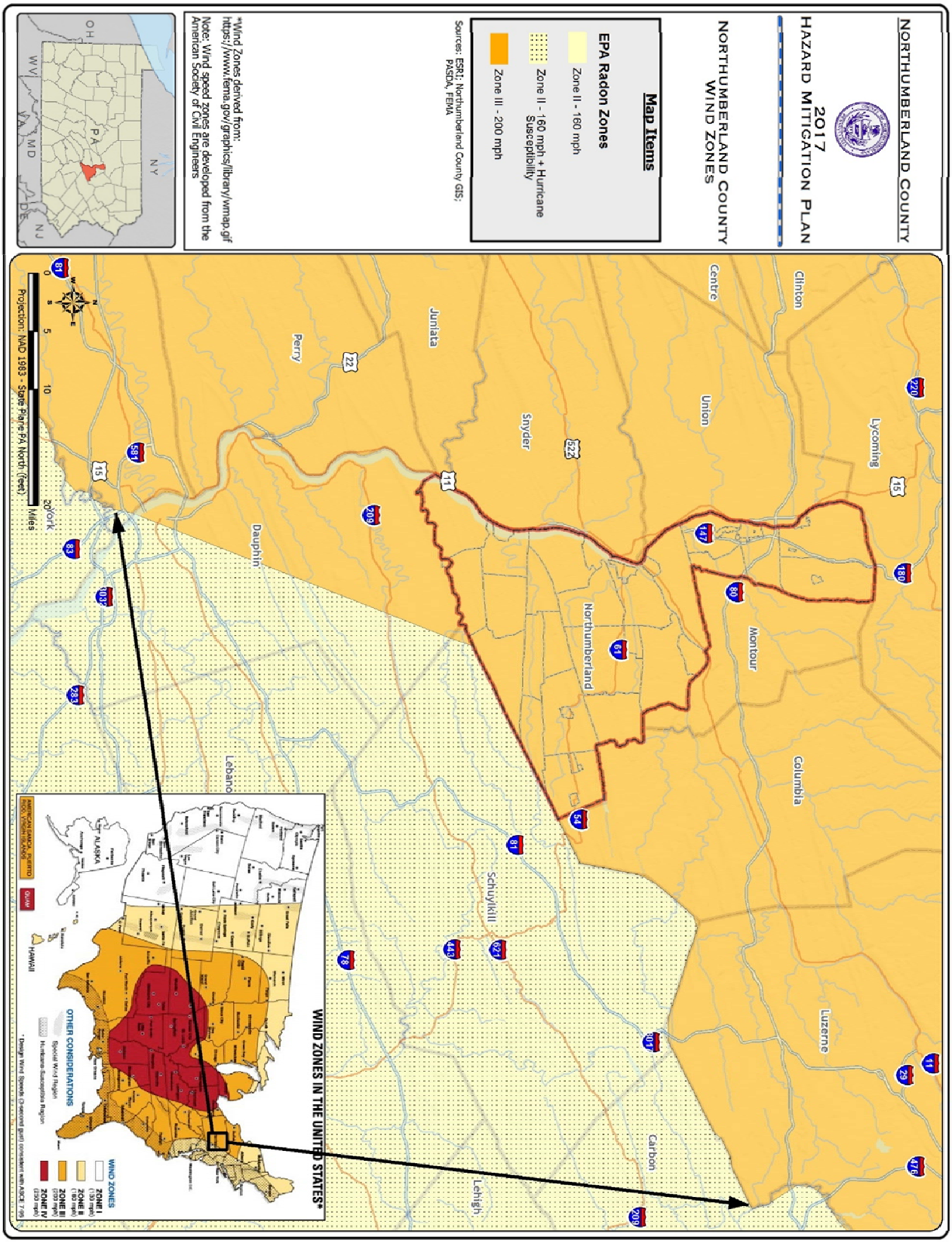
Map 4.3.1.7-1 shows wind speed zones developed by the American Society of Civil Engineers, based on information including 40 years of tornado history and over 100 years of hurricane history. It identifies wind speeds that could occur across the United States to be used as the basis for design and evaluation of the structural integrity of shelters and critical facilities. Northumberland County falls within Zone III, meaning design wind speeds for shelters and critical facilities should be able to withstand a three-second gust of up to 200 mph, regardless of whether the gust is the result of a tornado, hurricane, tropical storm, or windstorm event. Therefore, these structures should be able to withstand speeds experienced in an EF4 tornado.

The worst-case scenario of a tornado for Northumberland County occurred during a May 1985 storm that killed six people, injured 60, and destroyed campers, mobile homes, and businesses across Lycoming, Union, and Northumberland Counties. NCDC estimated that

the total property damage was $25,000,000. Other tornadoes that have occurred in Northumberland County have caused significant damage, but have not been as devastating as the 1985 incident.

On April 16, 1993, an F1 tornado occurred in Northumberland County, causing $50,000 in damages. As documented by NCDC, three structures sustained damage and several large trees were downed. The first building affected was a barn. A section of the roof was ripped off and deposited on the downwind side. Part of the roof to the house on the property was peeled back. The next damage occurrence was about 300 yards down the road. A flat roof was completely lifted off a house. Some bricks from the second floor of the house were deposited on the lawn. A garage behind the house had half of the second floor almost totally ripped off the structure – with the other half almost untouched. A scattering of debris from the house and garage were found all over the yard and up to a few hundred yards downwind. Pieces of the debris, including insulation, were hung up in a few trees on the property.

Map 4.3.1.7-1


NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
NORTHUMBERLAND COUNTY
WIND ZONES
Map Items
EPA Radon Zones
Zone II - 160 mph
Zone II - 160 mph + Hurricane Susceptibility
Zone III - 200 mph
Sources: ESRI; Northumberland County GIS; PASDA; FEMA
*Wind Zones derived from: https://www.fema.gov/graphics/library/wmap.gif
Note: Wind speed zones are developed from the American Society of Civil Engineers
Projection: NAD 1983 - State Plane PA North (feet)
Miles
Clinton
Centre
Lycoming
Union
Snyder
Juniata
Perry
Dauphin
Northumberland
Montour
Columbia
Luzerne
Carbon
Lehigh
Schuylkill
Lebanon
York
WIND ZONES IN THE UNITED STATES*
ALASKA
HAWAII
OTHER CONSIDERATIONS
WIND ZONES

Since tornado events are typically localized, environmental impacts are rarely widespread. However, where these events occur, severe damage to plant species is likely. This includes loss of trees and an increased threat of wildfire in areas where dead trees are not removed. Hazardous material facilities should meet design requirements for the wind zones identified in Map 4.3.1.7-1 in order to prevent release of hazardous materials into the environment.

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. One of the deadliest tornadoes in the Commonwealth occurred during a May 1985 storm that killed six people, injured 60, and destroyed campers, mobile homes, and businesses across Lycoming, Union, and Northumberland Counties. During this storm, multiple injuries and heavy damages were reported. A list of tornado and high wind events that have occurred in Northumberland County between 1953 and 2016 is shown in Table 4.3.1.7-2 with an associated Fujita Tornado Scale magnitude. Map 4.3.1.7-2 follows, showing the annual potential for tornadic events in a given year per 1,000 square miles.

Table 4.3.1.7-2

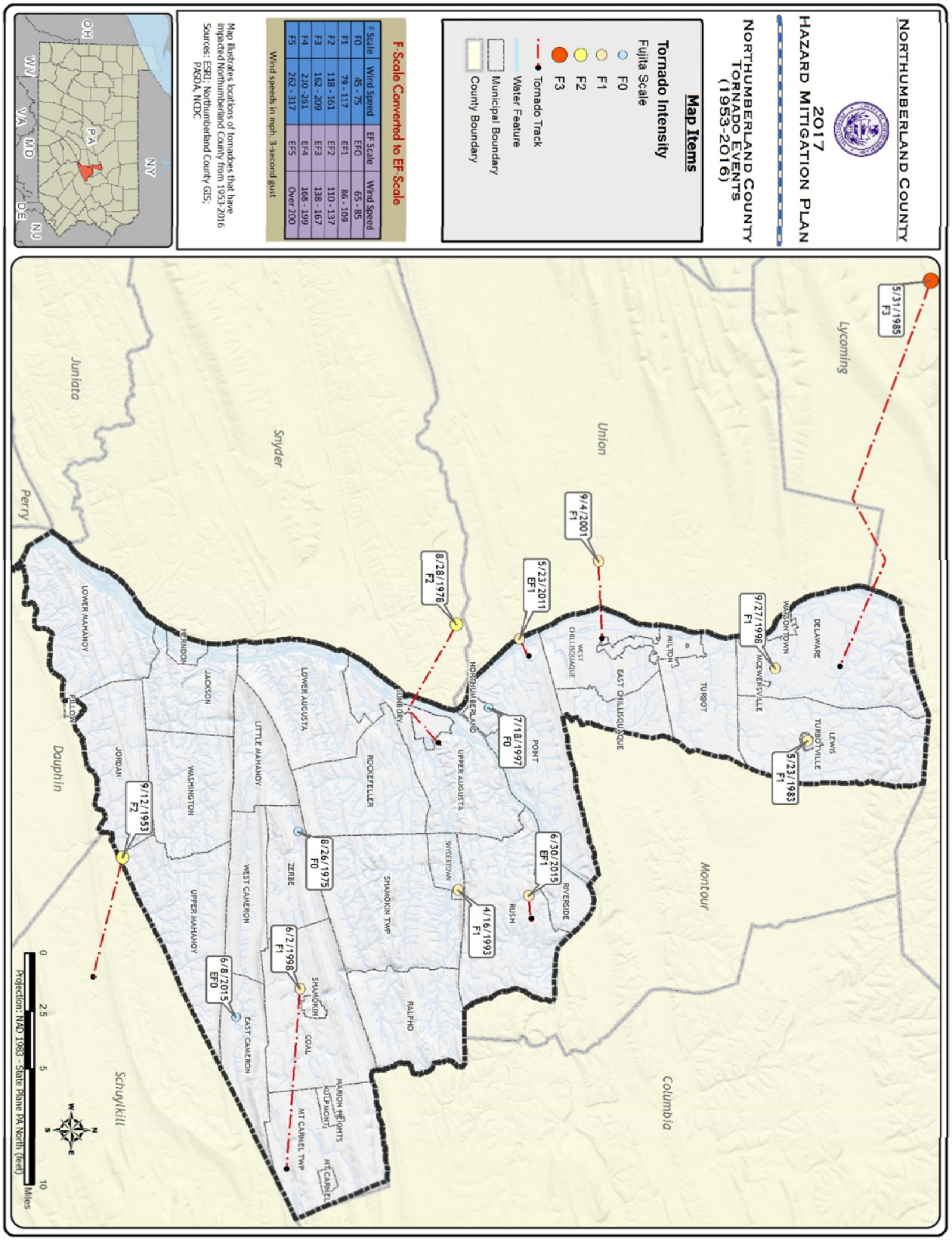
LOCATION	DATE	MAGNITUDE	ESTIMATED PROPERTY DAMAGE
Northumberland County	9/12/1953	F2	2,500
Northumberland County	8/26/1975	F0	2,500
Northumberland County	8/28/1978	F2	25,000
Northumberland County	5/23/1983	F1	250,000
Northumberland County	5/31/1985	F3	25,000,000
Northumberland Borough	4/16/1993	F1	50,000
Herndon	5/11/1996	F0	0
Northumberland Borough	7/18/1997	F0	0
Shamokin Township	6/2/1998	F1	0
McEwensville Borough	9/27/1998	F1	0
Northumberland County	9/29/1999	F0	100,000
Northumberland County	4/9/2000	F0	15,500
Northumberland County	12/12/2000	Unknown	500,400
Town of Montandon	9/4/2001	F1	0
Northumberland County	3/10/2002	F0	50,000
Shamokin	7/18/2003	F0	0
Northumberland County	11/13/2003	F0	50,000
Watsontown	6/27/2007	F0	0
Dalmatia	4/28/2011	F0	30,000
West Chillisquaque Township	5/23/2011	EF1	25,000
East Cameron Township	6/8/2015	EF0	15,000
Rush Township	6/30/2015	EF1	50,000

Table 4.3.1.7-2: Tornado Events for Northumberland County Pennsylvania (1953-2016)

Source: NCDC

The source data seems to be slightly incorrect. This tornado was actually in Point Township and more than likely exceeded $25,000 in damages

Map 4.3.1.7-2


NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
NORTHUMBERLAND COUNTY
TORNADO EVENTS
(1953-2016)
Map Items
Tornado Intensity
Fujita Scale
F0
F1
F2
F3
Tornado Track
Water Feature
Municipal Boundary
County Boundary
F-Scale Converted to EF-Scale
F Scale | Wind Speed | EF Scale | Wind Speed
F0 | 45 - 75 | EF0 | 65 - 85
F1 | 79 - 117 | EF1 | 86 - 109
F2 | 118 - 161 | EF2 | 110 - 137
F3 | 162 - 209 | EF3 | 138 - 167
F4 | 210 - 261 | EF4 | 168 - 199
F5 | 262 - 317 | EF5 | Over 200
Wind speeds in mph, 3-second gust
Map illustrates locations of tornadoes that have impacted Northumberland County from 1953-2016
Sources: ESRI; Northumberland County GIS; PASDA, NCDC
OH
WV
PA
NY
MD
VA
DE
NJ
5/31/1985 F3
9/27/1998 F1
5/23/1983 F1
9/4/2001 F1
5/23/2011 EF1
8/28/1978 F2
7/18/1997 F0
6/30/2015 EF1
4/16/1993 F1
8/26/1975 F0
6/2/1998 F1
6/8/2015 EF0
9/12/1953 F2
Lycoming
Juniata
Snyder
Union
Perry
Dauphin
Schuylkill
Montour
Columbia
DELAWARE
WARRIORTOWN
MCEWENSVILLE
LEWIS
TURBOTVILLE
TURBOT
MILTON
WEST CHILLISQUAQUE
EAST CHILLISQUAQUE
NORTHUMBERLAND
SUNBURY
POINT
UPPER AUGUSTA
RIVERSIDE
RUSH
SHAMOKIN TWP
SNYDERTOWN
RALPHO
ROCKEFELLER
LOWER AUGUSTA
LITTLE MAHANOY
ZERBE
WEST CAMERON
UPPER MAHANOY
SHAMOKIN
COAL
EAST CAMERON
MARION HEIGHTS
KULPMONT
MT CARMEL
MT CARMEL TWP
LOWER MAHANOY
HERNDON
JACKSON
WASHINGTON
JORDAN
FILLMORE
0 2.5 5 10 Miles
Projection: NAD 1983 State Plane PA North (feet)

On December 12, 2000, a strong cold front moved east across Pennsylvania, producing wind damage in all Central Pennsylvania counties. Statewide, more than 200,000 customers were left without power. A 79-year-old woman was killed when a tree fell on her mobile home.

In 2002, the County experienced damaging winds accompanied by a strong cold front. This occurred after the frontal passage as winds shifted to the west. Wind speeds were estimated to be between 50 and 60 mph. After crossing the central portions of the region, the line of showers intensified into a line of convection with lightning and thunder. More intense damage was noted with the front as it crossed the eastern portions of the region. Damaging winds continued throughout the night. Multiple trees and wires down during an approximately nine-hour period were reported. In addition to trees and wires, more notable property damage occurred such as when a section of a warehouse in Milton, Northumberland County, sustained serious damage. Also in Northumberland County, in the Borough of McEwensville, several homes and garages were damaged (NCDC).

A strong cold front swept across Central Pennsylvania during the early morning hours of November 13, 2003. Strong winds behind the cold front intensified as low pressure deepened north of the region. Reports of trees and wires down were common. Wind speeds were in excess of 71 mph. This storm resulted in three fatalities in Centre and Perry Counties and caused severe tree and related property damage.

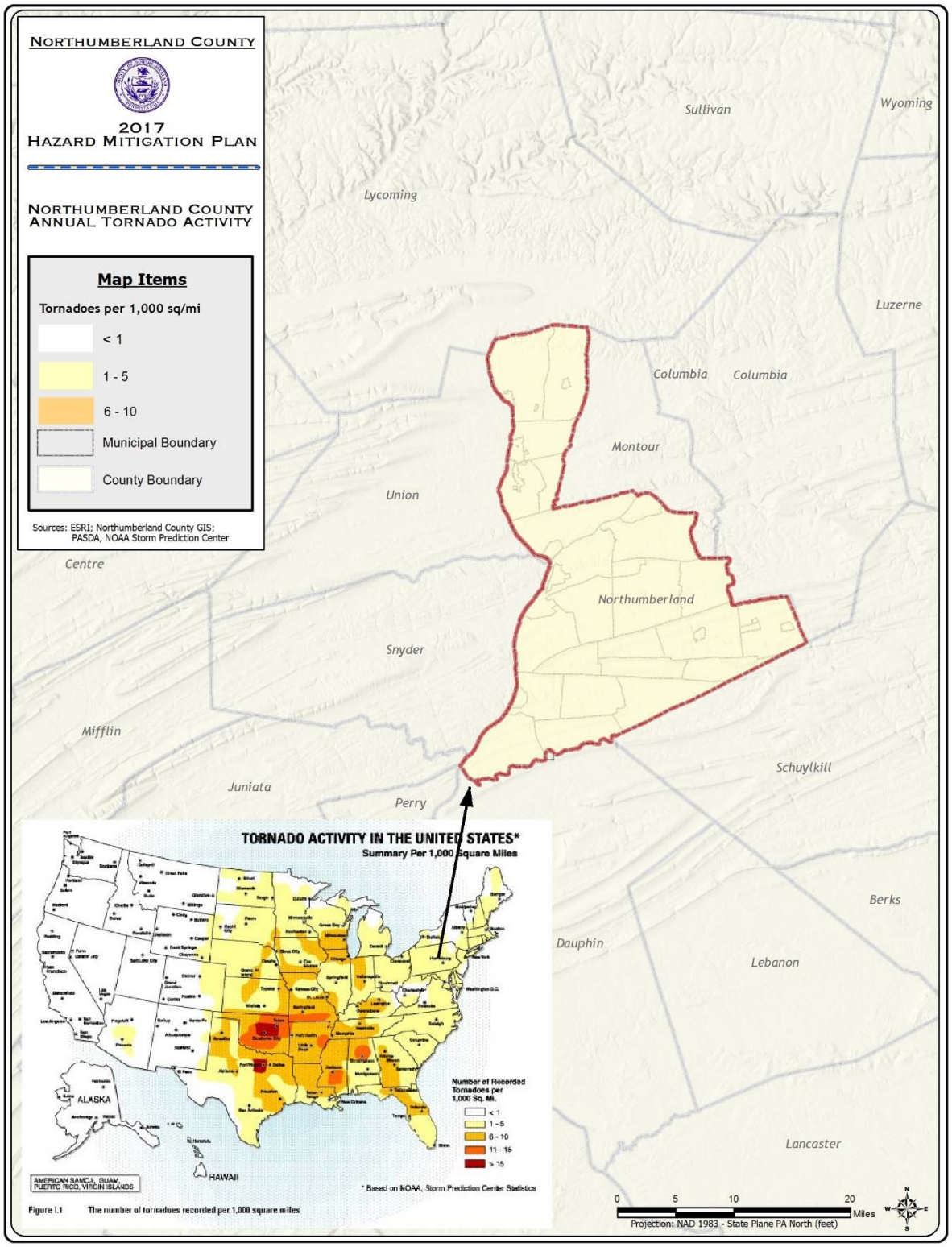
In 2015, June was the most active month for tornados in recent Northumberland County history. Strong storms formed though the county resulting in several different tornados. June 8th a short tornado touched down in East Cameron Township just south of Gowen City resulting in damage to a house and shed, and winds speeds were calculated at approximately 80 MPH. The second tornado occurred on June 30th. The EF1 tornado calculated at approximately 100 mph touched down in a rural area South of Riverside Northumberland County causing damage to a barn and a vehicle along with several tree in that area.

Future Occurrence

According to the National Weather Service, the Commonwealth of Pennsylvania has an annual average of 10 tornadoes with two related deaths. While the chance of being hit by a tornado is small, the damage that results when the tornado arrives is devastating. The probability of a tornado striking the County is at or just above average compared to the rest of the Commonwealth, with 13 occurring since 1950. Those that have occurred were relatively weak and caused little destruction, though there have been notable exceptions (described above). Most of Pennsylvania is susceptible to tornadoes of a magnitude of at most an EF-3. It can be assumed that future tornadoes will be similar in nature to those that have affected the County in the past, and on average one or two will strike the County annually as shown in Map 4.3.1.7-3. Overall, though, the probability

of future tornado and windstorm events can be considered *moderate* according to the Risk Factor Methodology (see Table 4.4.1-1)

Map 4.3.1.7-2



Vulnerability Assessment

While the frequency of windstorms and minor tornadoes is expected to remain relatively constant, vulnerability increases in more densely developed areas. Since high-wind events may affect the entire County, it is important to identify specific critical facilities and assets that are most vulnerable to the hazard.

Due to their lightweight and often unanchored design, mobile homes and commercial trailers are extremely vulnerable to high winds and flooding/floatation, and will generally sustain much more damage than traditional stick framed housing on a permanent foundation. While the County does not assign a structure type to its addressable structure data, the County's parcel data indicates the number and location of mobile home parcels. While there may be multiple mobile homes on a parcel described as "Mobile Home," this gives a general indication of the number and location of mobile homes. Table 4.3.1.7-4 lists the number of mobile homes per municipality for all jurisdictions with mobile home parcels. The parcel data indicates that only 11 jurisdictions countywide have mobile home parcels. Of the municipalities with mobile home parcels, West Chillisquaque Township has the most with 480.

MUNICIPALITY	NUMBER OF MOBILE HOME PARCELS PER MUNICIPALITY
Mobile Homes	
Coal Township	19
Delaware Township	266
Milton Borough	1
Mount Carmel Borough	10
Mount Carmel Township	3
Point Township	56
Riverside Borough	18
Shamokin Township	1
Sunbury City	6
W. Chillisquaque Township	480
Zerbe Township	16
Total	**876**
Mobile Homes in 100 year Flood Zone	
Delaware Township	15
Milton Borough	1
Mount Carmel Borough	10
Point Township	8
Riverside Borough	12
W. Chillisquaque Township	253
Total	**299**

Table 4.3.1.7-4: Mobile Home Parcels per Municipality

WILDFIRE

A wildfire is a raging, uncontrolled fire that spreads rapidly through vegetative fuels, exposing and possibly consuming structures. Wildfires often begin unnoticed and can spread quickly, creating dense smoke that can be seen for miles. Wildfires can occur at any time of the year, but mostly occur during long, dry hot spells. 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 fields, grass, brush, and forests. Ninety-eight percent of wildfires in Pennsylvania are a direct result of people, often caused by debris burns (PA DCNR, 1999).

Location and Extent

Wildfires take place in less developed or completely undeveloped areas, spreading rapidly through vegetative fuels. Any small fire, if not quickly detected and suppressed, can get out of control. Because there are many areas throughout Northumberland County that are covered by trees, the County is vulnerable to wildfires. The Forest Service estimates that Northumberland County has over 150,000 acres of woodland, nearly all of which is privately owned. The woodland contains second- and third-growth trees. Deciduous trees are the most prevalent type. The most common deciduous species in the County are oak and hickory; other common deciduous species found here include elm, ash, red maple, aspen, and birch. The most common coniferous species in Northumberland County is eastern white pine (Northumberland County Comprehensive Plan, 2005).

Under dry conditions or droughts, wildfires have the potential to burn forests as well as croplands. The greatest potential for wildfires is in the spring months of March, April, and May, and the autumn months of October and November. In the spring, bare trees allow sunlight to reach the forest floor, drying fallen leaves and other ground debris. In the fall, dried leaves are also fuel for fires. Although environmental factors can trigger wildfires, people are still the leading cause the vast majority of wildfires occurring in the Commonwealth.

Range of Magnitude

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

In addition to the risk wildfires pose to the general public and property owners, the safety of firefighters is also a concern. Although loss of life among firefighters does not occur often in Pennsylvania, it is always a risk. More common firefighting injuries include falls, sprains, abrasions, or heat-related injuries such as dehydration. Response to wildfires also exposes emergency responders to the risk of motor vehicle accidents and can place them in remote areas away from the communities that they are chartered to protect.

The impact of a severe wildfire can be devastating. The most significant environmental impact is the potential for severe erosion, silting of stream beds and reservoirs, and flooding due to ground cover loss following a fire event. Wildfires can also have a positive environmental impact, in that they burn dead trees, leaves, and grass to allow more open spaces for new vegetation to grow and receive sunlight. Another positive effect is that a wildfire stimulates the growth of new shoots on trees and shrubs, and its heat can open pine cones and other seed pods.

Based on information from DCNR, the largest wildfire in Northumberland County occurred in Coal Township, burning more than 22 acres. Coal Township has been identified as having a high wildfire hazard.

Past Occurrence

Anecdotal accounts indicate that Northumberland County has had a long history of wildfires. From the 1800s until the 1960s, many acres of the County burned yearly. The cause of these wildfires was usually either the engine sparks or overheated breaks of railroads, coal mining processes, and human negligence.

More recently, there have been 122 wildfire events reported to the DCNR Bureau of Forestry (DCNR- BOF) from 2011 to 2016 as show in Table 4.3.1.8-1 below. While this list does not include wildfires that were not reported to DCNR or that were controlled solely by the volunteer fire departments in the County, this is the most comprehensive list of wildfire occurrences available for Northumberland County. Of all the jurisdictions, Coal Township has had the most wildfire events: 36. Map 4.3.1.8-1 shows the spatial origin of where the wildfires have occurred.

YEAR OF WILDFIRES	MUNICIPALITY	NUMBER OF FIRES	ACREAGE AFFECTED
2016	Coal Twp	6	7.3
	Mt. Carmel Borough	1	3
	Mt. Carmel Twp.	2	0.4
	Point Twp.	1	0.1
	Rush Twp.	1	0.9
	Shamokin Twp.	2	2.3
	Turbot Twp.	1	4.2
	U. Augusta Twp.	2	0.2
	Zerbe Twp.	2	2.1
Totals		**18**	**20.5**
2015	Coal Twp.	10	3.1
	E. Cameron Twp.	1	0.1
	Kulpmont	1	0.5
	Point Twp.	2	0.95
	Riverside	1	0.7
	Rush Twp.	2	3.7
	Shamokin Twp.	2	25.25
	U. Augusta Twp.	2	4
	W. Chillisquaque Twp.	1	0.7
	Zerbe Twp.	2	13.2
Totals		**24**	**52.2**
2014	Coal Twp.	8	60.25
	Kulpmont	2	2.6
	L. Augusta Twp.	1	0.1
	Mt. Carmel Twp.	5	3.4
	Point Twp.	1	3
	Ralpho Twp.	1	0.1
	Shamokin City	2	0.1
	Shamokin Twp.	3	13.4
	Turbot Twp.	1	2
	U. Augusta Twp.	2	0.4
	W. Chillisquaque Twp.	1	2
	Zerbe Twp.	1	2
Totals		**28**	**89.35**

YEAR OF WILDFIRES	MUNICIPALITY	NUMBER OF FIRES	ACREAGE AFFECTED
2013	Coal Twp.	7	2.1
	Mt. Carmel Borough	2	0.3
	Mt. Carmel Twp.	12	3.1
	Ralpho Twp.	2	0.5
	Rockefeller Twp.	1	0.1
	Shamokin City	2	1
	Shamokin Twp.	2	0.35
	W. Cameron Twp.	2	0.5
	Zerbe Twp.	1	1.5
Totals		**31**	**9.45**
2012	Coal Twp.	3	2.28
	Little Kahanoy Twp.	1	1.6
	Lower Mahanoy Twp.	1	0.75
	Mt. Carmel Twp.	7	6.49
	Ralpho Twp.	1	0.2
	Rush Twp.	1	0.23
	Shamokin City	1	0.75
	Shamokin Twp.	1	1.77
Totals		**16**	**14.07**
2011	Coal Twp.	2	3.5
	Mt. Carmel Twp.	3	1.17
Totals		**5**	**4.67**

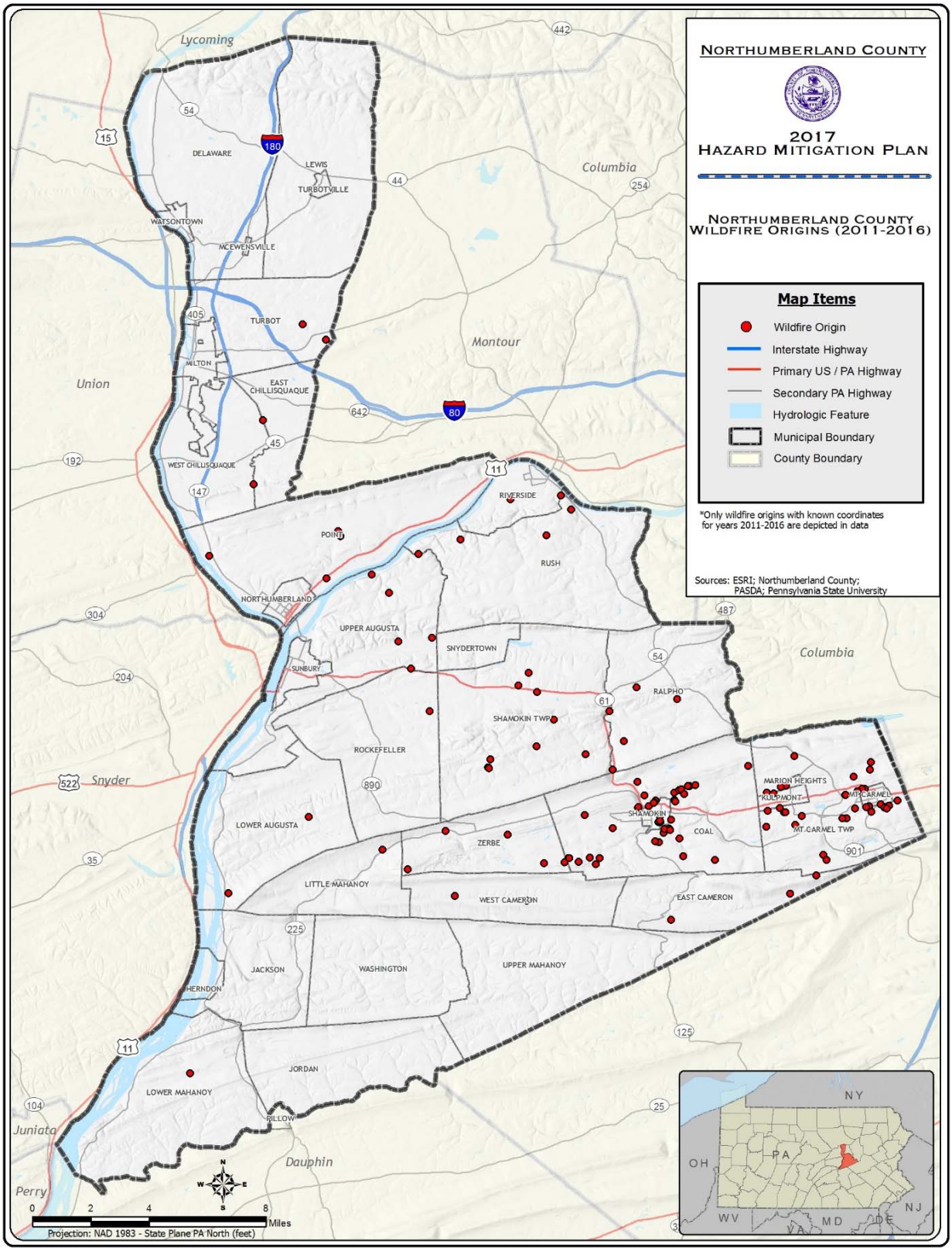
In the previous plan, there were 90 fires profiled that covered 197.22 acres between the years of 2002 and 2008. We understand that wildfires are an inherent risk in Northumberland County, and feel that we can represent this adequately just by showing the last 6 years of fires which are almost equal to the previous 6-8 years combined.

TOTALS	**122**	**190.24**

Source: DCNR

Table 4.3.1.8-1: Wildfire History in Northumberland County from 2011-2016

Map 4.3.1.8-1


NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
NORTHUMBERLAND COUNTY
WILDFIRE ORIGINS (2011-2016)
Map Items
Wildfire Origin
Interstate Highway
Primary US / PA Highway
Secondary PA Highway
Hydrologic Feature
Municipal Boundary
County Boundary
*Only wildfire origins with known coordinates for years 2011-2016 are depicted in data
Sources: ESRI; Northumberland County; PASDA; Pennsylvania State University
Lycoming
Columbia
Montour
Union
Snyder
Juniata
Perry
Dauphin
DELAWARE
LEWIS
TURBOTVILLE
WATSONTOWN
MCEWENSVILLE
TURBOT
MILTON
EAST CHILLISQUAQUE
WEST CHILLISQUAQUE
RIVERSIDE
POINT
RUSH
NORTHUMBERLAND
UPPER AUGUSTA
SUNBURY
SNYDERTOWN
RALPHO
SHAMOKIN TWP
ROCKEFELLER
LOWER AUGUSTA
ZERBE
SHAMOKIN
COAL
MARION HEIGHTS
KULPMONT
MT CARMEL
MT CARMEL TWP
LITTLE MAHANOY
WEST CAMERON
EAST CAMERON
JACKSON
WASHINGTON
UPPER MAHANOY
HERNDON
JORDAN
LOWER MAHANOY
RILLTON
0 2 4 8 Miles
Projection: NAD 1983 - State Plane PA North (feet)
NY
OH
PA
WV
MD
DE
NJ
VA

Future Occurrence

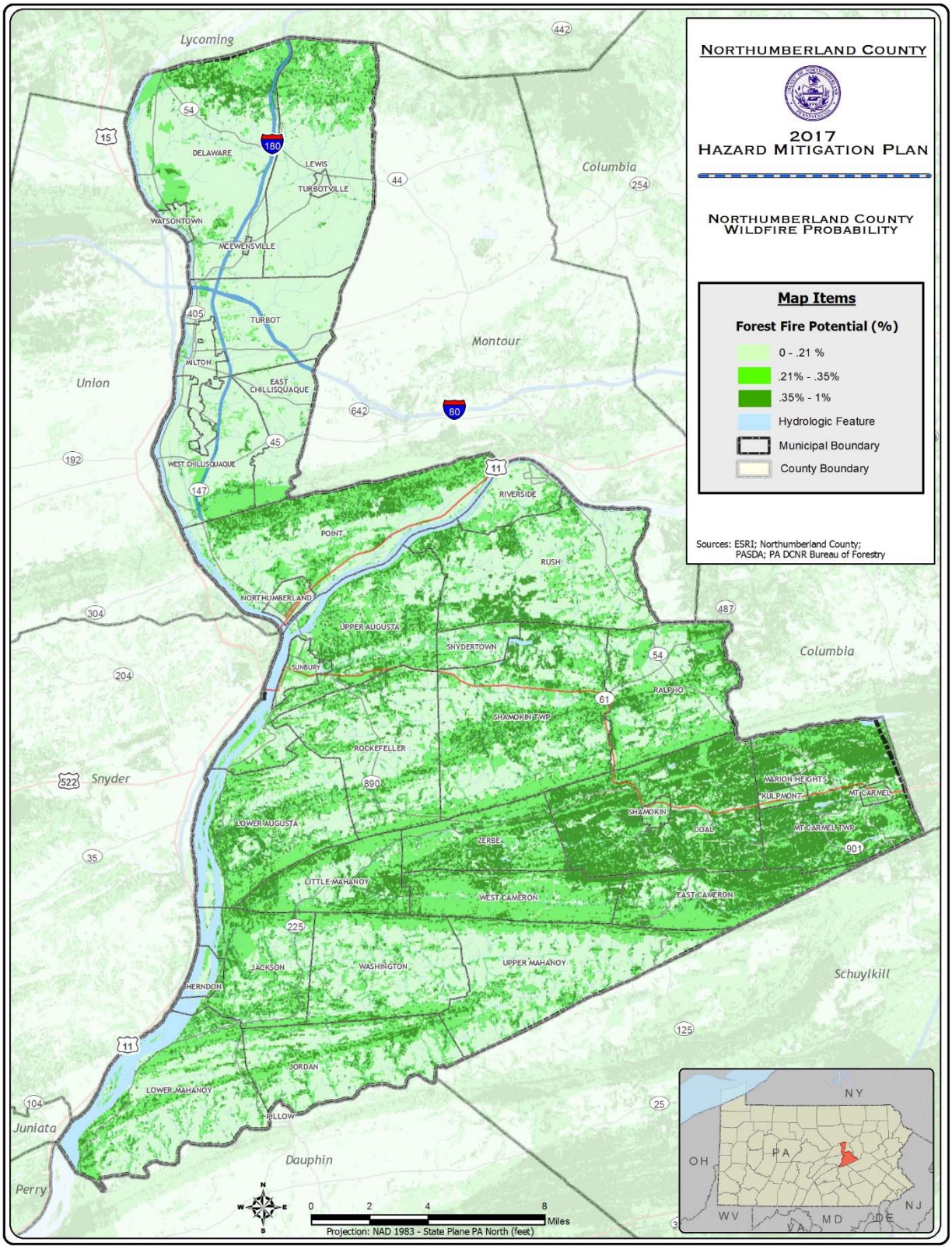
Previous events indicate that wildfires will continue to occur annually. Weather conditions like drought can increase the likelihood of wildfires occurring. Any fire, without the quick response or attention of firefighters, forestry personnel, or visitors to the forest, has the potential to become a wildfire.

The probability of a wildfire occurring in Northumberland County is *possible* in any given year as defined by the Risk Factor Methodology (Section 4.4.1). However, the likelihood of one of those fires attaining significant size and intensity is unpredictable and highly dependent on environmental conditions and firefighting response.

Vulnerability Assessment

The DCNR-BOF has conducted an independent wildfire hazard risk assessment for the various municipalities across Northumberland County. Results of that assessment are shown in Map 4.3.1.8-2. The potential for wildfire hazard is based on conditions that affect wildfire ignition and/or behavior such as fuel, topography, and local weather. Based on this assessment, the majority of the County has a medium vulnerability to wildfires. Delaware Township, West Cameron Township, Zerbe Township, Coal Township, Marion Heights Borough, Kulpmont Borough, Mount Carmel Borough, Mount Carmel Township, and East Cameron Township have a high vulnerability to wildfire hazards. Watsontown Borough, Milton Borough, East Chillisquaque Township, Northumberland Borough, Riverside Borough, and Snydertown Borough have a low vulnerability to wildfires.

Map 4.3.1.8-2


NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
NORTHUMBERLAND COUNTY
WILDFIRE PROBABILITY
Map Items
Forest Fire Potential (%)
0 - .21 %
.21% - .35%
.35% - 1%
Hydrologic Feature
Municipal Boundary
County Boundary
Sources: ESRI; Northumberland County;
PASDA; PA DCNR Bureau of Forestry
Lycoming
Columbia
Montour
Union
Snyder
Juniata
Perry
Dauphin
Schuylkill
DELAWARE
LEWIS
TURBOTVILLE
WATSONTOWN
MCEWENSVILLE
TURBOT
MILTON
EAST CHILLISQUAQUE
WEST CHILLISQUAQUE
RIVERSIDE
POINT
RUSH
NORTHUMBERLAND
UPPER AUGUSTA
SNYDERTOWN
SUNBURY
SHAMOKIN TWP
ROCKEFELLER
LOWER AUGUSTA
ZERBE
LITTLE MAHANOY
WEST CAMERON
EAST CAMERON
JACKSON
WASHINGTON
UPPER MAHANOY
HERNDON
JORDAN
LOWER MAHANOY
PILLOW
RALPHO
MARION HEIGHTS
KULPMONT
MT CARMEL
SHAMOKIN
COAL
MT CARMEL TWP
NY
PA
OH
WV
MD
DE
NJ
VA
0 2 4 8
Miles
Projection: NAD 1983 - State Plane PA North (feet)

WINTER STORM

Winter storms are a mix of wintry forms of precipitation such as snow, sleet, and freezing rain, and are typically accompanied by low temperatures. Nearly every year the Commonwealth of Pennsylvania experiences at least one significant winter storm that brings heavy and/or blowing snow, low temperatures and considerable accumulation. These storms are problematic for both rural and urban residents (utility loss, snow removal, mobility issues, etc.) and can lead to hazardous driving conditions on both residential and highway corridors.

Location and Extent

Winter storms are regional events. Every county in the Commonwealth is subject to severe winter storms, including Northumberland County. For the most part, Northumberland County generally receives the same amount of snowfall throughout, with the exception being the most southern tip of the County. According to the National Weather Service and the National Oceanic and Atmospheric Administration (NOAA) data from 1981-2010, Northumberland County receives on average 31 to 40 inches of snow annually. The southwestern tip of the County receives slightly less on average in the range of 21 to 30 inches of snow annually.

Range of Magnitude

Winter storms consist of cold temperatures, heavy snow or ice, and sometimes strong winds. They begin as low-pressure systems that move through Pennsylvania either following the jet stream or developing as extra-tropical cyclonic weather systems over the Atlantic Ocean called nor'easters. Due to their regular occurrence, these storms are considered hazards only when they result in damage to specific structures or cause disruption to traffic, communications, electric power, or other utilities.

A winter storm can adversely affect roadways, utilities and business activities, and can cause frostbite or loss of life. These storms may include one or more of the following weather events:

- ***Heavy Snowstorm –*** Accumulations of four inches or more in a six-hour period, or six inches or more in a 12-hour period.
- ***Sleet Storm –*** Significant accumulations of solid pellets that form from the freezing of raindrops or partially melted snowflakes, causing slippery surfaces that pose hazards to pedestrians and motorists.
- ***Ice Storm –*** Significant accumulations of rain or drizzle freezing on objects (trees, powerlines, roadways, etc.) as it strikes them, causing slippery surfaces and damage from the sheer weight of ice accumulation.
- ***Blizzard –*** Wind velocity of 35 miles per hour or more, temperatures below freezing, considerable blowing snow with visibility frequently below one-quarter mile lasting over an extended period of time.

- ***Severe Blizzard –*** Wind velocity of 45 miles per hour, temperature of 10 degrees Fahrenheit or lower, a high density of blowing snow with visibility frequently measured in feet lasting over an extended period of time.

Any of the above events can result in the following: closing of major or secondary roads, particularly in rural locations, stranded motorists, transportation accidents, loss of utility services, and depletion of oil heating supplies. Environmental impacts often include damage to shrubbery and trees due to heavy snow loading, ice buildup, and/or high winds that can break limbs or even bring down large trees. Gradual melting of snow and ice provides excellent groundwater recharge. However, high temperatures following a heavy snowfall can cause rapid surface water runoff and severe flooding.

Map 4.3.1.9-1 shows mean annual snowfall of Northumberland County from 1981-2010 (NOAA, National Weather Service) to be between 30 and 40 inches in all but the Southwest corner of the county. Two of the 11 Presidential Disaster and Emergency Declarations affecting Northumberland County have been in response to hazard events related to winter storms (see Table 4.2-1).

The worst-case scenario of a winter storm in Northumberland County occurred in March 1993. Brutal winds and intense snow were characteristic of the blizzard that brought Pittsburgh to a standstill on March 12-13, 1993. The storm closed multiple highways. At various times, snowfall rates were two to three inches per hour. In the blizzard's two-day period, one-third of the total yearly snowfall for 1993 had fallen. Residents were advised to stay off the roads and remain indoors if possible. A Presidential Disaster Declaration was issued for the storm.

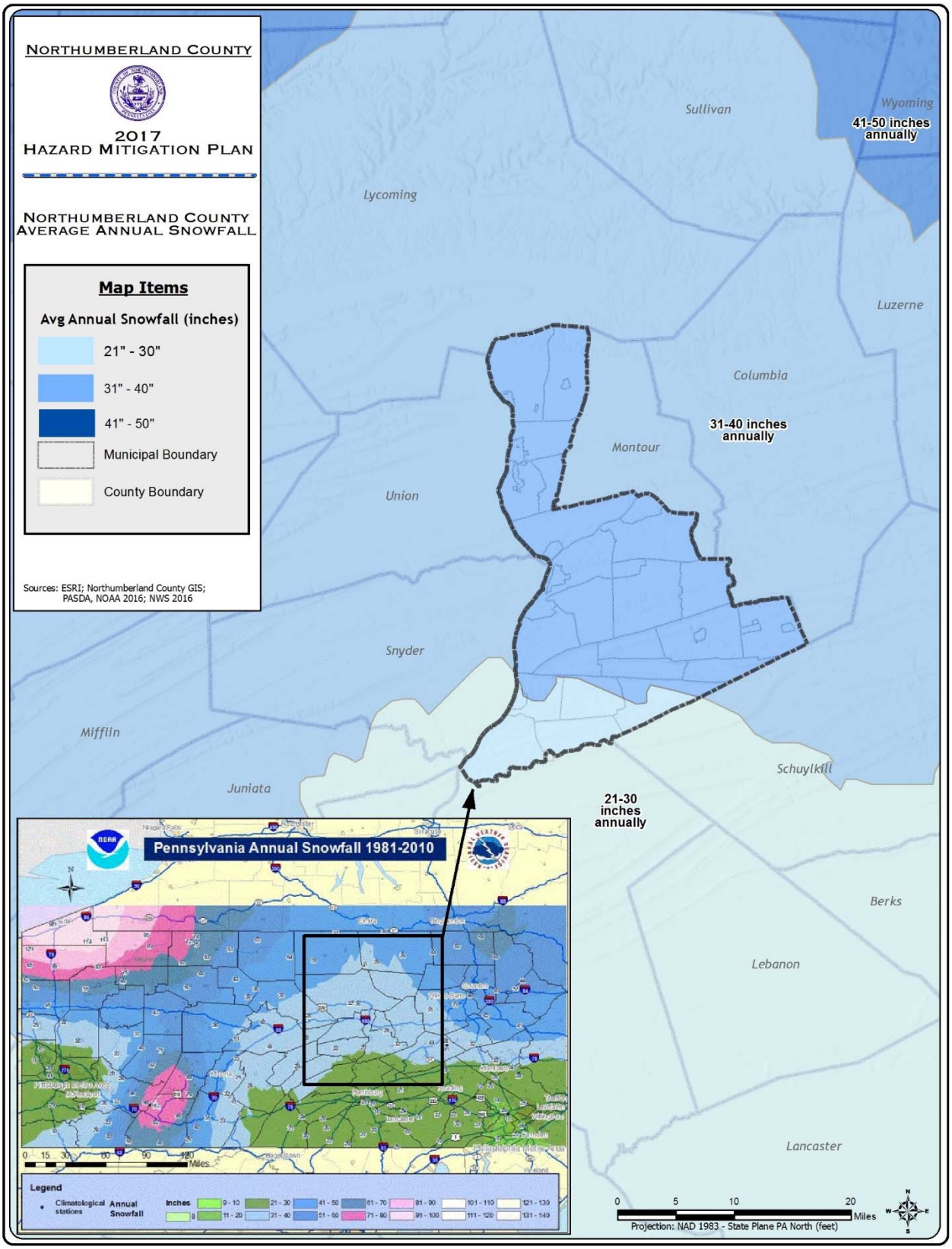
Image of Sunbury after snowfall accumulation during the Blizzard of 1993

Not always the worst storm but sometimes the unexpected storm can be devastating, in that it can catch residents and responders off guard. On Saturday, October 29, 2011, much of Pennsylvania, including Northumberland County, experienced an early snowstorm. Authorities reported the heavy, wet snow downed power lines and trees still bearing leaves. More than 250,000 customers in Eastern and Central Pennsylvania remained without power — down from a high of more than a half-million — as crews worked through the night to restore service and brought in help from other states (Associated Press).

The most recent event was Winter Storm Stella, which was rated a category 3 storm on the Northeast Snowfall Impact Scale released by NOAA. Stella began to hit Pennsylvania in the late hours of March 13, 2017. The storm blanketed most of Pennsylvania in snow overnight, with Central Pennsylvania counting more than 1 foot of snow by 8 a.m. (Penn Live, March 14, 2017). Northumberland County residents reported an average of 23 inches of snow once the storm had subsided.

Coal Township, March 14, 2017

Map 4.3.1.9-1


NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
NORTHUMBERLAND COUNTY
AVERAGE ANNUAL SNOWFALL
Map Items
Avg Annual Snowfall (inches)
21" - 30"
31" - 40"
41" - 50"
Municipal Boundary
County Boundary
Sources: ESRI; Northumberland County GIS; PASDA, NOAA 2016; NWS 2016
Sullivan
Wyoming
41-50 inches annually
Lycoming
Luzerne
Columbia
31-40 inches annually
Montour
Union
Snyder
Mifflin
Juniata
Schuylkill
21-30 inches annually
Berks
Lebanon
Lancaster
Pennsylvania Annual Snowfall 1981-2010
Legend
Climatological stations
Annual Snowfall
Inches
0 15 30 60 90 120
Miles
0 5 10 20
Miles
Projection: NAD 1983 - State Plane PA North (feet)

DATE	TYPE	PROPERTY DAMAGE
1/2/1996	Heavy Snow	0
1/7/1996	Blizzard	0
1/12/1996	Heavy Snow	0
3/7/1996	Heavy Snow	0
2/13/1997	Winter Storm	0
12/29/1997	Heavy Snow	0
1/15/1998	Ice Storm	0
1/22/1998	Ice Storm	0
1/2/1999	Winter Storm	0
1/8/1999	Winter Storm	0
1/14/1999	Winter Storm	0
3/14/1999	Heavy Snow	0
1/25/2000	Heavy Snow	0
1/30/2000	Heavy Snow	0
2/13/2000	Ice Storm	0
2/18/2000	Winter Storm	0
12/13/2000	Winter Storm	0
3/4/2001	Heavy Snow	4000
1/6/2002	Heavy Snow	0
12/5/2002	Heavy Snow	0
12/10/2002	Ice Storm	0
12/25/2002	Heavy Snow	0
2/16/2003	Heavy Snow	0
1/27/2004	Heavy Snow	0
2/3/2004	Heavy Snow	0
2/6/2004	Ice Storm	0
3/16/2004	Heavy Snow	0
3/19/2004	Heavy Snow	0
1/5/2005	Winter Storm	0
3/1/2005	Heavy Snow	0
12/9/2005	Heavy Snow	0
12/16/2005	Winter Storm	0
2/13/2007	Winter Storm	0
3/16/2007	Heavy Snow	0
2/1/2008	Winter Storm	0
2/12/2008	Ice Storm	0
12/19/2008	Winter Storm	0
1/6/2009	Ice Storm	0
1/27/2009	Winter Storm	0
2/5/2010	Winter Storm	0
2/9/2010	Winter Storm	0
2/25/2010	Winter Storm	0
2/1/2011	Winter Storm	0
3/6/2011	Heavy Snow	0
10/29/2011	Heavy Snow	0
12/14/2013	Winter Storm	0
2/4/2014	Winter Storm	0
2/13/2014	Heavy Snow	0
11/25/2014	Heavy Snow	0
12/11/2014	Heavy Snow	0
1/22/2016	Winter Storm	0
2/8/2017	Winter Storm	0
3/14/2017	Blizzard	?

Table 4.3.1.9-1: History of Winter Storms in Northumberland County

Past Occurrence

Northumberland County and the Commonwealth of Pennsylvania have a long history of severe winter weather. Significant winter storm events that have affected Northumberland County since 1994 are listed to the left. The NCDC data on past occurrence for winter storm events since 1994 is the only comprehensive list of data available for the County, aside from information from past disaster declarations.

In the winter of 1993-1994, the Commonwealth was hit by a series of protracted winter storms. The severity and nature of these storms, combined with accompanying record-breaking frigid temperatures, posed a major threat to the lives, safety, and well-being of Commonwealth residents and caused major disruptions to the activities of schools, businesses, hospitals, and nursing homes.

One of these devastating winter storms occurred in early January 1994, with record snowfall depths in many areas of the Commonwealth, strong winds, and sleet/freezing rains. Numerous storm- related power outages were reported and as many as 600,000 residents were without electricity, in some cases for several days at a time. A ravaging ice storm followed that closed major arterial roads and downed trees and power lines. Utility crews from a five-state area were called to assist in power restoration repairs. Officials from PPL Corporation stated that this was the worst winter storm in the history of the company; related damage-repair costs exceeded $5,000,000.

Serious power supply shortages continued through mid-January because of record cold temperatures in many places, causing sporadic power generation outages across the Commonwealth. The entire Pennsylvania-New Jersey-Maryland grid and its partners in the

District of Columbia, New York, and Virginia experienced 15- to 30-minute rolling blackouts, threatening the lives of people and the safety of buildings. Power and fuel shortages affecting Pennsylvania and the East Coast power grid system required the governor to recommend power conservation measures be taken by all commercial, residential, and industrial power consumers.

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

Future Occurrence

Winter storms are a regular, annual occurrence in Northumberland County and should be considered *highly likely* as defined by the Risk Factor Methodology (Section 4.4). The table below shows the probability of receiving measureable snowfall by month in Northumberland County. These probabilities are based on data collected over the last 10 years for Bear Gap and Sunbury and 5.5 years for Mount Carmel.

Snow Probability % by month in Northumberland County

MONTH	BEAR GAP STATION	SHAMOKIN STATION	MT. CARMEL STATION
January	100.00%	100.00%	80.00%
February	100.00%	100.00%	100.00%
March	50.00%	70.00%	100.00%
April	30.00%	40.00%	N/A
May	0.00%	0.00%	0.00%
June	0.00%	0.00%	0.00%
July	0.00%	0.00%	0.00%
August	0.00%	0.00%	0.00%
September	0.00%	0.00%	0.00%
October	10.00%	20.00%	20.00%
November	50.00%	60.00%	20.00%
December	90.00%	90.00%	80.00%

Vulnerability Assessment

Based on the available information, all communities in Northumberland County are essentially equally vulnerable to the direct impacts of winter storms. Residents of the mountainous areas of the County may be more susceptible, especially when emergency medical assistance is required. In addition, some rural areas of the County are susceptible to isolation caused by winter storms, including Herndon Borough, McEwensville Borough, Turbotville Borough, Snydertown Borough, and Washington Township. These areas have heavily wooded, private developments that make emergency response difficult when roadways are blocked by downed trees and wires.

Due to the frequency of winter storms, strategies have been developed to respond to these events. Snow removal and utility repair equipment is available to respond to typical events. The use of auxiliary heat and power supplies such as wood-burning stoves, kerosene heaters, and gasoline-power generators reduces the vulnerability of residents to extreme cold temperatures commonly associated with winter storms. People residing in structures lacking adequate equipment to protect against cold temperatures or significant snow and ice are more vulnerable to winter storm events.

Even for communities that are prepared to respond to winter storms, severe events involving snow accumulations that exceed six or more inches in a 12-hour period can cause a large number of traffic accidents, cause motorists to be stranded due to snow drifts, interrupt power supply and communications, and cause failure inadequately designed and/or maintained roof systems.

Northumberland County does have a large number of older structures. The 2015 American Community Survey Estimate reported that about 67 percent of the housing units in Northumberland County were built before 1970. Just 13 percent of the housing units in Northumberland County were completed after 1990. Municipalities with concentrations of units completed before 1950 include Coal Township (77.1 percent), East Cameron Township (50.2 percent), Mount Carmel Township (42.7), Shamokin City (78.2 percent), and Zerbe Township (79.4 percent). These municipalities with older building structures may be more vulnerable to snowstorms because the older roofs may not be able to handle a significant snow load.

Human-made Hazards

DAM FAILURE

Due to sensitivity issues, the Dam Failure profile has been redacted.

ENVIRONMENTAL HAZARDS

Northumberland County primarily experiences two kinds of environmental hazards: hazardous material releases and coal mining incidents. Hazardous material releases can occur at facilities or along transportation routes. These releases can result in injury and death and contaminate air, water, and soils. Activities associated with coal mines can cause fires or explosions, lead to ground failure or subsidence, and pollute streams and drinking water.

Location and Extent

A. Hazardous Materials Releases

Hazardous materials fall into several categories such as flammable and combustible materials, compressed gases, explosive and blasting agents, radioactive materials, oxidizing materials, poisons, and corrosive liquids. Hazardous materials incidents are generally unintentional and associated with transportation accidents or accidents at fixed facilities. However, hazardous materials can be released as a criminal or terrorist act. Any release can result in injury and death and may contaminate air, water, and/or soils.

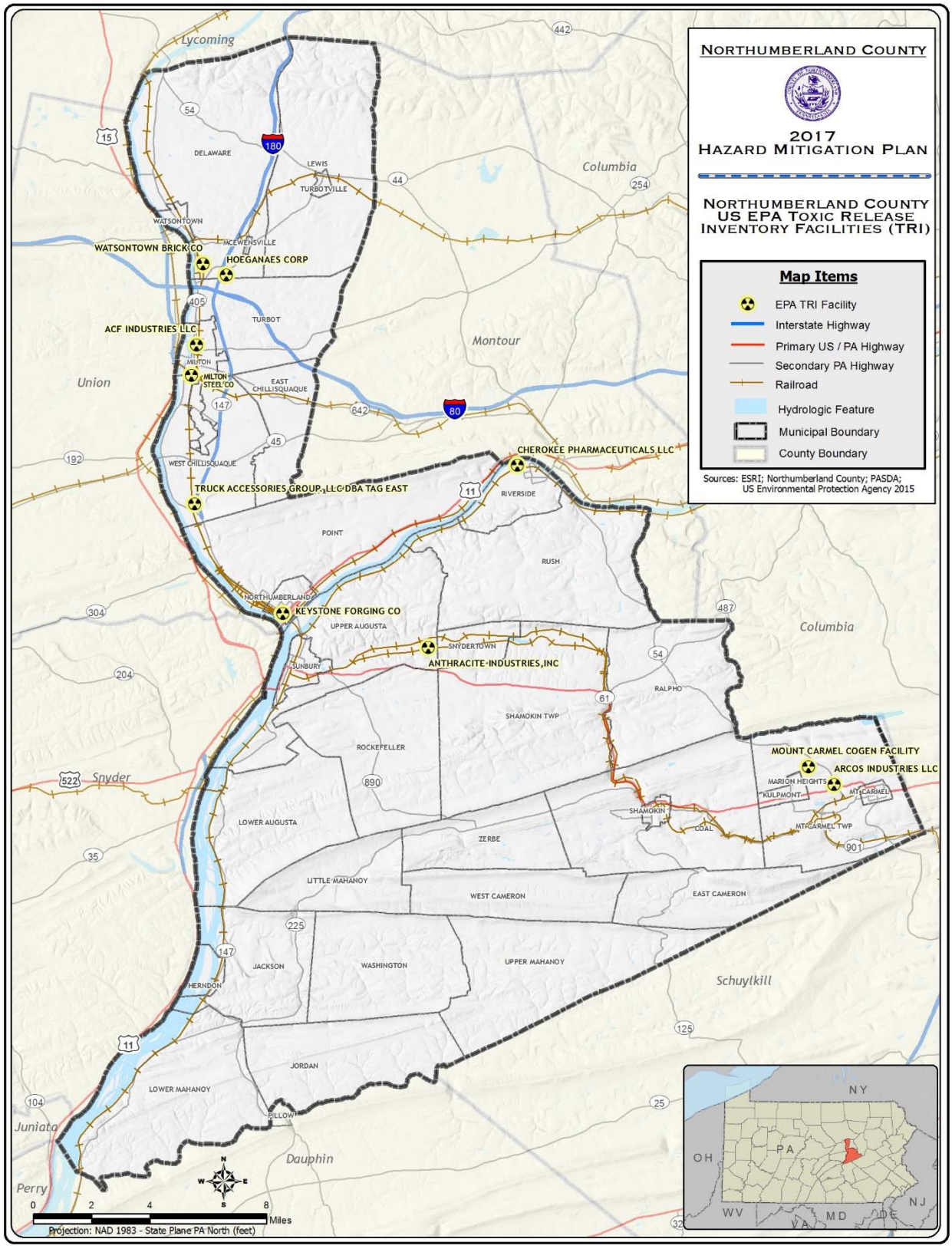
Facilities that use, manufacture, or store hazardous materials in Pennsylvania must comply with both Title III of the federal Superfund Amendments and Reauthorization Act (SARA), also known as the Emergency Planning and Community Right-to-Know Act (EPCRA), and the Commonwealth's reporting requirements under the Hazardous Materials Emergency Planning and Response Act (1990-165), as amended. The community right-to-know reporting requirements keep communities abreast of the presence and release of chemicals at individual facilities. EPCRA was designed to ensure that state and local communities are prepared to respond to potential chemical accidents through Local Emergency Planning Committees (LEPCs). LEPCs are charged with developing emergency response plans for SARA Title III facilities; these plans cover the location and extent of hazardous materials; establish evacuation plans, response procedures, and methods to reduce the magnitude of a materials release; and establish methods and schedules for training and exercises.

Because SARA Title III facilities are covered under their own unique planning process and are continually evaluated through the LEPC, this HMP will focus on the Environmental Protection Agency-identified hazardous materials sites known collectively as Toxic Release Inventory (TRI) sites. This dataset, publicly available at http://www.epa.gov/enviro/geo_data.html, includes a number of materials facilities:

- Superfund National Priorities List (NPL) sites
- RCRAInfo (EPA and state treatment, storage, disposal) facilities TRI system sites
- Integrated Compliance Information System (ICIS) and Permit Compliance System (PCS) - National Pollutant Discharge Elimination System (NPDES) Majors
- RCRAInfo - Large Quantity Generators (LQGs)
- Air Facility System (AFS) - Major discharges of air pollutants RCRAInfo - Corrective Actions
- Risk Management Plan
- Section Seven Tracking System Sites (Pesticides) ACRES - Brownfields Properties

Using this dataset will help to provide a more complete picture of the risk of hazardous materials releases in the County. Northumberland County has 10 EPA-identified Toxic Release Inventory sites throughout the County as shown in Map 4.3.2.2-1. Several of these facilities are located in close proximity to population centers that could be affected should a major accident or spill occur. Table 4.3.2.2-1 provides the complete list of TRI facilities and parent company, their jurisdiction, industry served and chemicals released.

Map 4.3.2.2-1


NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
NORTHUMBERLAND COUNTY
US EPA TOXIC RELEASE
INVENTORY FACILITIES (TRI)
Map Items
EPA TRI Facility
Interstate Highway
Primary US / PA Highway
Secondary PA Highway
Railroad
Hydrologic Feature
Municipal Boundary
County Boundary
Sources: ESRI; Northumberland County; PASDA;
US Environmental Protection Agency 2015
WATSONTOWN BRICK CO
HOEGANAES CORP
ACF INDUSTRIES LLC
MILTON STEEL CO
CHEROKEE PHARMACEUTICALS LLC
TRUCK ACCESSORIES GROUP, LLC DBA TAG EAST
KEYSTONE FORGING CO
ANTHRACITE INDUSTRIES,INC
MOUNT CARMEL COGEN FACILITY
ARCOS INDUSTRIES LLC
Lycoming
Columbia
Montour
Union
Snyder
Schuylkill
Juniata
Perry
Dauphin
DELAWARE
LEWIS
TURBOTVILLE
WATSONTOWN
MCEWENSVILLE
TURBOT
MILTON
EAST CHILLISQUAQUE
WEST CHILLISQUAQUE
RIVERSIDE
POINT
RUSH
NORTHUMBERLAND
UPPER AUGUSTA
SUNBURY
SNYDERTOWN
RALPHO
SHAMOKIN TWP
ROCKEFELLER
LOWER AUGUSTA
ZERBE
LITTLE MAHANOY
WEST CAMERON
EAST CAMERON
JACKSON
WASHINGTON
UPPER MAHANOY
HERNDON
JORDAN
LOWER MAHANOY
PILLOW
MARION HEIGHTS
KULPMONT
MT CARMEL
SHAMOKIN
COAL
MT CARMEL TWP
NY
PA
OH
WV
MD
DE
NJ
VA
0 2 4 8 Miles
Projection: NAD 1983 - State Plane PA North (feet)

FACILITY NAME	PARENT COMPANY	MUNICIPALITY	INDUSTRY	CHEMICALS
ACF INDUSTRIES LLC	ACF INDUSTRIES LLC	MILTON	Transportation Equipment	NICKEL, CHROMIUM, MANGANESE
ANTHRACITE INDUSTRIES,INC	ASBURY CARBONS INC	UPPER AUGUSTA TWP	Petroleum	LEAD
ARCOS INDUSTRIES LLC		MOUNT CARMEL TWP	Machinery	COPPER, NICKEL, CHROMIUM, MANGANESE, TETRACHLOROETHYLENE
CHEROKEE PHARMACEUTICALS LLC	MERCK & CO INC	RIVERSIDE	Chemicals	TOLUENE, METHANOL, ETHYLENE GLYCOL, HYDROCHLORIC ACID, DICHLOROMETHANE
HOEGANAES CORP	GKN N.A. INC	DELAWARE TWP	Primary Metals	ZINC, MANGANESE, HYDROGEN SULFIDE, COPPER, NICKEL, LEAD
KEYSTONE FORGING CO		NORTUMBERLAND	Fabricated Metals	NICKEL, CHROMIUM, MANGANESE
MILTON STEEL CO	ACROW CORP	MILTON	Fabricated Metals	MANGANESE
MOUNT CARMEL COGEN FACILITY		MOUNT CARMEL TWP	Electric Utilities	VANADIUM, HYDROGEN FLOURIDE, LEAD, MANGANESE, DIOXIN, MERCURY, BARIUM, CHROMIUM
TRUCK ACCESSORIES GROUP. LLC DBA TAG EAST	TRUCK ACCESSORIES GROUP LLC	MILTON	Transportation Equipment	STYRENE
WATSONTOWN BRICK CO		DELAWARE TWP	Nonmetallic Mineral Product	BARIUM, HYDROGEN FLOURIDE, ALUMINUM, MANGANESE, CHROMIUM

Table 4.3.2.2-1: EPA TRI Facilities in Northumberland County

Transportation of hazardous materials on highways involves tanker trucks or trailers. Unsurprisingly, large trucks are responsible for the greatest number of hazardous material release incidents. Hazardous material releases from rail transport are also of concern due to collisions and derailments that result in large spills.

Northumberland County has a road and railway network that may pose a risk for hazardous material incidents. These networks transport hazardous materials daily, especially on the most traveled routes in the County: Interstate 80, Interstate 180, U.S. Route 11, PA Route 61, and PA Route 147. These major roads pass through the more populous areas. Similarly, rail lines pass through cities and boroughs and along major waterways where larger numbers of people could be vulnerable should a serious accident occur in these places. These major transportation routes are also shown on Map 4.3.2.2-1.

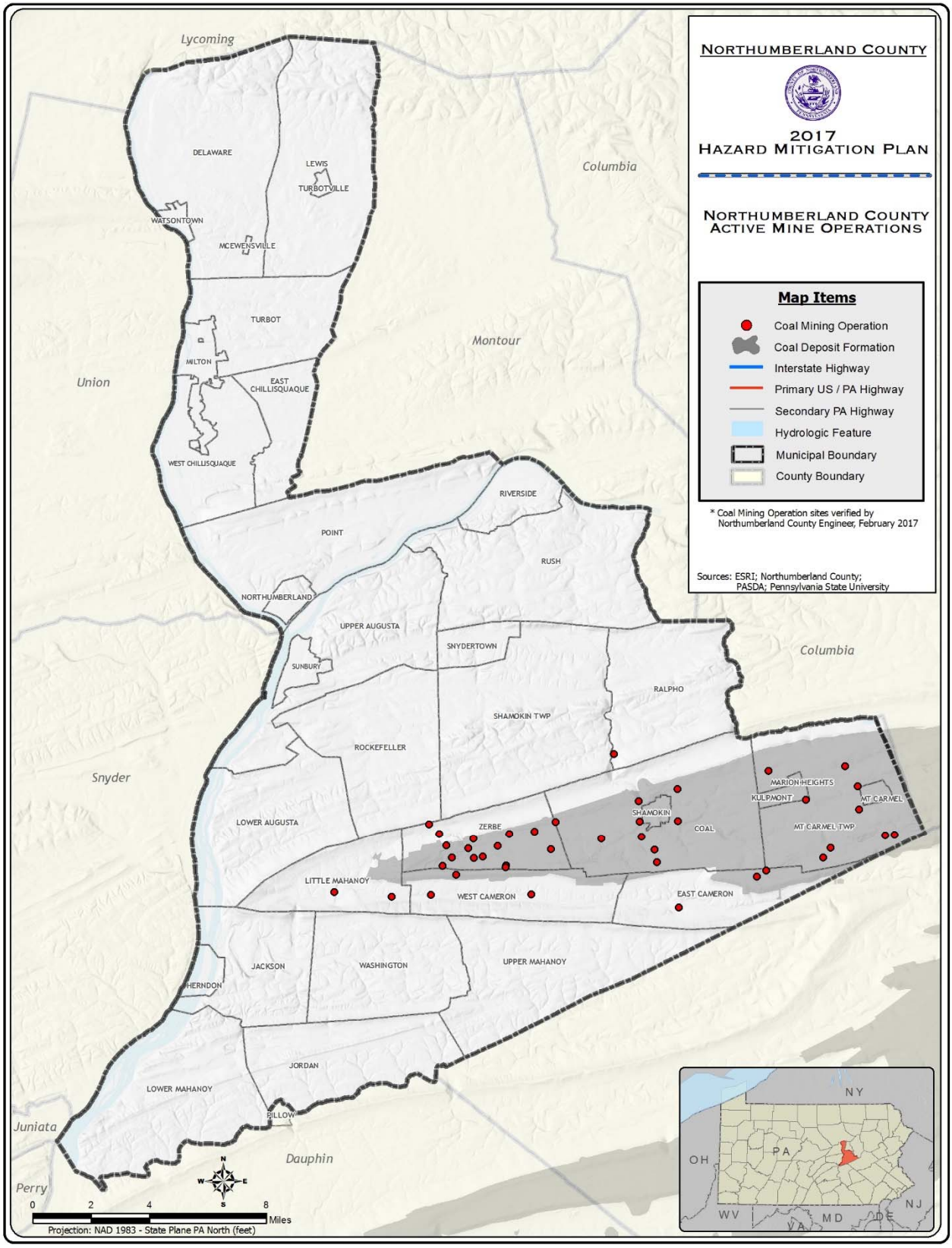
B. Coal Mining Incidents

Coal mining has historically been and continues to be a major industry in Pennsylvania. In Northumberland County, the southeastern part of the

County is underlain with the middle anthracite field of Pennsylvania. The jurisdictions located on top of this coal field in whole or in part include Coal Township, East Cameron Township, Kulpmont Borough, Little Mahanoy Township, Marion Heights Borough, Mount Carmel Borough, Mount Carmel Township, City of Shamokin, West Cameron Township, and Zerbe Township.

Map 4.3.2.2-2 shows the location of the 35 active coal mining operations in the County, including deep mines, surface mines, coal refuse production facilities, and mineral processing facilities that process coal. These coal mining operations are primarily located in the jurisdictions listed above, but there are also coal mining operations in Rockefeller, Ralpho, and Shamokin Townships. Hazards related to these coal mining operations include mine-related subsidence, groundwater and surface water contamination, coal slurry impoundments, and waste piles.

Map 4.3.2.2-2


NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
NORTHUMBERLAND COUNTY
ACTIVE MINE OPERATIONS
Map Items
Coal Mining Operation
Coal Deposit Formation
Interstate Highway
Primary US / PA Highway
Secondary PA Highway
Hydrologic Feature
Municipal Boundary
County Boundary
* Coal Mining Operation sites verified by Northumberland County Engineer, February 2017
Sources: ESRI; Northumberland County; PASDA; Pennsylvania State University
Lycoming
Columbia
Montour
Union
Snyder
Juniata
Perry
Dauphin
DELAWARE
LEWIS
TURBOTVILLE
WATSONTOWN
MCEWENSVILLE
TURBOT
MILTON
EAST CHILLISQUAQUE
WEST CHILLISQUAQUE
RIVERSIDE
POINT
RUSH
NORTHUMBERLAND
UPPER AUGUSTA
SUNBURY
SNYDERTOWN
RALPHO
SHAMOKIN TWP
ROCKEFELLER
LOWER AUGUSTA
ZERBE
SHAMOKIN
COAL
MARION HEIGHTS
KULPMONT
MT CARMEL
MT CARMEL TWP
LITTLE MAHANOY
WEST CAMERON
EAST CAMERON
JACKSON
WASHINGTON
UPPER MAHANOY
HERNDON
JORDAN
LOWER MAHANOY
PILLOW
0 2 4 8 Miles
Projection: NAD 1983 - State Plane PA North (feet)
NY
OH
PA
NJ
WV
MD
DE
VA

Range of Magnitude

A. Hazardous Material Release

Hazardous material releases can contaminate air, water, and soils, possibly resulting in death and/or injuries. Dispersion can take place rapidly when transported by water and wind. While often accidental, releases can occur as a result of human carelessness, intentional acts, or natural hazards. When caused by natural hazards, these incidents are known as secondary events. Hazardous materials can include toxic chemicals, radioactive materials, infectious substances, and hazardous wastes. Such releases can affect nearby populations and contaminate critical or sensitive environmental areas.

With a hazardous material release, whether accidental or intentional, there are several potentially exacerbating or mitigating circumstances that will affect its severity or impact. Mitigating conditions are precautionary measures taken in advance to reduce the impact of a release on the surrounding environment. Primary and secondary containment or shielding by sheltering-in-place protects people and property from the harmful effects of a hazardous material release. Exacerbating conditions, or characteristics that can enhance or magnify the effects of a hazardous material release, include the following:

- **Weather conditions -** Affect how the hazard occurs and develops
- **Micro-meteorological effects of buildings and terrain -** Alters dispersion of hazardous materials
- **Noncompliance with applicable codes (e.g., building or fire codes) and maintenance failures (e.g., fire protection and containment features) -** Can substantially increase the damage to the facility itself and to surrounding buildings

Whether or not a hazardous materials site is contained in the SFHA is also a concern, as there could be larger-scale water contamination during a flood event, should the flood compromise the production or storage of hazardous chemicals. Such a situation could swiftly move toxic chemicals throughout a water supply and across great distances.

The severity of a given incident is dependent not only on the circumstances described above, but also with the type of material released and the distance and related response time for emergency response teams. The areas within closest proximity to the releases are generally at greatest risk, yet depending on the agent, a release can travel great distances or remain present in the environment for a long period of time (e.g., centuries to millennia for radioactive materials), resulting in extensive impacts on people and the environment.

The worst-case scenario for a hazardous material release occurred on August 2, 2007. During this event, human error caused Merck & Company to release 20 tons of ethylene glycol, a form of antifreeze, into the

Susquehanna River from the company's Riverside site. Northumberland County officials and PEMA were not notified about the spill until two hours later. Then, later that same day, an additional eleven tons of ethylene glycol were released. According to a lawsuit brought by the EPA, Merck did not properly notify the EPA of the spill and agreed to pay a $1.5 million civil fine to settle the charges. While the exact environmental impacts of the event are unknown, the EPA stated that the spills "had a reasonable likelihood of adversely affecting heath or the environment and could have been prevented" (*Daily Item*, 2011).

B. Coal Mining Incidents

Coal mining is limited to the southeastern portion of the County, but the anthracite coal field covers approximately 35,380 acres. The primary environmental impacts of coal mining include mine-related subsidence, underground mine fire, stream contamination from mine drainage, modification of vegetation, and elevation changes. Beyond the environmental impacts, there are occupational hazards associated with coal mining, including loss of life from mine collapse, entrapment, gases, inundation, explosion, fire, equipment malfunction, or drowning. These occupational hazards are of particular concern in Northumberland County, as the coal fields there are still deep mined.

The worst-case scenario of a coal mining incident in Northumberland County would be if the Centralia Mine Fire, currently burning in adjacent Columbia County, were to spread to the coal mines under Mount Carmel. The Centralia fire began in May 1962, when a trash fire initiated an underground mine fire that continues to burn. The mine fire continually leaks toxic carbon monoxide gases, and sinkholes threaten remaining structures. The U.S. government decided to step in and purchase the property and demolish the homes resting on unsteady ground. Additionally, the fire caused the buckling of pavement of PA Route 54/PA Route 61; the road had to be re-routed to bypass the Borough entirely. The extensive underground network of mine tunnels and close proximity of Centralia (less than three miles separate the jurisdictions) could provide the mine fire with an avenue toward Mount Carmel.

Past Occurrence

A. Hazardous Materials Release

With some exceptions, the majority of incidents over the years have involved petroleum product spills along the highways or leaks from a fixed source. Most of these are the result of collisions or leaks and have limited impact on people and the environment. The number of hazardous materials being produced, stored, and transported continues to increase each year in Pennsylvania. Cumulatively, EPA TRI records indicate that there have been

a total of 51,392,141 pounds of chemicals released from fixed sites in Northumberland County between 1987 and 2008 (PEMA, 2010).

With respect to pipeline infrastructure hazards, two known accidents have been reported along the Sunoco liquid gas pipeline in Coal Township, as identified by NPMS and the U.S. DOT. These spills resulted in over 1,500 barrels of liquid gas and $4,000,000 in property damage in addition to the detriment on the environment in the vicinity of these unfortunate events.

Table 4.3.2.2-1 displays all hazardous material events reported to PEMA's WebEOC. The WebEOC system is PEMA's incident reporting system; the system was instituted in 2010, so data is only available for 2010 and 2011 at this time. Only jurisdictions that had hazardous material releases are included in this table.

MUNICIPALITY	2012	2013	2014	2015	2016	2017 (thru May 30th)	TOTAL
Coal	2	2	1	1	1		7
Delware	1				1		2
East Chillisquaque	1						1
Herdon							0
Little Mahanony				1	1		2
Lower Augusta				1			1
Lower Mahanony					1		1
Milton			1			1	2
Mount Carmel							0
Mount Carmel Twp		1	1			1	3
Northumberland	1			1		1	3
Point	1	1	2	1	1		6
Ralpho	3			1	11		15
Rockefellor		3					3
Rush			2	2	1		5
Shamokin			4	1	1		6
Shamokin Twp		2		1		1	4
Sunbury	3				1	1	5
Turbot	1			2	1	2	6
Upper Augusta	3	2	2				7
Watsontown	1	1		1			3
West Chillisquaque				1	1		2
Zerbe		1			1		2
TOTAL	17	13	13	14	22	7	86

Table 4.3.2.2-2: Hazardous Material and Petroleum Releases in Northumberland County

B. Coal Mining Incidents

Because the coal mining industry in Pennsylvania peaked in 1917, coal mining incidents were far more common in the late 1800s and early 1900s than they are now. In fact, from 1978 to 2008, there have been 21 fatal injuries in all anthracite mines nationwide. In Pennsylvania, since 1970 there have been no coal mine incidents in Pennsylvania with five or more fatalities, according to the U.S. Mine Safety and Health Administration. Table 4.3.2.2-3 lists the historical coal mine disasters occurring in Northumberland County.

In addition to these coal mining accidents, acid mine drainage has been an issue in Northumberland County, especially in the Shamokin Creek Basin. According to a USGS report monitoring the effects of abandoned coal mine drainage from 1999 to 2001, contaminated runoff and discharge from

abandoned anthracite mines degraded the aquatic ecosystem and water quality of the stream from the mine to the mouth of the Shamokin Creek.

DATE	NAME OF MINE	LOCATION OF MINE	FATALITIES	CAUSE
June 10, 1873	Henry Clay	Shamokin, PA	10	Fire
May 3, 1880	Lykens Valley	Shamokin, PA	5	Explosion
August 21, 1884	Buck Ridge	Shamokin, PA	7	Fire
April 1, 1893	Neilson	Shamokin, PA	10	Fire
October 8, 1894	Luke Fidler	Shamokin, PA	5	Fire
October 11, 1894	Henry Clay	Shamokin, PA	6	Boiler Explosion
November 25, 1902	Luke Fidler	Shamokin, PA	7	Explosion
May 27, 1911	Cameron	Shamokin, PA	5	Explosion
June 26, 1923	Richards Colliery	Mount Carmel, PA	5	Explosion
May 29, 1931	Richards Colliery	Mount Carmel, PA	5	Explosion

Table 4.3.2.2-3: Historic Coal Mining Accidents in Northumberland County

Future Occurrence

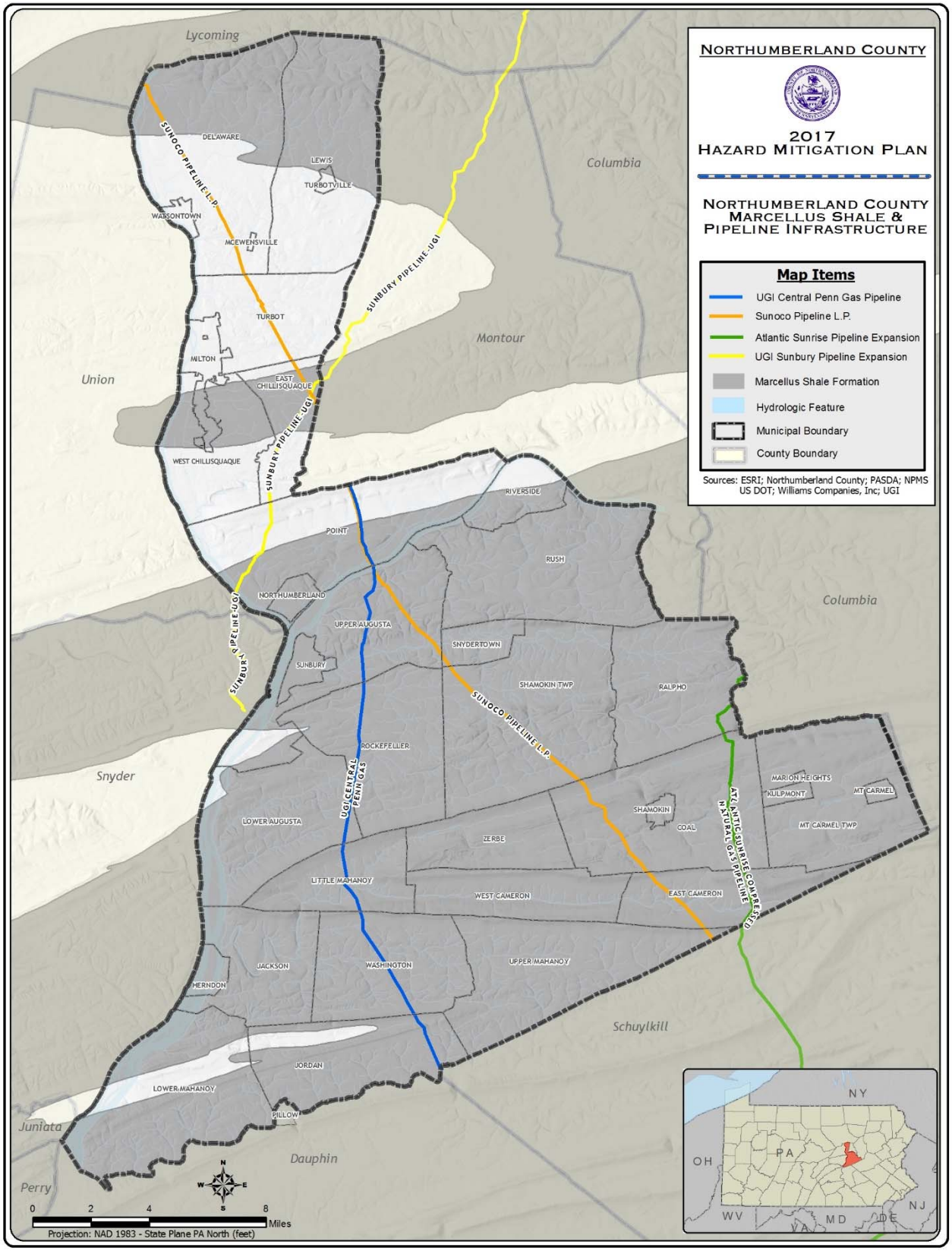
Overall, for both types of environmental hazards, the probability of future occurrence is *possible*, according to the Risk Factor Methodology probability criteria (see Table 4.4.1-1). The following sections discuss any unique factors that may impact the future occurrence of each type of environmental hazard.

A. Hazardous Materials Release

While incidents involving hazardous materials releases have occurred in Northumberland County in the past, they are generally difficult to predict. Any occurrence is largely dependent upon the accidental or intentional actions of a person or group. Population growth, especially in areas close to transportation routes, can expose more people to these hazards if a release incident occurs. The transport, storage, and handling of hazardous materials are increasing nationwide and with this is the potential for an increase in accidents. However, in PEMA's Hazardous Material Emergency Planning and Response Act Annual Report (2008), PEMA rates the chemical facility threat and transportation facility threat of hazardous material releases for each county. Northumberland County has a high chemical facility rating and a moderate transportation threat rating, meaning that a hazardous materials release is more likely to come from a fixed facility than a transportation event.

According to NPMS (National Pipeline Mapping System) which is managed by the US Department of Transportation, Northumberland County, as of 2016 has 56.2 miles of active pipeline. 22.41 miles of gas transmission pipeline operated by UGI Utilities, Inc and 34.21 miles of hazardous liquid pipeline operated by Sunoco Logistics currently function within the county limits. The amount of gas transmission will increase in the near future with the Sunbury gas pipeline (approx. 8.3 miles) and Expansion of the Atlantic Sunrise Project pipeline (approx. 9 miles) as shown in Map 4.3.2.2-3 below. These high volume pipelines will be delivering compressed natural gas from the gas fields to our north in the portion of the Marcellus Shale formation actively being extracted. This expanding infrastructure and the volatility that it possesses should be included into the HMP accordingly.

Map 4.3.2.2-3


NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
NORTHUMBERLAND COUNTY
MARCELLUS SHALE &
PIPELINE INFRASTRUCTURE
Map Items
UGI Central Penn Gas Pipeline
Sunoco Pipeline L.P.
Atlantic Sunrise Pipeline Expansion
UGI Sunbury Pipeline Expansion
Marcellus Shale Formation
Hydrologic Feature
Municipal Boundary
County Boundary
Sources: ESRI; Northumberland County; PASDA; NPMS US DOT; Williams Companies, Inc; UGI
Lycoming
Columbia
Montour
Union
Snyder
Juniata
Perry
Dauphin
Schuylkill
DELAWARE
LEWIS
TURBOTVILLE
WATSONTOWN
MCEWENSVILLE
TURBOT
MILTON
EAST CHILLISQUAQUE
WEST CHILLISQUAQUE
RIVERSIDE
POINT
RUSH
NORTHUMBERLAND
UPPER AUGUSTA
SUNBURY
SNYDERTOWN
SHAMOKIN TWP
RALPHO
ROCKEFELLER
LOWER AUGUSTA
ZERBE
SHAMOKIN
COAL
MARION HEIGHTS
KULPMONT
MT CARMEL
MT CARMEL TWP
LITTLE MAHANOY
WEST CAMERON
EAST CAMERON
JACKSON
WASHINGTON
UPPER MAHANOY
HERNDON
JORDAN
LOWER MAHANOY
PILLOW
SUNBURY PIPELINE-UGI
SUNOCO PIPELINE L.P.
UGI CENTRAL PENN GAS
ATLANTIC SUNRISE COMPRESSED NATURAL GAS PIPELINE
0 2 4 8 Miles
Projection: NAD 1983 - State Plane PA North (feet)
NY
OH
PA
WV
MD
DE
NJ
VA

B. Coal Mining Incidents

While many coal mining incidents have occurred in Northumberland County in the past, the mining industry has overall improved its safety through state and federal oversight, especially through the U.S. Mine Safety and Health Administration and PA DEP's Active and Abandoned Mine Operations. As a result, the chance of coal mining incidents is likely to stabilize or even decrease in the future. However, with 35 coal mining operations still active in Northumberland County, this hazard will continue to be present in the County.

Vulnerability Assessment

A. Hazardous Materials Release

There are approximately six miles of Interstate 80 that cross east to west through Northumberland County and 17 miles of Interstate 180/PA Route 147 in the County. Interstate 80 is a major route that traverses the Commonwealth of Pennsylvania and crosses into New Jersey on the east and Ohio on the west side. Interstate 180/PA Route 147 traverses the eastern portion of the County from Northumberland Borough to the Northumberland County-Lycoming County line. Various materials and substances are transported over both of these roads, so they are vulnerable corridors for hazardous waste accidents.

Jurisdictions that are home to one or more of the TRI facilities should be considered vulnerable to hazardous materials releases from fixed facilities. Table 4.3.2.2-4 illustrates the number of TRI sites by municipality in Northumberland County, along with the number of addressable structures and critical facilities that can be considered vulnerable to a hazardous materials release from a fixed facility. Populations in and around the communities that are home to TRI sites are more vulnerable to facility releases, particularly those within 1.5 miles of the facility. Shamokin City, Sunbury City, and Coal Township have the most addressable structures and critical facilities vulnerable to hazardous material releases, with over 4,000 vulnerable structures and over 20 vulnerable critical facilities in each municipality. In total, 28 of the 36 jurisdictions in Northumberland County have some addressable structures within 1.5 miles of a fixed hazardous materials facility.

Jurisdictions without fixed hazardous materials facilities in general do not have vulnerable structures or critical facilities. However, it is important to note that even if a jurisdiction houses no hazardous materials sites, it may be vulnerable to a release event occurring in an adjacent municipality. This is the case in Kulpmont Borough, Turbot Township, Marion Heights Borough, Shamokin Township, Jackson Township, McEwensville Borough, Snydertown

Borough, Jordan Township, Lower Augusta Township, Rush Township, and East Chillisquaque Township. There is an added concern in Northumberland

MUMICIPALITY	NUMBER OF TRI FACILITIES	TOTAL ADDRESSABLE STRUCTURES WITHIN 1.5-MILE BUFFER OF HAZARDOUS MATERIAL SITES	TOTAL CRITICAL FACILITIES WITHIN 1.5-MILE BUFFER OF HAZARDOUS MATERIAL SITES
Coal Township	0	0	0
Delaware Township	2	221	4
East Cameron Township	0	0	0
East Chillisquaque Township	0	2	0
Herndon Borough	0	0	0
Jackson Township	0	0	0
Jordan Township	0	0	0
Kulpmont Borough	0	822	10
Lewis Township	0	3	0
Little Mahanoy Township	0	0	0
Lower Augusta Township	0	0	0
Lower Mahanoy Township	0	0	0
Marion Heights Borough	0	365	3
McEwensville Borough	0	137	1
Milton Borough	3	2817	28
Mount Carmel Borough	0	0	0
Mount Carmel Township	2	1051	17
Northumberland Borough	1	1716	24
Point Township	0	624	5
Ralpho Township	0	0	0
Riverside Borough	1	532	10
Rockefeller Township	0	73	1
Rush Township	0	8	0
Shamokin City	0	2027	17
Shamokin Township	0	36	2
Snydertown Borough	0	53	0
Sunbury City	0	751	9
Turbot Township	0	472	4
Turbotville Borough	0	0	0
Upper Augusta Township	1	291	5
Upper Mahanoy Township	0	0	0
Washington Township	0	0	0
Watsontown Borough	0	233	2
West Cameron Township	0	0	0
West Chillisquaque Township	0	602	5
Zerbe Township	0	0	0
TOTAL	**10**	**12836**	**147**

Table 4.3.2.2-4: Addressable Structures and Critical Facilities Vulnerable to Fixed-Facility Hazardous Material Releases

County because so many of the hazardous materials facilities are located in close proximity to the Susquehanna River; a release into the river has the potential to impact not only Northumberland County residents but also

those in neighboring Union and Snyder Counties and in downstream communities.

B. Coal Mining Incidents

Structures vulnerable to coal mining incidents are vulnerable not only to mine-related subsidence but also all of the impacts described in this topical section. Table 4.3.2.2-5 shows the number of addressable structures and critical facilities within coal deposit areas in Northumberland County. With the limited spatial extent of the coal deposits in the County, there are 10 communities vulnerable to coal mining: Coal Township, East Cameron Township, Kulpmont Borough, Little Mahanoy Township, Marion Heights Borough, Mount Carmel Borough, Mount Carmel Township, Shamokin City, West Cameron Township, and Zerbe Township. Of these communities, the most densely populated – Shamokin City – has the highest number of addressable structures and critical facilities vulnerable to coal mining incidents, with 4,183 vulnerable structures and 36 vulnerable critical facilities.

MUMICIPALITY	TOTAL ADDRRESSABLE STRUCTURES UNDERLAIN BY COAL DEPOSITS	TOTAL CRITICAL FACILITIES UNDERLAIN BY COAL DEPOSITS
Coal Township	3919	38
Delaware Township	0	0
East Cameron Township	2	1
East Chillisquaque Township	0	0
Herndon Borough	0	0
Jackson Township	0	0
Jordan Township	0	0
Kulpmont Borough	1453	14
Lewis Township	0	0
Little Mahanoy Township	2	0
Lower Augusta Township	0	0
Lower Mahanoy Township	0	0
Marion Heights Borough	365	3
McEwensville Borough	0	0
Milton Borough	0	0
Mount Carmel Borough	3531	25
Mount Carmel Township	1452	23
Northumberland Borough	0	0
Point Township	0	0
Ralpho Township	0	0
Riverside Borough	0	0
Rockefeller Township	0	0
Rush Township	0	0
Shamokin City	4183	36
Shamokin Township	0	0
Snydertown Borough	0	0
Sunbury City	0	0
Turbot Township	0	0
Turbotville Borough	0	0
Upper Augusta Township	0	0
Upper Mahanoy Township	0	0
Washington Township	0	0
Watsontown Borough	0	0
West Cameron Township	9	0
West Chillisquaque Township	0	0
Zerbe Township	5	4
TOTAL	**14921**	**144**

Table 4.3.2.2-5: Addressable Structures and Critical Facilities Underlain by Coal Deposits

Floodplain management practices are important for areas where mining has occurred within close proximity to watercourses and associated flat-lying areas. Surface water may permeate into areas that still have open fractures. The build-up of surface water in fractures could lead to unexpected flood events. Also, surface water that enters into the fractures could mix with potential chemicals within rock strata and be flushed out and return to the groundwater system.

Areas of the County that have underlying mines are subject to subsidence and constitute a potential threat to people living in those areas. It is hard to estimate the number of people and properties vulnerable to a hazardous mining or other subsidence incident because of poor records where the mine shafts were located, the depth of the shafts, and the size of the these shafts.

LEVEE FAILURE

A levee is a human-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding (Interagency Levee Policy Review Committee, 2006).

Levee failures or breaches occur when a levee fails to contain the floodwaters for which it is designed to control or floodwaters exceed the height of the constructed levee.

Location and Extent

Levee failures, like dam failures, have the potential to place large numbers of people and properties at risk. Unlike dams, levees are built parallel to a river or another body of water to protect the population and structures behind it from risks of casualty or damage during flooding events (FEMA, 2008). Levees do not serve a purpose beyond flood protection, unlike dams that can serve to store water or generate energy in addition to protect areas from flooding.

Levee failures can be caused by a number of factors, and they can cause catastrophic effects. Damage to the area beyond a levee if it fails could be more significant than if the levee was not present (FEMA, 2008). Levees are designed to provide a specific level of protection, so flooding events could overtop the levees if these events exceeded the levee specifications. Additionally, levees can also fail if they are allowed to decay or deteriorate, so regular maintenance of levees is critical.

The Sunbury Project was authorized in 1936 in response to a major flood during the same year. The levee system is located along the east bank of the Susquehanna River and on the northeast bank of Shamokin Creek, protecting the City of Sunbury. The Shamokin Creek section was completed in 1948, the Upper Susquehanna River section finished in 1949, and the Lower Susquehanna River section operational in 1951. The levee system is owned by the City of Sunbury and is approximately 26,100 feet total in length, consisting of 12,100 feet of concrete floodwall and 14,000 feet of earth levee.

These levees were identified by compiling data taken from preliminary and final FIRMs and from the

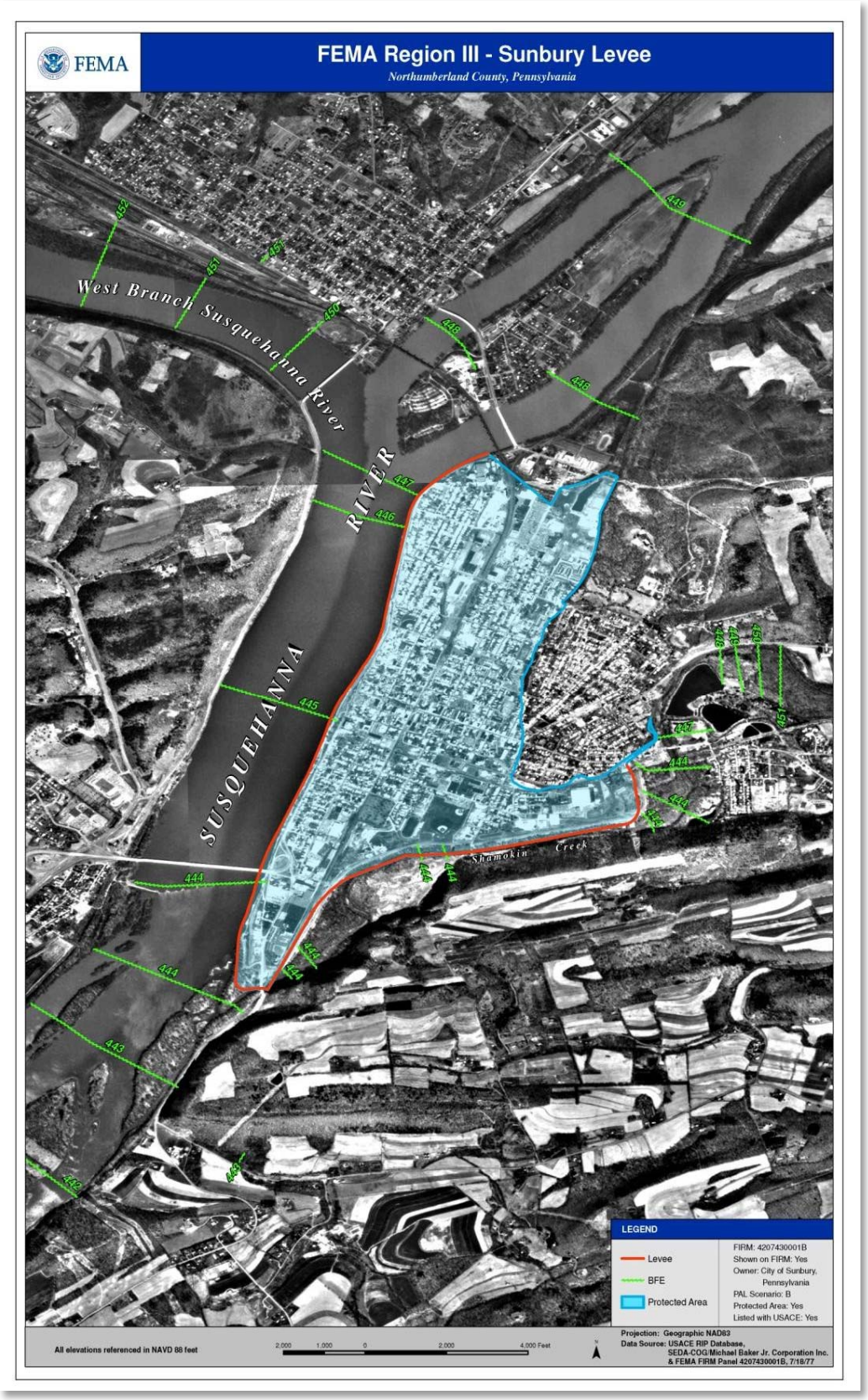
U.S. Army Corps of Engineers (FEMA R3, 2010). According to the FEMA Midterm Levee Inventory dated November 2011, the levee in the Sunbury Project is certified to protect against the 1 percent annual chance flood hazard event (FEMA R3, 2010). More details

about the location of the levee are listed in Table 4.3.2.3-1. The levee system can be seen in Figure 4.3.2.3-1.

MUNICIPALITY	LEVEE	FLOOD SOURCE	RIVER BASIN
City of Sunbury	Susquehanna River Levee (Right Bank, Downstream) and Shamokin Creek (Left Bank, Upstream)	Susquehanna River and Shamokin Creek	Lower Susquehanna

Table 4.3.2.3-1: Levees in Northumberland County

Figure 4.3.2.3-1



Range of Magnitude

A levee failure or breach causes flooding in landward areas adjacent to the structure. The failure of a levee or other flood protection structure could be devastating, depending on the level of flooding for which the structure is designed and the amount of landward development present. Large volumes of water may be moving at high velocities, potentially causing severe damage to buildings, infrastructure, trees, and other large objects.

The environmental impacts of a levee failure result in significant water quality and debris disposal issues. Floodwaters will 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 floodwaters. Hazardous materials may be released and distributed widely across the floodplain.

Water supplies and wastewater treatment could be off-line for weeks. After the floodwaters subside, contaminated and flood-damaged building materials and contents must be properly disposed.

Contaminated sediment must be removed from buildings, yards, and properties. In addition, severe erosion is likely, which can impact local ecosystems.

Levee failures are generally worse when they occur abruptly with little warning and result in deep, fast-moving water through highly developed areas. The levee in Northumberland County is located in one of the densest, highly populated areas of the County; this concern is real for many residents of Sunbury City. Fortunately, the levee held during Tropical Storm Lee in 2011. The worst-case scenario for levee failure in Northumberland County would be if the Susquehanna River section of the levee failed and the Sunbury Sewage Treatment Plant were to flood. In this scenario, not only would there be flooding in the areas behind the levee, but there would also likely be a temporary shutdown of the sewer treatment facility and thus, a reduction of access to clean water.

Past Occurrence

To date, there have been no known levee failures in Northumberland County.

Future Occurrence

Similarly to dam failures, given certain circumstances, levee failures can occur at any time. Given the proximity of the levee system to the Susquehanna River, a major waterway subject to flooding, the City of Sunbury will continue to rely on the protection provided by the levee in the future. However, the probability of future occurrence can be reduced through proper design, construction, and maintenance measures. Most levees are designed to meet a specified level of flooding. While FEMA focuses on mapping levees that will reduce the risk of a 1 percent annual chance flood, other levees may be designed to protect against smaller or larger floods. Design specifications

provide information on the percent annual chance flood a structure is expected to withstand, provided that it has been adequately constructed and maintained; the Midterm Levee Inventory indicates that the Sunbury levee system is expected to withstand a 1 percent annual chance flood event. If the levee system in Northumberland County is properly maintained, the future occurrence of levee failure will continue to be considered *unlikely* as defined by the Risk Factor Methodology probability criteria (see Table 4.4.1-1).

Vulnerability Assessment

As a levee system that protects against the 1 percent annual chance flood, the Sunbury system has a defined levee-protected area on the DFIRM maps for Sunbury City and Upper Augusta Township.

MUNICIPALITY	LEVEE AND FLOOD SOURCE	NUMBER OF CRITICAL FACILITIES WITHIN LEVEE PROTECTED AREA	NUMBER OF STRUCTURES WITHIN LEVEE PROTECTED AREA
City of Sunbury	Sunbury Levee, Susquehanna River and Shamokin Creek	39	3236
Upper Augusta Township	Sunbury Levee, Susquehanna River and Shamokin Creek	0	28

Table 4.3.2.3-2: Critical Facilities and Addressable Structres protected by Levee

Table 4.3.2.3-2 lists the number of critical facilities and addressable structures in the levee-protected area. There are vulnerable addressable structures in only two jurisdictions: the City of Sunbury and Upper Augusta Township. Approximately 75 percent of all addressable structures and 81 percent of critical facilities in Sunbury are located within the levee-protected area, making them the most vulnerable to a levee failure. In contrast, the 28 addressable structures in the levee-protected area in Upper Augusta Township represent only 2 percent of that municipality's addressable structures.

OPIOIDS

Opioids are prescribed for legitimate pain management, however, users can seek stronger and stronger doses to treat the same pain level as their bodies become accustomed to dosages. Physical addictions, a constant mental obsession with the sensations produced buy these medication, *can* lead individuals to seek out alternative methods for obtaining additional doses or alternate, possibly stronger, medications. The Pain & Policy Studies Group at the University of Wisconsin publishes global consumption data, provided by the International Narcotics Control Board, for six principal opioids being used as pain management. In 2015 it is reported that the United States consumes

677.7693 mg/capita. The United States is home to only 5% of the global population but consumes approximately 80% of the global opioid supply (Gusovsky, CNN, 2016).

Deaths attributed to opioid related overdoses, as well as criminal activity related to resale and misuse of opioids, are reaching their highest levels in the 21st century. A growing need for public awareness, education and treatment have caused many U.S. citizens to rely on their legislature for help.

In 2016 the Commonwealth of Pennsylvania released their own report with regard to combatting its rising opioid epidemic. The report stated that Pennsylvania now leads the nation in drug overdoses among men aged 12 to 25 (House Majority Policy Committee, 2016). Opioids in particular are the focus of many reports and studies in the Commonwealth because of the variety that are currently available through prescriptions and because of their addictive qualities.

It was also in 2016 that President Obama signed into law the Comprehensive Addiction and Recovery Act. This is the first major federal addiction legislation in 40 years and the most comprehensive effort undertaken to address the opioid epidemic, encompassing all six pillars necessary for such a coordinated response – prevention, treatment, recovery, law enforcement, criminal justice reform, and overdose reversal (CADCA, 2016).

Location and Extent

Because physical addiction can happen to any person who takes opioids, there is no way to say this is a hazard specifically contained to urban areas, although the rate of emergency responses for criminal activity involving controlled substances and overdoses involving controlled substances are higher in the more densely populated areas of Northumberland County.

Range of Magnitude

The heroin/opioid epidemic is complex in that it is a medical issue, a law enforcement issue, a community health issue and a societal issues (Project Bald Eagle, 2016). Opioid addiction can manifest in any population; there is no age group, ethnicity or cultural faction that can say it is unaffected by this "epidemic". This trend also speaks to criminal activity; there is no stereotypical community that is any more affected than others by crime related to illegal use or vending of opioids. Overdose and fatality statistics echo this widespread problem.

Past Occurrence

Northumberland County dispatches emergency services for 27 of its central and southern municipalities, Union County still dispatches to the other nine northern municipalities. Data was analyzed for Northumberland County's response jurisdiction only. The number of incidences involving drug use/possession spiked from 65 in 2012 to 98 in 2013 and have remained consistently high from 2013 to 2016. The number of incidences involving overdose was 131 in 2012, but in 2016 there were 160.

DRUG LAB/MANUFACTURING	
2012	4
2013	5
2014	2
2015	2
2016	5
2017 (5 months)	2
2017 (Projected Total)	4.8

DRUG SALES	
2012	44
2013	31
2014	44
2015	46
2016	60
2017 (5 months)	13
2017 (Projected Total)	31.2

DRUG USE/POSSESSION	
2012	65
2013	98
2014	98
2015	83
2016	96
2017 (5 months)	47
2017 (Projected Total)	112.8

OVERDOSE	
2012	131
2013	128
2014	141
2015	133
2016	160
2017 (5 months)	80
2017 (Projected Total)	192

Table 4.3.2.2-6: Drug Related Incidents with in Northumberland County from 2012 - 2017

Future Occurrence

When just considering the data for the first five months of 2017, 47 incidences involving drug use/possession and 80 incidences involving overdoes, projected totals for the year end would be higher than any in the past six years.

Vulnerability Analysis

Weighing these statistics with state and national statistics has made apparent to the Planning Team the need for Northumberland County to call problems related to opioids an actionable hazard. This section is being added as an introductory representation, with hopes that in future HMP updates there will be more enhanced data and specific, as well as successful, mitigation actions. However, at this time the proof exists that there is a need to create awareness and provide education to Northumberland County residents. State Representatives Lynda Schlegel Culver and Kurt Masser have been hosting Drug and Alcohol Community and Parent Awareness Programs featuring speakers and panels that will take and answer questions from concerned citizens. Even with education and awareness the potential exists for this hazard to continue or worsen because there is no specific trigger or attribute that identifies who will become addicted to or abuse opioids.

TRANSPORTATION ACCIDENTS

1993 Dump Truck - Tanker Collision, Front St., Northumberland

Transportation accidents can result from any form of air, rail, water, or road travel. It is unlikely that small accidents would significantly impact the larger community. However, certain accidents could have secondary regional impacts such as a hazardous materials release or disruption in critical supply/access routes, especially if vital transportation corridors or junctions are present (Research and Innovative Technology Administration, 2009). Traffic congestion in certain circumstances can also be hazardous. Traffic congestion is a condition that occurs when traffic demand approached or exceeds the available capacity of the road network. This hazard should be carefully evaluated during emergency planning since it is a key factor in timely disaster or hazard response, especially in areas with high population density (Federal Highway Administration, 2009).

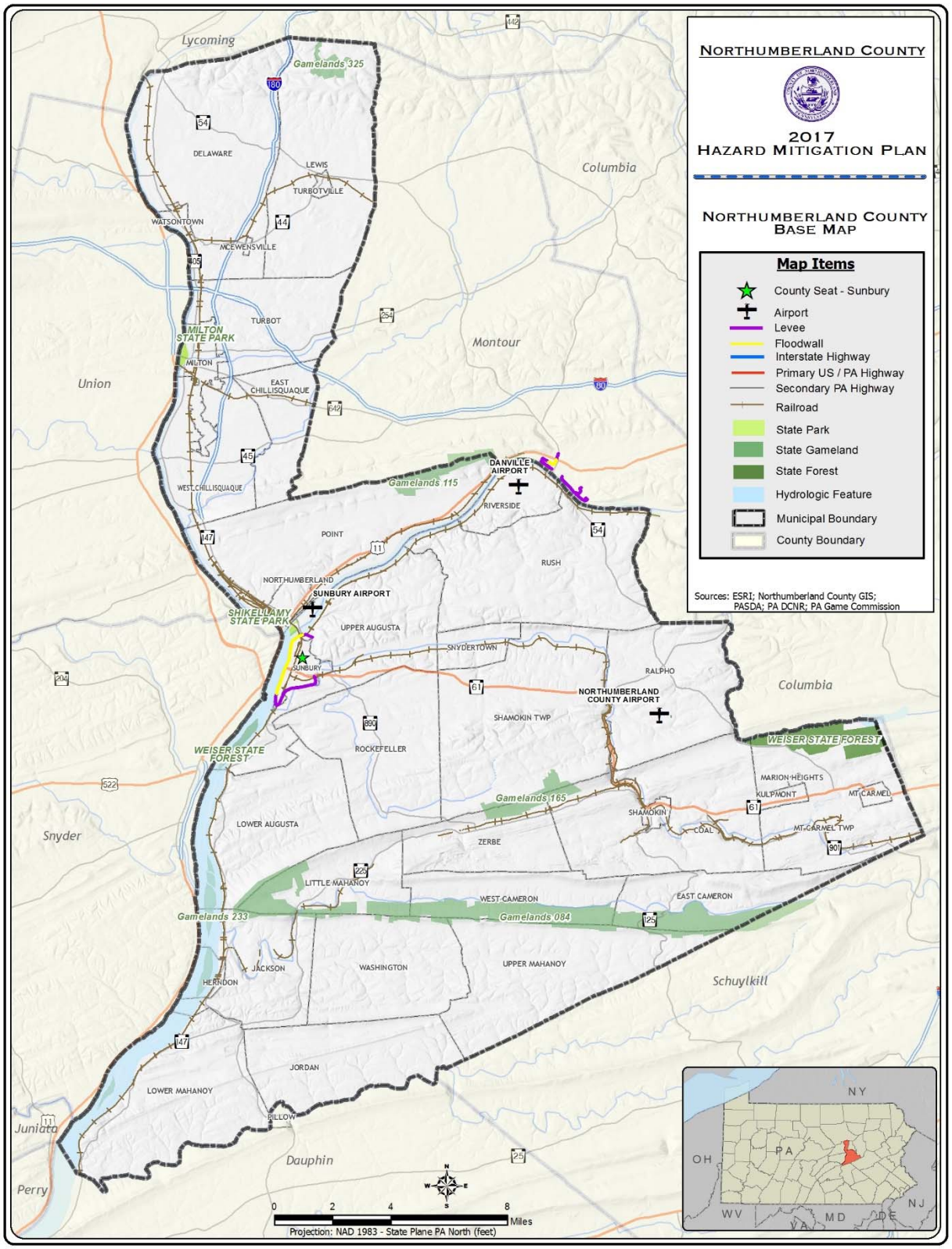
Location and Extent

Most of the transportation routes in Northumberland County were established by the original Indian inhabitants. The paths that were created gave way to roads and highways that are present today. In the mid-1800s, a canal system was created that was later replaced by the railroad. The railroad system was developed due to the increased demand for anthracite coal. After the decline in coal mining, almost every rail line within the County went bankrupt (Northumberland County Comprehensive Plan, 2005). Today there are three railroad authorities still in operation: North Shore Railroad System, Shamokin Valley Railroad, and SEDA-COG Joint Rail Authority. For the purposes of this Plan, transportation accidents are defined as incidents involving highway, air, and rail travel.

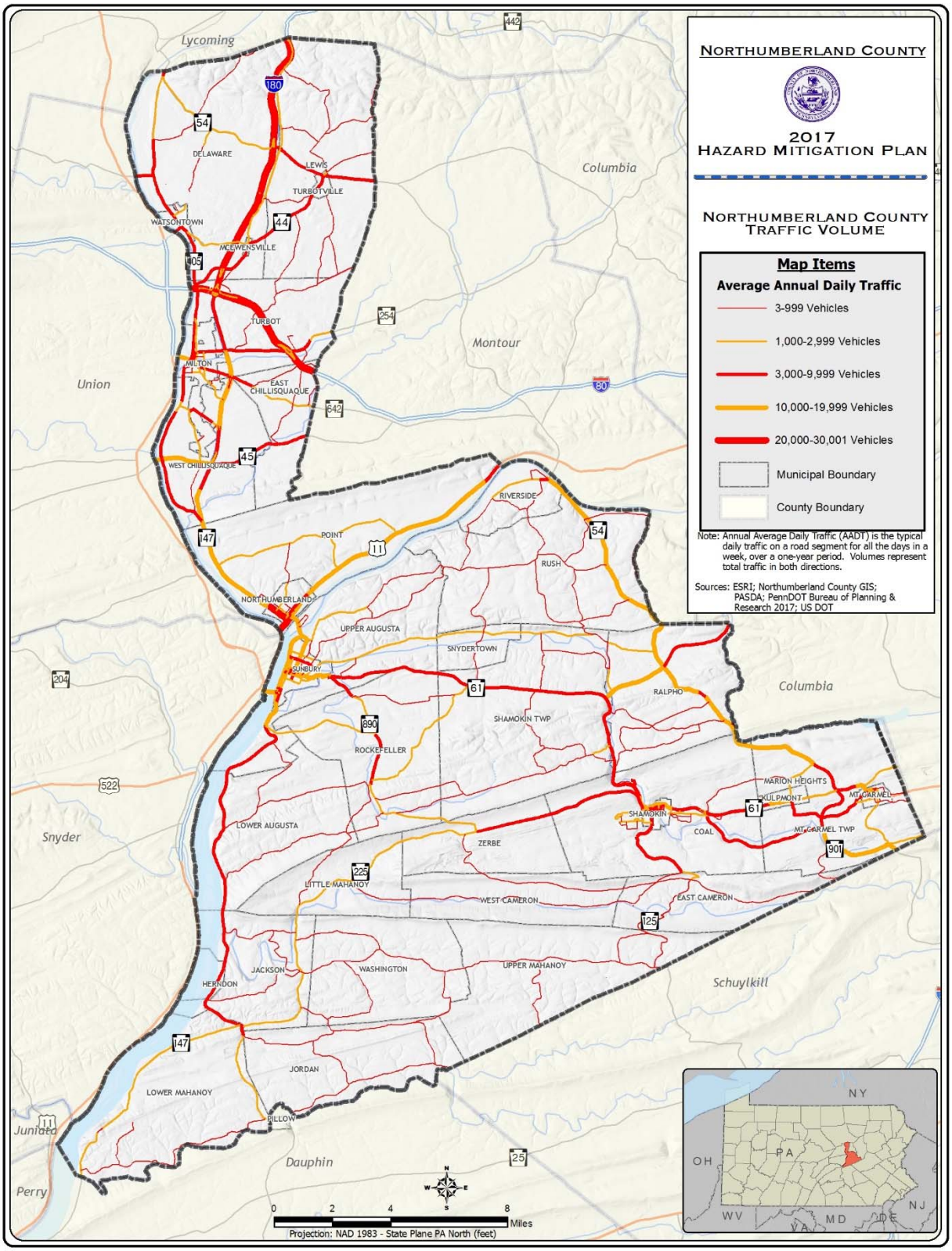
Rockefeller Township, 2013

Within Northumberland County, there are numerous U.S. and state highways. Toward the most northern part of the County, there is Interstate 80. See the map below for the location of Northumberland County's roadways.

Map 4.3.2.4-1


NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
NORTHUMBERLAND COUNTY
BASE MAP
Map Items
County Seat - Sunbury
Airport
Levee
Floodwall
Interstate Highway
Primary US / PA Highway
Secondary PA Highway
Railroad
State Park
State Gameland
State Forest
Hydrologic Feature
Municipal Boundary
County Boundary
Sources: ESRI; Northumberland County GIS; PASDA; PA DCNR; PA Game Commission
Lycoming
Columbia
Union
Montour
Snyder
Juniata
Perry
Dauphin
Schuylkill
Gamelands 325
Gamelands 115
Gamelands 165
Gamelands 233
Gamelands 084
MILTON STATE PARK
SHIKELLAMY STATE PARK
WEISER STATE FOREST
DANVILLE AIRPORT
SUNBURY AIRPORT
NORTHUMBERLAND COUNTY AIRPORT
DELAWARE
LEWIS
TURBOTVILLE
WATSONTOWN
MCEWENSVILLE
TURBOT
MILTON
EAST CHILLISQUAQUE
WEST CHILLISQUAQUE
RIVERSIDE
POINT
RUSH
NORTHUMBERLAND
SUNBURY
UPPER AUGUSTA
SNYDERTOWN
RALPHO
SHAMOKIN TWP
ROCKEFELLER
LOWER AUGUSTA
ZERBE
SHAMOKIN
COAL
MT CARMEL
MT CARMEL TWP
KULPMONT
MARION HEIGHTS
LITTLE MAHANOY
WEST CAMERON
EAST CAMERON
JACKSON
WASHINGTON
UPPER MAHANOY
HERNDON
JORDAN
LOWER MAHANOY
PILLOW
NY
PA
OH
WV
VA
MD
DE
NJ
0 2 4 8
Miles
Projection: NAD 1983 - State Plane PA North (feet)

Map 4.3.2.4-2


NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
NORTHUMBERLAND COUNTY
TRAFFIC VOLUME
Map Items
Average Annual Daily Traffic
3-999 Vehicles
1,000-2,999 Vehicles
3,000-9,999 Vehicles
10,000-19,999 Vehicles
20,000-30,001 Vehicles
Municipal Boundary
County Boundary
Note: Annual Average Daily Traffic (AADT) is the typical daily traffic on a road segment for all the days in a week, over a one-year period. Volumes represent total traffic in both directions.
Sources: ESRI; Northumberland County GIS; PASDA; PennDOT Bureau of Planning & Research 2017; US DOT
Lycoming
Columbia
Union
Montour
Snyder
Juniata
Perry
Dauphin
Schuylkill
DELAWARE
LEWIS
TURBOTVILLE
WATSONTOWN
MCEWENSVILLE
TURBOT
MILTON
EAST CHILLISQUAQUE
WEST CHILLISQUAQUE
POINT
RIVERSIDE
RUSH
NORTHUMBERLAND
UPPER AUGUSTA
SUNBURY
SNYDERTOWN
SHAMOKIN TWP
RALPHO
ROCKEFELLER
LOWER AUGUSTA
ZERBE
SHAMOKIN
COAL
MARION HEIGHTS
KULPMONT
MT CARMEL
MT CARMEL TWP
LITTLE MAHANOY
WEST CAMERON
EAST CAMERON
HERNDON
JACKSON
WASHINGTON
UPPER MAHANOY
JORDAN
LOWER MAHANOY
PILLOW
0 2 4 8 Miles
Projection: NAD 1983 - State Plane PA North (feet)
NY
PA
OH
WV
MD
DE
NJ
VA

Range of Magnitude

Significant transportation accidents can result in death or serious injury or extensive property loss or damage. Road and railway accidents in particular have the potential to result in hazardous materials release. Recently, two people were killed in Herndon when the driver of a car pulled in front of a freight train on June 21, 2011.

Past Occurrence

The most common transportation accidents in the County are highway incidents involving motor vehicles. Data that was obtained from the Northumberland County Emergency Management Agency shows a total of 100 transportation related events reported between 2012 and 2017 (table 4.3.2.4-1).

WEBEOC SUB-CATEGORY	2012	2013	2014	2015	2016	2017	GRAND TOTAL
Railroad Incident	1	0	0	0	1	1	3
Road Closure	10	12	5	5	6	2	40
Vehicle Accident	17	12	7	9	10	2	57
Total	**28**	**24**	**12**	**14**	**17**	**5**	**100**

Table 4.3.2.4-1: Transportation-Related Events Reported

These are the incidents that were reported to EMA on "Major" Roadways

On May 6, 2009, a 1981 single-engine Cessna crashed in Ralpho Township near the Northumberland County airport. The pilot was the only person on the plane and survived the crash.

Future Occurrence

The number of transportation-related accidents is expected to increase with increased vehicular usage. The trucking industry is expected to continue to grow, increasing the number of long-haul trucks operating in the County on a daily basis. Transportation incidents may increase slightly over the next five years without proper mitigation strategies in place. Therefore, based on this and past occurrences, the probability of transportation accidents is characterized as *highly likely*.

The average rate of aviation accidents nationwide is 8.47 accidents per 100,000 flight hours. Therefore, the likelihood of an aviation incident in the County is considered *low*.

Worth noting is the proposed Central Susquehanna Valley Throughway (CSVT). The CSVT has been under development and would bypass traffic off Routes 11/15. The project is currently on hold pending a funding source.

Vulnerability Assessment

A transportation-related accident can occur on any stretch of road or railway in Northumberland County. However, severe accidents are more likely along major highways such as Interstate 80 and

U.S. Routes 11 and 15, which experience heavier traffic volumes, including heavy freight vehicles. The people most likely affected by a traffic accident, especially one involving

truckers transporting hazardous materials, are those that live within a quarter-mile radius of the accident. In Northumberland County, 33 of the 36 municipalities have addressable structures within this buffer (see Table 4.3.2.4-2).

Like highway incidents, rail incidents can impact populations living and working within a quarter-mile of rail lines. These include populations in 28 of the 36 municipalities in Northumberland County (see Table 4.3.2.4-2). Additionally, the County is also susceptible to airplane accidents from air traffic through the Penn Valley, Northumberland County, Sunbury, and Danville Airports.

Table 4.3.2.4-2 illustrates the vulnerability of addressable structures and critical facilities for each kind of transportation accident. For this analysis, vulnerability for highway accidents was defined as jurisdictions falling within a quarter-mile of Interstate, U.S. highways, and state highways, the high- speed roads likely to yield deadly crashes. Vulnerability for air traffic accidents is defined as jurisdictions falling within five miles of the airports. Similar to highway accidents, jurisdictions that are vulnerable to rail accidents are those located within a quarter-mile of rail lines. Using these definitions, Washington and West Cameron Townships are the only municipalities that are not vulnerable to at least one type of transportation accident.

The specific vulnerability of jurisdictions depends on the mode of transportation in question. All jurisdictions except Marion Heights Borough, Washington Township, and West Cameron Township have addressable structures located within a quarter-mile of major highways. Jackson Township has the fewest structures within the quarter-mile radius of highways, with four, and Shamokin City has the most, with 3,240. Thirty of 36 municipalities also have critical facilities within a quarter-mile of major highways; Coal Township, Shamokin City, and Sunbury City have the most with 20, 31, and 42 vulnerable facilities, respectively.

Twenty-seven jurisdictions have addressable structures that are susceptible to effects from railroad accidents. Shamokin City and Sunbury City each have over 3,000 vulnerable structures compared to McEwensville Borough, which has only 22 addressable structures within a quarter-mile of railroad tracks. Shamokin City and Sunbury City also have the highest number of critical facilities vulnerable to rail accidents, with 35 and 48, respectively.

Vulnerability to air accidents is more concentrated because of the spatial allocation of airports. However, 19 municipalities around the airports have addressable structures within a five-mile radius of one of the airports. Zerbe Township has only one addressable structures in this radius, while Shamokin City and Coal Township have over 8,500 structures in this radius. Additionally, 16 municipalities have critical facilities within five miles of the airports. Coal Township, Shamokin City, and Sunbury City have the most critical facilities located in this buffer.

MUNICIPALITY	TOTAL ADDRESSABLE STRUCTURES	ADDRESSABLE STRUCTURES WITHIN 1/4 MILE OF RAILROAD	CRITICAL FACILITIES WITHIN 1/4 MILE OF RAILROAD	ADDRESSABLE STRUCTURES WITHIN 1/4 MILE OF MAJOR HIGHWAYS	CRITICAL FACITLIES WITHIN 1/4 MILE OF MAJOR HIGHWAYS	ADDRESSABLE STRUCTURES WITHIN 5 MILE RADIUS OF AIRPORT	CRITICAL FACILITIES WITHIN 5 MILE RADIUS OF AIRPORT
Coal Township	4477	1574	13	1809	20	4419	48
Delaware Township	1998	596	4	658	7	0	0
East Cameron Township	329	0	0	88	3	0	0
East Chillisquaque Township	297	139	5	179	9	20	2
Herndon Borough	187	187	3	187	3	0	0
Jackson Township	522	121	1	220	4	0	0
Jordan Township	368	0	0	8	0	0	0
Kulpmont Borough	1453	0	0	1445	14	472	3
Lewis Township	799	79	3	220	6	0	0
Little Mahanoy Township	197	85	3	106	5	2	0
Lower Augusta Township	482	58	0	73	0	414	5
Lower Mahanoy Township	818	227	3	421	6	0	0
Marion Heights Borough	365	0	0	0	0	68	0
McEwensville Borough	146	22	0	107	1	0	0
Milton Borough	2820	1733	21	2107	20	0	0
Mount Carmel Borough	3531	0	0	2992	23	3531	0
Mount Carmel Township	1456	178	1	1005	11	96	4
Northumberland Borough	1717	995	16	1154	22	1717	24
Point Township	1886	810	8	921	8	1886	24
Ralpho Township	2204	147	3	1142	14	2204	21
Riverside Borough	881	415	8	145	1	881	10
Rockefeller Township	1041	0	0	311	7	466	5
Rush Township	507	32	1	69	2	507	6
Shamokin City	4183	3920	35	3240	31	4183	36
Shamokin Township	1173	154	2	431	5	705	7
Snydertown Borough	156	23	0	10	0	37	0
Sunbury City	4312	3411	48	2875	42	4312	62
Turbot Township	826	44	0	552	3	0	0
Turbotville Borough	324	84	1	314	5	0	0
Upper Augusta Township	1261	545	3	693	5	1261	14
Upper Mahanoy Township	303	0	0	16	0	0	0
Washington Township	338	0	0	0	0	0	0
Watsontown Borough	1028	966	12	843	11	0	0
West Cameron Township	245	0	0	0	0	9	0
West Chillisquaque Township	1446	536	6	854	11	16	2
Zerbe Township	942	908	12	918	12	1	0
TOTAL	**45018**	**17989**	**212**	**26113**	**311**	**27207**	**273**

Table 4.3.2.4-2: Addressable Structures and Critical Facilities Vulnerable to Railroad, Highway, and Airport Accidents

UTILITY INTERRUPTION

Utility interruption hazards are hazards that impair the functioning of important utilities in the energy, telecommunications, public works, and information network sectors. Utility interruption hazards include the following:

- **Geomagnetic Storms,** including temporary disturbances of the Earth's magnetic field resulting in disruptions of communication, navigation, and satellite systems (National Research Council, 1986)
- **Fuel or Resource Shortage,** resulting from supply chain breaks or secondary to other hazard events, for example (Mercer County, PA, 2005)
- **Electromagnetic Pulse,** originating from an explosion or fluctuating magnetic field and causing damaging current surges in electrical and electronic systems (Institute for Telecommunications Sciences, 1996)
- **Information Technology Failure,** due to software bugs, viruses, or improper use (Rainer Jr. et al., 1991)
- **Ancillary Support Equipment:** electrical generating, transmission, system control, and distribution system equipment for the energy industry (Hirst and Kirby, 1996)
- **Public Works Failure:** damage to or failure of highways, flood control systems, deepwater ports and harbors, public buildings, bridges, dams, for example (U.S. Senate Committee on Environment and Public Works, 2009)
- **Telecommunications System Failure:** damage to data transfer, communications, and processing equipment, for example (FEMA, 1997)
- **Transmission Facility or Linear Utility Accident:** liquefied natural gas leakages, explosions, facility problems, for example (U.S. Department of Energy, 2005)
- **Major Energy, Power, Utility Failure:** interruptions of generation and distribution, power outages, for example (U.S. Department of Energy, 2000)

Location and Extent

Utility interruptions in Northumberland County include disruptions in fuel, water, electric, and telecommunications capabilities, but the primary focus is on electric power failures. Utility interruptions are often a secondary effect of another hazard event. For example, windstorms and severe winter storms may bring down power lines and cause widespread disruptions in the delivery of electricity. Flooding at utility facilities can also disrupt supplies of potable water, electricity, and fuel. Utility interruptions occur countywide, and their geographic extent typically depends on the source of the utility interruption. Severe thunderstorms, tornadoes, and winter storms can also lead to more regional utility interruptions, while localized outages can be caused by traffic accidents or wind damage. Heat waves may also result in rolling blackouts where power may not be available for an extended period of time.

Range of Magnitude

Most severe utility interruptions and power failures are regional events. A loss of utilities can have numerous impacts, including but not limited to food spoilage, loss of water supply (either because of a damaged pipeline or well pump failure), loss of heating or air conditioning, basement flooding (sump pump failure), lack of indoor lighting, and lack of telephone and Internet service. These issues range from a minor nuisance to a full hazard event, but the degree of damage or harm depends on the population affected

and the severity of the outage. For example, loss of heating and cooling capability is more dangerous in the winter and summer months, when heat-sensitive populations like the elderly rely on utilities to maintain a safe temperature.

At a minimum, utility interruptions can cause short-term disruption in the orderly functioning of business, government, and private citizen functioning and activities like traffic signals, elevators, and retail sales. One of the worst utility interruptions experienced in Northumberland County occurred during an early season snowfall on October 29, 2011. During this event, four inches of very wet snow fell across the County; during this event, approximately 1,783 customers (both business and residential) were without power for at least 2.5 hours. Power outages persisted through the afternoon of October 29; even six hours later, power outages remained in Upper Augusta Township, Rockefeller Township, Herndon Borough, Shamokin Township, West Cameron Township, and East Cameron Township (Gilger, 2011).

Past Occurrence

In Northumberland County, minor power outages occur annually. They are often associated with winter storms and windstorms. According to PPL Electric Utilities, Northumberland County's electricity provider, customers have power more than 99.9 percent of the time, but when outages occur, they are overwhelmingly caused by severe weather, especially downed trees and tree limbs, animals, and "other" assorted issues (PPL, 2011). PEMA's WebEOC tool indicates that there were nine utility outages in 2010 and seven in 2011 (calculated through November 21, 2011).

Future Occurrence

Minor, short-term utility interruptions may occur several times a year for any given area in the County, while major, long-term events may take place once every few years, but utility interruptions are difficult to predict. However, because utility interruptions are frequent by-products of severe weather events, citizens should prepare for them during severe storms. Therefore, the future occurrence of utility interruptions should be considered *possible* as defined by the Risk Factor Methodology probability criteria (see Table 4.4.1-1).

Vulnerability Assessment

Although the risk for future occurrence of utility interruptions is likely across Northumberland County due to the frequency of contributing factors such as transportation accidents and severe weather events, these interruptions are typically short-lived. Hospitals and emergency medical facilities as well as retirement homes and senior centers are particularly vulnerable to power outages. While backup power generators are often used at these facilities, loss of electricity may result in hot or cold temperatures to which elderly populations are particularly vulnerable.

PPL Electric Utilities has also taken steps to reduce the vulnerability of its entire service area to utility interruptions. PPL trims trees on more than 5,500 miles of power lines each year, trimming the entire distribution system every four to five years. PPL has installed animal

guards on all new and repaired equipment where animal involvement is suspected. PPL also uses infrared cameras to identify and correct hot spots, which are an early warning sign that there may be a problem in the electrical system. Finally, over the next five years, PPL has pledged $1.4 billion to maintain and improve the electric delivery system and reduce the number and duration of outages (PPL, 2011).

4.4 HAZARD VULNERABILITY SUMMARY

Methodology

Ranking hazards helps communities set goals and priorities for mitigation based on their vulnerabilities. A Risk Factor (RF) is a tool used to measure the degree of risk for identified hazards in a particular planning area. The RF can also be used to assist local community officials in ranking and prioritizing those hazards that pose the most significant threat to their area based on a variety of factors deemed important by the Planning Team and other stakeholders involved in the hazard mitigation planning process. The RF system relies mainly on historical data, local knowledge, general consensus opinions from the Planning Team, and information collected through development of the hazard profiles included in Section 4.3. The RF approach produces numerical values that allow identified hazards to be ranked against one another: the higher the RF value, the greater the hazard risk.

RF values were obtained by assigning varying degrees of risk to five categories for each of the fourteen hazards profiled in the 2011 HMP. Those categories include: *probability*, *impact*, *spatial extent*, *warning time,* and *duration*. Each degree of risk was assigned a value ranging from 1 to 4. The weighting factor is shown in Table 4.4.1-1. To calculate the RF value for a given hazard, the assigned risk value for each category was multiplied by the weighting factor. The sum of all five categories equals the final RF value, as demonstrated in the example equation:

Risk Factor Value = [(Probability x .30) + (Impact x .30) +

(Spatial Extent x .20) + (Warning Time x .10) + (Duration x .10)]

RISK ASSESSMENT CATEGORY	LEVEL	CRITERIA	INDEX	WEIGHT VALUE
PROBABILITY *What is the likelihood of a hazard event occurring in a given year?*	**UNLIKELY**	LESS THAN 1% ANNUAL PROBABILITY	**1**	**30%**
	POSSIBLE	BETWEEN 1% AND 49.9% ANNUAL PROBABILITY	**2**	
	LIKELY	BETWEEN 50% AND 90% ANNUAL	**3**	
	HIGHLY LIKELY	PROBABILITY GREATER THAN 90% ANNUAL PROBABILITY	**4**	
IMPACT *In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?*	**MINOR**	VERY FEW INJURIES, IF ANY. ONLY MINOR PROPERTY DAMAGE AND MINIMAL DISRUPTION ON QUALITY OF LIFE. TEMPORARY SHUTDOWN OF CRITICAL FACILITIES.	**1**	**30%**
	LIMITED	MINOR INJURIES ONLY. MORE THAN 10% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR MORE THAN ONE DAY.	**2**	
	CRITICAL	MULTIPLE DEATHS/INJURIES POSSIBLE. MORE THAN 25% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR MORE THAN ONE WEEK.	**3**	
	CATASTROPHIC	HIGH NUMBER OF DEATHS/INJURIES POSSIBLE. MORE THAN 50% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR 30 DAYS OR MORE.	**4**	
SPATIAL EXTENT *How large of an area could be impacted by a hazard event? Are impacts localized or*	**NEGLIGIBLE**	LESS THAN 1% OF AREA AFFECTED	**1**	**20%**
	SMALL	BETWEEN 1 AND 10.9% OF AREA AFFECTED	**2**	
	MODERATE	BETWEEN 11 AND 25% OF AREA AFFECTED	**3**	
	LARGE	GREATER THAN 25% OF AREA AFFECTED	**4**	
WARNING TIME *Is there usually some lead time associated with the hazard event? Have warning measures*	**MORE THAN 24 HRS**	SELF-DEFINED	**1**	**10%**
	12 TO 24 HRS	SELF-DEFINED	**2**	
	6 TO 12 HRS	SELF-DEFINED	**3**	
	LESS THAN 6 HRS	SELF-DEFINED	**4**	
DURATION *How long does the hazard event usually last?*	**LESS THAN 6 HRS**	SELF-DEFINED	**1**	**10%**
	LESS THAN 24 HRS	SELF-DEFINED	**2**	
	LESS THAN 1 WEEK	SELF-DEFINED	**3**	
	MORE THAN 1 WEEK	SELF-DEFINED	**4**	

Table 4.4.1-1: Summary of Risk Factor Approach Used to Racnk Hazard Risk

Table 4.4.1-1 summarizes each of the five categories used for calculating an RF for each hazard. According to the weighting scheme applied, the highest possible RF value is 4.0.

Ranking Results

Using the methodology described previously in this section, Table 4.4.2-1 lists the RF calculated for each of the 28 potential hazards identified in the 2012 HMP. Hazards identified as *high* risk have risk factors greater than or equal to 2.5. RFs ranging from 2.0 to 2.4 were deemed *moderate* risk hazards. Hazards with RFs of 1.9 and less are considered *low* risk.

HAZARD RISK	HAZARD NATURAL (N) HUMAN-MADE (M)	RISK ASSESSMENT CATEGORY					RISK FACTOR (RF)
		PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	
HIGH	Floods, Flash Floods, Ice Jams (N)	4	3	3	2	3	3.2
	Winter Storm (N)	4	2	4	1	2	2.9
	Radon Exposure (N)	4	2	2	1	4	2.7
	Drought (N)	2	2	4	1	4	2.5
MODERATE	Tornado, Wind Storm (N)	3	2	2	4	1	2.4
	Dam Failure (M)	2	3	3	2	1	2.4
	Levee Failure (M)	2	3	3	2	1	2.4
	Environmental Hazards (M)	2	2	3	4	2	2.4
	Utility Interruptions (M)	2	2	3	4	2	2.4
	Transportation Accidents (M)	2	3	1	4	2	2.3
	Hurricane, Tropical Storm, Nor'easter (N)	2	2	3	1	3	2.2
LOW	Extreme Temperatures (N)	1	2	2	1	3	1.7
	Invasive Species (N)	2	1	2	1	3	1.7
	Earthquake (N)	1	2	3	1	1	1.7
	Wildfire (N)	2	1	2	2	2	1.7
	War and Criminal Activity (M)	2	2	1	2	1	1.7
	Lightning Strike (N)	1	2	1	4	1	1.6
	Building or Structure Collapse (M)	1	2	2	2	1	1.6
	Hailstorm (N)	1	1	2	4	1	1.5
	Subsidence|Sinkholes (M)	1	1	1	4	3	1.5
	Pandemic (N)	1	1	2	3	1	1.4
	Landslide (N)	1	1	1	1	1	1
	Civil Disturbance (M)	1	1	1	1	1	1
	Drowning (M)	1	1	1	1	1	1
	Nuclear Incidents (M)	1	1	1	1	1	1
	Terrorism (M)	1	1	1	1	1	1
	Urban Fire and Explosion (M)	1	1	1	1	1	1
	Opioids (M)	1	1	1	1	1	1

Table 4.4.2-1: Ranking of Hazard Types Based on Risk Factor Methodology

Based on these results, there are three *high* risk hazards, seven *moderate* risk hazards and four *low* risk hazards in Northumberland County. Mitigation actions were developed for all high, moderate, and low risk hazards (see Appendix G). The threat posed to life and property for moderate and high risk hazards is considered significant enough to warrant the need for establishing hazard-specific mitigation actions. Mitigation actions related to future public outreach and emergency service activities are identified to address low risk hazard events.

A risk assessment result for the entire County does not mean that each municipality is at the same amount of risk to each hazard. Table 4.4.2-2 shows the different municipalities in Northumberland County and whether their risk is greater than (>), less than (<), or equal to (=) the RF assigned to the County as a whole.

Potential Loss Estimates

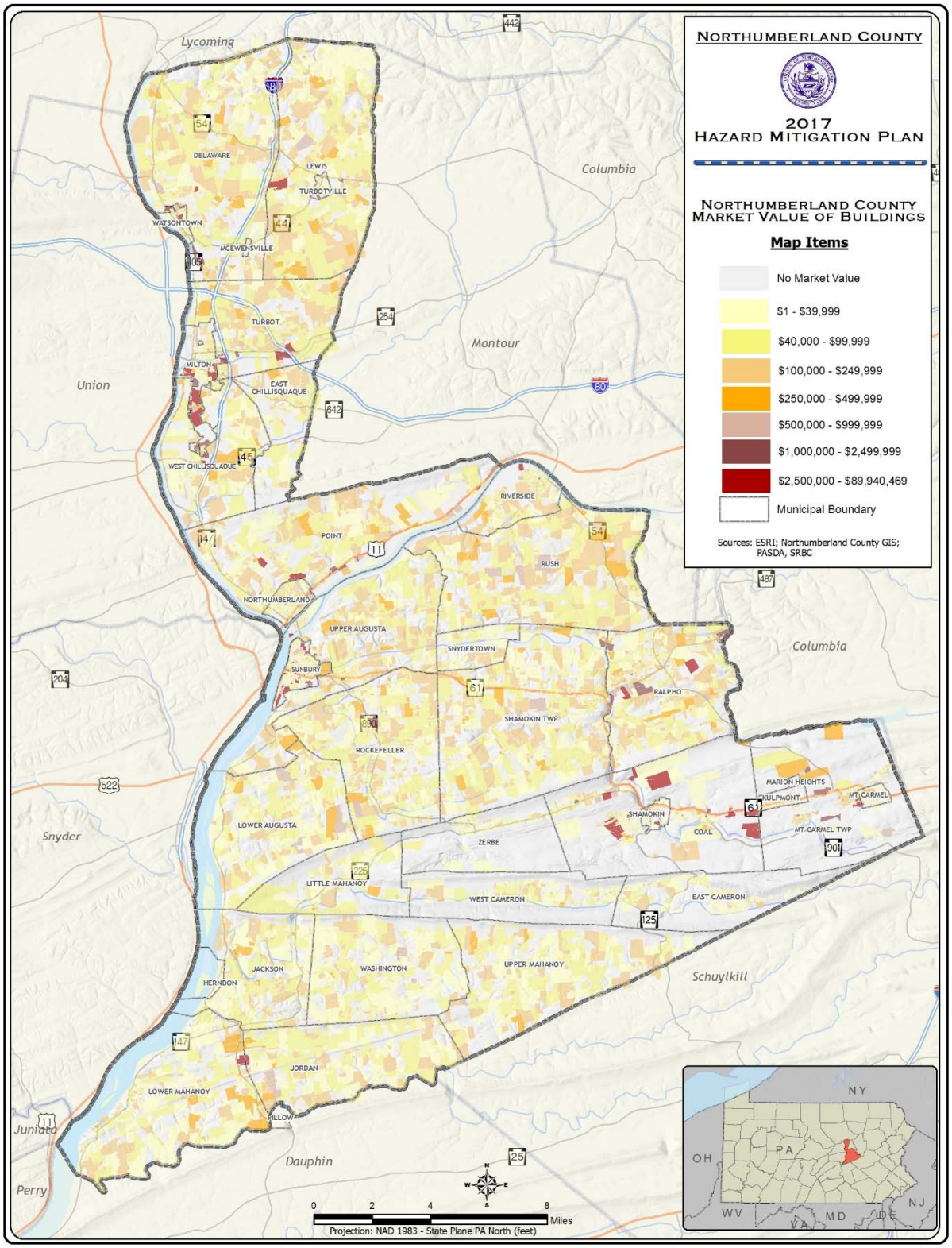
Based on various kinds of available data, potential loss estimates were established for drought, flood, flash flood, ice jam, tornado and windstorms, and winter storms. Estimates provided in this section are based on information provided from the Northumberland County GIS Department, property values from the County real estate assessment database, and previous events. Estimates are measured in potential losses that could occur in a countywide hazard event. In events that are localized, losses may be lower, while regional events could yield higher losses.

Potential loss estimates have four basic components:

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

The structure data used in this plan includes building values provided in the county tax assessment database. These values are representative of replacement value alone; content loss, functional loss, and displacement cost are not included. Map 4.4.3-1 illustrates the range of assessed values in Northumberland County at the parcel level by matching property PIN values to the County's tax assessment database. These values are representative of replacement value alone; content loss, functional loss, and displacement cost are not included. As of April 2017, 49,116 parcels in Northumberland County have a cumulative land implied market value of over $783 million and a building implied market value of over $2.9 billion. Coal Township holds the largest amount of assets in the County, with over $512 million in total market value (land and buildings); as a result, it has the highest potential to experience loss. At the other end of the spectrum, McEwensville Borough has the potential to experience the least amount of loss of all municipalities, with about $7 million in total assessed value.

Map 4.4.3-1


NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
NORTHUMBERLAND COUNTY
MARKET VALUE OF BUILDINGS
Map Items
No Market Value
$1 - $39,999
$40,000 - $99,999
$100,000 - $249,999
$250,000 - $499,999
$500,000 - $999,999
$1,000,000 - $2,499,999
$2,500,000 - $89,940,469
Municipal Boundary
Sources: ESRI; Northumberland County GIS; PASDA, SRBC
Lycoming
Columbia
Montour
Union
Snyder
Juniata
Perry
Dauphin
Schuylkill
DELAWARE
LEWIS
TURBOTVILLE
WATSONTOWN
MCEWENSVILLE
TURBOT
MILTON
EAST CHILLISQUAQUE
WEST CHILLISQUAQUE
RIVERSIDE
POINT
RUSH
NORTHUMBERLAND
UPPER AUGUSTA
SNYDERTOWN
SUNBURY
RALPHO
SHAMOKIN TWP
ROCKEFELLER
LOWER AUGUSTA
ZERBE
MARION HEIGHTS
KULPMONT
MT. CARMEL
SHAMOKIN
COAL
MT. CARMEL TWP
LITTLE MAHANOY
WEST CAMERON
EAST CAMERON
JACKSON
WASHINGTON
UPPER MAHANOY
HERNDON
JORDAN
LOWER MAHANOY
PILLOW
0 2 4 8 Miles
Projection: NAD 1983 - State Plane PA North (feet)
NY
PA
OH
WV
VA
MD
DE
NJ

Identified Hazards and Corresponding County-Wide Risk Factor

Part 1

	Floods, Flash Floods, Ice Jams (N)	Winter Storm (N)	Radon Exposure (N)	Drought (N)	Tornado, Wind Storm (N)	Dam Failure (M)	Levee Failure (M)	Environmental Hazards (M)	Utility Interruptions (M)	Transportation Accidents (M)	Hurricane, Tropical Storm, Nor'easter (N)	Extreme Temperatures (N)	Invasive Species (N)	Earthquake (N)	Wildfire (N)	War and Criminal Activity (M)	Lightning Strike (N)	Building or Structure Collapse (M)	Hailstorm (N)	Subsidence |Sinkholes (M)	Pandemic (N)	Landslide (N)	Civil Disturbance (M)	Drowning (M)	Nuclear Incidents (M)	Terrorism (M)	Urban Fire and Explosion (M)	Opioids (M)
	3.2	2.9	2.7	2.5	2.4	2.4	2.4	2.4	2.4	2.3	2.2	1.7	1.7	1.7	1.7	1.7	1.6	1.6	1.5	1.5	1.4	1.0	1.0	1.0	1.0	1.0	1.0	1.0
COAL Township	=	=	=	=	=	=	=	>	=	=	=	=	=	=	>	=	=	=	=	=	=	=	>	=	=	=	=	>
DELAWARE Township	=	=	=	=	=	=	=	>	=	>	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
EAST CAMERON Township	=	=	=	=	=	=	=	>	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=	=	=	=	=	=
EAST CHILLISQUAQUE Township	=	=	=	>	>	=	=	=	=	=	=	=	=	=	>	=	=	=	=	>	=	<	=	=	=	=	=	=
HERNDON Borough	>	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
JACKSON Township	>	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
JORDAN Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
KULPMONT Borough	=	=	=	=	=	=	=	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=	=	=	=	=	=
LEWIS Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	>	=	<	=	=	=	=	=	=
LITTLE MAHANOY Township	=	=	=	=	=	>	=	>	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
LOWER AUGUSTA Township	>	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=
LOWER MAHANOY Township	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
MARION HEIGHTS Borough	<	=	=	=	=	=	=	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=	=	=	=	=	=
MCEWENSVILLE Borough	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=
MILTON Borough	>	=	=	=	=	=	=	=	=	=	=	=	=	=	<	=	=	=	=	>	=	=	>	=	=	=	=	>
MILTON REGIONAL SEWER AUTHORITY	>	=	=	=	=	=	=	=	=	=	=	=	=	=	<	=	=	=	=	=	=	=	=	=	=	=	=	=
MOUNT CARMEL Borough	=	>	=	=	=	=	=	=	=	=	=	=	=	=	<	=	=	>	=	>	=	=	=	=	=	=	=	>
MOUNT CARMEL Township	=	>	=	=	=	>	=	>	=	=	=	=	=	=	>	=	=	>	=	=	=	=	>	=	=	=	=	=
NORTHUMBERLAND Borough	>	=	=	=	=	>	=	>	=	>	=	=	=	=	<	=	=	=	=	=	=	=	=	>	=	=	=	>
POINT Township	>	=	=	=	=	>	=	>	=	>	=	=	=	=	=	=	=	=	=	=	=	=	=	>	=	=	=	=
RALHO Township	=	>	=	=	=	>	=	>	=	=	=	=	=	=	>	=	=	=	=	>	=	=	=	=	=	=	=	>
RIVERSIDE Borough	=	=	=	=	=	=	=	>	=	=	=	=	=	=	<	=	=	=	=	=	=	=	=	=	=	=	=	=
ROCKEFELLER Township	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
RUSH Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	>	=	=	=	=	>	=	=	=	=	=	=	=	=
SHAMOKIN City	=	=	=	=	=	=	=	>	=	=	=	=	=	=	<	=	=	=	=	=	=	=	>	=	=	=	=	>
SHAMOKIN Township	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
SNYDERTOWN Borough	=	=	=	=	=	=	=	=	=	=	=	=	=	=	<	=	=	=	=	=	=	=	=	=	=	=	=	=
SUNBURY City	>	=	=	=	=	>	>	>	=	>	=	=	=	=	<	=	=	>	=	=	=	=	>	>	=	=	>	>
SUNBURY MUNICIPAL AUTHORITY	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
TURBOT Township	=	=	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=
TURBOTVILLE Borough	<	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=
UPPER AUGUSTA Township	>	=	=	=	=	>	=	>	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
UPPER MAHANOY Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=	=	=	=	=	=
WASHINGTON Township	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
WATSONTOWN Borough	=	=	=	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
WEST CAMERON Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	>	=	=	=	=	>	=	>	=	=	=	=	=	=
WEST CHILLISQUAQUE Township	>	=	=	=	=	=	=	>	=	>	=	=	=	=	=	=	=	=	=	>	=	<	=	=	=	=	=	=
ZERBE Township	=	=	=	=	=	=	=	>	=	=	=	=	=	=	>	=	=	=	=	=	=	=	=	=	=	=	=	=

Table 4.4.2-2: Calculatd Countywide Risk Factor

Future Development and Vulnerability

Risk and vulnerability to natural and human-made hazard events are not static. Risk will increase or decrease as counties and municipalities see changes in land use and development as well as changes in population. Northumberland County is expected to experience a variety of factors that will, in some areas, increase vulnerability to hazards, while in other areas, vulnerability may stay static or even be reduced.

Population change and the age of the housing stock are main indicators of vulnerability change in Northumberland County. As discussed in Section 2.3, the total population of Northumberland County has decreased by less than 1 percent from 2000 to 2010. This overall change reflects areas of growth in 21 municipalities along with loss in population in the remaining 15 (U.S. Census American Community Survey 2015). Of the 21 municipalities that grew in this time, six experienced growth of over 10 percent: Little Mahanoy Township grew by 10.1 percent, Mount Carmel Township grew by 16.2 percent, Ralpho Township grew by 14.8 percent, Shamokin Township grew by 11.5 percent, Upper Mahanoy Township grew by 32.9 percent, and Washington Township grew by 13 percent. This trend of growth is expected to continue in some Northumberland County municipalities at a high rate. Estimates by the U.S. Census Bureau's American Community Survey six municipalities currently project over 20 percent population growth through the year 2040. Shamokin Township tops the list at a projected growth of 42 percent, followed by Upper Mahanoy Township (39.95 percent), Washington Township (26.94 percent), Ralpho Township (26.59 percent), Mount Carmel Township (25.33 percent) and East Cameron Township (21.26 percent).

Most of the municipalities that lost population between 2000 and 2010 did not lose large percentages. Three municipalities lost over 10 percent of their population in this time period and all boroughs: Herndon Borough lost 15.4 percent, Marion Heights Borough lost 16.9 percent, and McEwensville Borough lost 11.1 percent. This looks to be a continuing problem moving forward for these areas, which at one time were densely populated hubs of the county. According to the American Community Survey they foresee residents sprawling away from the cities and borough as fast as jobs and technology allow. 2040 projections show population decrease in six municipalities dropping at over 25 percent (Herndon Borough, Marion Heights Borough, Mount Carmel Borough, City of Shamokin, Sunbury City and West Chillisquaque Township) with a seventh (Snydertown Borough) expected to lose 23.89 percent of its population in this time.

Areas of higher density, in the larger municipalities and growing municipalities, face an increased vulnerability and loss estimates from most hazard events. In addition, municipalities that experienced a large increase in population experience a higher risk to hazards such as drought, wildfire, environmental hazards, utility interruption, and winter storms. The two municipalities with the largest populations and thus higher vulnerability to hazards include Coal Township and Sunbury City.

In addition, remote and sparsely populated municipalities also face higher vulnerability to hazards because they do not have easy access to care facilities or response

personnel. For instance, the sparsely populated municipalities such as West Cameron Township and Little Mahanoy Township face increased vulnerability to winter storms due to isolation, access issues, and longer emergency response times.

The aging housing stock in Northumberland County is another source of current and future vulnerability in many hazard events. As discussed earlier in Section 4, a large percentage of the housing stock, nearly 60 percent, was built before 1960. These municipalities with older building structures may be at risk during flooding and winter storm events if the materials are either not strong enough to withstand the pressure or weight of the precipitation or are liable to leak, causing further risk of destruction to the house. In addition, Northumberland County have the potential to experience wind gusts up to 200 miles per hour during windstorms or tornadoes. The structure of these older houses may be more at risk of destruction under these strong wind conditions. Municipalities most vulnerable to these hazards, due to aging housing stock (Estimates by ACS 2011-2015 show just over 60% percent of occupied structures built before 1960), include Coal Township (77.1 percent), East Cameron Township (50.2 percent), Herndon Borough (95.6 percent), Kulpmont Borough (74.5 percent), McEwensville Borough (70.5 percent), Marion Heights Borough (82.1 percent), Milton Borough (62.7 percent), Mount Carmel Borough (85.3 percent), Northumberland Borough (68.1 percent), Shamokin City (78.2 percent), Sunbury City (74.7 percent), Turbotville Borough (57.7 percent), Upper Mahanoy Township (59.8 percent), and Zerbe Township (79.4 percent).

In 2005, Northumberland County adopted a Comprehensive Plan, which when it is next updated it will reflect the issues and goals being brought forth in this update. A main goal of the Comprehensive Plan is to preserve existing housing stock and development patterns. Several objectives are to maintain development patterns within existing sewer and water services areas and infill vacant land or properties before extending existing sewer and water services. Steering commercial, industrial, and residential growth to areas of existing development and facilities, such as roads, water, and sewer, will result in denser communities while keeping the same amount of open land in Northumberland County. Concentrating growth may help to reduce isolation-based vulnerability of communities with few access routes, no municipal water supply, and low cell phone reception. Higher densities mean that more people are likely to be impacted in a hazard event, should it strike those more populated areas. The municipalities that experience a large increase in population must be informed of their imminently higher risk to hazards such as transportation accidents, environmental hazards, utility interruption, and dam failure without proper planning and maintenance. Dated infrastructure and resulting blight also need to be recognized in communities where zoning and code enforcement are not stringently stressed and where population continues to dwindle.

SECTION 5.
CAPABILITY ASSSESSMENT

5.1 PROCESS SUMMARY

Performing the Capability Assessment is important to formulate a viable mitigation strategy later in the planning process. A Capability Assessment has two components: an inventory of a jurisdiction's existing planning and regulatory tools and an analysis of its capacity to use them effectively. The assessment process helps identify existing gaps, conflicts, and/or weaknesses that may need to be addressed through future mitigation planning goals, objectives, and actions. It also highlights the measures in place or already undertaken that merit continued support and enhancement through future mitigation efforts. The Capability Assessment also helps to ensure that proposed mitigation actions are practical, considering the local ability to implement them.

The Capability Assessment is an evaluation of Northumberland County's governmental structure, political framework, legal jurisdiction, fiscal status, policies and programs, regulations and ordinances, and resource availability. Each category is evaluated for its strengths and weaknesses in responding to, preparing for, and mitigating the effects of the identified hazards. The Capability Assessment has two components: (1) an inventory of the County's and municipalities' missions, programs, and policies and (2) an analysis of their capacity to execute them. A Capability Assessment is an integral part of the hazard mitigation planning process. Here, the County and municipalities identify, review, and analyze what they are currently doing to reduce losses and to identify the framework necessary to implement new mitigation actions. This information will help the County and municipalities evaluate alternative mitigation actions and address shortfalls in the mitigation Plan.

The evaluation of the categories listed above – governmental structure, political framework, legal jurisdiction, fiscal status, policies and programs, and regulations and ordinances – allows the Mitigation Planning Team to determine the viability of certain mitigation actions. The Capability Assessment analyzes what Northumberland County and its municipalities have the capacity to do and provides an understanding of what must be changed to mitigate loss.

Throughout the planning process, the Mitigation Planning Team considered the County's 36 individual municipalities. Pennsylvania municipalities have their own governing bodies, pass and enforce their own ordinances and regulations, purchase equipment, and manage their own resources, including critical infrastructure. Therefore, this Capability Assessment must consider the various characteristics and capabilities of each municipality under study.

Working with County officials, the Planning Team identified available resources, examined municipal capabilities compared to those of the County and identified the following list of capability needs:

- Increase communication and coordination between departments
- Increase public awareness and communication
- Develop a list of contact people for each organization/department
- Education for local municipality-elected officials

- Improved communication systems
- Financial resources education/information

Human Resources

Human resources include local fire, police, ambulance, and emergency management and response personnel. There are a total of 14 law enforcement agencies, 52 fire stations, 9 basic response ambulances, 7 advanced life support units, and 9 quick response squads in Northumberland County. These units are dispatched by the Northumberland County 9-1-1 center headquartered in Sunbury.

Physical Resources

Physical resources include the equipment, vehicles, public lands, facilities, and buildings available to the community. Northumberland County has two hospitals, Geisinger – Shamokin Area Community Hospital located in Shamokin and Sunbury Community Hospital located in Sunbury. In addition, Northumberland County has numerous privately owned extended care facilities throughout the County.

The County also has numerous publicly owned facilities and land that may be available in various times of need:

Senior Centers –

- Elysburg Senior Action Center
- Kulpmont Senior Action Center
- Lower Northumberland County Senior Action Center
- Milton Senior Action Center
- Mount Carmel Senior Action Center
- Northumberland Senior Action Center
- Riverside Senior Action Center
- Shamokin Senior Action Center
- Sunbury Senior Action Center
- Trevorton Senior Action Center
- Upper Northumberland Senior Action Center

County-Owned or Leased Buildings –

- The County Administration Building
- The Courthouse
- The Courthouse Annex
- Several Human Services Buildings
- Prison Complex at Northwestern Site
- Northumberland County Communications Center (Public Safety)

County-Owned Recreational Facilities –

- The Moser Complex
- Several fields in the Ferndale section of Coal Township

County-Owned Coal Land –

- 6,500 acres located in Coal Township, Mount Carmel Township, East Cameron Township, West Cameron Township and Zerbe Township

Technological Resources

Technological resources include early warning systems, stream-level monitoring gauges, computer systems, the Internet, and 9-1-1 communications systems. At the time of the HMP's development, a number of technological resources were available to aid in hazard mitigation:

A 9-1-1 communication system located in Sunbury

- Stream-level monitoring gauges – Sunbury Flood Control
- GIS and other computer systems

Informational Resources

Information resources include websites, brochures, pamphlets, workshops, and public service announcements.

The Department of Public Safety has an informational website located at http://www.publicsafety.norrycopa.net/.

The Northumberland County website is located at http://www.northumberlandco.org.

Information on hazard mitigation and how to protect oneself and one's home from common hazards was referenced at the websites for FEMA (www.fema.gov) and the Pennsylvania Emergency Management Agency (PEMA) (www.pema.state.pa.us).

Financial Resources

Sources of funding were deemed difficult for small rural communities to secure. Known, available federal and state funds include the following:

- **Transportation Improvement Program (TIP):** Provides funding for transportation improvement projects
- **Pennsylvania's Growing Greener:** Provides funding to protect and restore natural resources by cleaning up source pollution
- **South Central Mountain Counter-Terrorism Task Force:** Regional task force formed to integrate federal/state/county response to terrorism, institutionalize mutual aid, establish standing regional response groups, and encourage regional networking and communication. Homeland Security grants can be utilized through this group.
- **Community Development Block Grant (CDBG):** Awards funds to municipalities through the Pennsylvania Department of Community and Economic Development. Provides funding to benefit low- to moderate-income persons for community development purposes.
- **Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA) Program, Pre-Disaster Mitigation (PDM) Program:** Provides hazard mitigation funding to communities. Northumberland County's municipalities will be able to take advantage of these funds at the completion of this Plan.

5.2 CAPABILITY ASSESSMENT FINDINGS

Below are descriptions of the items listed in the Capabilities Assessment Survey. The County's and each municipality's response to the survey can be found in the Tables in Section 5.2.

A. Emergency Management

Emergency management is a comprehensive, integrated program of mitigation, preparedness, response, and recovery for emergencies/disasters of any kind. No public or private entity is immune to disasters, and no single segment of society can meet the complex needs of a major emergency or disaster on its own. Responses to this section of the survey can be found in Table 5.2.2.1-2.

Emergency Operations Plan

The Pennsylvania Emergency Management Services Code, Title 35, requires all political jurisdictions in the Commonwealth to have an Emergency Operations Plan (EOP), an Emergency Management Coordinator (EMC), and an Emergency Operations Center (EOC).

Northumberland County's EOP is updated every two years and complies with NIMS and is the basis for a coordinated and effective response to any disaster that may affect lives and property in Northumberland County. The EOP, or portions thereof, would be implemented when emergency circumstances warrant it. According to the Northumberland County Emergency Management Agency (EMA), all 36 municipalities within Northumberland County have updated local EOPs.

Continuity of Operations Plan

Continuity of Operations (COOP) is a critically important planning principle for emergency managers as well as for municipal officials. National Fire Protection Association (NFPA) 1600 provides those with the responsibility for disaster and emergency management and COOP planning programs with the criteria to assess current programs or to develop, implement, and maintain a program to mitigate, prepare for, respond to, and recover from disasters and emergencies.

Evacuation Plan

Evacuation is one of the most widely used methods of protecting the public from hazard impacts. The easiest way to minimize death and injury due to a hazard event is to remove as many people as possible from its path. Evacuation plans include descriptions of the area(s) being evacuated, the demographics and characteristics of people within those area(s), transportation routes to safe areas, and how the community will support those individuals who do not have access to their own transportation.

Disaster Recovery Plan

A Disaster Recovery Plan (DRP) is a comprehensive set of measures and procedures that ensure essential, mission-critical resources and infrastructure are maintained or backed up by alternatives during various stages of a disaster. The DRP is another step to ensure the preparedness and ability to respond quickly and effectively to restore the community's essential services. The DRP addresses the public sector's responsibilities, including temporary shelter, refuse disposal, overall damage assessment, restoration of utility services, reconstruction priorities, financial assistance, and dealing with demands.

StormReady

StormReady is a program administered by the NWS. To be certified as StormReady, a community must establish links to the NWS's warning systems and relationships with NWS staff, establish a 24-hour warning point, ensure sufficient capability to respond to severe weather events, and provide public outreach and education.

B. Participation in the National Flood Insurance Program

National Flood Insurance Program (NFIP)

The Pennsylvania Flood Plain Management Act (Act 166 of 1978) requires every municipality identified by the Federal Emergency Management Agency (FEMA) to participate in the NFIP and permits all municipalities to adopt floodplain management regulations. It is in the interest of all property owners in the floodplain to keep development and land usage within the scope of the floodplain regulations for their community. This helps keep insurance rates low and makes sure that the risk of flood damage is not increased by property development.

Of the County's 36 municipalities, 33 participate in the NFIP. Northumberland County's municipalities currently have a FIRM effective date of 2008. This information is reflected in Table 5.2.2.1-1.

FEMA Region III makes available to communities an ordinance review checklist that 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 Pennsylvania Department of Community and Economic Development (DCED) provides communities, based on their CFR, Title 44, Section 60.3 level of regulations, with a suggested ordinance document to assist them in meeting the minimum requirements of the NFIP along with the Pennsylvania Flood Plain Management Act (Act 166). These suggested or model ordinances contain provisions that are more restrictive than state and federal requirements. Suggested provisions include but are not limited to the following:

- Prohibiting manufactured homes in the floodway
- Prohibiting manufactured homes within the area measured 50 feet landward from the top of a bank of any watercourse within a special flood hazard area
- Special requirements for recreational vehicles within the flood hazard area

NFIP Participation	ACTIVE POLICIES	FIRM DATE
COAL Township	32	07/16/08
DELAWARE Township	32	07/16/08
EAST CAMERON Township	**0**	07/16/08
EAST CHILLISQUAQUE Township	3	07/16/08
HERNDON Borough	15	07/16/08
JACKSON Township	13	07/16/08
JORDAN Township	4	07/16/08
KULPMONT Borough	1	07/16/08
LEWIS Township	1	07/16/08
LITTLE MAHANOY Township	4	07/16/18
LOWER AUGUSTA Township	8	09/16/16
LOWER MAHANOY Township	9	07/16/08
MARION HEIGHTS Borough	**0**	NP
MCEWENSVILLE Borough	0	07/16/08
MILTON Borough	260	07/16/08
MOUNT CARMEL Borough	40	07/16/08
MOUNT CARMEL Township	1	07/16/08
NORTHUMBERLAND Borough	21	09/16/16
POINT Township	34	09/16/16
RALPHO Township	22	07/16/08
RIVERSIDE Borough	9	07/16/08
ROCKEFELLER Township	6	09/16/16
RUSH Township	9	07/16/08
SHAMOKIN City	33	07/16/08
SHAMOKIN Township	19	07/16/08
SNYDERTOWN Borough	0	07/16/08
SUNBURY City	218	09/16/16
TURBOT Township	15	07/16/08
TURBOTVILLE Borough	**0**	NP
UPPER AUGUSTA Township	55	09/16/16
UPPER MAHANOY Township	1	07/16/08
WASHINGTON Township	6	07/16/08
WATSONTOWN Borough	36	07/16/08
WEST CAMERON Township	**0**	07/16/08
WEST CHILLISQUAQUE Township	90	07/16/08
ZERBE Township	6	07/16/08

Table 5.2.2.1-1: NFIP Participation

Source: FEMA Community Listing for Pennsylvania dated Dec. 31, 2016

Municipal Floodplain Ordinance	18" FREEBOARD REQUIREMENT	BUILDING RESTRICTION (see below)	HAZARDOUS MATERIALS RESTRICTION
COAL Township			
DELAWARE Township	X	H N J	
EAST CAMERON Township			
EAST CHILLISQUAQUE Township	X	H N J	
HERNDON Borough			
JACKSON Township			
JORDAN Township			
KULPMONT Borough			
LEWIS Township			
LITTLE MAHANOY Township			
LOWER AUGUSTA Township			
LOWER MAHANOY Township		H N S J	
MARION HEIGHTS Borough			
MCEWENSVILLE Borough			
MILTON Borough	X	H N J	
MOUNT CARMEL Borough	X	H N J	
MOUNT CARMEL Township			
NORTHUMBERLAND Borough			
POINT Township		H N S	
RALPHO Township	At least 1 foot	H N J	
RIVERSIDE Borough			
ROCKEFELLER Township	At least 1 foot		
RUSH Township			
SHAMOKIN City			
SHAMOKIN Township			
SNYDERTOWN Borough	At least 1 foot		
SUNBURY City			
TURBOT Township			
TURBOTVILLE Borough			
UPPER AUGUSTA Township	X	H N J	
UPPER MAHANOY Township			
WASHINGTON Township			
WATSONTOWN Borough			
WEST CAMERON Township		H N J	
WEST CHILLISQUAQUE Township			
ZERBE Township			

Table 5.2.2.1-2: Municipal Floodplain Ordinance Components

H - Hospital | N - Nursing Home | S - Schools | R - Residental | J - Jail

- Special requirements for accessory structures
- Prohibiting new construction and development within the area measured 50 feet landward from the top of a bank of any watercourse within a special flood hazard area
- Providing the County Conservation District an opportunity to review and comment on all applications and plans for any proposed construction or development in any identified floodplain area

Table 5.2.2.1-1 shows the number of NFIP policies and the date of the most recent official Flood Insurance Rate Map (FIRM).

There have been no NFIP sanctions against Northumberland County's municipalities.

National Flood Insurance Program – CRS

The NFIP's Community Rating System (CRS) provides discounts on flood insurance premiums in those communities that establish floodplain management programs that go beyond NFIP minimum requirements. Under the CRS, communities receive credit for more restrictive regulations, acquisition, relocation, or flood-proofing of flood-prone buildings, preservation of open space, and other measures that reduce flood damage or protect the natural resources and functions of floodplains.

The CRS was implemented in 1990 to recognize and encourage community floodplain management activities that exceed the minimum NFIP standards. Section 541 of the 1994 Act amends Section 1315 of the 1968 Act to codify the CRS in the NFIP, and expands the CRS goals to specifically include incentives to reduce the risk of flood-related erosion and to encourage measures that protect natural and beneficial floodplain functions. These goals have been incorporated into the CRS, and communities now receive credit toward premium reductions for activities that contribute to them.

Under the CRS, flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet a minimum of three of the following CRS goals:

- Reduce flood losses
- Reduce damage to property Protect public health and safety
- Prevent increases in flood damage from new construction
- Reduce the risk of erosion damage
- Protect natural and beneficial floodplain functions
- Facilitate accurate insurance rating
- Promote the awareness of flood insurance

There are 10 CRS classes that provide varied reduction in insurance premiums. Class 1 requires the most credit points and gives the largest premium reduction; Class 10 receives no premium reduction. CRS premium discounts on flood insurance range from 45 percent for Class 9 communities up to 45 percent for Class 1 communities. The CRS recognizes 18

creditable activities that are organized under four categories: Public Information, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness.[2]

The six Northumberland County jurisdictions that are participating in the CRS are depicted in Table 5.2.2.2-1.

COMMUNITY NUMBER	COMMUNITY NAME	CRS ENTRY DATE	CURRENT EFFECTIVE DATE	CRS CLASS	% DISCOUNT FOR SFHA	% DISCOUNT FOR NON-SFHA	STATUS
420735	Herndon Borough	10/1/2007	10/1/2007	8	10%	5%	C
425384	Milton Borough	10/1/1992	5/1/2013	7	15%	5%	C
420739	Northumberland Borough	10/1/2007	10/1/2007	8	10%	5%	C
421026	Point Township	10/1/2007	10/1/2010	10	0%	0%	R
420743	Sunbury City	10/1/2007	10/1/2007	8	10%	5%	C
420745	Upper Augusta Township	10/1/2007	10/1/2007	8	10%	5%	C

Table 5.2.2.2-1: Northumberland County CRS Jurisdictions

Planning and Regulatory Capability

Pennsylvania municipalities have the authority to govern more restrictively than the state and county minimum requirements, assuming they are in compliance with all criteria established in the Pennsylvania Municipalities Planning Code (MPC) and their respective municipal codes.

Municipalities can develop their own policies and programs and implement their own rules and regulations to protect and serve their local residents. Local policies and programs are typically identified in a comprehensive plan, implemented via a local ordinance, and enforced through the governmental body or its appointee.

Municipalities regulate land use via the adoption and enforcement of zoning, subdivision and land development ordinances, building codes, building permit ordinances, floodplain, and/or storm water management ordinances. When effectively prepared and administered, these regulations can lead to hazard mitigation. For example, the adoption of the NFIP and the Pennsylvania Flood Plain Management Act (Act 166 of 1978) established minimum floodplain management criteria. A municipality must adopt and enforce these minimum criteria to be eligible for participation in the NFIP. Municipalities have the option of adopting a single-purpose ordinance or incorporating these provisions into their zoning and/or subdivision and land development ordinances, or building codes, thereby mitigating the potential impacts of local flooding.

Hazard Mitigation Plan

HMPs describe in detail the hazards that may affect the community, the community's vulnerability to those hazards, and an action plan for how the community plans to

minimize or eliminate that vulnerability. HMPs are governed by the DMA 2000, and having a FEMA-approved HMP makes the jurisdiction eligible for federal mitigation funding.

Comprehensive Land Use Plan

A Comprehensive Plan is a policy document that states objectives and guides the future growth and physical development of a municipality. The Comprehensive Plan is a blueprint for housing, transportation, community facilities, utilities, and land use. It examines how the past led to the present and charts the community's future path. The MPC Act 247 of 1968, as reauthorized and amended, requires counties to prepare and maintain a county Comprehensive Plan. In addition, the MPC requires counties to update the Comprehensive Plan every 10 years.

With regard to hazard mitigation planning, Section 301a.(2) of the MPC requires Comprehensive Plans to include a plan for land use, which, among other provisions, suggests that the plan should give consideration to floodplains and other areas of special hazards and other similar uses. The MPC also requires Comprehensive Plans to include a plan for community facilities and services, and recommends giving consideration to storm drainage and floodplain management.

Floodplain Management Plan

Floodplain Management Plans describe how the community will reduce the impact of flood events through preventive and corrective actions. These actions may include mandated open space and prohibition of development in floodplains, property buyout, and other measures.

Open Space Management Plan

Open Space Management Plans are designed to protect the natural environment of the community. They describe how the community will manage woodlands, grasslands, and trails without sacrificing the economic goals of the community. These areas are most widely used for recreational purposes, but also serve as the primary habitat for a number of species of plants and animals.

Stormwater Management Plan/Ordinance

The proper management of stormwater runoff can improve conditions and decrease the chance of flooding. These ordinances are developed in conjunction with the guidelines established in the Pennsylvania Stormwater Management Act (Act 167 of 1978).

The Pennsylvania Department of Environmental Protection's Stormwater Management Program provides grant money to counties to develop stormwater management plans for designated watersheds. This planning effort, as required by the Stormwater Management Act (Act 167 of 1978), results in sound engineering standards and criteria being incorporated into local codes and ordinances in order to manage stormwater runoff from new development in a coordinated, watershed-wide approach. Without such planning, stormwater is either not controlled by municipal ordinances, or is addressed on a site-to-site or municipal boundary basis. Municipalities within the same

watershed may require different levels of control of stormwater. The result is often the total disregard of downstream impacts or the compounding of existing flooding problems.

Municipalities have an obligation to implement the criteria and standards developed in each watershed stormwater management plan by amending or adopting laws and regulations for land use and development. The implementation of stormwater management criteria and standards at the local level is necessary, since municipalities are responsible for local land use decisions and planning. The degree of detail in the ordinances depends on the extent of existing and projected development. Municipalities within rapidly developing watersheds will benefit from the Watershed Stormwater Management Plan and will use the information for sound land use considerations. The Watershed Stormwater Management Plan is designed to aid the municipality in setting standards for the land uses it has proposed. The Watershed Plan and the attendant municipal regulations are intended to prevent future drainage problems and avoid the aggravation of existing problems. There are three watersheds in Northumberland County:

- Upper Susquehanna-Lackawanna
- Lower West Branch Susquehanna
- Lower Susquehanna-Pennsylvania

Natural Resource Protection Plan

Natural Resource Protection Plans are designed to protect woodlands, steep slopes, waterways, floodplains, wetlands, and coastal buffers through prohibiting or severely limiting development in these areas. Emergency managers and community planners have been made more and more aware of the benefits of protecting these areas as mitigation measures over the last few decades.

Flood Response Plan

These plans describe how a community will respond to flood events. They include warning the public, evacuation and sheltering, emergency response, recovery, and mitigation of future events. Most communities in Pennsylvania have moved away from planning for individual hazards and now include flood response as part of their all-hazard EOPs.

Capital Improvements Plan

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

Economic Development Plan

An Economic Development Plan serves as a road map for economic development decision making, based on the collection of statistical data, historical perspective, and human potential, and it does the following:

- Clearly defines realistic goals and objectives
- Establishes a defined time frame to implement goals and objectives
- Communicates those goals and objectives to the organization's constituents
- Ensures effective use of the organization's resources
- Provides a baseline from which progress can be measured
- Builds consensus around future goals and objectives

Historic Preservation Plan

These plans describe how the community will preserve the historic structures and areas within it. Since these structures pre-date building codes and modern community planning requirements, many of them are especially vulnerable to a variety of hazards. The Historic Preservation Plan may include measures to retrofit or relocate historic treasures out of hazard impact areas.

Floodplain Regulations

Through administration of the floodplain ordinances, the municipalities can ensure that all new construction or substantial improvements to existing structures that are located in the 1 percent chance floodplain are built with first-floor elevations above the Base Flood Elevation (BFE).

Zoning Regulations

Article VI of the MPC authorizes municipalities to prepare, enact, and enforce zoning to regulate land use. Its regulations can apply to the following:

- Permitted use of land
- Height and bulk of structures
- Percentage of a lot that maybe occupied by buildings and other impervious surfaces
- Yard setbacks
- Density of development
- Height and size of signs

Zoning ordinances contain both a map that delineates zoning districts and text documenting the regulations that apply in each zoning district.

Subdivision Regulations

Article V of the MPC authorizes municipalities to prepare, enact, and enforce a subdivision and land development ordinance, including regulations to control the layout

of streets, minimum lot sizes, and the provision of utilities. The objectives of a subdivision and land development ordinance are to do the following:

- Coordinate street patterns
- Ensure that adequate utilities and other improvements are provided in a manner that will not pollute streams, wells, and/or soils
- Reduce traffic congestion
- Provide sound design standards as a guide to developers, elected officials, planning commissions and other municipal officials

The Northumberland County Planning Commission has the authority to approve, approve with conditions, or disapprove all subdivisions and land developments that occur in municipalities that do not have an ordinance.

In cases where municipalities have their own Subdivision and Land Development Ordinance, plans must be submitted to the County Planning Commission for review, and the Planning Commission provides comments to the municipality within 30 days.

Unified Development Ordinance

Unified Development Ordinances combine all other development ordinances (e.g., subdivision management, zoning) into a single document reflecting the community's vision for its development. Combining these documents helps to "de-conflict" any discrepancies among them, which may be due to the individual documents being required by separate legislation.

Post-disaster Redevelopment/Reconstruction Ordinance

These ordinances are passed by proactive communities that recognize the complexities of post- disaster recovery. They describe the organization of the redevelopment oversight body, damage assessment, and recovery policies related to making the community more sustainable and safer following a disaster.

Building Code

Building codes are important in mitigation, because codes are developed for regions of the country in consideration of the hazards present within that region. Consequently, structures that are built to applicable codes are inherently resistant to many hazards like strong winds, floods, and earthquakes, and can help mitigate regional hazards like wildfires. In 2003 the Commonwealth of Pennsylvania implemented the Uniform Construction Code (Act 45 of 1999), a comprehensive building code that establishes minimum regulations for most new construction, including additions and renovations to existing structures.

The code applies to almost all buildings, excluding manufactured and industrialized housing (which are covered by other laws), agricultural buildings, and certain utility and miscellaneous buildings. The Uniform Construction Code (UCC) has many advantages in requiring builders to use materials and methods that have been professionally

evaluated for quality and safety, as well as requiring inspections of completed work to ensure compliance.

If a municipality has "opted in," all UCC enforcement is local, except where municipal (or third-party) code officials lack the certification necessary to approve plans and inspect commercial construction for compliance with UCC accessibility requirements.[3] If a municipality has "opted out," the Department of Labor and Industry is responsible for all commercial code enforcement in that municipality. The Department of Labor and Industry also has sole jurisdiction for all state-owned buildings no matter where they are located.

Most municipalities have adopted the UCC building codes. Furthermore, municipalities with their own Code Enforcer/Zoning Officer include the following:

- Coal Township
- Delaware Township
- East Chillisquaque Township
- Kulpmont Borough
- Lewis Township
- Lower Augusta Township
- McEwensville Borough
- Milton Borough
- Mount Carmel Borough
- Mount Carmel Township
- Northumberland Borough
- Ralpho Township
- Riverside Borough
- Rockefeller Township
- Rush Township
- Shamokin City
- Snydertown Borough
- Sunbury City
- Turbotville Borough
- Upper Augusta Township
- Washington Township
- Watsontown Borough
- West Chillisquaque Township

Fire Code

Fire codes relate to both the construction and use of structures in terms of preventing fires from starting and minimizing their spread, and minimizing the injuries and deaths caused by a fire within a building. They govern such things as the following:

- Building materials that may be used
- The presence and number/type of fire extinguishers
- Means of egress
- Hazardous materials storage and use

Firewise

Firewise is a national program that brings together the response community, community planners, and homeowners to minimize the risk of wildfires. The program focuses on development that is compatible with the natural environment. Participation in the program is begun and maintained by groups of homeowners.

Farmland Preservation

Farmland preservation measures are important to hazard mitigation. Preserved farms protect soil from erosion and prevent the contamination of local surface water. In addition, farms and forest land are important for recharging the community's aquifer, and provide habitat for local wildlife.

C. Administrative and Technical Capability

Responses to this section of the survey can be found in table 5.2.8-2.

Planners – Land Development/Management Practices

County Planning Commission

In Pennsylvania, planning responsibilities traditionally have been delegated to each county and local municipality through the MPC.

A planning agency acts as an advisor to the governing body on matters of community growth and development. A governing body may appoint individuals to serve as legal and engineering advisors to the planning agency. In addition to the duties and responsibilities authorized by Article II of the MPC, a governing body may, by ordinance, delegate approval authority to a planning agency for subdivision and land development applications. A governing body has considerable flexibility, not only as to which powers and duties are assigned to a planning agency, but also as to what form an agency will possess. A governing body can create a planning commission, a planning department, or both.

The purpose of the Northumberland County Planning Commission is to receive and make recommendations on public and private proposals for development, and to prepare and administer planning regulations. Subdivision and land development plans are also reviewed and approved by the Northumberland County Planning Commission, which works in conjunction with the municipal planning commissions, where applicable.

Municipal Planning Commission

The MCP conveys that the planning authority establishes the requirements that a municipality must follow.

Engineers – Construction Practices

A municipal engineer performs duties as directed in the areas of construction, reconstruction, maintenance and repair of streets, roads, pavements, sanitary sewers,

bridges, culverts, and other engineering work. The municipal engineer reviews and/or prepares plans, specifications, and estimates of the work undertaken within the municipality.

Planners/Engineers – Understanding of Natural and/or Human-caused hazards

When staff who are responsible for community planning or engineering the structures on which people rely are familiar with the hazards that can impact the community, there is a great potential for synergy. These staff members will design the communities and structures with hazard impacts in mind, resulting in more sustainable communities and stronger structures.

Emergency Manager

A municipal EMC is responsible for emergency management – preparedness, response, recovery, and mitigation within his/her respective Authority Having Jurisdiction (AHJ). The responsibilities of the EMC are outlined in PA Title 35 §7503:

- Prepare and maintain a current disaster emergency management plan
- Establish, equip and staff an EOC
- Provide individual and organizational training programs
- Organize and coordinate all locally available manpower, materials, supplies, equipment, and services necessary for disaster emergency readiness, response, and recovery
- Adopt and implement precautionary measures to mitigate the anticipated effects of a disaster
- Cooperate and coordinate with any public and private agency or entity
- Provide prompt information regarding local disaster emergencies to appropriate Commonwealth and local officials or agencies and the general public
- Participate in all tests, drills, and exercises, including remedial drills and exercises, scheduled by the agency or by the federal government

Floodplain Manager

Floodplain managers are experts in the rules and regulations of development in a floodplain, and can provide vast amounts of information on the risks and impacts of building within those hazard areas. They are an integral part of the mitigation planning team, and can make recommendations based on the needs and conditions of the community.

Land Surveyors

Land surveyors determine, among other things, the elevation of a given point (e.g., a structure). This is especially useful in determining what development lies in the floodplain, but can also be useful in examining vulnerability to other hazards as well.

Scientists – Knowledge of Hazards

Natural and human-made hazards' characteristics and impacts can be highly technical. Meteorology, aerodynamics, fluid dynamics, physics and health physics, chemistry, and several other scientific fields are involved in determining the impacts of a hazard event.

Having access to a scientist who can describe the technical aspects of hazards in lay terms is important to having a sound mitigation strategy.

Trained Staff – Assessing Community's Vulnerability to Hazards

The basis of hazard mitigation is hazard identification and vulnerability assessment. Conducting the vulnerability assessment is a complicated process. Planners must know where to find data on the hazards and their impacts, and the characteristics of the community. More importantly, they must be able to combine these two sets of knowledge to make the analysis useful.

Trained Staff – GIS and/or HAZUS

Spatial and tabular data are linked in a computerized, visual format through the use of sophisticated GIS technology. Through GIS projects, it is possible to accomplish environmental restoration, economic development, "smart growth" land use planning, infrastructure development, and training to use GIS for decision support. Northumberland County has GIS capabilities that can assist the municipalities.

Resource Development/Grant Manager

Few communities have the financial resources that are required to implement all of its potential programs (e.g., mitigation measures). Therefore, they must rely on grants and other fundraising opportunities to obtain the money necessary to perform mitigation projects. Many grants are competitive, and individuals can provide donations to a vast array of causes, so the community must demonstrate that it can use those funds better than other applicants. This may be difficult, but having a specialist on staff will likely increase the community's chances of receiving funding.

Fiscal Staff

Many of the funding streams that can be used for hazard mitigation have substantial management and reporting requirements. Employing or having access to staff specializing in grants management will help the community ensure that it does not lose a grant opportunity because it did not meet the administrative requirements of that grant.

D. Fiscal Capability

Fiscal capability is important to the implementation of hazard mitigation activities. Every jurisdiction must operate within the constraints of limited financial resources. During the 1960s and 1970s, state and federal grants-in-aid were available to finance a large number of programs, including streets, water and sewer facilities, airports, and parks and playgrounds. During the early 1980s, there was a significant change in federal policy, based on rising deficits and a political philosophy that encouraged states and local governments to raise their own revenues for capital programs. The result has been a growing interest in "creative financing."[6]

The following information pertains to various financial assistance programs pertinent to hazard mitigation. Responses to this section of the survey can be found in Table 5.2.8-3.

Capital Improvement Programming

Most capital improvement projects involve the outlay of substantial funds, and local government can seldom budget for these improvements in the annual operating budget. Therefore, numerous techniques have evolved to enable local governments to finance for capital improvements over a time period exceeding one year. Public finance literature and state laws governing local government finance classify techniques that are allowed to finance capital improvements. These techniques include revenue bonds; lease-purchase, authorities and special districts; current revenue (pay-as-you- go); reserve funds; and tax increment financing.

Some projects may be financed with general obligation bonds. With this method, the jurisdiction's taxing power is pledged to pay interest and principal to retire debt. General obligation bonds can be sold to finance permanent types of improvements, such as schools, municipal buildings, parks, and recreation facilities. Voter approval may be required.

Municipal authorities are most often used when major capital investments are required. In addition to sewage treatment, municipal authorities have been formed for water supply, airports, bus transit systems, swimming pools, and other purposes. Municipal authorities have powers to receive grants, borrow money, and operate revenue-generating programs and are authorized to sell bonds, acquire property, sign contracts, and take similar actions. Authorities are governed by authority board members who are appointed by the elected officials of the member municipalities.

Community Development Block Grant

These grants are designed to assist the vulnerable populations within the community by ensuring affordable housing, creating jobs, and providing direct services. The amount of each grant is determined by a formula that accounts for the community's need, poverty, population, housing, and comparison to other areas. The annual appropriation is divided among the states and local jurisdictions (referred to as "non-entitlement communities" and "entitlement communities"). The following are entitlement communities:

- Central cities of Metropolitan Statistical Areas (MSAs)
- Cities with at least 50,000 people
- Some urban counties with at least 200,000 people

States provide CDBG funds to non-entitlement jurisdictions.

The majority of CDBG funds are required to be spent to benefit low- and moderate-income people. Also, there is a set of national objectives for the program, including addressing existing conditions that pose a threat to the health and welfare of the community (e.g., low-income housing in a floodplain).

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.

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 Pennsylvania Department of Environmental Protection 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/Intergovernmental Agreements

Intergovernmental cooperation is one manner of accomplishing common goals, solving mutual problems, and reducing expenditures. The 36 municipalities within Northumberland County comprise 2 cities, 11 boroughs, and 23 townships. 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.

The Circuit Rider Program is an example of intergovernmental cooperation. This program offers municipalities the ability to join together to accomplish a common goal. The Circuit Rider is a municipal engineer who serves several small municipalities simultaneously. These are municipalities that may be too small to hire a professional engineer for their own operations, yet need the skills and expertise the engineer can offer. Municipalities can jointly obtain what no single municipality could obtain on its own.

E. Political Capability

Political capability refers to a jurisdiction's incentive or willingness to accomplish hazard mitigation objectives. It is measured by the degree to which local political leadership (including appointed boards) is willing to enact policies and programs that reduce hazard vulnerabilities in the community, even if met with some opposition. Examples may include guiding development away from identified hazard areas, restricting public investments or capital improvements within hazard areas, or enforcing local development standards that go beyond minimum state or federal requirements (e.g., building codes, floodplain management, etc.).

Local decision makers may not rank hazard mitigation as a high-priority task if there are other, more immediate political concerns. Unfortunately, it often takes a disaster to get people thinking about hazard mitigation. Responding to and recovering from a disastrous event can exhaust local resources, thereby elevating hazard mitigation to the forefront.

Cooperation among planning commission officials, emergency management officials, and other officials is essential to achieving hazard mitigation objectives. Maintaining

open lines of communication and sharing up-to-date information is key. Responses to this section of the survey can be found in Table 5.2.8-4.

F. Self-Assessment

The self-assessment provided the County and each municipality with an opportunity to approximate the jurisdiction's capability to implement hazard mitigation strategies. The assessment reflects this capability in each of the major capability areas. Responses to this section of the survey can be found in Table 5.2.8-4.

G. Existing Limitations

Of the nine municipalities that completed the Capability Assessment update as part of this planning process:

- None have a disaster recovery plan in place
- None had flood response plans
- None had a natural resource protection plan in place

With the exception of emergency managers and engineers or professionals trained in construction practices related to buildings and/or infrastructure (including building inspectors, very few of the municipalities had staff or access to personnel with technical expertise.

A majority of respondents indicated that there was limited capability in their respective jurisdiction to effectively implement hazard mitigation strategies.

Self-assessments of the different areas of capability also varied by municipality, but the overall trend showed that the communities have low capability to implement hazard mitigation strategies, especially in terms of fiscal capability.

Tables 5.2.8-1 through 5.2.8-4 show which municipalities completed the Capability Assessment Survey and their responses.

Municipal Capability Assessment Survey

Label Meanings
(X) Yes

	Year of most recent update	Hazard Mitigation Plan Status	Emergency Operation Plan Status	Diaster Recovery Plan Status	Evacuation Plan Status	Continuity of Operations Plan Status	NFIP Status	NFIP-CRS Status	Flood Plain Regulation Status	Flood Plain Management Status	Firewise Status	Comprehensive Land Use Status	Open Space Management Plan Status	Stormwater Management Plan Status	Natural Resource Protection Plan Status	Capital Improvement Plan Status	Economic Development Plan Status	Historic Preservation Plan Status	Farmland Preservation Plan Status	Building Code Status	Fire Code Status	Zoning Regulations	Subdivision Regulations Status	Storm Ready Status	Other Status
COAL Township	2017	X	X	X	X	X				X		X								X	X	X	X		X
DELAWARE Township	2017		X				X	X	X	X		X	X	X					X	X	X	X	X	X	
EAST CAMERON Township																									
EAST CHILLISQUAQUE Township	2017	X	X				X		X	X		X		X						X	X	X	X	X	
HERNDON Borough	2017	X	X	X	X	X	X	X	X			X	X	X	X				X			X	X		
JACKSON Township	2012		X						X	X															
JORDAN Township																									
KULPMONT Borough	2017		X			X	X		X											X					
LEWIS Township	2017						X	X	X	X		X	X	X					X	X	X	X	X	X	
LITTLE MAHANOY Township	2017								X	X		X								X					
LOWER AUGUSTA Township	2017		X				X		X			X										X	X		
LOWER MAHANOY Township																									
MARION HEIGHTS Borough																									
MCEWENSVILLE Borough	2017																			X		X			
MILTON Borough	2017	X	X		X		X	X	X	X		X	X	X				X		X		X	X	X	
MILTON REGIONAL SEWER AUTHORITY	2017																								X
MOUNT CARMEL Borough	2012								X											X			X		
MOUNT CARMEL Township	2017		X						X					X						X	X	X	X		
NORTHUMBERLAND Borough	2017	X	X				X	X	X	X		X	X	X				X		X		X	X		
POINT Township	2017	X	X	X	X	X	X	X	X	X		X	X	X					X	X	X	X	X		
RALPHO Township																									
RIVERSIDE Borough	2017		X		X									X						X		X	X		
ROCKEFELLER Township	2012									X				X						X		X	X		
RUSH Township	2017								X	X		X							X	X		X	X		
SHAMOKIN City	2012																								
SHAMOKIN Township	2017						X		X	X					X				X	X	X				X
SNYDERTOWN Borough																									
SUNBURY City	2017	X	X		X	X	X	X	X	X				X				X		X		X			
SUNBURY MUNICIPAL AUTHORITY	2017		X	X		X																			
TURBOT Township	2012		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X	X	
TURBOTVILLE Borough	2017		X																			X	X		
UPPER AUGUSTA Township	2017	X	X		X	X	X	X	X	X		X	X	X		X	X	X	X	X		X	X	X	
UPPER MAHANOY Township																									
WASHINGTON Township	2017								X	X										X					
WATSONTOWN Borough	2017		X						X	X				X								X	X		
WEST CAMERON Township																									
WEST CHILLISQUAQUE Township	2017					X	X		X	X		X		X					X	X		X	X		
ZERBE Township																									

Table 5.2.8-1: PLAN AND REGULATION STATUS

Municipal Capability Assessment Survey

Label Meanings
(X) Yes

	Year of most recent update	Planners (with land use\development background	Planners or Engineers (with Haards Knowledge)	Engineers or professionals trained in building and/or infastructure construction Practices (includes building inspectors)	Emergency Manager	Floodplain Manager	Land Surveyors	Scientists oe Staff familiar with the hazards of the community	Personnel skilled in Geographic Informations Systems (GIS) and/or FEMA's Hazaus Program	Grant writers or fiscal staff to handle large/complex grants	Other Status
COAL Township	2017	X	X	X	X	X	X	X	X	X	
DELAWARE Township	2017		X	X	X	X					
EAST CAMERON Township											
EAST CHILLISQUAQUE Township	2017	X	X	X	X	X			X	X	
HERNDON Borough	2017				X	X					
JACKSON Township	2012										
JORDAN Township											
KULPMONT Borough	2017				X						
LEWIS Township	2017		X	X	X	X					
LITTLE MAHANOY Township	2017										
LOWER AUGUSTA Township	2017										
LOWER MAHANOY Township											
MARION HEIGHTS Borough											
MCEWENSVILLE Borough	2017										
MILTON Borough	2017			X	X	X			X		
MILTON REGIONAL SEWER AUTHORITY	2017	X	X	X	X	X	X	X	X	X	X
MOUNT CARMEL Borough	2012			X	X			X		X	
MOUNT CARMEL Township	2017	X	X	X	X	X	X	X			
NORTHUMBERLAND Borough	2017				X	X				X	
POINT Township	2017		X	X	X	X	X	X	X		
RALPHO Township											
RIVERSIDE Borough	2017										
ROCKEFELLER Township	2012										X
RUSH Township	2017			X	X						
SHAMOKIN City	2012										
SHAMOKIN Township	2017		X	X		X				X	
SNYDERTOWN Borough											
SUNBURY City	2017				X	X		X		X	
SUNBURY MUNICIPAL AUTHORITY	2017				X					X	
TURBOT Township	2012										
TURBOTVILLE Borough	2017			X	X						
UPPER AUGUSTA Township	2017	X		X	X	X	X		X		
UPPER MAHANOY Township											
WASHINGTON Township	2017										
WATSONTOWN Borough	2017			X	X	X					
WEST CAMERON Township											
WEST CHILLISQUAQUE Township	2017										
ZERBE Township											

Table 5.2.8-2: ADMINISTRATION AND TECHNICAL CAPABILITY

Municipal Capability Assessment Survey

Label Meanings
(X) Yes

	Year of most recent update	Capital Improvement Programming	Community Development Block Grants	Special Purpose Taxes	Gas / Electric Utility Fees	Water / Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation, revenue, and or Special	Partnering or intergovernmental Aggremen	Other Status
COAL Township	2017	X	X	X				X	X	X	
DELAWARE Township	2017	X	X	X							
EAST CAMERON Township											
EAST CHILLISQUAQUE Township	2017		X	X						X	
HERNDON Borough	2017					X					
JACKSON Township	2012										
JORDAN Township											
KULPMONT Borough	2017										
LEWIS Township	2017	X		X		X					
LITTLE MAHANOY Township	2017										
LOWER AUGUSTA Township	2017										
LOWER MAHANOY Township											
MARION HEIGHTS Borough											
MCEWENSVILLE Borough	2017										
MILTON Borough	2017		X								X
MILTON REGIONAL SEWER AUTHORITY	2017	X				X				X	
MOUNT CARMEL Borough	2012		X								
MOUNT CARMEL Township	2017										
NORTHUMBERLAND Borough	2017		X							X	
POINT Township	2017		X						X		
RALPHO Township											
RIVERSIDE Borough	2017										
ROCKEFELLER Township	2012										
RUSH Township	2017		X								
SHAMOKIN City	2012										
SHAMOKIN Township	2017		X								
SNYDERTOWN Borough											
SUNBURY City	2017	X	X	X		X	X		X	X	
SUNBURY MUNICIPAL AUTHORITY	2017					X	X				
TURBOT Township	2012										
TURBOTVILLE Borough	2017	X	X	X	X	X	X	X	X	X	
UPPER AUGUSTA Township	2017	X	X	X		X	X	X	X	X	
UPPER MAHANOY Township											
WASHINGTON Township	2017										
WATSONTOWN Borough	2017		X	X	X				X	X	
WEST CAMERON Township											
WEST CHILLISQUAQUE Township	2017										
ZERBE Township											

Table 5.2.8-3: FISCAL CAPABILITY

Municipal Capability Assessment Survey

Label Meanings
(L) Limited
(M) Moderate
(H) High

	Year of most recent update	Planning and regulatory Capibility	Administrative and Technical Capability	Fiscal Capability	Community Political Capability	Community Resiliency Capability	Community	Political Willingness
COAL Township	2017	M	M	M	M	M	5	
DELAWARE Township	2017	H	H	H	H	M	2	
EAST CAMERON Township								
EAST CHILLISQUAQUE Township	2017	M	M	M	M	L	3	
HERNDON Borough	2017	L	L	L	L	M	3	
JACKSON Township	2012							
JORDAN Township								
KULPMONT Borough	2017							
LEWIS Township	2017	M	H	H	H	M	2	
LITTLE MAHANOY Township	2017							
LOWER AUGUSTA Township	2017	M	H	H	M	M	0	
LOWER MAHANOY Township								
MARION HEIGHTS Borough								
MCEWENSVILLE Borough	2017						0	
MILTON Borough	2017	M	M	M	M	M	5	
MILTON REGIONAL SEWER AUTHORITY	2017	H	H	H	L	M	2	
MOUNT CARMEL Borough	2012	L	M	L	L	L	3	
MOUNT CARMEL Township	2017	L	M	L	M	L	5	
NORTHUMBERLAND Borough	2017	M	L	L	M	M	3	
POINT Township	2017	M	M	M	M	M	5	
RALPHO Township								
RIVERSIDE Borough	2017							
ROCKEFELLER Township	2012	M	M	L	L	L	5	
RUSH Township	2017	M	L	M	L	L		
SHAMOKIN City	2012	M	M	H	M	H		
SHAMOKIN Township	2017	L	L	L			2	
SNYDERTOWN Borough								
SUNBURY City	2017	M	M	H	M	M	4	
SUNBURY MUNICIPAL AUTHORITY	2017	H	H	H	H		5	
TURBOT Township	2012	M	M	M	M	M	3	
TURBOTVILLE Borough	2017	M	M	M	M	M	3	
UPPER AUGUSTA Township	2017	H	M	M	M	M	3	
UPPER MAHANOY Township								
WASHINGTON Township	2017	L	L	L	L	L	3	
WATSONTOWN Borough	2017	L	L	M	M	M	3	
WEST CAMERON Township								
WEST CHILLISQUAQUE Township	2017	H	H	M	M	M	5	
ZERBE Township								

Table 5.2.8-4: SELF ASSESSMENT OF CAPABILITY

Municipal Capability Assessment Survey

Label Meanings
(I) Increase
(D) Decrease
(NC) No Change

	Year of most recent update	Avalanche/Glacier	Costal Erosion	Drought	Dust/Sand Storm	Earthquake	Expansive Soils	Extreme Temperatures	Hailstorm	Hurrican, Tropical Storm, Norteaster	Invasive Species	Landslide	Lighting Strike	Pandemic	Radon Exposure	Tornado, wind Storm	Tsunami	Wildfire	Volcano
COAL Township	2017			NC					NC	NC			NC			NC			
DELAWARE Township	2017	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
EAST CAMERON Township																			
EAST CHILLISQUAQUE Township	2017	NC	NC	I	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
HERNDON Borough	2017									I									
JACKSON Township	2012																		
JORDAN Township																			
KULPMONT Borough	2017			NC	NC			NC	NC	NC			NC	NC		NC		NC	
LEWIS Township	2017	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
LITTLE MAHANOY Township	2017	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
LOWER AUGUSTA Township	2017			NC					NC	NC	NC	NC	NC	NC	NC	NC		NC	
LOWER MAHANOY Township																			
MARION HEIGHTS Borough																			
MCEWENSVILLE Borough	2017																		
MILTON Borough	2017							NC	NC	NC			NC		NC				
MILTON REGIONAL SEWER AUTHORITY	2017	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
MOUNT CARMEL Borough	2012																		
MOUNT CARMEL Township	2017			NC		NC			I	NC	I								
NORTHUMBERLAND Borough	2017																		
POINT Township	2017								NC	NC	I	NC	NC		NC	NC	NC	NC	
RALPHO Township																			
RIVERSIDE Borough	2017			NC		NC		NC	NC	NC		NC	NC	NC	NC	NC		NC	
ROCKEFELLER Township	2012																		
RUSH Township	2017																		
SHAMOKIN City	2012																		
SHAMOKIN Township	2017									NC						NC			
SNYDERTOWN Borough																			
SUNBURY City	2017			NC				NC	NC	NC			NC	NC		NC			
SUNBURY MUNICIPAL AUTHORITY	2017																		
TURBOT Township	2012																		
TURBOTVILLE Borough	2017																		
UPPER AUGUSTA Township	2017									NC						NC			
UPPER MAHANOY Township																			
WASHINGTON Township	2017																		
WATSONTOWN Borough	2017								NC	NC			NC			NC			
WEST CAMERON Township																			
WEST CHILLISQUAQUE Township	2017	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
ZERBE Township																			

HAZARD AND RISK EVALUATION (NATURAL DISASTERS)

Municipal Capability Assessment Survey

Label Meanings
(I) Increase
(D) Decrease
(NC) No Change

	Year of most recent update	Building or Structure Collapse	Civil Disturbance	Dam Failure	Disorientation	Drowning	Levee Failure	Nuclear Incidents	Terrorism	Urban Fire or Explosion	War and Criminal Activity	Opioids
COAL Township	2017	NC										I
DELAWARE Township	2017	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
EAST CAMERON Township												
EAST CHILLISQUAQUE Township	2017	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
HERNDON Borough	2017											I
JACKSON Township	2012											
JORDAN Township												
KULPMONT Borough	2017	I	NC			NC			NC	NC		I
LEWIS Township	2017	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
LITTLE MAHANOY Township	2017	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
LOWER AUGUSTA Township	2017	NC				NC		NC	NC			NC
LOWER MAHANOY Township												
MARION HEIGHTS Borough												
MCEWENSVILLE Borough	2017											
MILTON Borough	2017	NC			NC							
MILTON REGIONAL SEWER AUTHORITY	2017	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
MOUNT CARMEL Borough	2012											
MOUNT CARMEL Township	2017	NC										I
NORTHUMBERLAND Borough	2017											
POINT Township	2017					NC			I			I
RALPHO Township												
RIVERSIDE Borough	2017	NC	NC			NC		NC	NC	NC	NC	NC
ROCKEFELLER Township	2012											
RUSH Township	2017											
SHAMOKIN City	2012											
SHAMOKIN Township	2017											I
SNYDERTOWN Borough												
SUNBURY City	2017						NC	NC	NC		NC	NC
SUNBURY MUNICIPAL AUTHORITY	2017						NC					
TURBOT Township	2012											
TURBOTVILLE Borough	2017											
UPPER AUGUSTA Township	2017											
UPPER MAHANOY Township												
WASHINGTON Township	2017											
WATSONTOWN Borough	2017	NC	NC			NC			NC		NC	I
WEST CAMERON Township												
WEST CHILLISQUAQUE Township	2017	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
ZERBE Township												

HAZARD AND RISK EVALUATION (HUMAN-MADE DISASTERS)

5.3 EXISTING PLANNING MECHANISMS

The HMP update process also allowed for the review and incorporation, if appropriate, of existing plans, studies, reports and other information that would aid in the mitigation of hazards across the County. The Planning Team will incorporate applicable hazard mitigation actions into existing plans and/or programs for implementation. Based on the capability assessments of the participating municipalities, the County will continue to plan and implement programs to reduce the effects of hazards on people, places and the environment.

There are numerous existing regulatory and planning mechanisms in place at the state, county, and municipal levels of government which support hazard mitigation planning efforts. These tools include the Commonwealth of Pennsylvania Standard All-Hazard Mitigation Plan, local floodplain management ordinances, the Northumberland County Comprehensive Plan, and the Northumberland County Emergency Operations Plan.

The recently updated Northumberland County Hazard Vulnerability Analysis provided information on past occurrences, vulnerability, and risks in the last five years. The Pennsylvania State Hazard Mitigation Plan was used as well as other County Plans throughout the update process to ensure uniformity.

In addition, data and technical information from the Northumberland County GIS Department, Public Safety Department, Tax Assessment Department and Information Services Department, was incorporated into the plan. This includes but is not limited to: Communications call reporting, Spatial and geography data, Tax Parcel Information, as well as Information Technology requirements for some action items.

Based on the comprehensive nature of this plan, the Hazard Mitigation Planning Team believes that this document will be highly useful when updating and developing other planning mechanisms in the County. Specific documents that the Planning Team will incorporate information from this Hazard Mitigation Plan into include:

- Northumberland County Comprehensive Plan: The Hazard Mitigation plan will provide information for the development of the next County Comprehensive Plan by making available specific risk and vulnerability information for the entire county but more specifically potential areas of growth.

- Northumberland County Emergency Operations Plan: This plan will also benefit from the information contained in the risk and vulnerability analysis and will be important to consider and incorporate into the next County EOP. Probability and vulnerability can help the Emergency Management Agency in their efforts to be proactive, as well as aid in response.

- Local Emergency Operations Plans: Local plans will have localized, community specific data available to them to aid in giving them the ability to build and update responses more effectively at a local level.

- Municipality Local Land Use Regulations: The Hazard Mitigation Plan provides an opportunity to contribute to local land use regulations to steer development away from hazard-prone areas.

Another area that the Hazard Mitigation Planning Team is strongly encouraged about and looking at focusing on is interoperability for response, collaboration and training. In meeting with some of our neighboring counties, we have realized that there is a real need to have regionalized efforts for collaboration in the event of an emergency as well as mitigating these potentially hazardous situations. One easy way to accomplish this is through a regional training effort.

We feel that being able to pull the resources together in a regionalized training environment will open the path to fluid communication across municipal, and political barriers. This will allow all parties to be on the same level of training and collaboration, and allow for interoperability from one County's Planning Mechanisms to another County's. Another critical benefit that will surface is that all the County and Local Officials will be armed with the knowledge that they can take back to their respective jurisdictions and provide better services to their residents. The Hazard Mitigation Planning Team feels this is one of the most applicable benefits of this plan.

SECTION 6.
MITIGATION STRATEGY

6.1 PROCESS SUMMARY

Mitigation goals are general guidelines that explain what the County wants to achieve. Goals are usually expressed as broad policy statements representing desired long-term results. Mitigation objectives describe strategies or implementation steps to attain the identified goals. Objectives are more specific statements than goals; the described steps are usually measurable and can have a defined completion date.

There were 6 goals and 27 objectives identified in the 2012 HMP. After some discussion, the 2017 HMP plan goals and objectives were determined to be consistent with the existing goals and objectives as expressed by the Municipal representatives via a mailed survey and then later confirmed at the two Capability & Risk Assessment meetings (March 23, 2017 at Milton, PA and March 30, 2017 at Sunbury, PA). There were no changes or revisions made to the goals or objectives from the meetings.

A summary comparison between the 2012 HMP goals & objectives and the 2017 HMP goals & objectives can be viewed in Table 6.1-1 List of 2012 Mitigation Strategy Goals and Objectives Reviewed for the 2017 HMP.

GOAL	OBJECTIVE	REVIEW
GOAL 1	**Increase public education and awareness of existing and potential hazards in Northumberland County.**	Review: This goal will remain as Goal 1 in the 2017 Mitigation Strategy.
Objective 1A	Develop public education and outreach programs on hazards and hazard mitigation.	This objective remains relevant and will be kept as objective 1A in the 2017 HMP.
Objective 1B	Educate property owners in hazard-risk areas regarding their risks and the precautions they can take.	This objective remains relevant and will be kept as objective 1B in the 2017 HMP.
Objective 1C	Provide ongoing training to EM Directors and municipal leaders to stay current on procedures/policies in development.	This objective remains relevant and will be kept as objective 1C in the 2017 HMP.
Objective 1D	Utilize the County website to provide ongoing education to the public about hazard mitigation and related upcoming events.	This objective remains relevant and will be kept as objective 1D in the 2017 HMP.
GOAL 2	**Protect the citizens of Northumberland County as well as public and private property from the impacts of natural and human-caused hazards.**	Review: This goal will remain as Goal 2 in the 2017 Mitigation Strategy.
Objective 2A	Protect existing structures from damage that can be caused by hazards.	This objective remains relevant and will be kept as objective 2A in the 2017 HMP.
Objective 2B	Promote management and regulatory procedures that would reduce the impacts of hazards on public and private property.	This objective remains relevant and will be kept as objective 2B in the 2017 HMP.
Objective 2C	Develop local structural projects to reduce the impacts of natural and human-caused hazards on public and private property.	This objective remains relevant and will be kept as objective 2C in the 2017 HMP.
Objective 2D	Maintain stream and culverts to reduce backup and flooding.	This objective remains relevant and will be kept as objective 2D in the 2017 HMP.
Objective 2E	Protect critical facilities from the impacts of natural and human-caused hazards.	This objective remains relevant and will be kept as objective 2E in the 2017 HMP.
Objective 2F	Maintain annual meetings of County and Municipal Officials to review local problem areas and ensure each organization are clear about their individual and collective responsibilities.	This objective remains relevant and will be kept as objective 2F in the 2017 HMP.
GOAL 3	**Mitigate the potential for injury/death and damage from natural and human-made hazards in Northumberland County.**	Review: This goal will remain as Goal 3 in the 2017 Mitigation Strategy.
Objective 3A	Develop regulations limiting development in hazard-prone areas	This objective remains relevant and will be kept as objective 3A in the 2017 HMP.
Objective 3B	Lessen impacts on natural resources and open space from natural and human-caused hazards.	This objective remains relevant and will be kept as objective 3B in the 2017 HMP.
Objective 3C	Direct new growth away from hazard-prone areas.	This objective remains relevant and will be kept as objective 3C in the 2017 HMP.
Objective 3D	Encourage property owners in the 1 percent annual chance floodplain to purchase flood insuarnce and provide education related to flood insuranceto assist residents in making informed decisions.	This objective remains relevant and will be kept as objective 3D in the 2017 HMP.
Objective 3E	Acquire, demolish, or elevate structures subject to flooding.	This objective remains relevant and will be kept as objective 3E in the 2017 HMP.

* This goal relates to response and recovery in Northumberland County.

Table 6.1-1A: List of 2012 Mitigation strategy Goals and Ojectives reviewed for the 2017 NC HMP

GOAL	OBJECTIVE	REVIEW
GOAL 4	**Encourage proper information management of data related to natural and human-caused hazards in Northumberland County.**	Review: This goal will remain as Goal 4 in the 2017 Mitigation Strategy.
Objective 4A	Develop data management policies to ensure adequate data management.	This objective remains relevant and will be kept as objective 4A in the 2017 HMP.
Objective 4B	Develop and update detailed databases related to hazards and hazard mitigation.	This objective remains relevant and will be kept as objective 4B in the 2017 HMP.
GOAL 5	**Increase local government awareness of hazard mitigation programs.**	Review: This goal will remain as Goal 5 in the 2017 Mitigation Strategy.
Objective 5A	Educate local public officials about hazard mitigation practices and the Hazard Mitigation Plan.	This objective remains relevant and will be kept as objective 5A in the 2017 HMP.
Objective 5B	Provide training and technical assistance to emergency management personnel regarding hazard mitigation.	This objective remains relevant and will be kept as objective 5B in the 2017 HMP.
Objective 5C	Encourage municipalities to develop, implement, regularly review, and update hazard mitigation plans.	This objective remains relevant and will be kept as objective 5C in the 2017 HMP.
Objective 5D	Maximize the use of public funding for hazard mitigation programs and equipment.	This objective remains relevant and will be kept as objective 1B in the 2017 HMP.
Objective 5E	Use public funding for mitigation projects on private property.	This objective remains relevant and will be kept as objective 5D in the 2017 HMP.
GOAL 6	**Improve emergency services and capabilities in Northumberland County to protect citizens from natural and human-caused hazards.***	Review: This goal will remain as Goal 6 in the 2017 Mitigation Strategy.
Objective 6A	Improve coordination and communication between departments.	This objective remains relevant and will be kept as objective 6A in the 2017 HMP.
Objective 6B	Ensure adequtae training and resources for those involved in emergency response, services, relief, or hazard mitigation.	This objective remains relevant and will be kept as objective 6B in the 2017 HMP.
Objective 6C	Ensure adequacy of equipment and technology.	This objective remains relevant and will be kept as objective 6C in the 2017 HMP.
Objective 6D	Ensure that residents receive relief and are evacuated as quickly as possible in the event of a disaster.	This objective remains relevant and will be kept as objective 6D in the 2017 HMP.
Objective 6E	Ensure that all emergency services are aware of funding opportunities that are available to maintain or acquire specialized equipment.	This objective remains relevant and will be kept as objective 6E in the 2017 HMP.

* This goal relates to response and recovery in Northumberland County.

Table 6.1-1B: List of 2012 Mitigation strategy Goals and Ojectives reviewed for the 2017 NC HMP

Actions provide more detailed descriptions of specific work tasks to help the County and its Municipalities achieve prescribed goals and objectives. There were 46 actions identified in the 2012 HMP Mitigation Strategy. These actions were prioritized using the PA-STEEL criteria.

Of the 46 actions listed in the 2012 HMP, 1 was removed, 18 were found relevant and kept the same, 27 were updated, and 34 new actions were added for a total of 79 actions for the 2017 HMP. A list of these actions as well as a review summary of their progress based on comments from the HMT is included in TABLE 6.1-2 List and Review Summary of 2012 Mitigation Actions for the 2017 HMP Mitigation Actions with the intent of carrying over any actions that have had no progress or were incomplete but still viable as well as continuous actions in the next five years.

GOAL	OBJECTIVE	REVIEW
ACTION 1	**ACTION:** Disseminate informational pamphlets or mailings and/or create websites and social media for Northumberland County residents that explain the risks of hazards, outline precautionary measures that can be taken to help reduce the impacts of a disaster to themselves and their property, and emphasize the values of hazard mitigation.	This action was updated to add "or mailings and/or create websites and social media" and is included in the 2017 NC HMP as action # 1.
ACTION 2	**ACTION:** Develop an informational website with information on the hazards that can effect the County, how residents can protect themselves from disaster, and mitigation actions the County and municipalities are taking to help reduce the risks.	This action remains relevant and is included in the 2017 NC HMP as action # 2.
ACTION 3	**ACTION:** Cooperate with local media to produce regular public service announcements or news releases on hazard risk, safety, and the importance of mitigation.	This action remains relevant and is included in the 2017 NC HMP as action # 3.
ACTION 4	**ACTION:** Coordinate with FEMA, PEMA, PA DCED, and any other appropriate agencies on developing and implementing a natural hazard awareness curriculum in local schools.	This action was updated by being rewritten and is included in the 2017 NC HMP as action # 4.
ACTION 5	**ACTION:** Disseminate informational pamphlets or mailings and/or create websites and social media on hazard mitigation for property owners in the 1 percent annual chance floodplain or owners of Repetitive and Severe Repetitive Loss structures.	This action was updated to add "or mailings and/or create websites and social media" and is included in the 2017 NC HMP as action # 5.
ACTION 6	**ACTION:** Develop informational workshops on hazard risks and hazard mitigation for property owners in high-risk areas.	This action remains relevant and is included in the 2017 NC HMP as action # 6.
ACTION 7	**ACTION:** Investigate avenues for real estate disclosure for properties in the 1 percent annual chance floodplain.	This action remains relevant and is included in the 2017 NC HMP as action # 7.
ACTION 8	**ACTION:** Assist municipalities in developing policies and procedures related to hazard mitigation, especially for municipalities that are vulnerable to direct impacts from possible levee failure.	This action remains relevant and is included in the 2017 NC HMP as action # 8.
ACTION 9	**ACTION:** Investigate a County fund to facilitate voluntarily acquiring, elevating, or retrofitting structures in hazard-prone areas.	This action remains relevant and is included in the 2017 NC HMP as action # 9.
ACTION 10	**ACTION:** Enforce forest and vegetation management policies along the West and North Branch of the Susquehanna River floodplain.	This action has been updated to add "along the West and North Branch of the Susquehanna River floodplain" and is included in the 2017 NC HMP as action # 10.
ACTION 11	**ACTION:** Enforce urban forestry and landscape management policies for Drainage & Stormwater Management.	This action has been updated to add "for Drainage & Stormwater Management" and is included in the 2017 NC HMP as action # 11.
ACTION 12	**ACTION:** Develop a plan of hazard mitigation best management practices that can be shared with other Counties.	This action has been updated to remove "Enforce" and add "Develop a plan of hazard mitigation" and "that can be shared with other Counties" and is included in the 2017 NC HMP as action # 12.

Table 6.2-1A: List and Review Summary of 2012 Mitigation Actions for the 2017 NC HMP Mitigation Actions

GOAL	OBJECTIVE	REVIEW
ACTION 13	**ACTION:** Enforce sediment and erosion control regulations for all Land Devlopment Planning, especially for floodplain areas.	This action has been updated to add "for all Land Devlopment Planning, especially for floodplain areas" and is included in the 2017 NC HMP as action # 13.
ACTION 14	**ACTION:** Work with state and federal officials to enforce dumping regulations along the North & West Branch of the Susquehanna River, especially the recreational areas.	This action has been updated to add "along the North & West Branch of the Susquehanna River, especially the recreational areas" and is included in the 2017 NC HMP as action # 14.
ACTION 15	**ACTION:** Work with state and federal officials to enforce wetlands development regulations for all Land Development Planning to protect the Natural Resources.	This action has been updated to add "for all Land Development Planning to protect the Natural Resources" and is included in the 2017 NC HMP as action # 15.
ACTION 16	**ACTION:** Identify potential locations to construct levees or floodwalls to protect communities subject to flooding along the West Branch of the Susquehanna River.	This action has been updated to add "Identify potential locations to" and "along the West Branch of the Susquehanna River" and is included in the 2017 NC HMP as action # 16.
ACTION 17	**ACTION:** Mitigate properties by elevation, acquisition & demolition, relocation or wet/dry floodproofing of properties in the hazard areas, notably the 1 percent annual chance floodplain.	This action was updated to add "Mitigate properties by elevation, acquisition & demolition, relocation or floodproof properties in the" and remove "to convert them to open space" and is included in the 2017 NC HMP as action # 17.
ACTION 18	**ACTION:** Track Opioid use within each municipality, assist and support law enforcement activities to eliminate and prohibit the manufacturing, distribution and use of Opioids in Northumberland Country.	This original action has been removed because it is included in action # 17. The new action is for the County to "track Opioid use within each municipality, assist and support law enforcement activities to eliminate and prohibit the manufacturing, distribution and use of Opioids in Northumberland Country" and is included in the 2017 NC HMP as action # 18.
ACTION 19	**ACTION:** Regularly inspect and maintain bridges, culverts, and levees for the protection from hazards and structural failures.	This action has been updated to add "for the protection from hazards and structural failures" and is included in the 2017 NC HMP as action # 19.
ACTION 20	**ACTION:** Develop a stream corridor restoration plan to protect the Susquehanna River banks, stream and creek banks from washout & erosion.	This action has been updated to add "to protect the Susquehanna River banks, stream and creek banks from washout & erosion" and is included in the 2017 NC HMP as action # 20.
ACTION 21	**ACTION:** Create and maintain a database and map of all critical facilities in the County for Emergency and Hazard Planning.	This action has been updated to add "for Emergency and Hazard Planning" and is included in the 2017 NC HMP as action # 21.
ACTION 22	**ACTION:** Inspect critical facilities regularly to ensure they comply with standard codes and can structurally withstand the impacts of a disaster.	This action was updated by adding "structurally" and is included in the 2017 NC HMP as action # 22.
ACTION 23	**ACTION:** Participate in the hazard mitigation planning process.	This action remains relevant and is included in the 2017 NC HMP as action # 23.

Table 6.2-1B: List and Review Summary of 2012 Mitigation Actions for the 2017 NC HMP Mitigation Actions

GOAL	OBJECTIVE	REVIEW
ACTION 24	**ACTION:** Enforce floodplain development regulations to ensure proper floodproofing and repairs/alterations.	This action has been updated to add "to ensure proper floodproofing and repairs/alterations" and is included in the 2017 NC HMP as action # 24.
ACTION 25	**ACTION:** Offer technical assistance to municipalities to develop, address, or enforce floodplain, zoning, hillside development regulations, subdivision and development regulations, design review standards, and environmental review standards.	This action remains relevant and is included in the 2017 NC HMP as action # 25.
ACTION 26	**ACTION:** Develop stormwater management plans and regulations for those watersheds in the County that do not currently have a plan.	This action remains relevant and is included in the 2017 NC HMP as action # 26.
ACTION 27	**ACTION:** Purchase of easement/development rights in hazard-prone areas, specifically the 1 percent annual chance floodplain to limit floodplain development.	This action was updated to add "Purchase of easement/development rights" in place of "Acquire easements" and add "to limit floodplain development" is included in the 2017 NC HMP as action # 17.
ACTION 28	**ACTION:** Promote open space preservation for flood water storage without causing damages.	This action has been updated to add "for flood water storage without causing damages" and is included in the 2017 NC HMP as action # 28.
ACTION 29	**ACTION:** Require special use permits for hazard-prone areas according to the Floodplain Ordinances.	This action has been updated to add "according to the Floodplain Ordinances" and is included in the 2017 NC HMP as action # 29.
ACTION 30	**ACTION:** Promote natural resource planning especially for public awareness and recreational uses.	This action has been updated to add "especially for public awareness and recreational uses" and is included in the 2017 NC HMP as action # 30.
ACTION 31	**ACTION:** Review, evaluate, and discuss designated growth areas in existing County and Local plans to ensure development will occur out of hazard-prone areas.	This action remains relevant and is included in the 2017 NC HMP as action # 31.
ACTION 32	**ACTION:** Review planned infrastructure to ensure that it will be developed outside of hazard-prone areas.	This action remains relevant and is included in the 2017 NC HMP as action # 32.
ACTION 33	**ACTION:** Recommend, encourage, and assist communities to participate in the National Flood Insurance Program (NFIP) Community Rating System (CRS).	This action remains relevant and is included in the 2017 NC HMP as action # 33.
ACTION 34	**ACTION:** Encourage regional development of plans and procedures with other Counties and Municipalities.	This action has been updated to add "with other Counties and Municipalities" and is included in the 2017 NC HMP as action # 34.
ACTION 35	**ACTION:** Encourage departments responsible for creating and storing data related to parcels, centerlines, buildings, addresses, hydrology, and hazards to develop and enforce data maintenance policies.	This action remains relevant and is included in the 2017 NC HMP as action # 35.

Table 6.2-1C: List and Review Summary of 2012 Mitigation Actions for the 2017 NC HMP Mitigation Actions

GOAL	OBJECTIVE	REVIEW
ACTION 36	**ACTION:** Encourage the development of data-sharing policies and agreements between departments and organizations responsible for data creation, management, and use.	This action remains relevant and is included in the 2017 NC HMP as action # 36.
ACTION 37	**ACTION:** Develop and maintain hazard occurrence databases to record information on hazards such as date and time of occurrence, duration of disaster, amount of damage, numbers of injuries, etc., for repetitive hazard profiling and for prediction & early warning planning & notifications.	This action has been updated to add "for repetitive hazard profiling and for prediction & early warning planning & notifications" and is included in the 2017 NC HMP as action # 37.
ACTION 38	**ACTION:** Develop detailed databases on parcels and buildings in and out of the 1 percent annual chance floodplain. The data could include first-floor elevations, number of stories, basements, value of the structure, acreage of parcel in the floodplain, etc.	This action remains relevant and is included in the 2017 NC HMP as action # 38.
ACTION 39	**ACTION:** Work with the Federal Emergency Management Agency (FEMA) to update current NFIP floodplain maps and determine base flood elevations for the county.	This action remains relevant and is included in the 2017 NC HMP as action # 39.
ACTION 40	**ACTION:** Ensure that all critical facilities, including local dams and levees, have updated Emergency Response Plans.	This action remains relevant and is included in the 2017 NC HMP as action # 40.
ACTION 41	**ACTION:** Develop and distribute a list of contact persons for each organization that may play a part in emergency response, services, relief, or hazard mitigation actions and planning.	This action has been updated to add "actions and planning" and is included in the 2017 NC HMP as action # 41.
ACTION 42	**ACTION:** Encourage the heads of each department or organization involved in emergency response, services, relief, or hazard mitigation to meet several times a year to discuss hazard mitigation planning and training.	This action has been updated to add "planning and training" and is included in the 2017 NC HMP as action # 42.
ACTION 43	**ACTION:** Disseminate informational brochures or mailings and/or create websites and social media for organizations involved in emergency response, services, relief, or hazard mitigation.	This action was updated to add "or mailings and/or create websites and social media" and is included in the 2017 NC HMP as action # 43.
ACTION 44	**ACTION:** Inventory all available equipment and technology used for emergency response, for hazard planning, and EOP resource listing .	This action has been updated to add "for hazard planning, and EOP resource listing " and is included in the 2017 NC HMP as action # 44.
ACTION 45	**ACTION:** Develop evacuation routes and an evacuation plan to be used in the event of a disaster.	This action remains relevant and is included in the 2017 NC HMP as action # 45.
ACTION 46	**ACTION:** Encourage homeowners to install appropriate venting devices to alleviate radon concentrations from within homes.	This action has been updated to add "from" and is included in the 2017 NC HMP as action # 46.
ACTION 47	**ACTION:** Require all municipalities in Northumberland County to create and adopt an Emergency Operations Plan and provide a copy to the County Dept. of Public Safety.	This is a new action and was included in the 2017 NC HMP as action # 47.

Table 6.2-1D: List and Review Summary of 2012 Mitigation Actions for the 2017 NC HMP Mitigation Actions

GOAL	OBJECTIVE	REVIEW
ACTION 48	**ACTION:** Develop a Mitigation Plan for Repetitive and Severe Repetitive Loss properties.	This is a new action and was included in the 2017 NC HMP as action # 48.
ACTION 49	**ACTION:** Recommend, encourage, and assist communities in the adoption of the 2017 NC HMP.	This is a new action and was included in the 2017 NC HMP as action # 49.
ACTION 50	**ACTION:** Municipalities shall require Building Permits for any work done to any structures located in the 1 percent annual chance floodplain.	This is a new action and was included in the 2017 NC HMP as action # 50.
ACTION 51	**ACTION:** Recommend and encourage municipalities to amend their floodplain ordinance to prohibit Manufactured Homes in the 1 percent annual chance floodplain.	This is a new action and was included in the 2017 NC HMP as action # 51.
ACTION 52	**ACTION:** Assist municipalities in developing policies and procedures related to hazard mitigation, especially for municipalities that are vulnerable to direct impacts from possible dam failure.	This is a new action and was included in the 2017 NC HMP as action # 52.
ACTION 53	**ACTION:** Develop a Northumberland County Post Disaster Recovery & Reconstruction Ordinance using the model ordinance included in the APA/FEMA PAS Report # 483/484.	This is a new action and was included in the 2017 NC HMP as action # 53.
ACTION 54	**ACTION:** Recommend, encourage and assist municipalities in enforcing their floodplain ordinances.	This is a new action and was included in the 2017 NC HMP as action # 54.
ACTION 55	**ACTION:** Assist municipalities in obtaining computer equipment, training, usage, and creating databases on local hazards for local Municipalities without equipment, etc..	This is a new action and was included in the 2017 NC HMP as action # 55.
ACTION 56	**ACTION:** Northumberland County to provide annual review/maintenance/update meetings for local municipalities, stakeholders, etc. over the next 5 years.	This is a new action and was included in the 2017 NC HMP as action # 56.
ACTION 57	**ACTION:** Conduct annual hazard emergency management training exercises/drills with County and local municipalities.	This is a new action and was included in the 2017 NC HMP as action # 57.
ACTION 58	**ACTION:** Disseminate informational pamphlets or mailings and/or create websites and social media for to residents of mobile home/trailer (Manufactured Home) parks on how and why to anchor mobile homes/trailers to protect against severe windstorms and flood events.	This is a new action and was included in the 2017 NC HMP as action # 58.
ACTION 59	**ACTION:** Conduct routine inspections, regular maintenance, and annual tests on all emergency communications equipment, public address systems, and alert sirens to ensure unhindered operation during an emergency event.	This is a new action and was included in the 2017 NC HMP as action # 59.
ACTION 60	**ACTION:** Maintain response actions to hazards that are consistent with County-level EOP.	This is a new action and was included in the 2017 NC HMP as action # 60.

Table 6.2-1E: List and Review Summary of 2012 Mitigation Actions for the 2017 NC HMP Mitigation Actions

GOAL	OBJECTIVE	REVIEW
ACTION 61	**ACTION:** Ensure that a planned, coordinated, technologically advanced, and effective public warning dissemination program exists at the local level.	This is a new action and was included in the 2017 NC HMP as action # 61.
ACTION 62	**ACTION:** Develop a technical proficiency at the municipal level for conducting post-disaster damage assessments and regulating reconstruction activities to ensure compliance with NFIP substantial damage/substantial improvement requirements and the PA UCC.	This is a new action and was included in the 2017 NC HMP as action # 62.
ACTION 63	**ACTION:** Develop a technical proficiency at the municipal level for assisting local residents and business owners in hazard mitigation measures that are to be incorporated in reconstruction activities.	This is a new action and was included in the 2017 NC HMP as action # 63.
ACTION 64	**ACTION:** Improve communications between the public and emergency management services through online information.	This is a new action and was included in the 2017 NC HMP as action # 64.
ACTION 65	**ACTION:** Develop and implement a post-disaster recovery and mitigation training program for local officials.	This is a new action and was included in the 2017 NC HMP as action # 65.
ACTION 66	**ACTION:** Maintain a partnering relationship with the NWS Mid-Atlantic River Forecast Center to enhance the existing Susquehanna River Basin Flood Forecast and Warning System via the Advanced Hydrologic Prediction Services Program.	This is a new action and was included in the 2017 NC HMP as action # 66.
ACTION 67	**ACTION:** Develop new or revise existing County and local municipal Subdivision and Land Development Ordinances, Comprehensive Plans, Erosion and Soil Ordinances, and Stormwater Ordinances to regulate the location and construction of buildings and other infrastructure in the known hazard areas.	This is a new action and was included in the 2017 NC HMP as action # 67.
ACTION 68	**ACTION:** Encourage municipal compliance with NFIP and PA Act 166 floodplain development regulations and/or encourage more restrictive requirements, as appropriate by conducting training and inspection workshops.	This is a new action and was included in the 2017 NC HMP as action # 68.
ACTION 69	**ACTION:** Maintain a flood damage reduction/prevention public education program utilizing the NC DPS website and social media including but not limited to the development of informative training for local officials on NWS "Storm Ready", FEMA, PEMS, and NFIP Programs.	This is a new action and was included in the 2017 NC HMP as action # 69.
ACTION 70	**ACTION:** Continue participation in the National Weather Service "Storm Ready" Program.	This is a new action and was included in the 2017 NC HMP as action # 70.
ACTION 71	**ACTION:** Coordinate with FEMA, PEMA, and PA DCED to ensure that affected County/municipal residents are aware of the Biggert-Waters legislation, the FEMA sponsored updated flood mapping for the Susquehanna River Basin, the availability and benefits of obtaining federally backed flood insurance. Encourage uninsured affected County/municipal residents to purchase flood insurance, and to inform residents outside of the SFHA that they are also eligible to purchase flood insurance through the NFIP.	This is a new action and was included in the 2017 NC HMP as action # 71.

Table 6.2-1F: List and Review Summary of 2012 Mitigation Actions for the 2017 NC HMP Mitigation Actions

GOAL	OBJECTIVE	REVIEW
ACTION 72	**ACTION:** When funding becomes available, preform acquisitions, foundation stabilizations, demolitions, elevations, remodeling, retrofitting, relocations, dry	This is a new action and was included in the 2017 NC HMP as action # 72.
ACTION 73	**ACTION:** Coordinate with local municipality and or PennDOT on the potential feasibility of replacing, removing or enlarging those roads, bridges and culvert stream crossings that are identified as being unable to pass the 10 year frequency flood flow.	This is a new action and was included in the 2017 NC HMP as action # 73.
ACTION 74	**ACTION:** Conduct drainage system and ditch maintenance & upgrades throughout the municipalities to prevent roadway flooding. Ensure existing drainage systems are adequate and functioning properly in order to reduce impacts related to flash flooding and storm water/runoff.	This is a new action and was included in the 2017 NC HMP as action # 74.
ACTION 75	**ACTION:** Conduct routine stream and river bank maintenance to keep them free of obstructions to flow and to prevent flooding problems.	This is a new action and was included in the 2017 NC HMP as action # 75.
ACTION 76	**ACTION:** Maintain and improve the Sunbury Levee System, and any other levees, in order to provide more effective flood protection from the potential impacts from upstream community floodwalls and levees.	This is a new action and was included in the 2017 NC HMP as action # 76.
ACTION 77	**ACTION:** Review and monitor Emergency Operations Plans for gas line installations. & structures.	This is a new action and was included in the 2017 NC HMP as action # 77.
ACTION 78	**ACTION:** Review and monitor stormwater runoff from gas line installations.	This is a new action and was included in the 2017 NC HMP as action # 78.
ACTION 79	**ACTION:** To provide the Executive Summary in the spanish language.	This is a new action and was included in the 2017 NC HMP as action # 79.

Table 6.2-1G: List and Review Summary of 2012 Mitigation Actions for the 2017 NC HMP Mitigation Actions

6.2 MITIGATION GOALS AND OBJECTIVES

Based on the results of the goals and objectives evaluation exercise and input from the HMT, a list of 6 goals and 27 objectives was developed for the 2017 HMP and is shown in TABLE 6.2-1 List of Mitigation Strategy Goals and Objectives for the 2017 HMP. These goals and objectives are the same as the 2012 HMP.

GOAL	OBJECTIVE
GOAL 1	**Increase public education and awareness of existing and potential hazards in Northumberland County.**
Objective 1A	Develop public education and outreach programs on hazards and hazard mitigation.
Objective 1B	Educate property owners in hazard-risk areas regarding their risks and the precautions they can take.
Objective 1C	Provide ongoing training to EM Directors and municipal leaders to stay current on procedures/policies in development.
Objective 1D	Utilize the County website to provide ongoing education to the public about hazard mitigation and related upcoming events.
GOAL 2	**Protect the citizens of Northumberland County as well as public and private property from the impacts of natural and human-caused hazards.**
Objective 2A	Protect existing structures from damage that can be caused by hazards.
Objective 2B	Promote management and regulatory procedures that would reduce the impacts of hazards on public and private property.
Objective 2C	Develop local structural projects to reduce the impacts of natural and human-caused hazards on public and private property.
Objective 2D	Maintain stream and culverts to reduce backup and flooding.
Objective 2E	Protect critical facilities from the impacts of natural and human-caused hazards.
Objective 2F	Maintain annual meetings of County and Municipal Officials to review local problem areas and ensure each organization are clear about their individual and collective responsibilities.
GOAL 3	**Mitigate the potential for injury/death and damage from natural and human-made hazards in Northumberland County.**
Objective 3A	Develop regulations limiting development in hazard-prone areas
Objective 3B	Lessen impacts on natural resources and open space from natural and human-caused hazards.
Objective 3C	Direct new growth away from hazard-prone areas.
Objective 3D	Encourage property owners in the 1 percent annual chance floodplain to purchase flood insuarnce and provide education related to flood insuranceto assist residents in making informed decisions.
GOAL 4	**Encourage proper information management of data related to natural and human-caused hazards in Northumberland County.**
Objective 4A	Develop data management policies to ensure adequate data management.
Objective 4B	Develop and update detailed databases related to hazards and hazard mitigation.
GOAL 5	**Increase local government awareness of hazard mitigation programs.**
Objective 5A	Educate local public officials about hazard mitigation practices and the Hazard Mitigation Plan.
Objective 5B	Provide training and technical assistance to emergency management personnel regarding hazard mitigation.
Objective 5C	Encourage municipalities to develop, implement, regularly review, and update hazard mitigation plans.
Objective 5D	Maximize the use of public funding for hazard mitigation programs and equipment.
Objective 5E	Use public funding for mitigation projects on private property.
GOAL 6	**Improve emergency services and capabilities in Northumberland County to protect citizens from natural and human-caused hazards. ***
Objective 6A	Improve coordination and communication between departments.
Objective 6B	Ensure adequtae training and resources for those involved in emergency response, services, relief, or hazard mitigation.
Objective 6C	Ensure adequacy of equipment and technology.
Objective 6D	Ensure that residents receive relief and are evacuated as quickly as possible in the event of a disaster.
Objective 6E	Ensure that all emergency services are aware of funding opportunities that are available to maintain or acquire specialized equipment.
Objective 3E	Acquire, demolish, or elevate structures subject to flooding.

* This goal relates to response and recovery in Northumberland County.

Table 6.2-1: List of Mitigation Strategy Goals and Objectives for the 2017 NC HMP

6.3 IDENTIFICATION AND ANALYSIS OF MITIGATION TECHNIQUES

Appendix 7 of the SOG developed by PEMA provides a comprehensive list of hazard mitigation ideas. Northumberland County used this guide to identify mitigation techniques and develop mitigation actions. There are six categories of mitigation actions which Northumberland County considered in developing its Mitigation Action Plan. Those categories include:

- **Prevention:** Government administration or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning, zoning, building codes, subdivision regulations, hazard specific regulations (such as floodplain regulations), capital improvement programs, and open-space preservation and stormwater regulations.
- **Property Protection:** Actions that involve modifying or removing existing buildings or infrastructure to protect them from a hazard. Examples include the acquisition, elevation and relocation of structures, structural retrofits, flood-proofing, storm shutters, and shatter-resistant glass. Most of these property protection techniques are considered to involve “sticks and bricks”; however, this category also includes insurance.
- **Emergency Services:** Actions that typically are not considered mitigation techniques but reduce the impacts of a hazard event on people and property. These actions are often taken prior to, during, or in response to an emergency or disaster, Examples include warning systems, evacuation planning and management, emergency response training and exercises, and emergency flood protection procedures.
- **Natural Resource Protection:** Actions that, in addition to minimizing hazard losses also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, forest and vegetation management, wetlands restoration or preservation, slope stabilization, and historic property and archeological site preservation.
- **Public Education and Awareness:** Actions to inform and educate citizens, elected officials, and property owners about potential risks from hazards and potential ways to mitigate them. Such actions include hazard mapping, outreach projects, library materials dissemination, real estate disclosures, the creation of hazard information centers, and school age / adult education programs.
- **Structural Project Implementation:** Mitigation projects intended to lessen the impact of a hazard by using structures to modify the environment. Structures include stormwater controls (culverts), dams, dikes, levees, and saferooms.

Table 6.3-1 provides a strategy matrix identifying the mitigation techniques used for the moderate and high-risk hazards in the County. The specific actions associated with these techniques are in Appendix G.

HAZARD RISK	HAZARD NATURAL (N) HUMAN-MADE (M)	MITIGATION STRATEGY TECHNIQUE CATEGORY					
		PREVENTION	PROPERTY PROTECTION	EMERGENCY SERVICES	NATURAL RESOURCE PROTECTION	PUBLIC EDUCATION AND AWARENESS	STRUCTURAL PROJECT IMPLEMENTATION
HIGH	Floods, Flash Floods, Ice Jams (N)	X	X	X	X	X	X
	Winter Storm (N)		X	X		X	X
	Radon Exposure (N)	X		X		X	X
	Drought (N)	X		X	X	X	
MODERATE	Tornado, Wind Storm (N)	X	X	X		X	X
	Dam Failure (M)	X	X	X		X	X
	Levee Failure (M)	X	X	X		X	X
	Environmental Hazards (M)	X		X	X	X	
	Utility Interruptions (M)	X	X	X		X	X
	Transportation Accidents (M)	X		X		X	
	Hurricane, Tropical Storm, Nor'easter (N)	X	X	X		X	X

Table 6.3-1: MITIGATION STRATEGY TECHNIQUE MATRIX

6.4 MITIGATION ACTION PLAN

The following Risk Assessment stage of the 2017 HMP development process, Risk Assessment Meetings were held on March 23 & 30, 2017 to develop a Mitigation Action Plan (see the meeting minutes in Appendix A). Following the goals and objectives review and evaluation during the meeting, the HMT went over Mitigation Techniques using PEMA's Mitigation Strategy Ideas section of the SOG. Municipalities were given Hazard Mitigation Action forms and asked to fill out the form for any action they completed, or any new action that was needed, or for any new hazard not addressed.

The Mitigation Action Form was not the only avenue available to the Local Municipalities to identify mitigation priorities. In total, all municipalities were able to select actions by using one of the following methods: submission of a Mitigation Action Form; comment provided on other worksheets to be completed throughout the process (i.e., the Hazard Mitigation Plan Update Questionnaire, the Hazard and Repetitive Loss Evaluation, Risk Assessment Form, Comment sheets for any of the meetings); or actions located in the 2012 Mitigation Action Plan that the HMT evaluated and determined to be in progress or incomplete but still viable.

Unfortunately, only one Municipality chose to attend one of the two meetings and none of the municipalities filled out a Hazard Mitigation Action form, so going forward the HMT formulated the Mitigation Actions and assigned Municipal responsibility.

The final list of the 78 Mitigation Actions is made up of actions developed by the HMT from the 2012 Mitigation Action Plan, actions from the 2012 HMP goals and objectives, and new actions developed by the HMT.

Appendix G lists all the mitigation actions for the 2017 HMP. At least one mitigation action was established for each moderate and high-risk hazard in Northumberland County, but more than one action is identified for several hazards. Each Municipality is assigned at least one action. Each mitigation action is intended to address one or more of the goals and objectives in Section 6.2. Actions 5, 33, 39, 62, 68, 68, 71 and 72 contribute to continued compliance with and participation in the NFIP. Additionally, Actions 24, 25, 32, 50, 54, and 67 will reduce the effects of hazards on new buildings and infrastructure while Actions 5, 6, 9, 17, 25, 48, 50, 54, and 72 will reduce the effects of hazards on existing buildings and infrastructure.

Each of the actions in Appendix G list the Municipality or Municipalities participating in the action, the action number and description, mitigation technique(s), hazard(s) addressed, the potential funding sources, the lead agency or department, and implementation schedule.

6.5 MITIGATION ACTION ASSESSMENT

Economic considerations are particularly important in weighing the costs versus benefits of implementing one action prior to another. Following PEMA's SOG, and FEMA's Local Mitigation Planning Handbook, mitigation requirements indicate that any prioritization system used shall include a special emphasis on the extent to which benefits are maximized according to a cost-benefit review of the proposed projects. To do this, and to be consistent with FEMA's guidance on using cost-benefit review of mitigation planning, the HMT created Table 6.5-1.

Table 6.5-1 lists the 78 mitigation actions and follows the PA STEEL Alternate Actions Assessment Method and includes a higher weighting for the two elements of the economic feasibility factor – Benefits of Actions and Cost of Action. This method incorporates concepts similar to those described in Method C of FEMA 386-5: Using Benefit Cost Review in Mitigation Planning (FEMA 2007). The HMT applied the seven PA STEEL criteria in Table 6.5-1 to evaluate the mitigation actions as either favorable, less favorable, and not applicable factors. Table 6.5-1 summarizes the assessment methodology and provides the factors for the "Benefit of Action" column and the "Cost of Action" column of Table 6.5-2.

TABLE 6.5-1
Alternative Actions Assessment Method

			PA STEEL Criteria Considerations (+ Favorable - Less favorable N Not Applicable)																									
			P			A			S		T			E			E							L				
			Political			Administrative			Social		Technical			Economic			Environmental							Legal				
Action No.	Mitigation Action Description	Criteria Topics for Questions	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance / Operations	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	**Benefit of Action**	**Cost of Action**	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endangered Species	Effect on HAZMAT / Waste Site	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenge	Summary (Equal Weighted)	Summary (Benefits and Costs Weighted)
1	ACTION: Disseminate informational pamphlets or mailings and/or create websites and social media for Northumberland County residents that explain the risks of hazards, outline precautionary measures that can be taken to help reduce the impacts of a disaster to themselves and their property, and emphasize the values of		+	+	+	-	+	+	+	+	+	+	N	+	+	N	+	N	N	N	N	N	+	+	+	+	16 (+) 6 (N) 1 (-)	20 (+) 6 (N) 1 (-)
2	ACTION: Develop an informational website with information on the hazards that can effect the County, how residents can protect themselves from disaster, and mitigation actions the County and municipalities are taking to help reduce the risks.		+	+	+	-	+	+	+	+	+	+	+	+	+	N	+	N	N	N	N	N	+	N	+	N	15 (+) 7 (N) 1 (-)	19 (+) 7 (N) 1 (-)
3	ACTION: Cooperate with local media to produce regular public service announcements or news releases on hazard risk, safety, and the importance of mitigation.		+	+	+	-	+	+	+	+	+	+	+	+	-	+	+	N	N	N	N	N	+	N	+	+	16 (+) 5 (N) 2 (-)	18 (+) 7 (N) 4 (-)
4	ACTION: Coordinate with FEMA, PEMA, PA DCED, and any other appropriate agencies on developing and implementing a natural hazard awareness curriculum in local schools.		+	+	+	+	+	+	+	+	+	+	+	+	+	N	+	N	N	N	N	N	+	+	+	+	18 (+) 5 (N) 0 (-)	22 (+) 5 (N) 0 (-)
5	ACTION: Disseminate informational pamphlets or mailings and/or create websites and social media on hazard mitigation for property owners in the 1 percent annual chance floodplain or owners of Repetitive and Severe Repetitive Loss structures.		+	+	+	+	+	+	+	+	+	+	N	+	+	N	+	N	N	N	N	N	+	+	+	+	17 (+) 6 (N) 0 (-)	21 (+) 6 (N) 0 (-)
6	ACTION: Develop informational workshops on hazard risks and hazard mitigation for property owners in high-risk areas.		+	+	+	-	+	+	+	+	+	+	N	+	+	N	+	N	N	N	N	N	+	+	+	+	16 (+) 6 (N) 1 (-)	20 (+) 6 (N) 1 (-)
7	ACTION: Investigate avenues for real estate disclosure for properties in the 1 percent annual chance floodplain.		+	+	+	-	+	+	+	+	+	+	N	+	+	+	+	N	N	N	N	N	+	+	+	+	17 (+) 5 (N) 1 (-)	21 (+) 5 (N) 1 (-)
8	ACTION: Assist municipalities in developing policies and procedures related to hazard mitigation, especially for municipalities that are vulnerable to direct impacts from possible levee failure.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)
9	ACTION: Investigate a County fund to facilitate voluntarily acquiring, elevating, or retrofitting structures in hazard-prone areas.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)

TABLE 6.5-1
Alternative Actions Assessment Method *(continued)*

			PA STEEL Criteria Considerations																									
			+ Favorable - Less favorable N Not Applicable																									
			P			***A***			***S***		***T***			***E***			***E***							***L***				
			Political			**Administrative**			**Social**		**Technical**			**Economic**			**Environmental**							**Legal**				
Action No.	**Mitigation Action Description**	**Criteria Topics for Questions**	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance / Operations	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	**Benefit of Action**	**Cost of Action**	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endangered Species	Effect on HAZMAT / Waste Site	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenge	Summary (Equal Weighted)	Summary (Benefits and Costs Weighted)
10	ACTION: Enforce forest and vegetation management policies along the West and North Branch of the Susquehanna River floodplain.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	+	+	+	+	+	22 (+) 1 (N) 0 (-)	26 (+) 1 (N) 0 (-)
11	ACTION: Enforce urban forestry and landscape management policies for Drainage & Stormwater Management.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	+	+	+	+	+	22 (+) 1 (N) 0 (-)	26 (+) 1 (N) 0 (-)
12	ACTION: Develop a plan of hazard mitigation best management practices that can be shared with other Counties.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)
13	ACTION: Enforce sediment and erosion control regulations for all Land Devlopment Planning, especially for floodplain areas.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	+	+	+	+	+	22 (+) 1 (N) 0 (-)	26 (+) 1 (N) 0 (-)
14	ACTION: Work with state and federal officials to enforce dumping regulations along the North & West Branch of the Susquehanna River, especially the recreational areas.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	+	+	+	+	+	22 (+) 1 (N) 0 (-)	26 (+) 1 (N) 0 (-)
15	ACTION: Work with state and federal officials to enforce wetlands development regulations for all Land Development Planning to protect the Natural Resources.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	+	+	+	+	+	22 (+) 1 (N) 0 (-)	26 (+) 1 (N) 0 (-)
16	ACTION: Identify potential locations to construct levees or floodwalls to protect communities subject to flooding along the West Branch of the Susquehanna River.		+	+	+	-	-	-	+	+	+	+	+	+	-	+	-	+	N	+	-	+	+	+	+	16 (+) 1 (N) 6 (-)	18 (+) 1 (N) 6 (-)
17	ACTION: Mitigate properties by elevation, acquisition & demolition, relocation or wet/dry floodproofing of properties in the hazard areas, notably the 1 percent annual chance floodplain.		+	+	+	-	-	+	+	+	+	+	+	+	-	+	-	N	N	N	N	+	+	+	+	15 (+) 4 (N) 4 (-)	17 (+) 4 (N) 6 (-)
18	ACTION: Track Opioid use within each municipality, assist and support law enforcement activities to eliminate and prohibit the manufacturing, distribution and use of Opioids in Northumberland Country.		+	+	+	-	-	+	+	+	+	+	N	+	-	+	-	N	N	N	N	+	+	+	+	14 (+) 5 (N) 4 (-)	16 (+) 4 (N) 6 (-)

TABLE 6.5-1
Alternative Actions Assessment Method *(continued)*

			PA STEEL Criteria Considerations																									
			+ Favorable - Less favorable N Not Applicable																									
			P			A			S		T			E			E							L				
			Political			Administrative			Social		Technical			Economic			Environmental							Legal			Summary (Equal Weighted)	Summary (Benefits and Costs Weighted)
Action No.	Mitigation Action Breif Description	Criteria Topics for Questions	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance / Operations	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	**Benefit of Action**	**Cost of Action**	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endangered Species	Effect on HAZMAT / Waste Site	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenge		
19	ACTION: Regularly inspect and maintain bridges, culverts, and levees for the protection from hazards and structural failures..		+	+	+	+	+	+	+	+	+	+	N	+	+	+	+	N	N	N	N	+	+	+	+	18 (+) 5 (N) 0 (-)	22 (+) 5 (N) 0 (-)
20	ACTION: Develop a stream corridor restoration plan to protect the Susquehanna River banks, stream and creek banks from washout & erosion.		+	+	+	-	-	+	+	+	+	+	+	+	+	N	-	+	+	N	+	+	+	+	+	18 (+) 2 (N) 3 (-)	22 (+) 2 (N) 3 (-)
21	ACTION: Create and maintain a database and map of all critical facilities in the County for Emergency and Hazard Planning.		+	+	+	+	+	+	+	+	+	+	+	+	+	N	-	N	N	N	N	+	+	+	+	17 (+) 5 (N) 1 (-)	21 (+) 5 (N) 1 (-)
22	ACTION: Inspect critical facilities regularly to ensure they comply with standard codes and can structurally withstand the impacts of a disaster.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	19 (+) 4 (N) 0 (-)	23 (+) 4 (N) 0 (-)
23	ACTION: Participate in the hazard mitigation planning process.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)
24	ACTION: Enforce floodplain development regulations to ensure proper floodproofing and repairs/alterations.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)
25	ACTION: Offer technical assistance to municipalities to develop, address, or enforce floodplain, zoning, hillside development regulations, subdivision and development regulations, design review standards, and environmental review standards.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)
26	ACTION: Develop stormwater management plans and regulations for those watersheds in the County that do not currently have a plan.		+	+	+	-	-	+	+	+	+	+	+	-	+	-	+	+	+	N	+	+	+	+	+	18 (+) 1 (N) 4 (-)	20 (+) 1 (N) 6 (-)
27	ACTION: Purchase of easement/development rights in hazard-prone areas, specifically the 1 percent annual chance floodplain to limit floodplain development.		+	+	+	+	-	+	+	+	+	+	+	-	+	+	-	+	+	N	+	+	+	+	+	19 (+) 1 (N) 3 (-)	21(+) 1 (N) 5 (-)

TABLE 6.5-1
Alternative Actions Assessment Method *(continued)*

			PA STEEL Criteria Considerations																												
			+ Favorable - Less favorable N Not Applicable																												
			P			***A***			***S***		***T***			***E***			***E***								***L***						
			Political			**Administrative**			**Social**		**Technical**			**Economic**			**Environmental**								**Legal**						
Action No.	**Mitigation Action Breif Description**	**Criteria Topics for Questions**	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance / Operations	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	**Benefit of Action**	**Cost of Action**	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endangered Species	Effect on HAZMAT / Waste Site	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenge	Summary (Equal Weighted)	Summary (Benefits and Costs Weighted)					
28	ACTION: Promote open space preservation for flood water storage without causing damages.		+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	N	+	+	+	+	+	22 (+) 1 (N) 0 (-)	26 (+) 1 (N) 0 (-)					
29	ACTION: Require special use permits for hazard-prone areas according to the Floodplain Ordinances..		+	+	+	-	-	-	+	+	+	+	+	+	+	+	+	+	N	+	+	+	+	+	+	19 (+) 1 (N) 3 (-)	23 (+) 1 (N) 3 (-)					
30	ACTION: Promote natural resource planning especially for public awareness and recreational uses..		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	+	+	+	+	+	22 (+) 1 (N) 0 (-)	26 (+) 1 (N) 0 (-)					
31	ACTION: Review, evaluate, and discuss designated growth areas in existing County and Local plans to ensure development will occur out of hazard-prone areas.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)					
32	ACTION: Review planned infrastructure to ensure that it will be developed outside of hazard-prone areas.		+	+	+	+	+	+	+	+	+	+	+	+	N	N	+	+	+	+	+	+	+	+	+	21 (+) 2 (N) 0 (-)	25 (+) 2 (N) 0 (-)					
33	ACTION: Recommend, encourage, and assist communities to participate in the National Flood Insurance Program (NFIP) Community Rating System (CRS).		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)					
34	ACTION: Encourage regional development of plans and procedures with other Counties and Municipalities.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)					
35	ACTION: Encourage departments responsible for creating and storing data related to parcels, centerlines, buildings, addresses, hydrology, and hazards to develop and enforce data maintenance policies.		+	+	+	-	+	-	+	+	+	+	+	+	+	+	+	N	N	N	N	+	+	+	+	17 (+) 4 (N) 2 (-)	21 (+) 4 (N) 2 (-)					
36	ACTION: Encourage the development of data-sharing policies and agreements between departments and organizations responsible for data creation, management, and use.		+	+	+	+	+	+	+	+	+	+	+	+	+	N	+	N	N	N	N	+	+	+	+	18 (+) 5 (N) 0 (-)	22 (+) 5 (N) 0 (-)					

TABLE 6.5-1
Alternative Actions Assessment Method *(continued)*

			PA STEEL Criteria Considerations																										
			+ Favorable - Less favorable N Not Applicable																										
			P			***A***			***S***		***T***			***E***				***E***						***L***					
			Political			**Administrative**			**Social**		**Technical**			**Economic**				**Environmental**						**Legal**					
Action No.	**Mitigation Action Breif Description**	**Criteria Topics for Questions**	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance / Operations	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	**Benefit of Action**	**Cost of Action**	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endangered Species	Effect on HAZMAT / Waste Site	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenge	Summary (Equal Weighted)	Summary (Benefits and Costs Weighted)		
37	ACTION: Develop and maintain hazard occurrence databases to record information on hazards such as date and time of occurrence, duration of disaster, amount of damage, numbers of injuries, etc., for repetitive hazard profiling and for prediction &		+	+	+	-	+	-	+	+	+	+	+	+	+	+	+	N	N	N	N	+	+	+	+	17 (+) 4 (N) 2 (-)	21 (+) 4 (N) 2 (-)		
38	ACTION: Develop detailed databases on parcels and buildings in and out of the 1 percent annual chance floodplain. The data could include first-floor elevations, number of stories, basements, value of the structure, acreage of parcel in the		+	+	+	-	-	-	+	+	+	+	+	+	-	+	-	N	N	N	N	+	+	+	+	14 (+) 4 (N) 5 (-)	16 (+) 4 (N) 7 (-)		
39	ACTION: Work with the Federal Emergency Management Agency (FEMA) to update current NFIP floodplain maps and determine base flood elevations for the county.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	N	N	N	+	+	+	+	19 (+) 4 (N) 0 (-)	23 (+) 4 (N) 0 (-)		
40	ACTION: Ensure that all critical facilities, including local dams and levees, have updated Emergency Response Plans.		+	+	+	+	+	+	+	+	+	+	+	+	+	N	+	N	N	N	N	+	+	+	+	15 (+) 5 (N) 0 (-)	19 (+) 5 (N) 3 (-)		
41	ACTION: Develop and distribute a list of contact persons for each organization that may play a part in emergency response, services, relief, or hazard mitigation actions and planning.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	N	N	N	+	+	+	+	18 (+) 4 (N) 1 (-)	22 (+) 4 (N) 1 (-)		
42	ACTION: Encourage the heads of each department or organization involved in emergency response, services, relief, or hazard mitigation to meet several times a year to discuss hazard mitigation planning and training.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	N	N	N	+	+	+	+	18 (+) 4 (N) 1 (-)	22 (+) 4 (N) 1 (-)		
43	ACTION: Disseminate informational brochures or mailings and/or create websites and social media for organizations involved in emergency response, services, relief, or hazard mitigation.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	N	N	N	+	+	+	+	16 (+) 4 (N) 3 (-)	18 (+) 4 (N) 5 (-)		
44	ACTION: Inventory all available equipment and technology used for emergency response, for hazard planning, and EOP resource listing .		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	N	N	N	+	+	+	+	17 (+) 4 (N) 4 (-)	19 (+) 4 (N) 6 (-)		
45	ACTION: Develop evacuation routes and an evacuation plan to be used in the event of a disaster.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	N	N	N	+	+	+	+	19 (+) 4 (N) 0 (-)	23 (+) 4 (N) 0 (-)		

TABLE 6.5-1
Alternative Actions Assessment Method *(continued)*

			PA STEEL Criteria Considerations																										
			+ Favorable - Less favorable N Not Applicable																										
			P			A			S		T			E				E						L				
			Political			Administrative			Social		Technical			Economic				Environmental						Legal				
Action No.	Mitigation Action Breif Description	Criteria Topics for Questions	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance / Operations	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	**Benefit of Action**	**Cost of Action**	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endangered Species	Effect on HAZMAT / Waste Site	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenge	Summary (Equal Weighted)	Summary (Benefits and Costs Weighted)
46	ACTION: Encourage homeowners to install appropriate venting devices to alleviate radon concentrations from within homes.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)
47	ACTION: Require all municipalities in Northumberland County to create and adopt an Emergency Operations Plan and provide a copy to the County Dept. of Public Safety.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	+	+	+	+	+	+	+	22 (+) 1 (N) 0 (-)	26 (+) 1 (N) 0 (-)
48	ACTION: Develop a Mitigation Plan for Repetitive and Severe Repetitive Loss properties.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	+	N	N	N	+	+	+	+	+	19 (+) 4 (N) 0 (-)	23 (+) 4 (N) 0 (-)
49	ACTION: Recommend, encourage, and assist communities in the adoption of the 2017 NC HMP.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)
50	ACTION: Municipalities shall require Building Permits for any work done to any structures located in the 1 percent annual chance floodplain.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	+	N	+	N	+	+	+	+	+	20 (+) 3 (N) 0 (-)	24 (+) 3 (N) 0 (-)
51	ACTION: Recommend and encourage municipalities to amend their floodplain ordinance to prohibit Manufactured (Mobile) Homes in the 1 percent annual chance floodplain.		+	+	N	+	+	+	N	-	+	+	-	+	+	-	N	+	N	N	N	+	+	+	+	+	14 (+) 6 (N) 3 (-)	18 (+) 6 (N) 3 (-)
52	ACTION: Assist municipalities in developing policies and procedures related to hazard mitigation, especially for municipalities that are vulnerable to direct impacts from possible dam failure.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)
53	ACTION: Develop a Northumberland County Post-Disaster Recovery & Reconstruction Ordinance using the model ordinance included in the APA/FEMA PAS Report # 483/484.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	+	+	+	+	+	+	+	22 (+) 1 (N) 0 (-)	26 (+) 1 (N) 0 (-)
54	ACTION: Recommend, encourage and assist municipalities in enforcing their floodplain ordinances.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)

TABLE 6.5-1
Alternative Actions Assessment Method *(continued)*

			PA STEEL Criteria Considerations																										
			+ Favorable - Less favorable N Not Applicable																										
			P			***A***			***S***		***T***			***E***				***E***							***L***				
			Political			**Administrative**			**Social**		**Technical**			**Economic**				**Environmental**							**Legal**				
Action No.	**Mitigation Action Breif Description**	**Criteria Topics for Questions**	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance / Operations	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	**Benefit of Action**	**Cost of Action**	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endangered Species	Effect on HAZMAT / Waste Site	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenge	Summary (Equal Weighted)	Summary (Benefits and Costs Weighted)
55	ACTION: Assist municipalities in obtaining computer equipment, training, usage, and creating databases on local hazards for local Municipalities without equipment, etc..		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)
56	ACTION: Northumberland County to provide annual review/maintenance/update meetings on the 2017 NC HMP for local municipalities, stakeholders, etc. over the next 5 years.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)
57	ACTION: Conduct annual hazard emergency management training exercises/drills with County and local municipalities.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)
58	ACTION: Disseminate informational pamphlets or mailings and/or create websites and social media for to residents of mobile home/trailer (Manufactured Home) parks on how and why to anchor mobile homes/trailers to protect against severe		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	N	+	+	+	+	+	21 (+) 2 (N) 0 (-)	25 (+) 2 (N) 0 (-)
59	ACTION: Conduct routine inspections, regular maintenance, and annual tests on all emergency communications equipment, public address systems, and alert sirens to ensure unhindered operation during an emergency event.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	N	+	+	+	+	+	21 (+) 2 (N) 0 (-)	25 (+) 2 (N) 0 (-)
60	ACTION: Maintain response actions to hazards that are consistent with County-level EOP.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)
61	ACTION: Ensure that a planned, coordinated, technologically advanced, and effective public warning dissemination program exists at the local level.		+	+	+	+	+	+	+	+	+	+	+	+	-	N	-	N	N	N	N	+	+	+	+	16 (+) 5 (N) 2 (-)	18 (+) 5 (N) 4 (-)
62	ACTION: Develop a technical proficiency at the municipal level for conducting post-disaster damage assessments and regulating reconstruction activities to ensure compliance with NFIP substantial damage/substantial improvement requirements		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	N	N	+	+	+	+	20 (+) 3 (N) 0 (-)	24 (+) 3 (N) 0 (-)
63	ACTION: Develop a technical proficiency at the municipal level for assisting local residents and business owners in hazard mitigation measures that are to be incorporated in reconstruction activities.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	N	N	+	+	+	+	20 (+) 3 (N) 0 (-)	24 (+) 3 (N) 0 (-)

TABLE 6.5-1
Alternative Actions Assessment Method *(continued)*

			PA STEEL Criteria Considerations																								
			+ Favorable - Less favorable N Not Applicable																								
			P			***A***			***S***		***T***			***E***				***E***						***L***				
			Political			**Administrative**			**Social**		**Technical**			**Economic**				**Environmental**						**Legal**				
Action No.	**Mitigation Action Breif Description**	**Criteria Topics for Questions**	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance / Operations	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	**Benefit of Action**	**Cost of Action**	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endangered Species	Effect on HAZMAT / Waste Site	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenge	Summary (Equal Weighted)	Summary (Benefits and Costs Weighted)
64	ACTION: Improve communications between the public and emergency management services through online information.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)
65	ACTION: Develop and implement a post-disaster recovery and mitigation training program for local officials.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)
66	ACTION: Maintain a partnering relationship with the NWS Mid-Atlantic River Forecast Center to enhance the existing Susquehanna River Basin Flood Forecast and Warning System via the Advanced Hydrologic Prediction Services Program.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)
67	ACTION: Develop new or revise existing County and local municipal Subdivision and Land Development Ordinances, Comprehensive Plans, Erosion and Soil Ordinances, and Stormwater Ordinances to regulate the location and construction of buildings		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)
68	ACTION: Encourage municipal compliance with NFIP and PA Act 166 floodplain development regulations and/or encourage more restrictive requirements, as appropriate by conducting training and inspection workshops.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**N**	+	+	+	+	+	+	+	22 (+) 1 (N) 0 (-)	26 (+) 1 (N) 0 (-)
69	ACTION: Maintain a flood damage reduction/prevention public education program utilizing the Northumberland County Department of Public Safety website and social media including but not limited to the development of informative training for local officials on NWS "Storm Ready", FEMA, PEMS, and NFIP Programs.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**N**	**N**	**N**	+	+	+	+	+	+	20 (+) 3 (N) 0 (-)	24 (+) 3 (N) 0 (-)
70	ACTION: Continue participation in the National Weather Service "Storm Ready" Program.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**N**	+	+	+	+	+	+	+	22 (+) 1 (N) 0 (-)	26 (+) 1 (N) 0 (-)
71	ACTION: Coordinate with FEMA, PEMA, and PA DCED to ensure that affected County/municipal residents are aware of the Biggert-Waters legislation, the FEMA sponsored updated flood mapping for the Susquehanna River Basin, the availability and benefits of obtaining federally backed flood insurance. Encourage uninsured affected County/municipal residents to purchase flood insurance, and to inform residents outside of the SFHA that they are also eligible to purchase flood insurance		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**N**	**N**	**N**	+	+	+	+	+	+	20 (+) 3 (N) 0 (-)	24 (+) 3 (N) 0 (-)

TABLE 6.5-1
Alternative Actions Assessment Method *(continued)*

			PA STEEL Criteria Considerations																										
			+ Favorable - Less favorable N Not Applicable																										
			P			***A***			***S***		***T***			***E***				***E***							***L***				
			Political			**Administrative**			**Social**		**Technical**			**Economic**				**Environmental**							**Legal**				
Action No.	**Mitigation Action Breif Description**	**Criteria Topics for Questions**	Political Support	Local Champion	Public Support	Staffing	Funding Allocation	Maintenance / Operations	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	**Benefit of Action**	**Cost of Action**	Contributes to Economic Goals	Outside Funding Required	Effect on Land / Water	Effect on Endangered Species	Effect on HAZMAT / Waste Site	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	State Authority	Existing Local Authority	Potential Legal Challenge	Summary (Equal Weighted)	Summary (Benefits and Costs Weighted)
72	ACTION: When funding becomes available, preform acquisitions, foundation stabilizations, demolitions, elevations, remodeling, retrofitting, relocations, dry and wet floodproofing on flood hazard prone homes and commercial structures in accordance with the currently adopted community floodplain ordinances, PA UCC		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	15 (+) 7 (N) 1 (-)	19 (+) 7 (N) 1 (-)
73	ACTION: Coordinate with local municipality and or PennDOT on the potential feasibility of replacing, removing or enlarging those roads, bridges and culvert stream crossings that are identified as being unable to pass the 10 year frequency		+	+	+	-	-	+	+	+	+	+	-	+	-	+	-	+	N	N	N	+	+	+	+	15 (+) 3 (N) 5 (-)	17 (+) 3 (N) 7 (-)
74	ACTION: Conduct drainage system and ditch maintenance & upgrades throughout the municipalities to prevent roadway flooding. Ensure existing drainage systems are adequate and functioning properly in order to reduce impacts related to flash		+	+	+	-	-	+	+	+	+	+	-	+	-	+	-	+	N	N	N	+	+	+	+	15 (+) 3 (N) 5 (-)	17 (+) 3 (N) 7 (-)
75	ACTION: Conduct routine stream and river bank maintenance to keep them free of obstructions to flow and to prevent flooding problems.		+	+	+	+	-	+	+	+	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+	20 (+) 0 (N) 3 (-)	22 (+) 0 (N) 5 (-)
76	ACTION: Maintain and improve the Sunbury Levee System, and any other levees, in order to provide more effective flood protection from the potential impacts from upstream community floodwalls and levees.		+	+	+	-	-	-	+	+	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+	18 (+) 0 (N) 5 (-)	20 (+) 0 (N) 7 (-)
77	ACTION: Review and monitor Emergency Operations Plans for gas line installations and structures.		+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	22 (+) 0 (N) 1 (-)	26 (+) 0 (N) 1 (-)
78	ACTION: Review and monitor stormwater runoff from gas line installations and structures.		+	+	+	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	21 (+) 0 (N) 2 (-)	25 (+) 0 (N) 2 (-)
79	ACTION: To provide the Executive Summary in the spanish language.		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	23 (+) 0 (N) 0 (-)	27 (+) 0 (N) 0 (-)

Table 6.5-2 also lists the 78 mitigation actions, many of which will require substantial time commitments from County and Local Municipal staff. The HMT developed and believes these mitigation actions are attainable and can be effectively implemented over the next five-year cycle. While all of the activities will be pursued over the next five years, the reality of limited time and resources requires the identification of high-priority mitigation actions. Prioritization allows the individuals and organizations involved to focus their energies and ensure progress on mitigation activities. The mitigation actions were evaluated using the ten criteria suggested in Appendix 12 of PEMA's SOG, and in the FEMA Local Mitigation Planning Handbook. The criteria include the following:

- **Life Safety:** How effective will the action be at protecting lives and preventing injuries?
- **Property Protection:** How significant will the action be at eliminating or reducing damage to structures and infrastructures.
- **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.
- **Political:** Is there overall public support for the mitigation action? Is there the political will to support it?
- **Legal:** Does the community have the authority to implement the action?
- **Environmental:** What are the potential environmental impacts of the action? Will it comply with environmental regulations?
- **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?
- **Administrative:** Does the community have the personnel and administrative capabilities to implement the action and maintain it or will outside help be necessary?
- **Local Champion:** Is there a strong advocate for the action or project among local departments and agencies that will support the action's implementation?
- **Other Community Objectives:** Does the action advance other community objectives, such as capital improvements, economic development, environmental quality, or open space preservation? Does it support the policies of the comprehensive plan?

This method uses life safety, property protection, technical, political, legal, environmental, social, administrative, local champion, and other community objectives, to evaluate which of the identified actions should be considered most critical. Economic considerations are particularly important in weighing the costs versus benefits of implementing one action prior to another. Table 6.5-2 includes a summary of the feasibility factors from the "Benefit of Action" column and the "Cost of Action" column of Table 6.5-1, and places equal weight (+3) on those factors. The sum of the row is provided in the Feasibility Score Non-Weighted column, and in the Feasibility Score Non-Weighted column. This provides higher Economic factoring to the prioritization chart.

TABLE 6.5-2 Mitigation Action Prioritization Assessment		Mitigation Action Evaluation Criteria Considerations										Benefit - Cost Ratio			
(+) FAVORABLE (--) NOT FAVORABLE (N) NOT APPLICABLE/NEUTRAL		Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	**Economic Benefit of Action (+3)**	**Economic Cost of Action (+3)**	**Feasibility Score Non-Weighted**	**Feasibility Score Weighted**
Nc	Mitigation Action Brief Description														
1	NC to set up website/social media & mailings on for residents on hazards.	(+)	(+)	(+)	(+)	(+)	N	(+)	(+)	(+)	N	+	+	10 (+) 2 (N) 0 (-)	16 (+) 2 (N) 0 (-)
2	NC website on hazards info, protection & mitigation.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	N	+	+	11 (+) 1 (N) 0 (-)	17 (+) 1 (N) 0 (-)
3	News press to to media on hazards & mitigations.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	-	11 (+) 0 (N) 1 (-)	14 (+) 0 (N) 3 (-)
4	Hazard awareness education for schools.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	+	12 (+) 0 (N) 0 (-)	18 (+) 0 (N) 0 (-)
5	Develop website/social media & mailings on flooding.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	N	+	+	11 (+) 1 (N) 0 (-)	17 (+) 1 (N) 0 (-)
6	Workshops on hazard risk & mitigation for public.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	+	12 (+) 0 (N) 0 (-)	18 (+) 0 (N) 0 (-)
7	Real estate disclosure on floodplain properties.	(+)	(--)	(--)	(+)	(+)	(--)	(+)	(+)	(+)	(--)	+	+	8 (+) 0 (N) 4 (-)	14 (+) 0 (N) 4 (-)
8	Develop policy & procedures on hazard mitigation.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	+	12 (+) 0 (N) 0 (-)	18 (+) 0 (N) 0 (-)
9	Investigate NC fund for hazard mitigation of properties.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(+)	+	+	11 (+) 0 (N) 1 (-)	17 (+) 0 (N) 1 (-)
10	Enforce forest & vegetation management policies.	(--)	(--)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
11	Enforce urban forestry & landscape management policies.	(--)	(--)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
12	Enforce best management practices.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	+	12 (+) 0 (N) 0 (-)	18 (+) 0 (N) 0 (-)

TABLE 6.5-2 Mitigation Action Prioritization Assessment co	Mitigation Action Evaluation Criteria Considerations										Benefit - Cost Ratio			
(+) FAVORABLE (--) NOT FAVORABLE (N) NOT APPLICABLE/NEUTRAL	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	**Economic Benefit of Action (+3)**	**Economic Cost of Action (+3)**	**Feasibility Score Non-Weighted**	**Feasibility Score Weighted**
Nc Mitigation Action Brief Description														
13 Enforce sediment & erosion control policies.	(--)	(--)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
14 Enforce dumping regulations.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	+	12 (+) 0 (N) 0 (-)	18 (+) 0 (N) 0 (-)
15 Enforce wetlands development regulations.	(--)	(--)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
16 Construct levees & floodwalls.	(+)	(+)	(--)	(+)	(+)	(+)	(+)	(--)	(--)	(+)	+	-	9 (+) 0 (N) 3 (-)	12 (+) 0 (N) 6 (-)
17 Mitigate properties in the 100 yr floodplain.	(+)	(--)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	-	11 (+) 0 (N) 1 (-)	14 (+) 0 (N) 3 (-)
18 Trach opioid use & assist and support law enforcement.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(+)	+	-	10 (+) 0 (N) 2 (-)	13 (+) 0 (N) 5 (-)
19 Inspection & maintenance of bridges, culverts & levees.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	+	+	11 (+) 0 (N) 1 (-)	17 (+) 0 (N) 1 (-)
20 Develop a stream corridor restoration plan.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	+	12 (+) 0 (N) 0 (-)	18 (+) 0 (N) 0 (-)
21 Database & map of critical facilities.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(+)	+	+	11 (+) 0 (N) 1 (-)	17 (+) 0 (N) 1 (-)
22 Inspection of critical facilities in hazard -prone areas.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	+	12 (+) 0 (N) 0 (-)	18 (+) 0 (N) 0 (-)
23 Participate in hazard mitigation planning process.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	+	12 (+) 0 (N) 0 (-)	18 (+) 0 (N) 0 (-)
24 Enforce floodplain development regulations.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	+	12 (+) 0 (N) 0 (-)	18 (+) 0 (N) 0 (-)

TABLE 6.5-2 Mitigation Action Prioritization Assessment co		Mitigation Action Evaluation Criteria Considerations										Benefit - Cost Ratio			
(+) FAVORABLE (--) NOT FAVORABLE (N) NOT APPLICABLE/NEUTRAL		Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	**Economic Benefit of Action (+3)**	**Economic Cost of Action (+3)**	**Feasibility Score Non-Weighted**	**Feasibility Score Weighted**
No	Mitigation Action Brief Description														
25	Technical assistance to enforce development regulations in hazard areas.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	+	12 (+) 0 (N) 0 (-)	18 (+) 0 (N) 0 (-)
26	Develop stormwater management plans.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	-	+	11 (+) 0 (N) 1 (-)	14 (+) 0 (N) 3 (-)
27	Purchase easements & development rights in the 100 yr floodpla	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(--)	-	+	9 (+) 0 (N) 3 (-)	13 (+) 0 (N) 5 (-)
28	Promote open space preservation.	(--)	(--)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(--)	+	+	9 (+) 0 (N) 3 (-)	15 (+) 0 (N) 3 (-)
29	Require special use permits for hazard areas.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(--)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
30	Promote natural resource planning.	(--)	(--)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(--)	+	+	9 (+) 0 (N) 3 (-)	15 (+) 0 (N) 3 (-)
31	Evaluate existing plans to prohibit growth in hazard areas.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	+	12 (+) 0 (N) 0 (-)	18 (+) 0 (N) 0 (-)
32	Review planned infrastructure to prohibit growth in hazard area	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	N	11 (+) 1 (N) 0 (-)	14 (+) 3 (N) 0 (-)
33	Encourage & assist communities to participate in NFIP & CRS.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(+)	+	+	11 (+) 0 (N) 1 (-)	17 (+) 0 (N) 1 (-)
34	Encourage regional development of plans & procedures.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	+	12 (+) 0 (N) 0 (-)	18 (+) 0 (N) 0 (-)
35	Develop & enforce data maintenance policies.	(--)	(--)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(--)	+	+	8 (+) 0 (N) 4 (-)	14 (+) 0 (N) 4 (-)
36	Development data sharing policies & agreements.	(--)	(--)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(--)	+	+	8 (+) 0 (N) 4 (-)	14 (+) 0 (N) 4 (-)

TABLE 6.5-2 Mitigation Action Prioritization Assessment co	Mitigation Action Evaluation Criteria Considerations										Benefit - Cost Ratio			
(+) FAVORABLE (--) NOT FAVORABLE (N) NOT APPLICABLE/NEUTRAL	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	**Economic Benefit of Action (+3)**	**Economic Cost of Action (+3)**	**Feasibility Score Non-Weighted**	**Feasibility Score Weighted**
No Mitigation Action Brief Description														
37 Develop & maintain hazard occurance databases.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(--)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
38 Develop databases on 100 yr floodplain properties.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(+)	+	-	10 (+) 0 (N) 2 (-)	14 (+) 0 (N) 4 (-)
39 Work with FEMA to update maps & base flood elevations.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(--)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
40 Ensure all critical facilities have an EOP.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	+	12 (+) 0 (N) 0 (-)	18 (+) 0 (N) 0 (-)
41 Develop & distribute a contact list of assistance.	(+)	(--)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(--)	+	+	9 (+) 0 (N) 3 (-)	17 (+) 0 (N) 3 (-)
42 Encourage EMA agencies & staff to hold several meetings/yr.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(+)	+	+	11 (+) 0 (N) 1 (-)	17 (+) 0 (N) 1 (-)
43 Develop website/social media & mailings for EMA agencies.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(+)	+	+	11 (+) 0 (N) 1 (-)	17 (+) 0 (N) 1 (-)
44 Inventory all equipment & technology used for emergency respo	(+)	(--)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(+)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
45 Develop evacuation routes & plans used for disasters.	(+)	(--)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(+)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
46 Encourage homeowners to install venting equipment for Radon.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(--)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
47 Require adoption of EOP by all municipalities.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(+)	+	+	11 (+) 0 (N) 1 (-)	17 (+) 0 (N) 1 (-)
48 Develop a mitigation plan for RL & SRL properties.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(+)	+	+	11 (+) 0 (N) 1 (-)	17 (+) 0 (N) 1 (-)

TABLE 6.5-2 Mitigation Action Prioritization Assessment co		Mitigation Action Evaluation Criteria Considerations										Benefit - Cost Ratio			
(+) FAVORABLE (--) NOT FAVORABLE (N) NOT APPLICABLE/NEUTRAL		Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	**Economic Benefit of Action (+3)**	**Economic Cost of Action (+3)**	**Feasibility Score Non-Weighted**	**Feasibility Score Weighted**
Nc	Mitigation Action Brief Description														
52	Assist in developing policy & procedures on dam & levee failure.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(--)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
53	Develop NC post-disaster recovery & reconstruction ordinance.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(--)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
54	Enforce floodplain ordinances.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(+)	+	+	11 (+) 0 (N) 1 (-)	17 (+) 0 (N) 1 (-)
55	Assist municipalities in obtaining computer equipment, etc.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(+)	+	+	11 (+) 0 (N) 1 (-)	17 (+) 0 (N) 1 (-)
56	NC to provide annual review & meetings on the 2017 NC HMP.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	+	12 (+) 0 (N) 0 (-)	18 (+) 0 (N) 0 (-)
57	Conduct EMA training.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(+)	+	+	11 (+) 0 (N) 1 (-)	17 (+) 0 (N) 1 (-)
58	Develop website/social media & mailings on mobile home anch	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(+)	+	+	11 (+) 0 (N) 1 (-)	17 (+) 0 (N) 1 (-)
59	Inspect, maintain & annually test all emergency equipment.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(+)	+	+	11 (+) 0 (N) 1 (-)	17 (+) 0 (N) 1 (-)
60	Maintain response actions to hazards.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(+)	+	+	11 (+) 0 (N) 1 (-)	17 (+) 0 (N) 1 (-)
61	Ensure all municipalities have public warning systems.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(+)	+	-	10 (+) 0 (N) 2 (-)	13 (+) 0 (N) 5 (-)
62	Develop post-disaster damage assessment & reconstruction reg	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(--)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
63	Develop assistance for residents in hazard mitigation.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(--)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)

TABLE 6.5-2 Mitigation Action Prioritization Assessment co	Mitigation Action Evaluation Criteria Considerations										Benefit - Cost Ratio			
(+) FAVORABLE (--) NOT FAVORABLE (N) NOT APPLICABLE/NEUTRAL	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	**Economic Benefit of Action (+3)**	**Economic Cost of Action (+3)**	**Feasibility Score Non-Weighted**	**Feasibility Score Weighted**
No Mitigation Action Brief Description														
64 Improve communication between public & EMA.	(+)	(--)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(--)	+	+	9 (+) 0 (N) 3 (-)	15 (+) 0 (N) 3 (-)
65 Develop training for local government in post-disaster & mitigat	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(--)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
66 Maintain partnering with NWS Mid-Atlantic River Forcast Cente	(+)	(--)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(--)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
67 Revise land development & stormwater ordinances to include ha	(+)	(--)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	+	11 (+) 0 (N) 1 (-)	17 (+) 0 (N) 1 (-)
68 Municipal compliance with NFIP & PA Act 166.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(--)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
69 Public education program & training for local officials on hazar	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(--)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
70 Participate in the Storm Ready Program.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(--)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
71 Make residents aware of the Biggert-Waters Act.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(--)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
72 Flood mitigation of residential & commercial properties.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(--)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
73 Repair or replace bridges & culverts & roads.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(+)	+	-	10 (+) 0 (N) 2 (-)	13 (+) 0 (N) 5 (-)
74 Drainage system maintenance & updates.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	-	11 (+) 0 (N) 1 (-)	14 (+) 0 (N) 3 (-)
75 Stream & river bank maintenance.	(+)	(--)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	-	10 (+) 0 (N) 2 (-)	13 (+) 0 (N) 5 (-)

TABLE 6.5-2 Mitigation Action Prioritization Assessment co	Mitigation Action Evaluation Criteria Considerations										Benefit - Cost Ratio			
(+) FAVORABLE (--) NOT FAVORABLE (N) NOT APPLICABLE/NEUTRAL	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	**Economic Benefit of Action (+3)**	**Economic Cost of Action (+3)**	**Feasibility Score Non-Weighted**	**Feasibility Score Weighted**
No Mitigation Action Brief Description														
76 Maintain & improve all levees, including the Sunbury levee.	(+)	(+)	(+)	(+)	(+)	(--)	(+)	(+)	(+)	(+)	+	-	10 (+) 0 (N) 2 (-)	13 (+) 0 (N) 5 (-)
77 Review & monitor EOP for gas lines.	(+)	(--)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(--)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
78 Review & monitor stormwater runoff from gas lines.	(+)	(--)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(--)	+	+	10 (+) 0 (N) 2 (-)	16 (+) 0 (N) 2 (-)
79 To provide the Executive Summary in the spanish language.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	+	+	12 (+) 0 (N) 0 (-)	18 (+) 0 (N) 0 (-)

Once an action has been determined to be feasible it should be prioritized against all other feasible mitigation actions. To prioritize actions, the following weighted, multi-objective mitigation action prioritization criteria was used:

- **Effectiveness (20% of score):** The extent to which an action reduces the vulnerability of people and property.
- **Efficiency (30% of score):** The extent to which time, effort, and cost is well used as a means of reducing vulnerability.
- **Multi-Hazard Mitigation (20% of score):** The action reduces vulnerability for more than one hazard.
- **Addresses High Risk Hazard (15% of score):** The action reduces vulnerability for people and property from a hazard(s) identified as high risk.
- **Addresses Critical Communication/Critical Infrastructure (15% of score):** The action pertains to the maintenance of critical functions and structures such as transportation, supply chain management, data circuits, etc.

Cumulative scores will range between 0 and 3. Priority assignment is as follows:

- **Low priority = 0-1.8**
- **Medium priority = 1.9-2.4**
- **High priority = 2.5-3.0**

TABLE 6.5-3 Multi-Objective Mitigation Action Prioritization Chart

Mitigation Actions		Multi-Objective Mitigation Action Prioritization Criteria					
No.	Brief Action Description	Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Critical Communications/ Critical Infrustructure	**Priority**
1	NC to set up website/social media & mailings on for residents on	2.7	2.6	3	3	1.5	**2.60**
2	NC website on hazards info, protection & mitigation.	2.7	2.6	3	3	1.5	**2.60**
3	News press to to media on hazards & mitigations.	2.7	2.6	3	3	1.5	**2.60**
4	Hazard awareness education for schools.	2.5	2.6	2.7	3	1.5	**2.50**
5	Develop website/social media & mailings on flooding.	2.7	2.6	1.9	3	1.5	**2.38**
6	Workshops on hazard risk & mitigation for public.	2.7	2.8	2.7	3	2	**2.67**
7	Real estate disclosure on floodplain properties.	3	3	3	3	1.5	**2.78**
8	Develop policy & procedures on hazard mitigation.	3	3	3	3	2.5	**2.93**
9	Investigate NC fund for hazard mitigation of properties.	2.3	2.3	2.3	3	2	**2.36**
10	Enforce forest & vegetation management policies.	2.3	2.8	2.5	3	1.5	**2.48**
11	Enforce urban forestry & landscape management policies.	2.3	2.8	2.5	3	1.5	**2.48**
12	Enforce best management practices.	2.6	2.8	2.8	3	2.8	**2.79**
13	Enforce sediment & erosion control policies.	2.4	2.8	2.8	3	1.5	**2.56**
14	Enforce dumping regulations.	2.3	2.8	2.5	3	1.5	**2.48**
15	Enforce wetlands development regulations.	2.6	2.6	2.6	3	1.5	**2.50**
16	Construct levees & floodwalls.	2.7	2	2.5	3	2	**2.39**
17	Mitigate properties in the 100 yr floodplain.	2.8	2.8	3	3	1.5	**2.68**
18	Trach opioid use & assist and support law enforcement.	2.6	2.7	2.3	3	1.5	**2.47**
19	Inspection & maintenance of bridges, culverts & levees.	2.3	2.3	2.4	3	1.5	**2.31**
20	Develop a stream corridor restoration plan.	2.2	2.2	2.2	3	1.5	**2.22**
21	Database & map of critical facilities.	2.8	2.8	2.6	3	2.8	**2.79**
22	Inspection of critical facilities in hazard -prone areas.	2.6	2.6	2.6	3	2.8	**2.69**
23	Participate in hazard mitigation planning process.	2.9	2.9	3	3	2.9	**2.94**
24	Enforce floodplain development regulations.	2.8	2.9	2.8	3	2.6	**2.83**
25	Technical assistance to enforce development regulations in hazard	2.8	2.8	2.8	3	2.4	**2.77**
26	Develop stormwater management plans.	2.6	2.6	2.7	3	2.5	**2.67**
27	Purchase easements & development rights in the 100 yr floodplain.	2.9	2.9	2.6	3	2.3	**2.77**
28	Promote open space preservation.	2.9	2.9	2.9	3	1.9	**2.77**
29	Require special use permits for hazard areas.	2.6	2.6	2.6	3	2.6	**2.66**
30	Promote natural resource planning.	2.6	2.6	2.6	3	2.1	**2.59**
31	Evaluate existing plans to prohibit growth in hazard areas.	2.7	2.6	2.8	3	2.2	**2.66**

TABLE 6.5-3 Multi-Objective Mitigation Action Prioritization Chart

Mitigation Actions		Multi-Objective Mitigation Action Prioritization Criteria					
No.	Brief Action Description	Effectiveness	Efficiency	Multi-Hazard Mitigation	Addresses High Risk Hazard	Addresses Critical Communications/ Critical Infrastructure	**Priority**
32	Review planned infrastructure to prohibit growth in hazard areas.	2.7	2.6	2.8	3	2.4	**2.69**
33	Encourage & assist communities to participate in NFIP & CRS.	2.7	2.6	2.8	3	2.6	**2.72**
34	Encourage regional development of plans & procedures.	2.8	2.8	2.8	3	2.8	**2.83**
35	Develop & enforce data maintenance policies.	2.4	2.6	2.5	3	2.5	**2.59**
36	Development data sharing policies & agreements.	2.4	2.6	2.5	3	2.5	**2.59**
37	Develop & maintain hazard occurance databases.	2.8	2.8	3	3	2.7	**2.86**
38	Develop databases on 100 yr floodplain properties.	2.8	2.8	2.8	3	2.5	**2.79**
39	Work with FEMA to update maps & base flood elevations.	2.8	2.8	2.6	3	2.8	**2.79**
40	Ensure all critical facilities have an EOP.	2.9	2.9	2.9	3	2.9	**2.92**
41	Develop & distribute a contact list of assistance.	2.3	2.2	2.2	3	1.9	**2.30**
42	Encourage EMA agencies & staff to hold several meetings/yr.	2.7	2.7	2.7	3	2.8	**2.76**
43	Develop website/social media & mailings for EMA agencies..	2.7	2.7	2.7	3	2.8	**2.76**
44	Inventory all equipment & technology used for emergency	2	2.6	2.8	3	1.9	**2.48**
45	Develop evacuation routes & plans used for disasters.	2.7	2.7	2.7	3	2	**2.64**
46	Encourage homeowners to install venting equipment for Radon.	2.8	2.6	1.9	3	1.9	**2.46**
47	Require adoption of EOP by all municipalities.	2.9	2.9	2.9	3	2.9	**2.92**
48	Develop a mitigation plan for RL & SRL properties.	2.7	2.7	2.5	3	2	**2.60**
49	Recommend, encourage & assist all to adopt the 2017 NC HMP.	2.9	2.9	2.9	3	2.9	**2.92**
50	Municipalities to require building permits for the 100 yr floodplain.	2.9	2.9	2.7	3	2.4	**2.80**
51	Recommend & encourage municipalities to prohibit mobile homes in the 100 yr floodplain.	2.9	2.6	2.9	3	2	**2.69**
52	Assist in developing policy & procedures on dam & levee failure.	2.9	2.6	2.2	3	2.8	**2.67**
53	Develop NC post-disaster recovery & reconstruction ordinance.	2.9	2.6	2.2	3	2.8	**2.67**
54	Enforce floodplain ordinances.	2.8	2.9	2.8	3	2.6	**2.83**
55	Assist municipalities in obtaining computer equipment, etc.	2.8	2.6	2.8	3	2.5	**2.73**
56	NC to provide annual review & meetings on the 2017 NC HMP.	2.9	2.9	2.5	3	2	**2.70**
57	Conduct EMA training.	2.7	2.7	2.7	3	2.8	**2.76**
58	Develop website/social media & mailings on mobile home	2.7	2.7	2.6	3	1.5	**2.55**
59	Inspect, maintain & annually test all emergency equipment.	2.8	2.7	2.6	3	1.5	**2.57**
60	Maintain response actions to hazards.	2.8	2.8	2.8	3	2.8	**2.83**
61	Ensure all municipalities have public warning systems.	2.8	2.8	2.6	3	2.2	**2.70**
62	Develop post-disaster damage assessment & reconstruction	2.6	2.6	2.6	3	2.7	**2.68**
63	Develop assistance for residents in hazard mitigation.	2.8	2.8	2.8	3	2.1	**2.73**
64	Improve communication between public & EMA.	2.8	2.8	2.7	3	2.1	**2.71**
65	Develop training for local government in post-disaster & mitigation	2.8	2.8	2.7	3	2.4	**2.75**
66	Maintain partnering with NWS Mid-Atlantic River Forcast Center.	2.3	2.2	2.3	3	2	**2.33**
67	Revise land development & stormwater ordinances to include	2.6	2.6	2.6	3	2.2	**2.60**
68	Municipal compliance with NFIP & PA Act 166.	2.7	2.4	2.8	3	2.6	**2.66**
69	Public education program & training for local officials on hazard mitigation programs.	2.8	2.8	2.7	3	2.4	**2.75**
70	Participate in the Storm Ready Program.	2.7	2.7	2.7	3	2.5	**2.72**
71	Make residents aware of the Biggert-Waters Act.	2.4	2.3	2.6	3	2	**2.44**
72	Flood mitigation of residential & commercial properties.	2.7	2.7	2.5	3	1.5	**2.53**
73	Repair or replace bridges & culverts & roads.	2.3	2.3	2.4	3	2.5	**2.46**
74	Drainage system maintenance & updates.	2.6	2.6	2.7	3	1.5	**2.52**
75	Stream & river bank maintenance.	2.2	2.2	2.2	3	2.8	**2.41**
76	Maintain & improve all levees, including the Sunbury levee.	2.9	2.6	2.2	3	2.8	**2.67**
77	Review & monitor EOP for gas lines.	2.5	2.4	2.5	3	2.8	**2.59**
78	Review & monitor stormwater runoff from gas lines.	2.5	2.4	2.5	3	2.8	**2.59**
79	To provide the Executive Summary in the spanish language.	3	2.8	2.7	2.8	1.5	**2.63**

Effectiveness: The extent to which an action reduces the vulnerability of people and property.
Efficiency: The extent to which time, effort, and cost is well used as a means of reducing vulnerability.
Multi-Hazard Mitigation: The action reduces vulnerability for more that one hazard.
Addresses High Risk Hazard: The action reduces vulnerability for people and property from hazard(s) identified as high risk.
Addresses Critical Communications/Critical Infrastructure: The action pertains to the maintenance of critical functions and structures such as transportation, supply chain, management, data circuits, etc.

SECTION 7.
PLAN MAINTENANCE

7.1 DEVELOPMENT PROCESS SUMMARY

This development of Northumberland County's Federal Emergency Management Agency (FEMA) approved 2017 Hazard Mitigation Plan (HMP) was a comprehensive effort that utilized a variety of sources and data for trend analysis, reviewed a vulnerability and risk assessment for local hazards, created a fluid process to streamline future updates to the HMP, and identified the hazard mitigation measures needed to limit the effects of local hazards.

The 2017 HMP states that it will be updated every five years. The HMP will actually be reviewed and evaluated more frequently, as it will be consulted in the creation and/or update of other County planning documents (see Section 7.3). Any potential modifications to the HMP that would impact those other documents were noted by County planning staff.

The Plan Maintenance section was created based on discussions with the Planning Team regarding how the HMP would be monitored, evaluated, and updated over the next five years. The HMP's relationship with the County Comprehensive Plan and Emergency Operations Plan was discussed and documented in Section 7.3. The Planning Team, municipal representatives, and other stakeholders were offered the opportunity to review and comment on this section along with the rest of the HMP during the public meeting.

7.2 MONITORING, EVALUATING AND UPDATING THE PLAN

Hazard mitigation planning in Northumberland County is the responsibility of all levels of government (i.e., county and local), as well as the citizens of the County. As listed in FEMA 386-4, the Northumberland County Hazard Mitigation Planning Team (HMT) must continuously monitor and document the progress of the HMP's recommended actions. The Planning Team (listed in Section 3.2), under the direction of the Planning Team Leader, will be responsible for maintaining this HMP. The HMT plans on meeting every six months, but no less than once per calendar year and following each emergency declaration, with the purpose of reviewing the Plan. The Planning Team Leader will assemble the HMT for annual\biannual reviews of the HMP. Each year, the County will solicit new projects from the municipalities by sending Project Opportunity Forms and informing the municipalities of the opportunity to update their mitigation measures.

Each review process will ensure that: the Risk Assessment reflects current conditions in the County and the municipalities, the Capability Assessment accurately reflects local circumstances, and the hazard mitigation strategy is updated based on the County's damage assessment reports and local mitigation project priorities. The Planning Team will complete a Progress Report to evaluate the status and accuracy of the HMP and record the Planning Team's findings. The Northumberland County Planning Team Leader will maintain a copy of these records.

As directed by FEMA 386-4, the Progress Report will include the following information: the hazard mitigation action's objectives; who the lead and supporting agencies

responsible for implementation are; how long the project should take, including a delineation of the various stages of work along with timelines (milestones should be included); whether the resources needed for implementation, funding, staff time, and technical assistance are available, or if other arrangements must be made to obtain them; the types of permits or approvals necessary to implement the action; details on the ways the actions will be accomplished within the organization, and whether the duties will be assigned to agency staff or contracted out; and the current status of the project, identifying any issues that may hinder implementation.

The HMP must be updated on a five-year cycle. This HMP will be updated and resubmitted to FEMA for approval within the five-year period. The monitoring, evaluating, and updating of the Plan every five years will rely heavily on the outcomes of the annual Planning Team meetings.

7.3 INCORPORATION INTO OTHER PLANNING MECHANISMS

NORTHUMBERLAND COUNTY COMPREHENSIVE PLAN

Method

The Northumberland County Planning Commission is responsible for maintaining and updating the County Comprehensive Plan, and provides a model Subdivision and Land Use Ordinance for use by the municipalities. The Planning Commission meets regularly to review, discuss, and comment on municipal subdivision and land development plans, municipal floodplain ordinances, municipal stormwater management plans and ordinances, and other community planning and development matters. After the adoption of the existing HMP, these reviews will include informal cross- referencing of the planned development or regulatory activity with the provisions of the HMP. It uses this information to identify necessary revisions and to amend the Comprehensive Plan. The Planning Commission's meetings are open to the public and are advertised according to the Pennsylvania Sunshine Act (65 PA C.S.A.). All 36 municipalities are covered by the County Comprehensive Plan. These practices will continue using the information in the HMP.

Maintenance Schedule

Article III of the Pennsylvania Municipalities Planning Code (Act 247 of 1968, as reenacted and amended) requires all Pennsylvania counties (except Philadelphia) to adopt a comprehensive plan and update it at least every 10 years. Coupling this requirement with the Disaster Mitigation Act of 2000 (DMA 2000)-required five-year update cycle for HMPs, when possible, will allow the County to better integrate the County Comprehensive Plan and HMP planning processes and strengthen public participation for both efforts.

Northumberland County's current Comprehensive Plan was adopted on June 28, 2005. This plan provides general direction and a blueprint for the future of Northumberland

County and constituent communities. Recommendations from the HMP can be incorporated into the document.

NORTHUMBERLAND COUNTY EMERGENCY OPERATIONS PLAN

Method

The Pennsylvania Emergency Management Services Code (35 PA C.S. Sections 7701-7707, as amended) requires each county and municipality to prepare, maintain, and keep current an Emergency Operations Plan (EOP). The Northumberland County Department of Public Safety is responsible for preparing and maintaining the County EOP. The risk assessment information presented in the HMP can be used to update the hazard vulnerability assessment section of the County EOP. The risk assessment information will affect subsequent updates to the EOP.

Maintenance Schedule

The EOP is reviewed at least biennially. Whenever portions of the plan are implemented in an emergency event or training exercise, a review is performed and changes are made where necessary. These changes are then distributed to the County's 36 municipal Emergency Management Coordinators (EMCs).

The Northumberland County Department of Public Safety should consider the County's HMP during its biennial review of the County EOP. Recommended changes to the HMP, based on changes to the EOP, will then be coordinated with the Planning Team.

ACT 167 STORMWATER MANAGEMENT PLANS

Method

Act 167 requires that all stormwater management plans include an analysis of present and projected land development in flood hazard areas and its sensitivity to damages from future flooding or increased runoff. In drafting Act 167 Stormwater Management Plans, the HMP's hazard profile on floods was consulted to identify the location and extent of flooding, range of magnitude, past occurrences, likelihood of future occurrences, and vulnerability assessment due to flooding events. The floodplain maps included in this HMP can be used as a reference to meet Act 167 requirements.

Maintenance Schedule

Like the HMP, stormwater management plans must be reviewed (and revised, if necessary) every five years.

As these plans are reviewed by the Northumberland County Planning Commission, information gathered in the revision of these plans will be incorporated into the revision of the HMP, and vice versa.

PLAN INTERRELATIONSHIPS

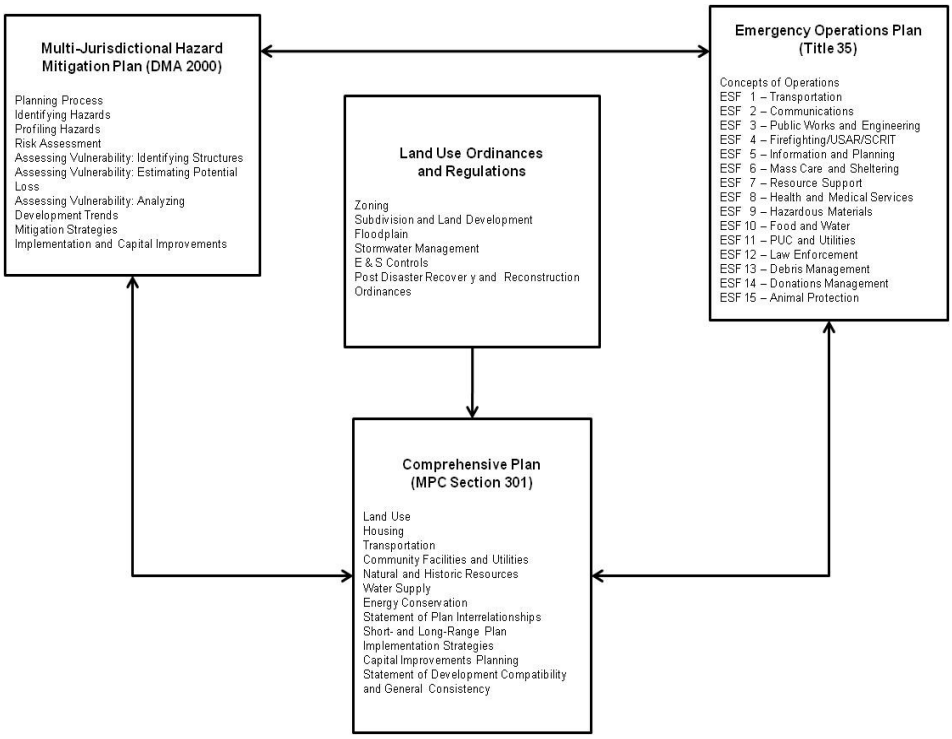
Figure 7.3.4-1 illustrates the interrelationships between the HMP, County Comprehensive Plan, County EOP, and other community planning mechanisms. Ensuring consistency between these planning mechanisms is critical. In fact, Section 301 (4.1) of the Pennsylvania Municipalities Planning Code requires that comprehensive plans include a discussion of the interrelationships among their various plan components, "which may include an estimate of the environmental, energy conservation, fiscal, economic development, and social consequences on the environment."

When developing the HMP, certain sections of the County Comprehensive Plan, EOP, and various land use ordinances and regulations provided key information. Moving forward, each of these documents **should not be** treated as unrelated and updated separately. The County and each participating municipality are responsible for incorporating the specific mitigation actions recommended in this Plan into the necessary planning documents, including the appropriate comprehensive plan, the County EOP, and any land use ordinances and regulations.

For example, zoning and other land use regulations will be amended to reflect the newly identified hazard areas, to ensure that development in those areas is minimized or at least conducted in a way that otherwise mitigates against the effects of hazards (e.g., requiring structures built in the floodplain to be elevated). As proposed changes to building codes are presented, their potential for mitigating damage due to hazards will be examined, and the changes will only be adopted if they are shown to lower risk. Changes to stormwater management plans will incorporate identified mitigation actions and will encourage increased participation in the NFIP.

To that end, Northumberland County and its municipalities must ensure that the components of the HMP are integrated into existing community planning mechanisms and are generally consistent with goals, policies, or recommended actions. Northumberland County and the Planning Team will utilize the existing maintenance schedule of each plan to incorporate the goals, policies, or recommended actions as each plan is updated.

Figure 7.3.4-1: Plan Interrelationships



7.4 CONTINUED PUBLIC INVOLVEMENT

The Northumberland County Department of Public Safety will ensure that the HMP is posted and maintained on the County website http://www.publicsafety.norrycopa.net/ and will continue to encourage public review and comment on the Plan through information posted to the website and public notices in local newspapers.

The citizens of Northumberland County are encouraged to submit their comments to elected officials and/or members of the Planning Team. To promote public participation, Northumberland County welcomed comments on sections of the HMP at every public meeting. This offered the public the opportunity to share their comments and observations. All comments received will be maintained and considered by the Planning Team when updating the HMP.

Northumberland County will continue to reach out to municipalities via telephone, mail, and e-mail regarding mitigation projects, especially those municipalities that did not submit projects for inclusion in this HMP. Any additional Hazard Mitigation Project Opportunity Forms received during the life of this five-year HMP will be incorporated into the Plan as an interim, updated and included in the next five- year Plan update.

SECTION 8.
PLAN ADOPTION

Records reflecting formal adoption of this HMP by the County and participating municipalities can be found in Table 3.5-1 and the last page of Appendix J. The template used by the County and municipalities are shown on the following pages.

NORTHUMBERLAND COUNTY HAZARD MITIGATION PLAN

County Adoption Resolution

Resolution No. _____

Northumberland County, Pennsylvania

WHEREAS, the municipalities of Northumberland 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, Northumberland 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 Northumberland County Hazard Mitigation Plan has been developed by the Northumberland County Planning Department and the Northumberland County Department of Public Safety in cooperation with other County departments, local municipal officials, and the citizens of Northumberland County, and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted to develop the Northumberland County Hazard Mitigation Plan, and

WHEREAS, the Northumberland 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 Northumberland that:

- The Northumberland 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 Northumberland County Hazard Mitigation Plan are hereby directed to implement the recommended activities assigned to them.

ADOPTED, this _____ day of _____, 2017.

ATTEST: **NORTHUMBERLAND COUNTY COMMISSIONERS**

_____ By _____

By _____

By _____

NORTHUMBERLAND COUNTY HAZARD MITIGATION PLAN

Municipal Adoption Resolution

Resolution No. _____

<Municipality Name>, Northumberland County, Pennsylvania

WHEREAS, the <Municipality Name>, Northumberland 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, 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 Northumberland County Hazard Mitigation Plan has been developed by the Northumberland County Planning Department and the Northumberland County Department of Public Safety in cooperation with other County departments, and officials and citizens of <Municipality Name>, and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted to develop the Northumberland County Hazard Mitigation Plan, and

WHEREAS, the Northumberland 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 Northumberland that:

- The Northumberland 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 Northumberland County Hazard Mitigation Plan are hereby directed to implement the recommended activities assigned to them.

ADOPTED, this _____ day of _____, 2017.

ATTEST: **<MUNICIPALITY NAME>**

_____ By _____

By _____

By _____

APPENDIX A
MEETINGS AND DOCUMENTATION

Meeting # 1 — September 15, 2016

M1 - Public Kick-Off Meeting

This meeting was publicly advertised via email, phones calls and word of mouth. This was the initial meeting with PEMA as the presenter. This was also the most publicly attended meeting that was held.

M1 - Public Advertisement

From: Jeffery, Stephen
Sent: Thursday, September 01, 2016 3:22 PM
To: Albert Shutt <albertshutt@ymail.com>; chazx208@ptd.net; Chris Boyer (hamptonfd@yahoo.com) <hamptonfd@yahoo.com>; David Staman (beanddave@windstream.net) <beanddave@windstream.net>; DJ Spotts <DJ294@MSN.com>; engine721@aol.com; George Geise (chiefggeise@gmail.com) <chiefggeise@gmail.com>; George Geise (pointema@hotmail.com) <pointema@hotmail.com>; ghwretired@yahoo.com; Godin, Jason <jgodin@pa.gov>; jason.kling@us.army.mil; jeff Weikel (jwjeffpirate@gmail.com) <jwjeffpirate@gmail.com>; Jennifer Weaver (dreamweaver@countryilink.net) <dreamweaver@countryilink.net>; Karl Beagle (rush000006@aol.com) <rush000006@aol.com>; Ken Hollenboch (fireman_emt8@hotmailo.com) <fireman_emt8@hotmailo.com>; Kevin O'hearn (ohearn@ptd.net) <ohearn@ptd.net>; Mark Cupp (hmscupp@yahoo.com) <hmscupp@yahoo.com>; Matt Heim (lmtemc@live.com) <lmtemc@live.com>; Myron Messinger (papmyron@netscape.com) <papmyron@netscape.com>; O'Hearn, Kevin <kevin.ohearn@norrycopa.net>; Paul Smink (progolfer50@hotmail.com) <progolfer50@hotmail.com>; rtr6266@yahoo.com; SunburyEMA@aol.com; Todd Mace (pesi.tmace@gmail.com.) <pesi.tmace@gmail.com>; Todd Oberdorf (EMA Riverside) <obermt@verizon.net>; Todd Oberdorf (WORK) (todd.oberdorf@merck.com) <todd.oberdorf@merck.com>; Vaughn Murray <ex220@dejazzd.com>; Wayne Bieber (WKBieber@earthlink.com) <WKBieber@earthlink.com>
Subject: HMP

RE: Northumberland County Hazardous Vulnerability Assessment and Hazardous Mitigation Plan Stakeholder kick-off meeting to review and renew the current plan that is expiring September of 2017.

This letter is to inform you of a very important initiative that is again going to take place in our county. The Northumberland County Planning Department and the Northumberland County Department of Public Safety will soon begin the process of reviewing the Northumberland County Hazardous Mitigation plan (HMP). The HMP is the blueprint for reducing property damage and saving lives from effects of future natural and man-made disasters in Northumberland County.

The plan is required to be updated every four years and is required for the county to be eligible to receive certain types of state and federal relief funding after a disaster.

The meeting will be held on Thursday September 15th from 10:00 am to 12:00 pm at the following location:

Northumberland County Department of Public Safety
911 Greenough Street, Suite 2
Sunbury, PA 17801

This kick-off meeting will help familiarize the stakeholders with the current HMP and the process of reviewing and renewing the current plan, as well discuss future meetings and our milestones to get this project completed before the deadline in 2017.

If you have any questions, please feel free to contact us.

Stephen J Jeffery, CEM
Director of Public Safety/OEM

cc: Donald Alexander, Planning Director
Maryrose McCarthy, Chief Clerk

M1 - Meeting Minutes

...Shoch
...issioner - Chairman
...hard.shoch@norrycopa.net

...muel Schiccatano
...mmissioner - Vice Chairman
...muel.schiccatano@norrycopa.net

...ymberley Best
...mmissioner
...mberley.best@norrycopa.net

COUNTY OF NORTHUMBERLAND

DEPARTMENT OF PUBLIC SAFETY
911 Greenough Street. Suite 2, Sunbury PA 17801
Ph. 570.988.4217 | Fax. 570.988.4375 | www.northumberlandco.org

Stephen Jeffery
Director/OEM
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Russell Fellman
911 Coordinator
Russell.fellman@norrycopa.net

Jason Zimmerman
Operation & Training
Jason.zimmerman@norrycopa.net

The first meeting of the Northumberland County Hazardous Mitigation Plan update was called to order by EMC Stephen Jeffery on September 15, 2016 at 10:00AM at the Northumberland County Department of Public Safety.

A total of 29 people were present with representation from 4 local municipalities, 2 school districts, PEMA, Penn Dot, the American Red Cross, Rail Road and 2 industry representatives.

The focus on the initial meeting was to discuss the planning process to move the meeting forward and to establish an agenda.

Director Jeffery welcomed all the representatives and briefly explained the current plan and his expectation is having it completed. Ernie Szabo from PEMA reiterated some of Mr. Jeffery's remarks as wells provided some additional information on the planning process with locations and information to find additional information.

Mr. Jeffery explained to the representatives that as all or most know the plan has been written, he is not expecting to reinvent the wheel or re-write the plan but to review the proper pages that need to be addressed. Mr. Jeffery stated he has already met with some of the county staff and reviewed and updated some of the information for the yearly update. He also stated that they are kind of behind the eight ball considering this should have been started a few months back, unfortunately it fell through the cracks and we were unable to get a grant started to assist the county in getting it done, so in the end the county is responsible to get it completed before the 2017 deadline for the FEMA review and acceptance.

Stephen Stated he plans on sending out Capability Assessment Survey's for the municipalities to complete and have them returned to the next meeting which is he plans on scheduling for October 20th.

Stephen and Ernie explained to the municipalities, if you have projects that you would like to be looked at or have completed projects such as the projects in Mt Carmel and Shamokin that are near completion or completed please let us know so that it can be added to the update.

With no other information and remarks from the group the meeting was adjourned. The next meeting will be at the Northumberland County Department of Public Safety at 10:00AM on October 20th.

Stephen Jeffery

APPENDIX A

M1 – Sign-In Sheet

NORTHUMBERLAND COUNTY
ALL-HAZARD MITAGATION

	Name	Email	Phone	Agency
1	Edna Reinard	edna.reinard@redcross.org	570-850-4664	Am. Red Cross
2	Randy Ulrich	rfulrich@nshr.com	570 452 1330	North Shore Railroad
3	Ernie Szabo	erszabo@pa.gov	717 657 2159	PEMA
4	Mark Lyash	mlyash82@gmail.com	(570) 898-0187	Ralpho Twp
5	Howard Shaddick	HRShaddick@gmail.com	570 672 2040	Ralpho Twp
6	Jack Hallick	Jack.Hallick@michaelfoods.com	570-425-6142	Michael Foods
7	Jeff Roadcap	jroadcap@linemountain.com	570-758-2011	Line Mountain School Dist.
8	Jim Chamberlain	jchamberlain@weismarkets.com	570-274-7020	Weis markets
9	Doug Diehl	ddiehl@miltonpa.org	570-412-0854	Borough of Milton

	Name	Email	Phone	Agency
1	Corey Pisarz	cpisarz@pa.gov	570-286-7178	PennDOT
2	[illegible]	[illegible]@pa.gov	570-286-7178	PennDOT
3	Chuck Hopta	chopta@norrycopa.net	570-988-4215	North'd County
4	Ken Young	g93119k@ptd.net	570 644 0663	Shamokin TWP
5	Adam Wajtowicz	adam.wajtowicz@merck.com	570-271-2045	MERCK-Cherokee
6	Ed Markowski	EdMark@ptd.net	570-286-7696	Upper Augusta twp
7				

	Name	Email	Phone	Agency
1	Daniel Saxton	d305feihc@AOL.com	570-274-5010	Sunbury EMA.
2	Michael Rhoads	mrhoads@sunburypa.org	570-286-4207	City of Sunbury - Code
3	Michael Kerstetter	makin@ptd.net	570-988-1930	Sunbury Municipal Auth
4	Jake Wilt	jakesma@ptd.net	570-286-5858	Sunbury municipal Authority
5	Dan Romer	dromer@ptd.net	570-286-5858	Sunbury Municipal Authority
6	Jason Zimmerman			
7	Eric Wendt			
8	Keith Aryes			
9	Richard Reichner	rreichner@sunburypa.org	570-286-4207	City of Sunbury - Councilman
10	Cheryl Delsite	cdelsite@sunburypa.org	570-286-7820	City of Sunbury - Asst. Clerk

	Name	Email	Phone	Agency
1	Lori Smoogen	lori.smoogen@norrycopa.net	988-4222	North'ld Co.
2	Jim Zaick	jzaick@indians171.k12	570-648-5757	SASD
3	John Klinger	jdklinger@AquaAmerica.com	570.898.4263	AQUA - PA
4	Glenn Schaeffer		570-758-4439	Jordan Twp.

Meeting # 2 — October 20, 2016

M2 - Public Meeting – Informational

This meeting was also open to the public, but was only advertised at the kick off meeting and by word of mouth. The meeting was just an informal meeting with discuss the process that we were looking to take.

M2 – Meeting Minutes

Richard Shoch
Commissioner - Chairman
richard.shoch@norrycopa.net

Samuel Schiccatano
Commissioner - Vice Chairman
samuel.schiccatano@norrycopa.net

Kymberley Best
Commissioner
kymberley.best@norrycopa.net

COUNTY OF NORTHUMBERLAND

DEPARTMENT OF PUBLIC SAFETY
911 Greenough Street. Suite 2, Sunbury PA 17801
Ph. 570.988.4217 | Fax. 570.988.4375 | www.northumberlandco.org

Stephen Jeffery
Director/OEM
Stephen.jeffery@norrycopa.net

Russell Fellman
911 Coordinator
Russell.fellman@norrycopa.net

Jason Zimmerman
Operation & Training
Jason.zimmerman@norrycopa.net

The second meeting of the 2017 Hazardous Mitigation Plan was called to order by EMC Stephen Jeffery on October 20th at 10:00AM at the Department of Public Safety.

A total of 8 people were in attendance. Stephen Jeffery Northumberland County EMC. Charles Hopta, Northumberland County engineer, David Hummel Northumberland County Assessment Director, Don alexander Northumberland County Planning Director, James Chamberlain Weis Markets, Glenn Schaeffer Jordon Twp. And Ernie Szabo from PEMA.

Mr. Jeffery briefed the group that he has sent out the capability assessments forms to all the municipalities but has only received 6 surveys out of the 36.

The group did review the Risk factor analysis as well as the county risk factures and noticed there is really no changes that need to be made from the current plan to the update.

It was suggested by the group to copy the current capability and have them mailed or hand delivered to the municipalities to have them completed.

Ernie suggested to keep in mind that if we have or now of projects that need to be completed or projects of success be documented in the plan.

Stephen advised the group that the county is still looking for help to get the plan updated, time is short as well as are people schedules.

A discussion on how to get the plan moving and implemented with many suggestions was talked about.

Mr. Jeffery plans on having another meeting after the Thanksgiving Holiday with the planning team to review and update the plan. Date time and location will be announced at a later time.

Being there was no other information, the group made a motion to adjourn.

M2 – Sign-In Sheet

Flood Mitigation Meeting
October 19th 2016

	Name	Email	Phone	Agency
1	James Chamberlain	jchamberlain@weismarkets.com	570 713 3575	Weis Markets
2	Jason Zimmerman			NC EMA
3	Chuck Hopta	chopta@norrycopa.net	570-988-4215	North'd Cty
4	M. David Hummel	dhummel@norrycopa.net	570-988-4494	North'd County
5	Ernest Szabo	enszabo@pa.gov	717 651 2159	PEMA
6	Stephen Jeffery	sjeffery@norrycopa.net		NCEMA

Meeting # 3 December 14, 2016

M3 - Planning Committee Meeting Only

This meeting was held to continue discussing the update process and determine the best method for file sharing and editing the document.

M3 - Meeting Minutes/Notes

- Hazard Plan shared drive
  - All committee members must be setup to full access
  - Have on single document that will track changes

- Put new copy on website after each meeting
  - Table list on the site with new plan

- September 1st 2017 this plan expires
  - Have new one in 4 months early?
- Deadline May 1st to submit

- Ask PEMA
  - NFIP Policies
  - Severe and Repetitive Severe Loss

- Make a list of known hazards and discuss with group if it should go in the plan
  - List the risk - - action can be to "look into the situation"
  -

M4 – Sign-In Sheet

Planning Committee

Eric Wendt

Chuck Hopta

Lori Smoogen

Stephen Jeffery

David Hummel

Keith Ayers

Doug Diehl

Meeting # 4 January 11, 2017

M4 - Planning Committee Meeting Only

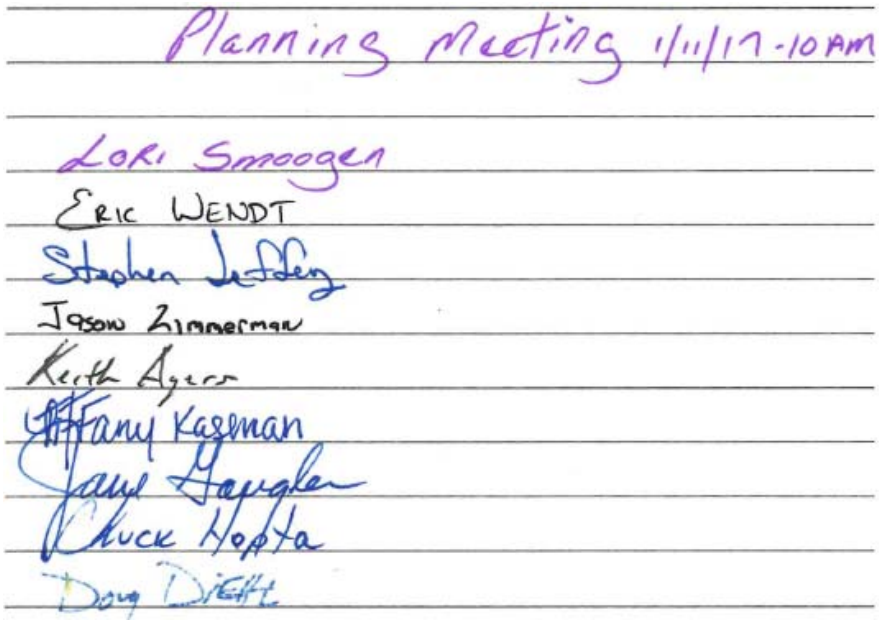
This meeting was an informational meeting that put us on the right track for what we needed to accomplish. After having a conversation with FEMA the day before we were able the layout a specific move forward plan.

M4 - Meeting Minutes/Notes

This meeting was recorded for the minutes but the recording became corrupt. The following is a compilation of notes for the attending member.

???

M4 – Sign-In Sheet



Meeting # 5 February 08, 2017

M5 - Planning Committee Meeting with Stakeholders

This meeting had a few stakeholders that were invited to review our progress and to ask questions on their involvement and what was needed from them.

M5 – Meeting Minutes

PLEASE REFER TO SIGN IN SHEET FOR ALL ENTITIES IN ATTENDANCE

This is the first meeting after the county has mailed the fact finding material to each municipality and entity that it deemed vital to building the emergency mitigation plan

The meeting began with Chuck Hopta(forward referred to as CH) suggesting that the committee ask the municipalities that are present if they have any questions. The representative from Sunbury Municipal Authority(forward referred to as SMA), Jeff Lewis(forward referred to as JL), asked what the county wants from them, what their role may be. They said they have all the same information as Sunbury city. CH said they should be working hand in hand with the city if it is all the same data, a coordinated effort when filing the paperwork sent out from the committee. Eric Wendt(forward referred to as EW, sorry Eric) said last time this mailer was sent, they had sent to the same entities and they were following suit. EW said there was nothing in the previous plan from SMA which suggested to them that there was a previous coordinated effort. EW admitted that there was no data in the previous action plan that broke down data by municipality but that was the intention this time. The committee is looking to make sure that the data is not generalized, but rather that the county's municipalities have their own substantial data. CH said that SMA's coordination with the city would still provide the information the committee needs for that particular municipality but their added input would provide even better data. It was also mentioned by CH that we do not have the previous responses, therefore this committee has had to start fresh with responses. JL did say that Sunbury City's plan does differ from the plans for SMA; EW said that if need be there can be a separate page added to reflect SMA's plan. CH then asked why their plan isn't the same as Sunbury City's. Doug Diehl(forward referred to as DD) asked if they were separate from the City and JL said yes they are severed; DD concluded that they will have their own plan because they are considered a critical facility and SMA does the CRS, but that Sunbury City should have SMA's plan as part of their own. EW and CH said again that they can be provided their own area of the plan because they are a separate entity with it's own plan. JL then began to ask questions specific about the fact finding sheet, stating that the Authority has not done a disaster recovery sheet pointing to the section about capital improvement plan status. JL questioned about whether that section meant the Authority needed to respond. DD said if they have that information then enter it, otherwise in that area they would default back to Sunbury City. JL asked why the County would care if their plan for example included the improvement of a water tank. EW said that he is not one hundred percent sure why the fact finding sheet was developed with the specific questions that it has on it, but that from his understanding of what the plan is supposed to entail, the County would be looking to include in the plan any of the necessary entities plans to make improvements as part of their own preemptive mitigation. All parties then agreed on an understanding that this plan needs to provide specific data for all entities concerned. EW said one of the items discussed in the past was a drainage ditch that constantly overflows; if it's not listed in the plan now, but an entity had plans to fix it because it could have potential to cause a hazardous situation, then in the future there's no trying to recover specific funds to fix that problem under this plan because it was left out. JL said that there was an authorized resolution in the past that said they were part of the County plan so that they could be provided funds under these

circumstances. EW said they may be but that we are now in the mandated renewal stage of that plan; the County must meet FEMA's standards to ensure there would be funds in the case of there being a need. EW said when it is completed and adopted again, then all entities concerned can make resolutions on their level to once again be part of that plan. CH said there's funding that the entities could miss out on if they don't adopt the new plan either so the fact finding stage is necessary. CH said so far they have not held anyone to that but that grace may not be available in the future. JL said they were concerned whether they had been part of the plan all this time because they are not specifically mentioned in it, even though they had adopted it by resolution. EW said the company previously used to create this plan had created quite a few inaccuracies within the plan, which SMA being left out is one, but going forward the committee will try to avoid and correct any of the previous inaccuracies they can. DD called out Dean Miller(representing West Chillisquaque at the meeting forward referred to as DM) as well to say that if his municipality had an area that is prone to flash flooding and it takes out a roadway or a tank, and it's not part of the plan then it could create a problem for any federal recovery effort where they would be seeking disaster funds. JL agreed they now had a better understanding of their part in the updating of the plan because of these examples, but said it's their problems not Sunbury City's that they want to make sure they include because it's their problem to fix. DD said if they are mitigating a problem that they have old infrastructure that's outdated and they have a capital campaign to replace it, and they have to come up to current flood standards or increase, then that action should be included in this plan so that in the future if there are any funds for this work they'd be able to go for it. CH asked Ken Young(representing Shamokin Township at this meeting, forward referred to as KY) if he had any questions; KY said that he was asked on short notice to show up to the meeting and he didn't have the paperwork that everyone was referring to, but he said he was at the other meetings (there was no specific information given to indicate what meetings he was referring to). DD then asked if he had anything the committee sent out; KY said he's sure it was received but it wasn't in his possession although he is sure he has access to it. CH asked EW if it was sent directly to the Township, EW confirmed. KY said they are all part time and they are operating out of their houses, and DD said that he had a blank fact finding pack with him if he wanted a copy. DD also asked DM if he needed a copy; he said he thinks that their information was already sent back and approved by the committee. CH asked EW if that was accurate, EW confirmed. EW stated that at the time of this meeting only three entities had returned information: Mount Carmel Township, West Chillisquaque Township and Watsontown Borough. KY said in thinking about Shamokin Township's situation, they do have areas that flood or are in the floodplain but there are no plans currently to change any of the flood lines. DD said then they would just be responsible to answer standard questions on the sheet. CH said they don't have to create a plan, but this sheet is their chance to make them part of the County plan in case there are problems areas they are aware of that might require emergency funds. KY said at this point the Township is reactive, if there is an emergency then they go out to make repairs if there is support available. DD said they should have an emergency operations plan though, because they are either required to have their own or accept the County's plan. KY said they were planning to accept the County's plan. DD said in that case it would still be necessary to provide information to the County so that their needs can be made part of the County's plan. KY asked if there was a form in the packet he was just given at this meeting where they would list this information, a few people responded yes. KY said then he will get a form in, even if there's nothing on it. CH said that the entities mailed to need respond to help give validity to the plan that will be submitted. DD tried to run through the pages briefly with KY. As they ran through the page, KY mentioned the fiber optic cable that runs through the township and DD said then that's something he can list. DD said we don't know the details of each municipality so we need input on the local level so it can be part of the plan or else it may be missed and therefore not approved. DD also said it's a way of letting the County and anyone else who uses the plan know if there are potentials for problems (examples given were if there were a terror attack to the optics line, flooding that could destroy the optics line, complete loss of communication for the whole township) that need to be explored.

EW said from talking to Ernie(PEMA contact), the action items could be just a "wish list" that explains in a few years "here are the things we'd like to change or improve". He said even if they don't happen at least the intention was made known. CH said then if it's on this "wish list" we could be eligible for funding before or after a disaster, and that's the most important thing about the fact finding process because the County doesn't want to eliminate anyone from funding. KY asked if there was a sample resolution in the packet, DD said no not yet because the committee is still building the new plan to turn for approval. CH said we needed to do this fact finding because the previous company that performed this function did not provide enough detail for the County to confidently move forward with a review of the plan based on the previous data gathered.

CH asked if there were any other questions from anyone present. EW said his main concern to discuss at this meeting was an agenda for a public meeting, what needed to be addressed at a public meeting with regard to this committee. DD said we need to mimic the things we just talked about, letting the people present know that this committee is trying to obtain information to build a better plan for approval. DD said we should start with a summary of what we are doing, the reasons why we are doing it and how it can help. DD said then you would ask for input from the municipalities and individuals present, give the public an opportunity to tell the County and municipalities present a chance to hear what they think are recurring issues that perhaps the municipalities didn't consider or weren't aware of. EW said he wanted to be sure that everyone is on the same page when addressing the public. EW said that Stephen Jeffrey had mentioned inviting someone from PEMA or FEMA, CH said if they show that's good but if they don't we will be ok. KY brought up that the support of communications is a countywide issue. CH asked if the dates for the public meetings were available for all present to know. EW and Tiffany Kaseman(forward referred to as TK) said March 23 was the meeting to be held in the Milton Borough office and March 30 was the meeting to be held in the Administration Center in Sunbury, and that both meetings will be from 6:30 to 8:00pm. DD confirmed that the location in Milton was correct.

EW said tentatively the timeline is that the committee is looking to get back municipal responses by March 1, then to start entering that data into an updated plan so that the info can be discussed by the time there are public meetings at the end of March. EW said the committee is then hopeful that anyone who has not responded may attend and ask questions that will help them to complete the fact finding sheet, or perhaps the committee may get undiscovered information from public input at the meetings as well. EW said after the public meetings the committee would use the month April to finalize the plan so that it can be submitted to FEMA on May 1 so they can begin to review it because FEMA's review process is quite lengthy and always results in the plan being turned back to make changes they require or request. FEMA had suggested to submit 90 days prior to needing to approve the new plan; May 1 fits in that time frame.

West Chil asked for a confirmation again on the location of the March 23 meeting; many committee members responded the Milton Borough Office.

TK asked if someone could please explain the public meeting because she was not previously part of this committee; she asked if it's general information about the plan and the process or is it an update for anyone currently interested in knowing what the committee is doing for the plan already in place. EW said that's the same as his questions to DD because he also was not involved in the last process five years ago that was run by the company who made the existing plan. EW said the main purpose of the meeting will be to educate the public about the plan, what the committee is currently doing, and what the committee plans to do to update the current plan, and that we are looking for any input from the municipalities or the public. EW said he was planning to create a more structured agenda. TK asked if the committee was looking for input on the plan that already exists and where it needs to update or in general on the committee's entire process; TK asked if this was a public meeting that will be starting from scratch. EW said he wasn't sure if building on the plan was worthwhile; he said he assumes there's not going to be a lot of input from the public if he had to take a guess. EW is hopeful that Stephen or Ernie will have more input on the agenda and how the meeting should be run because he hasn't the past experience to answer exactly what the meeting's tone will be. TK said she is just trying to understand what

public means, she was trying to understand who the target audience is for these meeting. DD said the target is both member of the public and members of the municipalities. He mentioned last time there were many people present from varied entities: SEDA COG, Merck, school districts, municipalities and public. CH said multiple public meetings are required under the plan. EW said FEMA is concerned with knowing that the County is trying to educate the public about the plan and how it impacts them. CH said even if there is no public input it's still shown as an effort by the County. DD said the minimum requirement is two public meetings. KY asked if the FEMA support is post-disaster support, CH confirmed. KY asked if there was any that could be spent upfront, CH said that in some areas there are funds that can be spent upfront if you apply for a project, but the project needs to be in the plan. DD said there are hazard mitigation grants available; he gave the example of knowing of areas that will flood because they have done so in the past. KY asked if this is about flooding. CH and DD said that's the easiest topic to discuss because it's the most prevalent in the county. EW confirmed flooding and winter storms are the most frequent occurrences in Northumberland County. DH said although flooding is the first thing people think of, we still need to hear from municipalities about all possible hazards.

EW said the other thing he wanted to discuss was being sure the meetings were properly advertised.

JL wanted to confirm whether the committee wanted them to go to the City or to someone in the County; EW said just fill it out as the Authority and they will be provided their own section within the plan. EW said they don't have to share the packet with Sunbury City because they were sent their own packet. EW said the front letter provides all the necessary information for returning completed forms.

CH thanked all participants at this meeting, stating that we are still learning the process as well because this was previously performed by a third party company. KY asked who the company was; CH said Delta Development. EW said there was a PEMA grant last time this was done, and PEMA recommended this company, however they no longer make that recommendation.

KY asked about all of the county bridges and whether they can be upgraded for flow. CH said they'd have to apply, which is a slow process and that they'd be more inclined to perform structure relocation. KY said after the last flood there was bridge on State Route 61 that was a problem and only after the flood did PennDOT come out to remove sediment. CH said PennDOT may have been the only one with permission to do that work. DD said this is the type of information needed in their return because it can help put pressure on the State to mitigate these areas.

There was a brief conversation about County bridges that was unrelated to the committee or its work and purpose. Again, all in attendance were thanked and the meeting was ended.

M5 – Sign-In Sheet

Commissioners Meeting Room 10AM

NORTHUMBERLAND COUNTY

HAZARD MITIGATION

PLANNING COMMITTEE

MEETING DATE: February 8, 2017

	PRINT NAME	REPRESENTING	TITLE (IF APPLICABLE)
1.	Ken Young	Shamokin TWP	Engineer
2.	Dean L. Miller	West Chillisquaque Twp	Supervisior
3.	Jeff Lewis	Sunbury Municipal Auth	Manager
4.	Tiffany Kaseman	North'd County	Chief Assessor
5.	Keith Ayers	North'd County GIS	
6.	Chuck Hopta		Engr.
7.	Doug DIEHL	Milton Boro & NC HAZ MIT PLAN	Floodplain Mnger
8.	ERIC WENDT	NORTHUMBERLAND COUNTY	IT

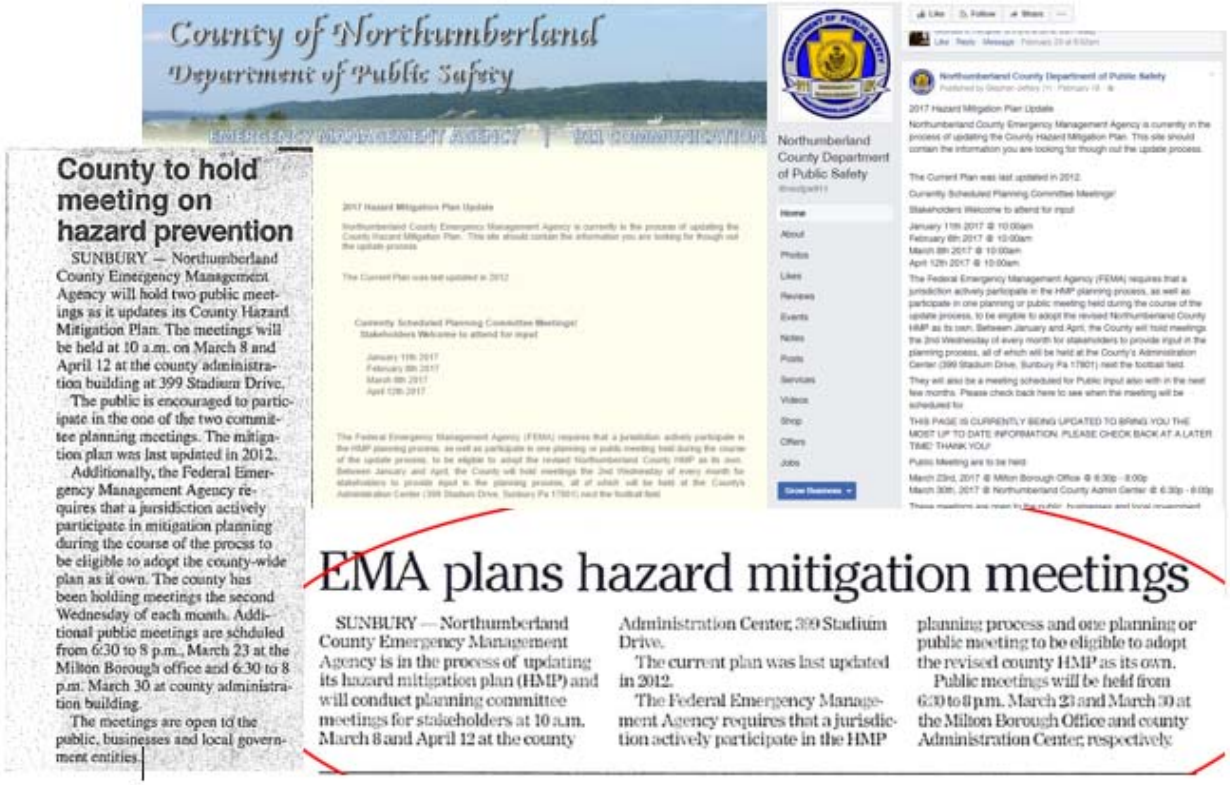
Meeting # 6 — March 08, 2017

M6 - Planning Committee Meeting with Stakeholders

This meeting had a few stakeholders that were invited to review our progress and to ask questions on their involvement and what was needed from them.

M6 – Publicly Advertised Material

We advertised this as well as our next 3 meetings at the same time for convenience through Newspaper, Website, Facebook and a mailing that went to each municipality.



M6 – Meeting Minutes

PLEASE REFER TO SIGN IN SHEET FOR ALL ENTITIES IN ATTENDANCE

Stephen Jeffery(forward referred to as SJ), director of Public Safety, opened the meeting by explaining why the committee has been assembled. SJ stated that this process was started a few months ago and at the present time the committee is working on entering the fact finding forms that have been returned into the updated plan. SJ said there aren't a lot of changes but that the plan still needs to be updated. SJ then asked everyone present to introduce themselves. *All present were on the sign in sheet and the names will not be repeated here*
SJ also let members present who aren't on the committee know where each of the committee members present work. SJ asked where the committee wanted to start. Eric Wendt(forward referred to as EW, sorry Eric) said he would give an update of the status of his work with Keith

Ayers(forward referred to as KA). EW said they have been reviewing the maps and charts in the existing plan. EW also said that Chuck Hopta had created a list of items from the plan that he felt needed to be updated, and that has been what each of them was focusing on. EW said he is the person who has been receiving the completed forms from the fact finding packet that had been mailed in January. Lori Smoogen(forward referred to as LS) asked if they have all been returned, EW said that he has only received 18 out of 38 at the time of this meeting. EW said he has been taking the answers from the completed forms and digitizing it back into the Excel document that way he can generate the graphs and charts from the new data. EW also said that the completed forms have been scanned to keep as original but that he is also typing the responses into a new form document that can be edited and added to the plan easily. EW and KA have been qc'ing the data with Doug Diehl(forward referred to as DD) as well. KA said there's a lot to be done as far as the data and the mapping because there are a lot of things that are wrong from the past version. KA said that he has the "stuff" from HAZUS that was run from last time which he is currently trying to make sense out of. KA made all aware there is a lot of work to be done in a short amount of time. DD did note that the stuff the committee is finding isn't minute, there are significant errors. LS said when she was reviewing tornado data in the plan she tried to use the link the previous company, Delta Data, had cited but the information was very inaccurate in the plan as compared to the actual data she was finding. KA also said that he had come across "dead links" in the plan, but he has been able to use plans from other counties and track their sources to try and get better data for Northumberland County's plan. KA also said a lot of the write ups and supporting text can't be copied and pasted either, it will need to be reviewed for edit or to be completely written again. KA admitted though that there may be a need to added written data, he is falling short of time to complete that task because of the amount of work this plan update has already consumed. Ed Markowski(further referred to as EM) asked if the committee had looked at the new mapping that had come through from Sunbury to Wilkes Barre. KA said they saw the DFIRM but that there was really nothing changing within the county. EM said there were a few changes, and KA said he knows of the changes in Sunbury but there is nothing significant countywide. KA said he planned to do individual maps for each municipality as far as the flood zones and structures or critical facilities impacted. KA said he'd be sending maps back to the municipalities that have responded so they can give their input on their accuracy. EM said that one of the problems they have in this area is watching for a flood event. He said the west branch of the Susquehanna River is handled out of State College but the north branch is handled out of New York. He said the he is responsible for everything that is on the island (between Sunbury and Northumberland), and that the number of structures will grow again this year as it has in the past. He said his problem is that the data reported from afar is not as reliable as his ability to view the situation himself. He wants to address problems with the existing river gauges with the federal government. He says he needs at least 48 hours to start moving all the boats off the river and campers and boat trailers off the island in the event of a flood so notification and reliability need to be improved. DD asked EM if he had gone to the new website where you are able to watch the river gauges. EM said they watch them but the north branch has such erratic readings coming through that it's not helping. DD asked if he was trying to say that the prediction isn't the best, EM confirmed. EM also said that there are also problems with the Little Shamokin Creek that need to be addressed. KA said the Silver Jackets program is now doing modeling on the north branch with new depth grids and 3D data, but DD said Milton's didn't work. EM said he was hoping for better data and that right now he was dealing with repetitive loss in the area. He said they (FEMA) are getting more aggressive with these issues. DD admitted that repetitive loss is a bis issue in Northumberland County, at this time he also asked EM which municipality he was with. EM said there are some jurisdictions that are looking at a cost analysis in repetitive loss as to where money is coming in and going out with respect to insurance money. EM mentioned that they have to anticipate insurance rate changes because of repetitive losses which impact the municipalities.
A short conversation broke out about Upper Augusta's zoning and permits

DD said some of the stuff that is coming up in the new mitigation plan will help with structure counts. The data that is in the plan will also include what the loss value will be. KA said that the previous value was understated by about $120 million; Tiffany Kaseman(forward referred to as TK) and DD added that the number represented in the last plan was just the assessed value, that the common level ratio was not applied to it to equate it closer to market value. EM said at this time that he has read that properties are not allowed to be called out for repetitive loss, essentially that public figures cannot disclose that a property had been frequently flooded. TK asked the purpose of making public officials withhold this information; EM's answer did not make the purpose clear but he said it was a directive that could be found on FEMA's website. TK asked if this was part of the updates after Biggert Waters. EM began speaking about maps that were discarded and how they related to getting CRS credits. DD said they are available on the FEMA website in the archives.

A conversation broke out about CRS ratings and maps, as well as the flood insurance.

DD brought the conversation back to emergency management plans and how they should be created at the municipal level and passed on to SJ. DD said some municipalities have created their own but most have piggybacked on the county's plan. EM said Upper Augusta had started one but they had just decided to fall back on the county plan. DD said that's why the fact finding packet that was sent out was so important; any and all plans need to be integrated into the county level plan so that response can be coordinated in times of need. SJ said it would be 2011 all over again, and DD said yes unfortunately. DD said he sent Ernie an email some numbers that may have been a mistake (not sure what that statement referred to). DD said that there is some data in the charts that needs to be changed because it's not accurate to the county's situation. DD and SJ agreed there is a lot of data that needs to be changed because it appears to be generic or erred.

A suggestion was made that portions should be sent to PEMA to review as they are being completed. DD said to check with Ernie and see if that can be done. SJ said he is trying to still get someone from PEMA to attend our meetings. DD said just keep offering. EM began to speak of his experience with submissions to PEMA, DD also gave examples.DD said it's important to get all the data in that they are asking for though because this is what will help to get mitigation funds. EM mentioned a pipeline project in his township, DD asked him to expand on that. EM said it was a $100k project to replace storm water drainage. EM said the mapping that is being requested out of PEMA/FEMA is not cost feasible for such a small municipality. DD said he believes improvement of infrastructure is covered in the plan because of the different responses that they have been receiving.

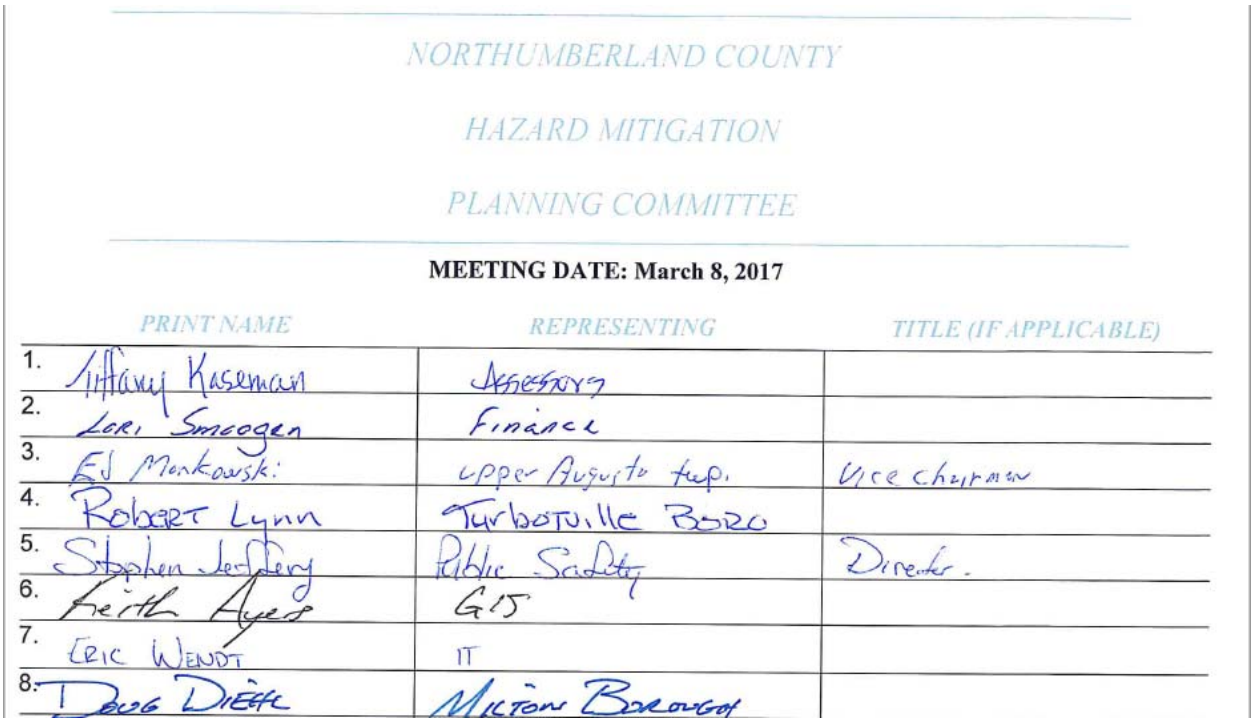
DD asked is anyone had heard from Ernie lately, EW said the last contact was an email where there were four people included and they spoke about public meeting information. DD asked if we had heard anything back about what the agenda for the public meeting is supposed to look like. No one had heard from him, EW said he'd like to start putting the agenda together. LS said we should have something that looks like our Commissioner's meetings. DD said perhaps the public should be provided an assessment they can fill out and return or a sheet that they can return with comments or questions. DD said provide a deadline for the public to return it so that people aren't returning them for months after the meetings. TK said the committee could even have the public hand in questions before or during the meeting and then they can be addressed and answered at the end of the meeting. LS mentioned something like the assessment DD had brought up, but this would be more like an evaluation.

SJ asked if there were any other issues to cover. TK and DD mentioned the dates and times again of the public meetings. SJ said that notice was placed on the webpage, Facebook and in newspapers. LS asked how many papers it was advertised in. TK said the county usually advertises in The Standard Journal, The Daily Item and The News Item. SJ said one of the advertisements was wrong. EW said he read the press release but it was not actually printed as it was written. LS said the only invoice she had received so far was the Standard Journal. EW said he received a copy of the erred release and added that to the meeting folder. TK found the News Item article and

was told to add that to the meeting folder as well. At this meeting it was determined by comparing the articles that the Daily Item printed the erred notice.
EW said that at this point 20 municipalities had returned their fact finding packets. Robert Lynn(forward referred to as RL), representing Turbotville Borough at this meeting, asked if EW had received his borough's information; EW confirmed. EW asked if DD had Milton Borough's to return at the present meeting. DD said he had returned it via email, but he had a copy with him which was copied and taken by EW.
DD asked RL if there were any large future projects included in their fact finding return. RL said they had mudslides and washed out roads that are scheduled for updating but he isn't sure if it's in the plan because the borough considers that normal maintenance. DD said the reason he was asking was because even if they consider this work to be normal maintenance, if it's not in the plan but becomes a bigger issue in the future then the funds under PEMA may not be allocated for these specific problems. RL explained that some of the problems they have really aren't worth the paper work. DD mentioned a previous issue that was discussed, a covered bridge in West Chillisquaque. SJ asked if EW had received the fact finding info from Washington Township; EW confirmed. EW also said there were two others that had been returned for bad addresses that he had mailed out again.
Several unrelated conversations broke out at this time

The meeting informally came to an end at this time.

M6 – Sign-In Sheet



NORTHUMBERLAND COUNTY

HAZARD MITIGATION

PLANNING COMMITTEE

MEETING DATE: March 8, 2017

	PRINT NAME	REPRESENTING	TITLE (IF APPLICABLE)
1.	Tiffany Kaselman	Assessors	
2.	Lori Smoogen	Finance	
3.	EJ Mankowski	Upper Augusta Twp.	Vice Chairman
4.	Robert Lynn	Turbotville Boro	
5.	Stephen Jeffery	Public Safety	Director.
6.	Keith Ayers	GIS	
7.	Eric Wendt	IT	
8.	Doug Dieffe	Milton Borough	

Meeting # 7 March 23, 2017

M7 – Public Meeting – Capability and Risk Assessment – Milton Borough Office – 6:30 PM

1. **Welcome and Introductions**
   a. Planning Team

2. **Project Overview**
   a. Overview of Hazard Mitigation

   b. Participation - why it's important to Participate

   c. Meetings Held
      i. Planning committee Meetings
         September 15th 2016 @ 10:00 am
         October 20th 2016 @ 10:00am
         December 14th 2016 @ 10:00am
         January 11th 2017 @ 10:00am
         February 8th 2017 @ 10:00am
         March 8th 2017 @ 10:00am

   d. Future Meetings
      i. Planning committee Meetings
         April 12th 2017 @ 10:00am

      ii. Public Meeting
         March 31st 2017 @ 6:30 (NC Admin Center)

3. **Capability Assessment**
   a. 38 Surveys sent out
   b. 19 Municipalities returned them
   c. Questions
   d. Extra's to fill out

4. **Risk Assessment**
   a. New Risks
      i. New pipeline infrastructure
      ii. Influx in Localities having growing amounts of Chemicals/Fuel/Tanks
      iii. Opioid Epidemic

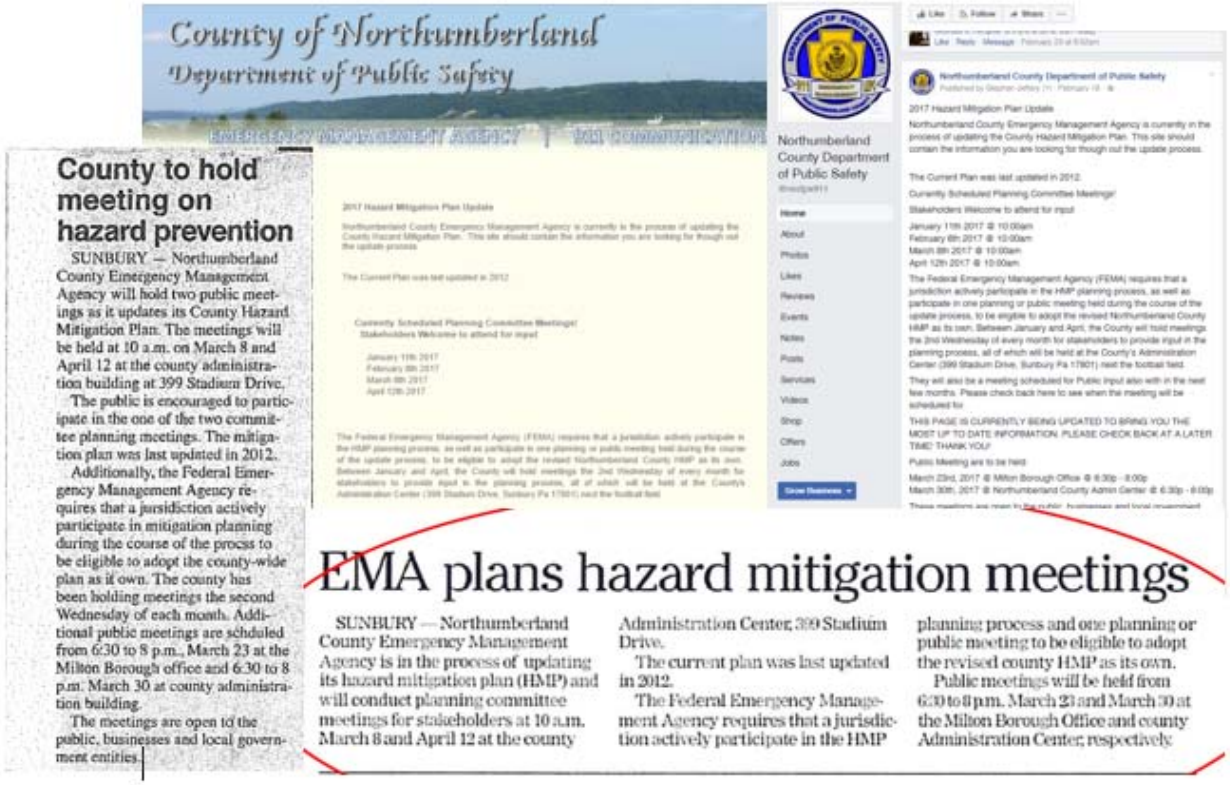
   b. Discussion

5. **Plan Maintenance**
   a. Mistakes found
   b. Update process
      i. Maps
      ii. Data
   c. Tentative Timeline

6. **Question and Comment Session**

M7 – Publicly Advertised Material

We advertised this as well as our next 2 meetings at the same time for convenience through Newspaper, Website, Facebook and a mailing that went to each municipality.



County of Northumberland
Department of Public Safety

County to hold meeting on hazard prevention

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The public is encouraged to participate in the one of the two committee planning meetings. The mitigation plan was last updated in 2012.

Additionally, the Federal Emergency Management Agency requires that a jurisdiction actively participate in mitigation planning during the course of the process to be eligible to adopt the county-wide plan as it own. The county has been holding meetings the second Wednesday of each month. Additional public meetings are scheduled from 6:30 to 8 p.m., March 23 at the Milton Borough office and 6:30 to 8 p.m. March 30 at county administration building.

The meetings are open to the public, businesses and local government entities.

Northumberland County Department of Public Safety

EMA plans hazard mitigation meetings

SUNBURY — Northumberland County Emergency Management Agency is in the process of updating its hazard mitigation plan (HMP) and will conduct planning committee meetings for stakeholders at 10 a.m. March 8 and April 12 at the county Administration Center, 399 Stadium Drive.

The current plan was last updated in 2012.

The Federal Emergency Management Agency requires that a jurisdiction actively participate in the HMP planning process and one planning or public meeting to be eligible to adopt the revised county HMP as its own.

Public meetings will be held from 6:30 to 8 p.m. March 23 and March 30 at the Milton Borough Office and county Administration Center, respectively.

M7 – Meeting Minutes

PLEASE REFER TO SIGN IN SHEET FOR ALL ENTITIES IN ATTENDANCE

This is the first of the advertised public meetings. Agendas and informational handouts were created for the public's use. It was the committee's intention to follow the agenda at this meeting and reserve time at the end of its "presentation" for questions or comments. Only one member of the public attended, therefore the meeting was held in an informal manner with the agenda as a guideline.

Doug Diehl(forward referred to as DD)introduced the committee members to Wayne Bieber(forward referred to as WB), who was attending representing East Chillisquaque Township. Eric Wendt(forward referred to as EW) began to speak of the bullet points on the agenda. He explained that the committee is trying to gather information from municipalities to list within the county plan that would cover various forms of hazard mitigation. He said that information has to be present in the plan if in the future you would be looking for funds or grants from PEMA/FEMA to mitigate a hazard or potential hazard. These meetings are an attempt to make the public aware that there needs to be participation on the municipal level. DD said what we are trying to do is add a little bit of room into the county plan, meaning that we are trying to show that many different issues and areas are being investigated and developed under action plans, not just issues

that have happened in the past. DD also said it gives us a chance to move forward and further explore some of the issues that are only briefly mentioned on this or previous plans. DD said that working within the Community Rating System(forward noted as the CRS) can potentially benefit; the example he used is reduced flood insurance rates. WB brought up the example of being able to be removed from the flood zone by having an elevation plan done on their property and Stephen Jeffery(forward referred to as SJ) mentioned this is a problem in Shamokin after the 2011 flood. DD said the reason we always come back to the floodplain and flooding issues is because that's the most visible problem we have in Northumberland County. DD did mention other problems that we have be investigating under the plan such as the new pipeline structure, gas lines, fracking and influx of chemical storage tanks. Having a better, more modern plan will help Public Safety to improve their response as well. WB said he'd like to know if there is a protocol in place with PPL that notification is sent when they open the discharge at the reserve in Washingtonville. He has seen localized flooding on the creeks in his township because of this action and he'd like to know ahead of that action so the residents who live along these waterways can be made aware. SJ said that Public Safety doesn't receive notice but they would check with Montour County to see if they get that type of notice. At this time a train went through and made the recording slightly incoherent but as the noise passed DD asked if train derailment was part of the hazard mitigation plan; EW could not confirm. DD said that this is the kind of conversation that is fruitful for the plan and this is why we need the public's input. DD said it's even important to explain that there are future plans and outline them for years to come within the plan.

DD began to speak about the meeting dates that are on the agenda. He explained that we have not only met in person but that we also have had emails and phone calls with regard to this plan update. EW said PEMA typically counties have four public meeting: a "kick off" meeting, a compatibility assessment meeting which covers the fact finding packets that were sent to each municipality, a meeting of about risk assessment and then a final meeting after the plan has been approved. EW said that the compatibility assessment really doesn't have to be discussed at length at this meeting because WB already turned in the forms but if he did have questions we'd be able to discuss them.

As a side note SJ mentioned that he just sent out the paperwork for snow removal, a federal declaration for aid because of Winter Storm Stella. WB said his township did have to do subcontracting for removal. SJ said there was a webinar that explained what the declaration could cover. WB asked if he should be preparing his information to turn into SJ; SJ confirmed.

A short conversation took place about the recent snow storm

DD began to talk about how the northern part of the county feels that Northumberland County doesn't fairly represent them; WB said he agrees and truly believes it's because of the separation of communication centers for emergency response.

A short conversation took place about the new radio project and EOC

WB began talking about the gas pipeline that was put in the ground in his township and expressed his concerns about runoff from the mountain. WB said he actually had to speak with the gas company about his concerns, and had gotten them to help fix a road in that area. DD said that this was good information to bring up because it needs to be explored within the plan, the change in or extra run off that is occurring. DD said we'll never be able to address everything but it really is important to throw all the scenarios that we *can* think of into this plan.

DD touched on the bullet point on the agenda of the opioid epidemic. EW said it's not just the effects on the community but the responders who are put in the dangerous situations to control it as well. SJ said it's not just the use of drugs, but that they are now being manufactured in homes, cars and even concealed outdoor areas that increase risk for first responders. DD asked if there were any classes given to educate first responders for these situations; SJ confirmed there are some classes that go hand in hand with law enforcement. Tiffany Kaseman(forward referred to as TK) said that assessors are offered classes educating them on how to spot dangerous properties such as "meth labs". SJ mentioned a state level specialist that offers education. WB also said there was a local training that happened to help first responders identify dangerous properties. DD

asked if that's a type of training that we should be trying to put together. SJ said responders from around here have been going down to Fort Indiantown Gap for this kind of training.
DD asked for any other input on risk assessment; EW said there's possibly discussion that could be had about the new bypass but that would probably be easily handled under soil erosion within the plan.
A short conversation took place about the bypass work that is happening in Snyder County
SJ began to talk about all the changes along the Susquehanna river that are taking place north of Northumberland County and how eventually they will cause strain on our area because of their enhanced flood measures. DD said we are going to see higher velocities and SJ said in 2011 the river broke only a few inches below the top of the wall. EW mentioned the water was so high it was hitting the bridged between Sunbury and the Island. He said they will have major trouble in the future on the island. SJ mentioned Ed Markowski's comments from the last meeting about how the water rises fast on the island. SJ also was mentioning what precaution procedures were happening during the 2011 flood. SJ then talked about how the mobile home parks in West Chillisquaque had to be evacuated. WB said he had asked local officials after that event if there was a way to prevent it in the future (rescue measures for people who refused to evacuate the mobile home parks along the river). WB said the answer was that when a destroyed home was removed, no one is allowed to occupy that lot in the future. DD said that can be written into a municipality's flood plain ordinance; TK mentioned new ordinances for West Chillisquaque that required raising new mobile homes off the ground between ten and fourteen feet. DD said he has seen that people are not removing the mobile homes, they are actually "remodeling" them so they don't have to move off the lot.
A conversation began about mobile homes, upkeep and permitting/code issues and the hazards that mobile homes can cause but also the danger they can be in if not properly maintained
DD brought us back to the agenda by asking EW to explain the mistakes that have been found throughout the previous plan. EW said there's many examples of the company that prepared the previous plan just putting data in the plan for the sake of filling the plan. Many labels, charts and links have no relevance to Northumberland County data. EW said that Keith Ayers have been working on damage assessment values from flood zone and improving them. EW said they visited Columbia County to review their plan and he mentioned they do not use HAZUS data, they took their own current data and used it for the plan. DD asked what the major problem was that Keith found, TK said that the last plan used straight assessed value which is from 1972. TK said to get market value you have to apply a factor, and it was off considerably. SJ said this whole plan is a disaster, he said when they first looked at the plan he assumed nothing would change but then errors were discovered by many people.
A short conversation took place about the county's base year for its assessed values
DD said that many people on the committee have been working to take out the errors and put in the accurate data in time for the first draft to be submitted. WB asked how much of the data that was submitted from five years ago is being used; EW said that the company that did the last plan did not provide the original data that was gathered. EW and DD said now the committee is using the plan as a skeleton but they are starting from scratch. Committee members also have been looking at other recently approved plans for ideas of what PEMA has been looking for in our plan. WB asked if this time the plan is being done in house; DD confirmed. DD mentioned an area he investigated pertaining to two different dams but found that the company used identical data for each dam, which is seriously wrong. EW also mentioned how the plan did not list critical facilities accurately, but that is an area that is being fixed this time around. EW said when they looked at the number of critical facilities it was nowhere near where it should be, the value was seriously underrepresented. SJ mentioned how the wildfire data was not listed accurately.
DD brought everyone's attention to the last item, the timeline. EW said we are short on time but that PEMA suggested we have the plan 70-80% done by May 1 because PEMA will rip this plan apart regardless but at least we will have something substantial to submit and still be able to work on areas moving forward as well as making changes they require. TK said that EW is also trying to

build a databank so that in the future we don't lose the work that is being done this time. It was mentioned at the previous meeting to ask Ernie is the committee could start submitting completed sections of the plan; EW said that PEMA is not going to take partial submissions. EW said they have not asked for an extension as of this date. DD gave examples of how the plan ends up being reviewed, and that sending portions instead of the whole plan would just complicate the process. DD asked if PEMA was still being invited to the meetings; SJ said it's been an open invitation. DD said PEMA should be notified every time we have a meeting; SJ said he has not been doing that, he made them aware of the dates during the kickoff. DD said they still need to be notified every single time there is a meeting because when they start tearing the report apart the committee can at least question why PEMA did not take part in the planning and development process when they were invited to all these meetings. SJ said he's been trying to get several other people (names mentioned were not recognized) but without any success. DD said that SJ should be asking Ernie who the exact contact is that needs to be invited to these meetings and send them a message directly, and in that same message ask about an extension.

DD said we need to ask for an extension now because if they answer now that it's not possible, the committee at least knows what data is vital to get submitted. DD said SJ was right that we *should* have been able to look at this in the beginning and be able to rely on the data because it was a plan accepted by PEMA but in the end they approved a plan with major errors and tell them that is the reason we need an extension. EW said the last time they had a conference call with PEMA/FEMA they seemed shocked that the county was doing the new plan completely in house but at that time they offered any assistance that they could. WB asked if any of the municipalities were given a copy from Delta of the data they were given last time because he remembers there were many more pages to fill out last time. EW said this time he went through the fact finding packet and reduced it to what he felt was essential; he did not want to overwhelm the people filling it out which may have resulted in the municipalities not filling it out at all. EW went over the forms really quickly to show where he cut out unnecessary areas. EW said this is the part that is from scratch because none of the information was archived and it was not put into the plan the way the municipalities had originally answered. EW also explained his methods for archiving it this time. WB said he remembers it was sent via email last time and EW said it was also available to be submitted online so it was highly unlikely that anyone had kept or received a copy.

A short conversation took place about office staffing in the county and in municipalities

SJ said this plan revision should have started the day after the current plan was signed. SJ said the previous planning director told him there was no money to get a company to review the plan, he then said a year went by and he asked the county commissioners when they were going to get on top of reviewing the plan. SJ said he commissioners said there was no money to do that, the he said he found a grant was available for review work. He said the commissioners told him to write the grant, but he said he couldn't because he didn't have the information needed. He then said before you know it the one year deadline had arrived. SJ said the bosses down there (not sure who he is referencing) said well you need to get it done, but he said he was not sure how it was supposed to be started or run and the only person still here that would have any information would be EW. SJ said he then talked to Ernie about contacting local universities to have someone come in to help write the new plan, but after so long Ernie's suggestion was to just build a team here. SJ said his first contact was to DD, and DD agreed to help because it's a requirement from the state to have this complete. SJ said when the state has to be called for help, their first reaction is "what does your plan say?" EW said of the municipalities that have responded thus far, about half have replied no when asked if they have an established emergency plan. SJ said a template was hand delivered last year to each municipality so that the information could be update with Public Safety.

A conversation started about local officials and how they have changed

The meeting informally ended at this point.

M7 – Sign-In Sheet

NORTHUMBERLAND COUNTY

HAZARD MITIGATION

PLANNING COMMITTEE

MEETING DATE: March 23, 2017

	PRINT NAME	REPRESENTING (IF APPLICABLE)	TITLE (IF APPLICABLE)
1.	Tiffany Kaseman	Assessors	
2.	Stephen Lutzy	Public Safety NC	Director.
3.	ERIC WENDT	NC INFO SERVICES	
4.	Doug DIEHL	Milton Boro	Code ENF.
5.	Wayne Ann Bilger	EAST Chillisquaque Twp.	Supervisor

Meeting # 8 March 30, 2017

M8 – Public Meeting – Capability and Risk Assessment – NC Admin Center – 6:30 PM

1. **Welcome and Introductions**
   a. Planning Team

2. **Project Overview**
   a. Overview of Hazard Mitigation

   b. Participation - why it's important to Participate

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5. **Plan Maintenance**
   a. Mistakes found
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   c. Tentative Timeline

6. **Question and Comment Session**

M8 – Publicly Advertised Material

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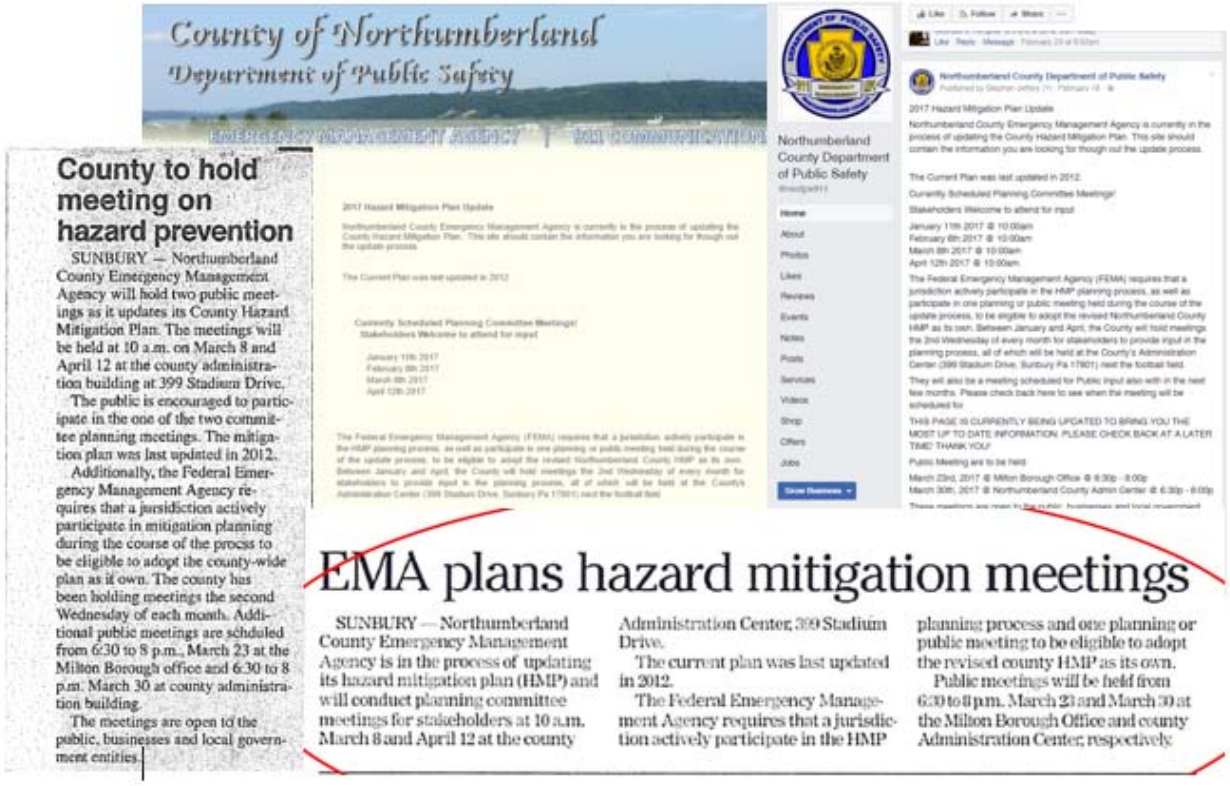

County of Northumberland
Department of Public Safety

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M8 – Meeting Minutes

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This is the second of the advertised public meetings. Agendas and informational handouts were created for the public's use. It was the committee's intention to follow the agenda at this meeting and reserve time at the end of its "presentation" for questions or comments. There were no members of the public in attendance, therefore the meeting was held in an informal manner without following the agenda.

Keith Ayers (forward referred to as KA) asked the present planning team members to make a commitment to begin editing the revised version of the plan. Chuck Hopta and Doug Diehl asked specific questions about what portions of the plan were already edited and how accessible are these sections so that members can jump in and begin work. Tiffany Kaseman asked is the plan if it seems to be easy to write these sections, KA said it's not entirely technical so there are sections that could easily be written to suit our County's characteristics. KA said he can keep up with any member's questions by email or phone call. Chuck, Doug and Tiffany made verbal commitment to begin review and edit of the plan revision. Eric Wendt and KA began talking what work they have been wrapping up, calling specific attention to critical facilities. The meeting was brief and ended informally.

M8 – Sign-In Sheet

NORTHUMBERLAND COUNTY

HAZARD MITIGATION

PLANNING COMMITTEE

MEETING DATE: March 30, 2017

	PRINT NAME	REPRESENTING (IF APPLICABLE)	TITLE (IF APPLICABLE)
1.	Doug Diehl	Boro of Milton & NC HMP T	Code Enf.
2.	Eric Wendt	NC	IT
3.	Stephen Lutley	Northld Co DPS	Director
4.	Tiffany Rasenan	Assessors	
5.	Chuck Hopta	Engineer - Northld Co	Engr
6.	Keith Ayers	NC GIS	GIS

Meeting # 9

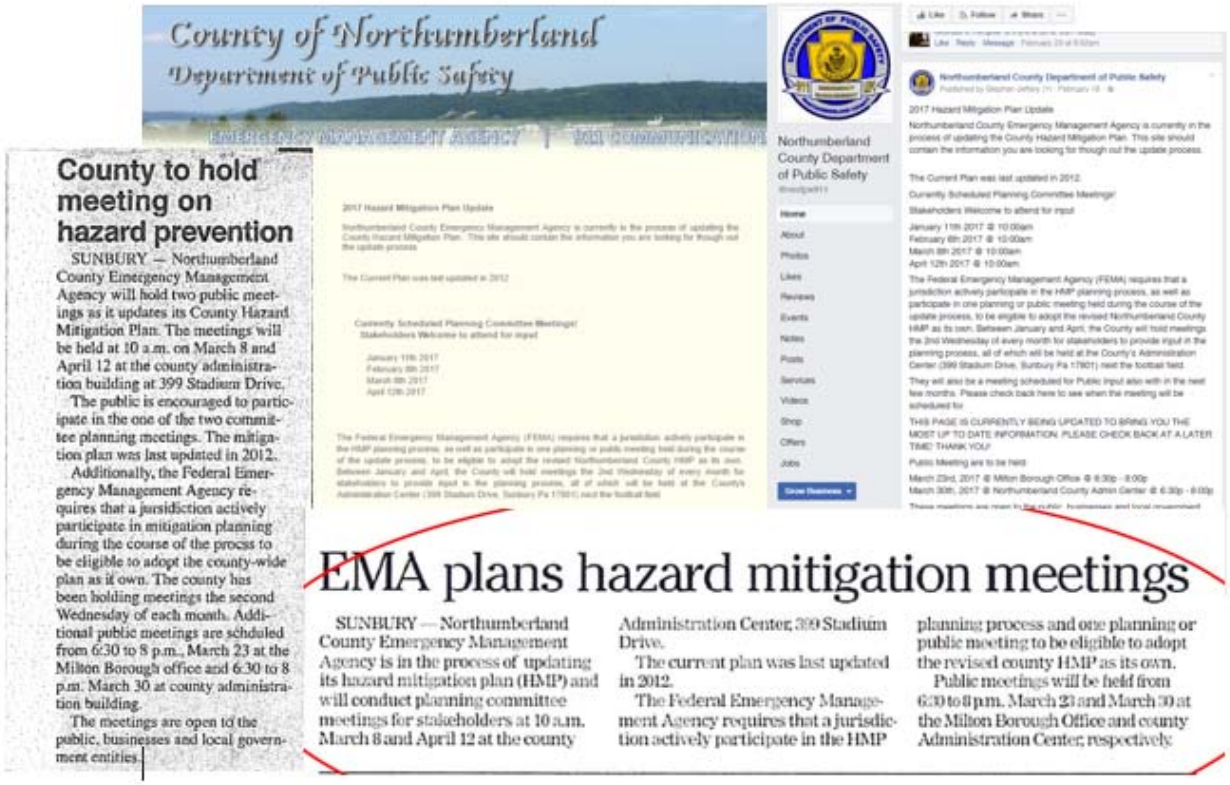
April 12, 2017

M9 – Planning Committee Meeting with FEMA

This meeting was advertised publicly even though it was intended to be a planning committee meeting only. We did also extend an invitation to FEMA and PEMA to attend to make sure our process was meeting their current standards and recommendations. FEMA was in attendance an helped to clarify some of the questions we had and also gave some sound advice as to the details of the plan as well.

M9 – Publicly Advertised Material

We advertised this meeting through Newspaper, Website, Facebook and a mailing.



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M9 – Meeting Minutes

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This meeting was attended by Mari Radford of FEMA; the present team members used this meeting to asked questions about the County's review process

Eric Wendt (forward referred to as EW) began asking about declarations and proclamations that were not reported in the last plan, Mari Radford (forward referred to as MR) said the intent of

adding these into the plan is to establish a pattern. EW asked if we are required to go back and look at all recorded incidents in the County if they were omitted, MR said don't worry about it unless it was a major event that shaped the way our communities moved forward. EW and MR agreed that detailed inventory of disasters is scant prior to the 1990's. MR said they are looking for a sound analysis of what happened before, what we think is coming ahead, and our ability to deal with it.

EW gave an update to those in attendance; the original document is not user friendly, so team members are creating a new document to clean up formatting. EW gave the group samples to look at and reminded the group that although the plan is in sections right now, we will assemble is later. EW also explained the update process for maps and tables.

Keith Ayers (forward referred to as KA) explained to the group that it was decided a few weeks prior that we would have to begin a new plan in our own fashion. MR said they have seen in the past that plans are inflated for the sake of looking bigger without any need for the additional context, but she agreed with the teams plan to enhance the maps and tables because visually that is was the public likes to see represented. KA said we have been merging redundant data, EW said that's what they are also doing with the tables. EW said he waits for Tiffany Kaseman (forward referred to as TK) to make edits to the actual text, then goes back through the completed section to add in "graphics". MR asked specifically about the data, she said she often sees in 2017 plans that they have stopped gathering data in 2015. MR wanted to know if we are covering 2016 as well. Doug Diehl (forward referred to as DD) said yes, we are incorporating information from PEMA and CRS. KA said we just added the 2017 blizzard data. DD said the complete over haul is due to the inaccurate data we found from the last plan.

EW said we had a tentative deadline of May 1 but that the work is too aggressive to meet that deadline. EW asked MR if she could suggest a realistic due date; MR said in the regulations there is not specific timeline but that it will be submitted to the State first and then it will move on to FEMA, unless the State returns it to the County with major changes. But once it is with FEMA, they have 45 days to review it. MR said they have never gone past 45 days; MR said if the State gets it to her by September 1, then that would allow for enough time. MR asked if the team could get it to the State by July that should also allow for this timeline to move quickly and smoothly. EW said that was what he and KA were going to ask for as the tentative due date.

EW asked members present to try to contact municipalities that have provided no response, which prompted Chuck Hopta (forward referred to as CH) to ask MR how much of an effort we must put forth to get these municipalities to participate. MR said because we are doing this at a County level, try the best we can; those municipalities that do not participate will not be able to look for aid later. CH said that the problem areas are our smaller rural municipalities, MR said they can miss out on grant money to which CH said they don't even know about grant money, nor do they usually care.

Overlapping conversations took place at this time

DD and KA let MR know that we have been reviewing other county plans to see what we may be missing. KA told MR we are not using the HAZUS tools. MR said using the HAZUS census blocks would misrepresent such a rural county like ours and said our plan is a better representation. MR asked if we are doing the same work that Columbia County did, KA said we are using that plan to help our framework and help with data sources. MR said FEMA is looking for an analysis of potential losses and that they are looking for the most up to date listing of critical facilities. MR said FEMA is also looking for debris and asked if we are able to calculate what we think debris might be; she

said it's not mandatory to list but that it's the first thing you have to pay for in these events. MR said as long as we explain in the plan how we came up with a number, it will be sufficient representation.

MR said for the future, because we have a GIS specialist, we might want to think about doing some user identified HAZUS runs. She asked if we have any footprint data, KA said we have 2016 data available. MR suggested doing some training for HAZUS.

KA asked how important the appendix is; MR said the appendix should contain all sources, documentation of meetings (sign- in, minutes, and agendas), NFIP data, repetitive loss and severe repetitive loss. *An explanation of CRS happened at this time*

MR next asked about plan integration, she said she saw in section 2 that there was a plan from 2005 that would be coming up for renewal and are we in the midst of updating that. No one is aware of whether it is being updated because Planning was not present. MR said FEMA likes to see it mentioned that this plan can be integrated into other plans, even if it's just a basic table showing other plans and their status. MR gave examples of where plans may get integrated and possibly how, she said this was not a requirement during the last plan process. KA asked CH if he knows whether there are other plans that exist on the County level. CH said he isn't aware of any economic plans and that we don't own any bridges or roads so he knows there isn't a transportation plan. He also said he is not aware of any local municipalities having full blown plans. MR said just be sure to look for opportunities to offer this plan to integrate. DD asked if it would be advantageous to call out problematic areas so that they can be easily referenced, MR said that would make it super easy for others to integrate this plan. MR said identify roads within the hazards to make it easier. *A few independent conversations broke out at this time*

MR asked if we were familiar with the local review plan tool because it's the checklist she will be using against our plan. This form must be filled out and submitted along with the plan to be reviewed because FEMA will send the approval letter to the municipalities on proof of adoption based on that list. MR also said they have a template for the executive summary, it's available to help create the synopsis that you would send to elected officials or the press instead of the full blown plan. MR said call out the transportation concerns in the executive summary as well.

EW asked is they prefer to see the appendix or if we can provide data directly in the plan. MR said putting work directly in the plan is better, but they don't want to see minutes or sign-in sheets directly in the plan, so keep that in the appendix. MR wanted to know if we contacted any of our neighboring counties, EW said that he and KA talked to Columbia County. Steve Jeffrey (forward referred to as SJ) said that Union and Snyder Counties were invited to the kick off meeting but they did not send anyone. MR said FEMA is working toward getting working relationships between "neighbors" so we need to keep inviting our neighboring counties. MR also wanted to know if we had any input from local businesses or our school districts, DD said they know what we are doing but they aren't interested in the process or providing input. SJ and CH said there were a variety of attendees for the first meeting, such as businesses and schools, but nothing since.

MR asked what our plans were for posting the draft, EW said we continue to posts updated copies online. CH asked if posting online is sufficient, MR said provided that it's advertised where it can be accessed then posting it online is sufficient. MR said any vehicle you can use, do it, and just make sure we put in the plan how and when we made the plan available. DD said we are on board for using social media if need be. EW said we utilize the county's public websites as well. MR said provide an opportunity for feedback.

MR asked if we are including pictures in the plan, EW said as much as we can. MR said make sure that they are included because that draws more people to be involved in reviewing the plan. When the group began to talk about pictures, and flooding, EW said that there should be measurements on local areas known to flood so that people have a tangible idea of what's happening. MR asked if the county has high water marks posted, everyone made reference to Knoebels' high water marks. *many independent conversations broke out about driving through flood water*

MR asked if we are profiling the same hazards as were done in the last plan, CH said yes, and DD and KA said they have actually added hazards. KA asked if we have to include all the hazards from the last plan, MR said the rule is if you don't profile the same hazards then you must explain why. *The group discussed local hazards*

Members asked MR if we are heading in the right direction, she said she would rather see a plan built buy the community as opposed to a consultant. The group told MR the reason for doing this at the county level was because of a lack of funds to hire or match through grants, and that the previous company did not leave the county with any original data.

MR said it's a requirement that the plan be reviewed once a year and after disasters. Updates should be sent to PEMA and FEMA, including how, what and when the updates are as well as who worked on it. MR said this can also help in getting the team trained in the future.

EW said on our local review we are slimming down the redundant material which prompted MR to ask if we had reviewed our actions yet. EW said we've looked through them but they are all very general and the actions are weak and unsupported. MR said every hazard that is profiled has to have any action along with it, and every community should have one action assigned to it. MR said figure out a matrix and what works for each community, but what she will be looking for is acquisition, elevation or mitigation/reconstruction for flood prone properties. MR said mitigation/reconstruction is a new allowable program for structures that can's be moved or elevated that will allow for the structure to have the demolition and reconstruction on the original site paid for, provided it's not in a flood way.

MR said they would like to see an updated table of our municipalities and who is participating in the NFIP. *DD and MR discussed data they were viewing on his tablet*

MR said it's ok to send sections for review so that we can understand if we heading in the right direction as we continue to develop the plan. EW said we can send sections 1 through 3, and that would help the team.

The team made a review of deadlines and MR thanked the team for the invite.

M9 – Sign-In Sheet

NORTHUMBERLAND COUNTY

HAZARD MITIGATION

PLANNING COMMITTEE

MEETING DATE: April 12, 2017

	PRINT NAME	REPRESENTING (IF APPLICABLE)	TITLE (IF APPLICABLE)
1.	Keith Ayers	NC GIS	GIS
2.	Tiffany Kaseman	Assessors	Chief Assessor
3.	Lori Smoogen	Finance	Sr. Finance Manager
4.	Chuck Hopta	Engineer	Engineer
5.	Stephen Seeley	Emerg Management	Director.
6.	Doug Diehl	Borough of Milton	Zoning & Code Enf & Floodplain Mgr
7.	Mari Radford	FEMA R3.	Community Planning Lead
8.	Eric Wendt	Noe Co IT	Assistant Director

Meeting # 10 May 10, 2017

M10 – Planning Committee Meeting with Stakeholders

This meeting was held as an informational meeting to discuss where we were in the update process and allow some of the municipalities who have not been able to attend previous meeting to participate in the planning process.

M10 – Meeting Minutes

PLEASE REFER TO SIGN IN SHEET FOR ALL ENTITIES IN ATTENDANCE

This is a meeting specifically to review the teams work thus far and a chance for any "straggler" municipalities to provide input

Tiffany Kaseman (forward referred to as TK) asked Eric Wendt (forward referred to as EW) how up to date the numbers are for the presidential declarations are in the plan. EW said he copied the old table but that Steve Jeffrey (forward referred to as SJ) made updates prior to him copying the table.

EW let the team know that the first three sections were submitted and PEMA/FEMA sent back their comments. EW is working on making the appendix for each of the meetings. The team has originally put this data directly into the plan as screenshots, but they will not be fully listed in the appendix. EW said section 1 and 2 are complete, although there is a small section of 2 that needs to be enhanced per FEMA's recommendations. EW is also going through section 3 now and that will be complete relatively soon. Lori Smoogen (forward referred to as LS) asked EW if he has to recreate the agendas, he said he will be pulling info from the minutes and sign-ins to provide information.

EW said FEMA wants to see information about impacts to local roadways and that will have to be added somewhere in section 2-2. Also there is a need to add detail specifically what kinds of hazards are happening (ex. hazmat vs. winter storm). EW said he currently has a question out to FEMA about the mandatory requirement of including neighboring counties in this process; EW said he doesn't remember ever being invited to work with any other county that surrounds ours when they were developing or updating their HMP. Steve Jeffrey (forward referred to as SJ) said he remembers Columbia County inviting Northumberland County to their kick off meeting. EW is asking for input on how we should be inviting our neighbors; do we make an independent effort or should we publicly advertise? SJ said he remembers receiving notice directly from Columbia County and recalls an invite from Dauphin County as well. EW made the decision that we will try to connect directly with the entities in neighboring counties that we work closely with to get them involved in the final stages and in future plan updates. Chuck Hopta (forward referred to as CH) said when we do contact those counties, let them know we would like to see how they might have us involved in their HMP. CH said that would be helpful to add to our plan.

EW asked SJ if he has a list of what municipalities actually adopted the last plan; SJ said not many and LS said she has the "stuff" that was sent to them, but there was no concrete answer if there is a list. EW said he added to the plan that only 8 adopted it last time, but LS said she has a scanned copy of resolutions sent back to us.

EW said FEMA changed their requirements of where data needs to be posted; EW gave an example of plan integration being moved from section 3 to section 5.

EW also said FEMA wants a specific action plan for our diversity of language spoken in the county. The plan needs to have detailed action plans for reaching non-English speaking populations in the event of an emergency. EW said FEMA also wants the plan to acknowledge there are specific communities that need to have notification needs met because of the community not using electronic media methods (ex. smartphones, computers, email). Consider hardcopy letters, television, radio, or other print methods. CH and EW mentioned "shout out" phone call systems, EW asked SJ if that is a capability in Swift. Multiple members discussed a dedicated call list for municipalities and that we contact the municipalities about this effort to build the list. Keith Ayers (forward referred to as KA) said he was hoping to have an explanation of enhanced services that are part of the 911 communication system update added into section 2.

At this point a few independent conversations broke out

EW made a quick review of the last 22 minutes for Doug Diehl (forward referred to as DD) who arrived late. CH asked DD if Milton Borough had ever received an invitation from neighboring counties or boroughs to take part in their HMP process; DD said no.

At this point a few independent conversations broke out

EW said we have to discuss the last public meetings we need to schedule. EW scheduled a meeting for June 7 at 10am and then for June 21 at 7pm. DD said according to PEMA's schedule, we are about 5 months out from our deadline. EW and DD were discussing which sections DD can review, TK said that section 4 will take an exceptional amount of work. DD said he is comparing mitigation actions between our plan and Columbia County because FEMA wants specific municipalities tagged for mitigation or hazards. EW said not a single municipality filled in anything for actions.

Members all explained what portions they are working in. TK asked if any members has made edits to their specific hazards they were reviewing, pass them along to her so she can use their version instead of the old language.

At this time SJ said that George Geise (forward referred to as GG) from Point Township was on his way to the meeting. DD said the Point Township is one of the larger missing pieces because they have large recreation areas in the flood plain. DD said that has to be made throughout the plan that we need to call attention to these places and make it mandatory for those municipalities to get involved in hazard mitigation, specifically actions to detail. DD asked for any input from the team members on recreation areas that are in the flood plain.

Multiple members began to talk about RV parks and areas prone to flash flooding, these need to be called out in the plan.

At this time GG arrived, DD began to explain what the team has been doing and what we would need from him. DD began to give examples of actions plans that GG cold relate to for his township. EW took notes of data that GG was providing specific to habitual flooding. DD asked GG if there were any future projects they were looking at in Kapp Heights and on Cannery Road, GG said there are a few thanks to the Growing Greener program. DD also asked about whether Point Township is affected by the gas pipeline project, GG said yes. DD asked EW if

there were any areas in question that we would need to review with GG, EW said no we covered what was needed.

DD and EW reviewed that the final draft would be submitted for review on July 1. DD also said the next meetings are June 7 and June 21. GG asked if there was anything that he would need to bring to the next meeting. DD said anything that pertains to their action plans in reference to hazards would be helpful.

At this point, multiple redundant conversations happened about the gas lines in the county. The meeting ended informally

M10 – Sign-In Sheet

NORTHUMBERLAND COUNTY

HAZARD MITIGATION

PLANNING COMMITTEE

MEETING DATE: May 10, 2017

	PRINT NAME	REPRESENTING (IF APPLICABLE)	TITLE (IF APPLICABLE)
1.	ERIC WENDT	NC IT	IT
2.	Keith Ayers	GIS Northld County	GIS
3.	Tiffany Kaseman	Assessors	
4.	Lori Smoogen	Finance	
5.	Stephen Jeffrey	EMA	
6.	Chuck Hopta	County Engineer	Engineer
7.	Doug Dill	Bd of Mictor	Code Enf. Floodplain Manager
8.	George Geise	Point Twp	EMC / Supervisor
9.			

M11 – Planning Committee Meeting with Surrounding Counties

This meeting was held as an informational meeting to discuss where we were in the update process. We also invited our peers in our neighboring counties to attend and give us some feedback\input on our plan as well as some insight on the struggles they had seen with theirs. In our discussions we found some opportunities to work together and collaborate on some training and public awareness in the future.

M11 – Advertised Material

This email was sent out to the folk in our neighboring counties that either we work with on a daily basis, or we know have worked on the Hazard Mitigation Plan in their County. This included EMA, 911, GIS and Planning personnel.

From: Wendt, Eric
Sent: Tuesday, May 23, 2017 3:40 PM
Subject: HMP Invite

Hello All,
I wanted to take a minute and touch base with you on behalf of our Hazard Mitigation Planning team. As you all know, it is a requirement of FEMA that we reach out to our surrounding Counties and our Peers to get a comprehensive review of our Hazard Mitigation Plan. We are holding a Planning meeting on June 7th at the Northumberland County Administration Center (399 Stadium Drive, Sunbury Pa 17801) @ 10:00 am in the conference room/public meeting room. I would like to extend an invitation to you to join us at our planning meeting to get your input or views on how our plan can integrate with the plans that you are currently working on or using.

If you cannot join us at the meeting on June 7th, we will be posting completed sections of the plan at the following website for review http://publicsafety.norrycopa.net/index.php/ema/hazard-mitigation. If you wouldn't mind taking a few minutes to read through the sections and offer any insights you might have, please feel free to send them to us at hazardplan@norrycopa.net.

M11 – Meeting Minutes

PLEASE REFER TO SIGN IN SHEET FOR ALL ENTITIES IN ATTENDANCE

This is a meeting specifically to review the teams work thus far and a chance for any "straggler" municipalities to provide input

Eric Wendt (forward referred to as EW) sent a copy around of the press release for the last public meeting to all members interested to view. EW gave an update where we are with editing, he gave a review where the sections are at the moment. Chuck Hopta (forward referred to as CH) asked if we were checking to make sure the same data is in the plan as before, as far as graphics (tables & charts). EW said yes everything is included as before. EW said that Keith Ayers (forward noted as KA) is specifically updating the maps. EW said he still wanted to get with CH to make sure the data is as close to 100% as possible.

EW said the biggest problem was that Delta did the plan previously and now we are doing it on our own without any supporting data from the previous plan. Fran McJunkin (forward referred to as FM) from Lycoming County GIS commented that Delta did their plan as well and they know what we are up against. EW gave a brief description of those troubles to the group. FM wanted to ask follow up questions about doing the plan on our own:

- Did the team find anything interesting? The group gave answers of all the errors that were being found with the data we had to work with. FM said that was a struggle for Lycoming because they saw the county differently as the company handling the plan update.
- From the previous results, did the team see anything different than what would have been expected? The group expressed the misrepresentation of county data was their biggest concern.
- What is County's number on hazard? KA said flooding is our worst hazard. FM said they have the same, although they did want to explore other hazards with more depth.
- She heard the team talking about opioids, will that be included in the plan? EW said yes it is being pulled out of criminal activity because it's a growing epidemic for the County. FM said they are making it a stand-alone section of their comprehensive plan. EW said our section will be semi-brief because it's an introductory addition to the plan. FM said they ran into opioid data as they were investigating the impact of the Marcellus shale industry. Tiffany Kaseman (forward referred to as TK) said we are striking at the same time the Commonwealth does, but we don't have enough data for the entire county to make this a detailed section. But because there is a growing desire to educate the public from many other sources, the team felt it needs attention in the plan.

TK asked at this time for the purpose of needing to reach out to our neighboring counties, as far as PEMA/FEMA making it a requirement. EW said PEMA/FEMA wants to see that we are working to keep neighbors informed about our plan and to learn where we may fit in theirs.

At this time Dough Diehl (forward referred to as DD) arrived and provided all in attendance with a copy of the work he had completed for section 6. He began to review what all the pages were. He said that this data was his interpretation of what should be removed from the 2012 data, what should stay for 2017 and what needs to be added for the 2017 plan update. He also said he was taking leads from PEMA as far as how to make the data meet their requirements. DD make an actual review of all the data as the group followed along. *Slight discussions took place on the items DD was reviewing, but only in the capacity of housekeeping*

FM mentioned at this time that UGI was in her office the day before looking for all of their properties that are located in the flood plain, which they are planning to map this data themselves so they can enhance their plans. DD said he has conversations each year with utilities in Milton Borough and how they are prepared for flood issues. KA asked if UGI was going to share information with the county, FM said she didn't believe that was their intention. *At this point a few independent conversations broke out*

FM asked if we have a plan to get one municipality right off the bat to sign the approved plan; DD said he plans to get Milton Borough to sign immediately. FM said that Lycoming County is considering looking to have hot links to the planning areas available via the internet or social media to make public interaction easier. *At this point a few independent conversations broke out*

FM began to speak of their experience with updating the County's comprehensive plan, she said that their levee management was not under flooding but under economic development because the levee protects 40% of Williamsport's commercial and industrial properties. DD asked CH if Sunbury is having problems getting recertification of the levee, CH said they are still trying to find funding to complete the entire modification but at this time the northern part is done. *At this point a few independent conversations broke out*

Josh Schnitzlein (forward referred to as JS), the Lycoming County Hazard Planner, began to ask questions about the objectives hand out that DD provided. He wanted to know who would be championing the education objective. DD said these objectives will correlate to the action items. FM shared Lycoming's experience that the county commissioners would not allow the county to have a Facebook page, which resulted in members of the public to develop their own but it was not monitored or regulated. Lori Smoogen (forward noted as LS) said that public safety does have a Facebook page and that it is updated frequently and regulated, as far as content. *At this point a few independent conversations broke out*

JS continued to ask questions specific to the objectives and actions, specifically obtaining properties to relocate or demolish in floodplains. DD said the main purpose of the actions are for flood proofing. DD said SEDA-COG has plans to work with some municipalities to mitigate properties in repetitive claim areas. JS asked about goal 4 and related to HAZUS modeling, do we have anything tied into our GIS. DD mentioned that we have flood plains but that we don't have dam profiles. KA, DD and JM all mentioned data about the Stevenson Dam. JS asked who the entity is that primarily seeks the funding for these projects. EW said we have a grants manager but that there's a possibility the public safety may do that. JS pointed to the action item about increasing communication between county departments, he said that is something they are trying to improve in Lycoming County as well. JS also asked if the department of public safety has any annual or more often recurring training opportunities with respect to response. Jason Zimmerman (forward referred to as JZ) said yes there is training. JS asked if there is any training or summit for municipal leaders that involves FEMA and NFIP. No one had knowledge, DD said that's definitely in the action items. FM said this is an area that we may be able to set up regionally, multi-jurisdictional training. FM gave examples of the meetings she had held in the past with the help of SEDA-COG. Many members agreed that creating a regional education partnership would be worthwhile for our plans and future updates. JS and FM brought up the Silver Jackets as an example of regionalized task forces. FM gave a brief description of the Silver Jackets, but mentioned that they don't usually involve local municipalities. DD mentioned there was an action item to improve communication with local officials.

After exploring more of the action items, JS mentioned the PHARE funds that Lycoming County was able to use. FM said they were lucky to be able to apply to PHFA for funds, but she also mentioned more of about the PHARE program. TK told the group that it is Act 105 of 2010.

JS said that they are currently working with the US Army Corp doing a study to identify other non-structural means of preventing flooding, but that he liked that the plan has a similar action item. FM took the time at this point to explain how JS became the county's full time hazard planner. *FM gave a brief explanation of some of her findings about claims amounts for local flood areas*

JS asked if the county gets a planning intern to do any work, CH said no. DD said we aren't aware of what we would need to do to get an intern. Nicholas Comell (forward referred to as NC) said he can answer questions, at this point FM pointed out that he is their current intern from Bloomsburg University. LS said there was talk of getting an intern, TK said that planning does have one. JS said that having a website is important but that an intern can definitely help to develop the add-ins that are needed per our action items. TK mentioned that planning is currently using their intern to get pictures and enhance their literature. FM said we could certainly ask any of the surrounding schools for interns that would be able to help with the type of data we are using. NC said that in his disciplinary training, students are required to have a full time summer internship but they are hard to come by in this area. He said that he lives in Bloomsburg but is commuting to Williamsport because that is as close as he could find. KA said it would be nice to have an intern

but at the moment he doesn't have the time to train the intern on their tasks so that individual can work alone. At this point FM explained work flow in Lycoming County is structured. EW said the licensing is an issue as well because the county does not have an ELA; DD said this is along the lines of one of the action items where we are trying to get at least every municipality some kind of equipment, if they don't already have it, to aid the municipality in communicating with the county and using county resources. DD said we want to help but we can't find a way to force the municipalities to participate.

JS asked if the county has a stream gauge website for the public; DD said he only has something for Milton Borough, but nothing county wide. EW said there is a link to the NOAH site on the public safety page. FM mentioned that their approach is different because flooding affects them differently because of how the West Branch crosses the county. FM gave an example of how much the public relied on county resources during the last major flood. NC mentioned what kind of work the interns do, which they actually have real projects from local counties that they work on. He also said that they don't have to be on site with the county if there is a problem with licensing because the school has licenses and programs that the students can use to aid their internship.

DD said he is finding there are two key goals from this meeting he will need help from the team to complete: who are the lead agencies for each of the action items and need team members to key into the schedule with data about whether or not actions are already being completed, what years they began and how long they may take. DD said he'd even love to get feedback from Lycoming County if they felt they could contribute in a way that we already hadn't. EW said he would take a look at the handouts and get comments back as soon as he can.

FM asked if there was any significant public input; EW had to relay that there was only one municipality who showed up for a public meeting but that there were only about half the municipalities who responded to the survey.

At this point, multiple redundant conversations happened. The meeting ended informally

M11 – Sign-In Sheet

MEETING DATE: June 7, 2017

	PRINT NAME	REPRESENTING (IF APPLICABLE)	TITLE (IF APPLICABLE)
1.	ERIC WENDT	NC IT	
2.	Jason Zimmerman	NC DPS	
3.	Lori Smeager	Finance	
4.	Chuck Hopta	Engineer	
5.	Josh Schnitzkeh	Lycoming County Hazard Planner	
6.	Nicholas Carell	Lycoming County Intern	
7.	Tara McClunkin	Lycoming County GIS	
8.	Tiffany Kaseman	Assessing	
9.	Keith Ager	NC GIS	
10.	Doug Diehl	Milton Borough	

Meeting # 12 June 21, 2017

M12 – Public Meeting – Plan Review – NC Admin Center – 6:30 PM

Northumberland County All-Hazard Mitigation Plan Public Meeting
Wednesday, June 21, 2017 @ 7:00pm

AGENDA

1. **Welcome and Introductions**
   a. Planning Team

2. **Project Overview**
   a. Brief Overview of Hazard Mitigation

   b. Work Completed to Date

3. **Previous Meetings**
   a. Planning Committee Meetings (All meetings held at 10:00am)

   September 9, 2016
   October 20, 2016
   December 14, 2016
   January 11, 2017
   February 8, 2017
   March 8, 2017
   April 12, 2017
   May 10, 2017
   June 7, 2017

   b. Public Input Meetings

   March 23, 2017 – 6:30pm
   March 30, 2017 – 6:30pm

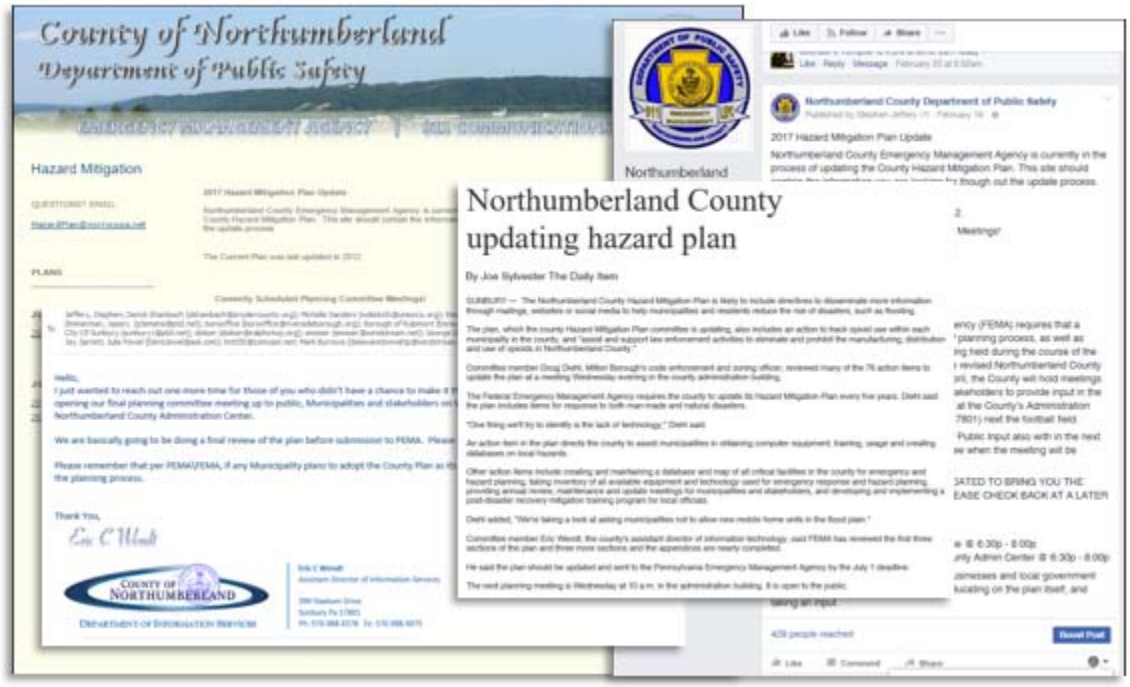
4. **Action Items**
   a. Review

   b. Discussion

5. **Question and Comment Session**

M12 – Publicly Advertised Material

We advertised this as well as our next meeting at the same time for convenience through Newspaper, Website, Facebook and a mailing that went to each municipality



M12 – Meeting Minutes

PLEASE REFER TO SIGN IN SHEET FOR ALL ENTITIES IN ATTENDANCE

This is the final public meeting of this update process

Eric Wendt (forward referred to as EW) began the meeting by welcoming all present who were not part of the planning team. EW gave a brief introduction of the planning team members present and gave a brief description of what the team has been doing with the existing Hazard Mitigation Plan. EW also reviewed the previous meetings (dates and times) and when the plan will be submitted for two step review from PEMA and FEMA.

EW review briefly what the handouts were for the meeting. At this time he asked Doug Diehl (forward referred to as DD) to review the handouts instead because DD had been working on the action items. DD began to make a review of the actions items. The following minutes will highlight the actions that produced discussions the yielded potential changes to our action items:

Action # 16 – Identify potential location to construct levees or floodwalls to protect communities subject to flooding (…); George Geise (forward referred to as GG) suggested adding into this item or possibly make it its own item to improve or expanding existing structures as well (i.e. the wall in Sunbury).

At this time another member of the public came in and a few independent conversations broke out

#47 and 50 – Require municipalities to create and adopt an EOP, provide it to Public safety, and also require building permits in the 1% annual chance floodplain; GG asked if the county would want a copy of the flood plain or development ordinances from municipalities. Steve Jeffery said it wouldn't hurt because we do get stray phone calls about this information. GG thought maybe it would be helpful to share with PEMA or FEMA. DD said we could discuss finding a "librarian" to collect and store a copy for the county to include with the county level EOP or HMP. DD said it would be good to have for at least the list of contacts that the County would have to contact prior to, during or after a hazardous event.

No other action items reviewed produced discussions that the team needed to use for further development.

At this time EW asked if anyone present had any other unanswered questions; a member of the public asked if the 2012 plan was available to compare to the handouts given at the meeting. DD actually reviewed the handout to show that each of the items is the original from 2012 and notes whether they are updated or the same, then there are action items that say new.

DD made a plea to members present to help the team by spreading the word that this hazard plan is intent on exhibiting inclusion; municipalities, media, or even the public have a vested interest in hazard mitigation.

At this point, multiple redundant conversations happened. The meeting ended informally

M12 – Sign-In Sheet

MEETING DATE: June 21, 2017

	PRINT NAME	REPRESENTING (IF APPLICABLE)	TITLE (IF APPLICABLE)
1.	Ed Markowski	Upper Augusta twp	Vice Chairman CRS - FPM.
2.	Keith Ayers	Northd County GIS	GIS
3.	Tiffany Kaseman	Assessors	
4.	Doug DiEHL	Milton Borough	Code Enf. Officer
5.	ERIC WENDT	NORTHUMBERLAND COUNTY	IT
6.	Stephen Jeffery	Northumberland Cnty	EMA.
7.	Joe Sylvester	The Daily Item	Reporter
8.	George Geise	Point Twp ~~EMA~~	EMA
9.	M. Noordam		Area Resident
10.			

Meeting # 13 June 28, 2017

M13 – Planning Committee open to Public – Plan Review – NC Admin Center – 10:00 AM

Northumberland County All-Hazard Mitigation Plan Public Meeting
Wednesday, June 28, 2017 @ 10:00am

AGENDA

1. **Welcome and Introductions**
   a. Planning Team

2. **Project Overview**
   a. Brief Overview of Hazard Mitigation

   b. Work Completed to Date

3. **Previous Meetings**
   a. Planning Committee Meetings (All meetings held at 10:00am)

   September 9, 2016
   October 20, 2016
   December 14, 2016
   January 11, 2017
   February 8, 2017
   March 8, 2017
   April 12, 2017
   May 10, 2017
   June 7, 2017

   b. Public Input Meetings

   March 23, 2017 – 6:30pm
   March 30, 2017 – 6:30pm
   June 21, 2017 – 6:30pm

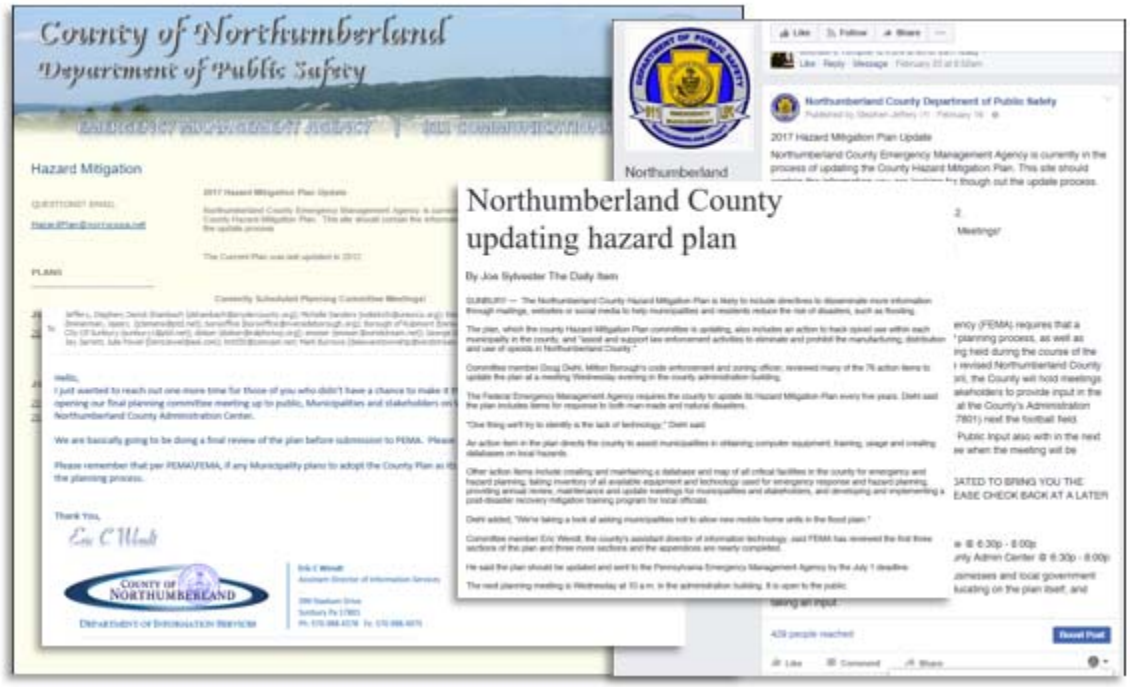
4. **Action Items**
   a. Review

   b. Discussion

5. **Question and Comment Session**

M13 – Publicly Advertised Material

We advertised this as well as our next meeting at the same time for convenience through Newspaper, Website, Facebook and a mailing that went to each municipality



M13 – Meeting Minutes

PLEASE REFER TO SIGN IN SHEET FOR ALL ENTITIES IN ATTENDANCE

This is the final meeting of this update process

Eric Wendt (forward referred to as EW) began the meeting by welcoming all present who were not part of the planning team and did introduce the members of the Planning Team who were present. EW said the agenda that was handed out for this meeting is the same as the agenda for the week before. EW said that we are now in the final few days of our editing process and that we have been working closely with FEMA and PEMA so that we are meeting State and Federal requirements. EW said that the team have done an early submission of the first three sections so that we would know if they were heading in the right direction. At this time EW asked Dough Diehl (forward referred to as DD) to give a brief explanation of what has been happening with the actions, not a full and detailed explanation, but to mention the newer actions.

DD said he had been in contact with PEMA and FEMA about how they wish to see the action items represented. PEMA and FEMA felt that the team was being too vague with the actions as submitted, so DD made a complete review of all the actions and even added a few: asking municipalities to prohibit

mobile homes in floodways, literature in a second dominant language, regionalized education, more public meetings, and provide basic technological equipment to local municipalities. EW also gave a brief explanation of these new action items.

EW let the public and municipalities present know that we will be providing this plan to review via the county's departmental websites. In that time the team encourages ANY feedback because it is planned that the team will meet at least every six months as part of its obligation to the action items as well as mandatory five year reviews.

DD said that FEMA encourages municipalities to reach out to them for education opportunities. DD said we have plans to invite FEMA for regional training in the future.

EW asked if anyone had any questions; Chuck Hopta asked EW to let the municipalities present know whether or not the team received the survey retuned completed from their particular municipality.

> Ralpho Twp – reported that they are present, the survey is nearly complete but the twp supervisors want to see it at their next public meeting before it's sent to the County.
>
> Upper Augusta – it was confirmed they have submitted their completed survey
>
> Watsontown Boro - it was confirmed they have submitted their completed survey
>
> Sunbury City – they have it completed, they just need to send it
>
> Herndon Boro - it was confirmed they have submitted their completed survey

Stephen Jeffery said it was difficult getting all of the municipalities to complete the surveys and the team has tried to impress upon the municipalities that funding may be denied if they do not show an interest in participating. DD even said he offered his availability after traditional work hours but there was little interest. At this point multiple members of the planning team wanted to make the public aware they could be denied funding if they do not participate in the plan, multiple examples were given.

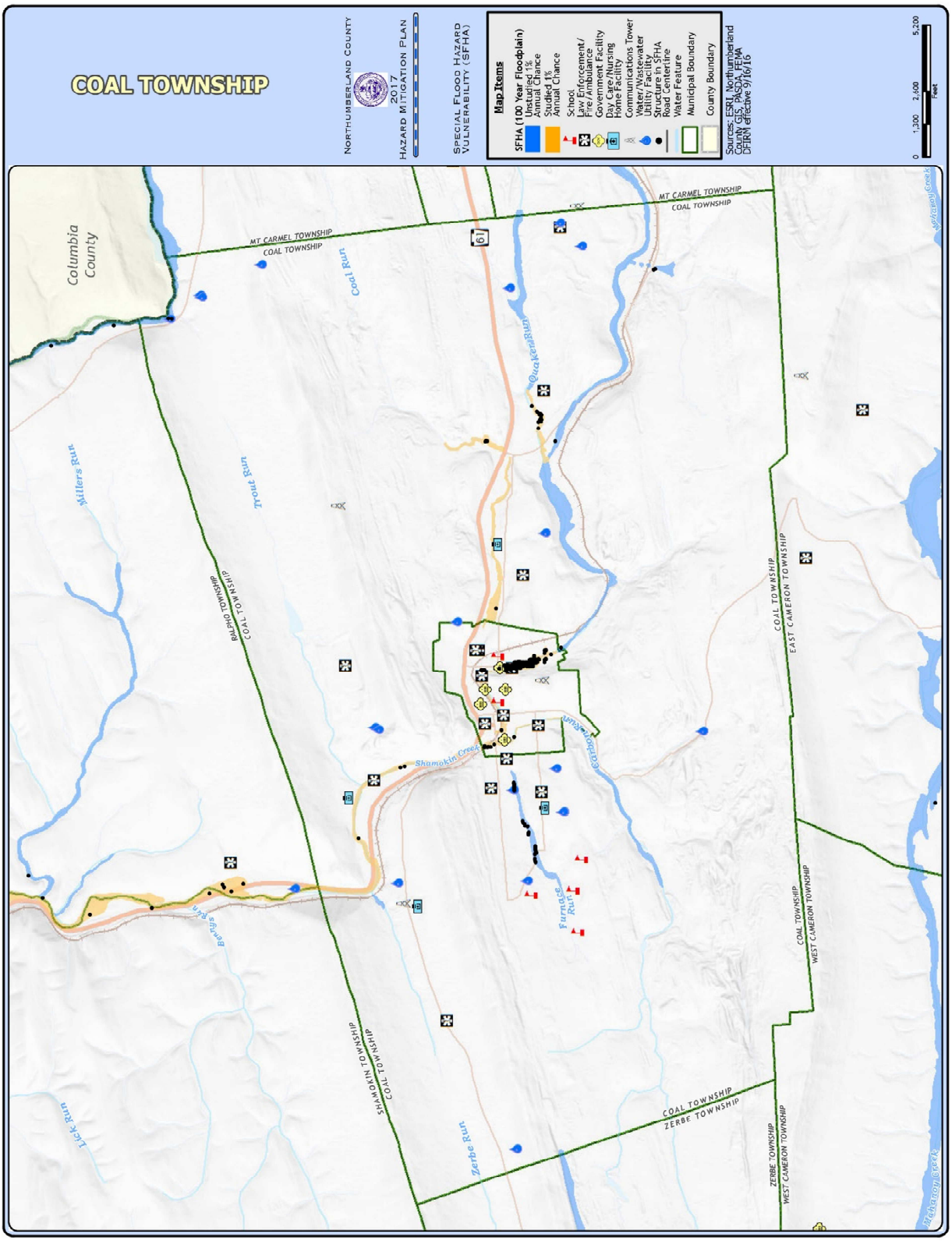
EW thanked everyone present for their efforts and adjourned the meeting.

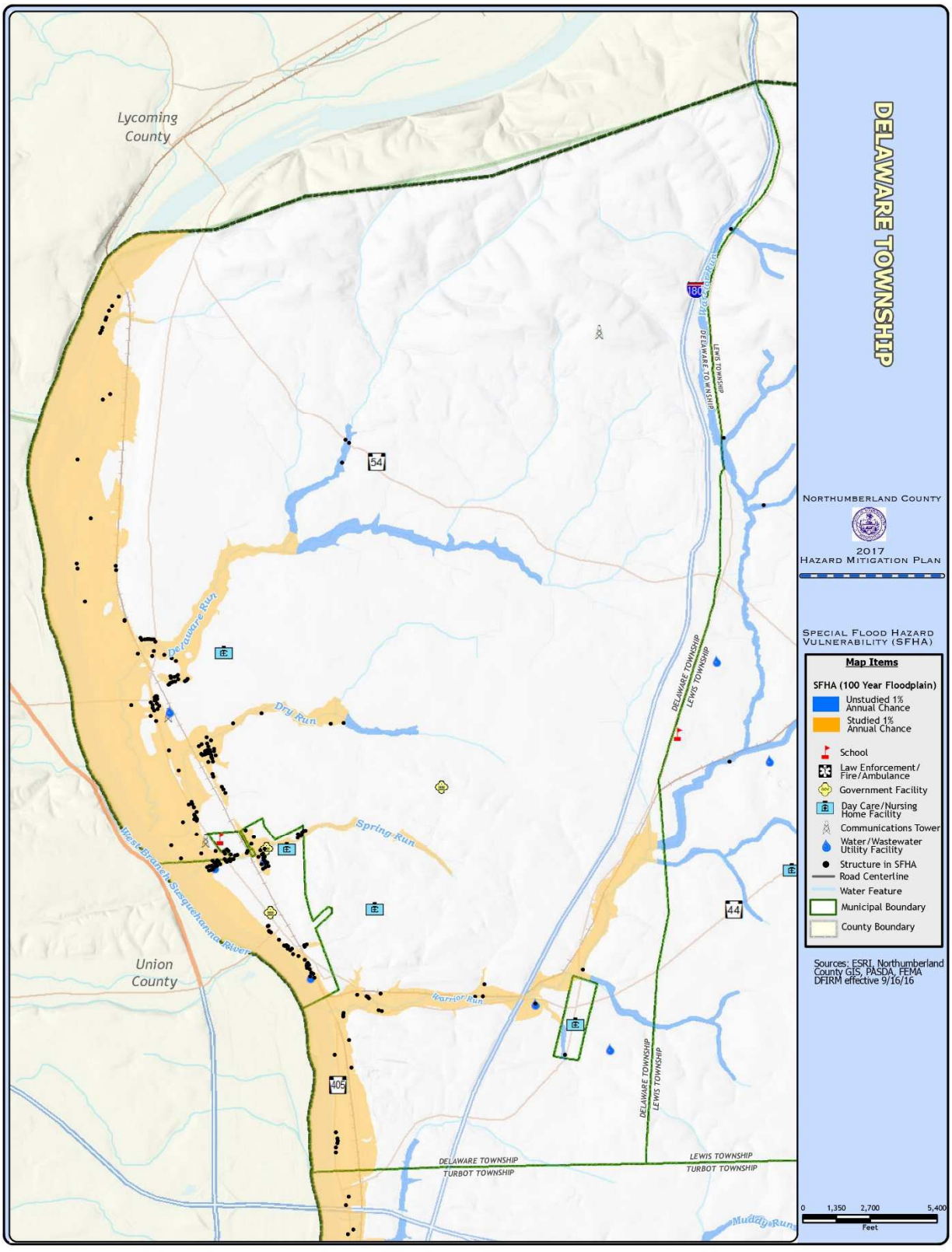
M13 – Sign-In Sheet

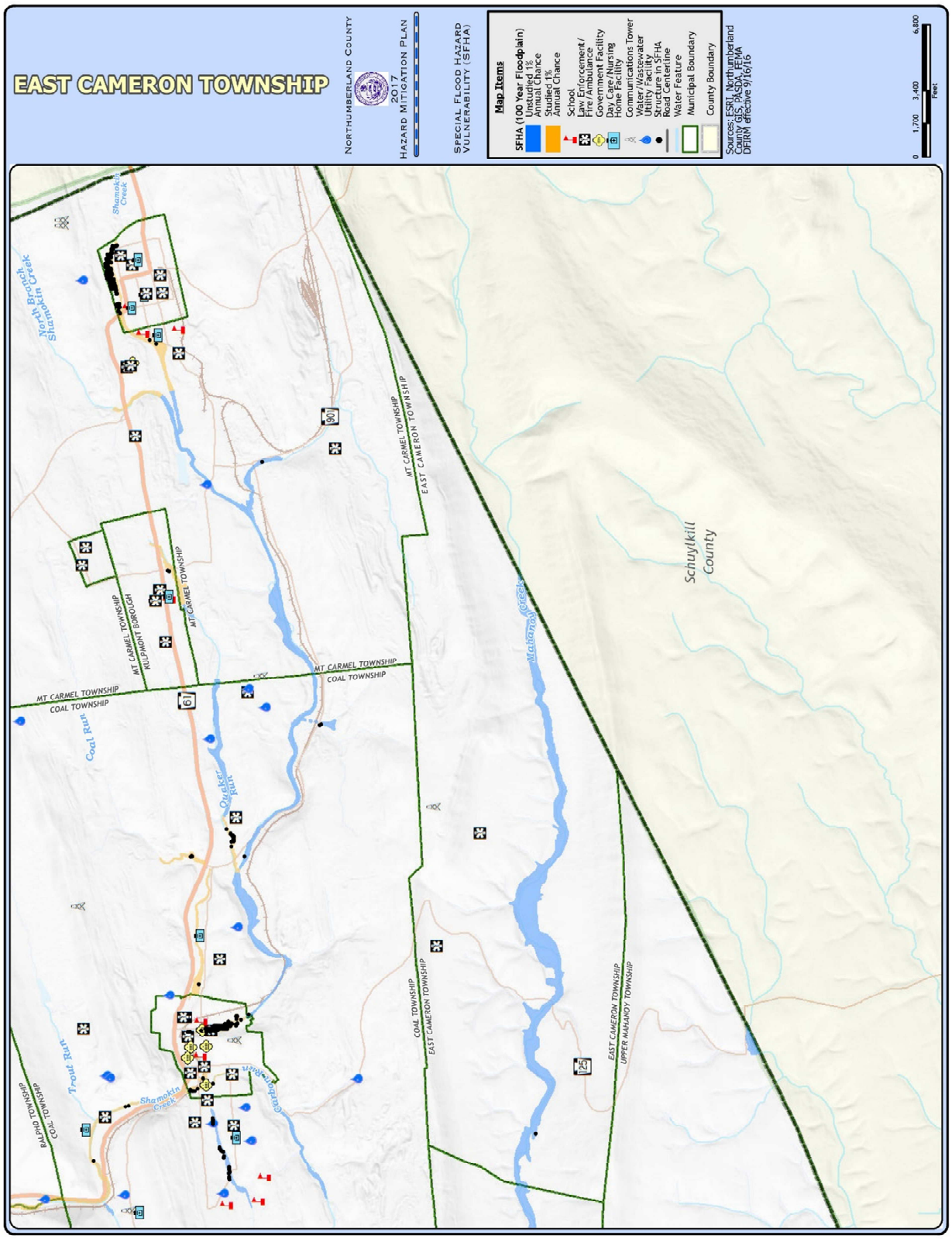
MEETING DATE: June 28, 2017

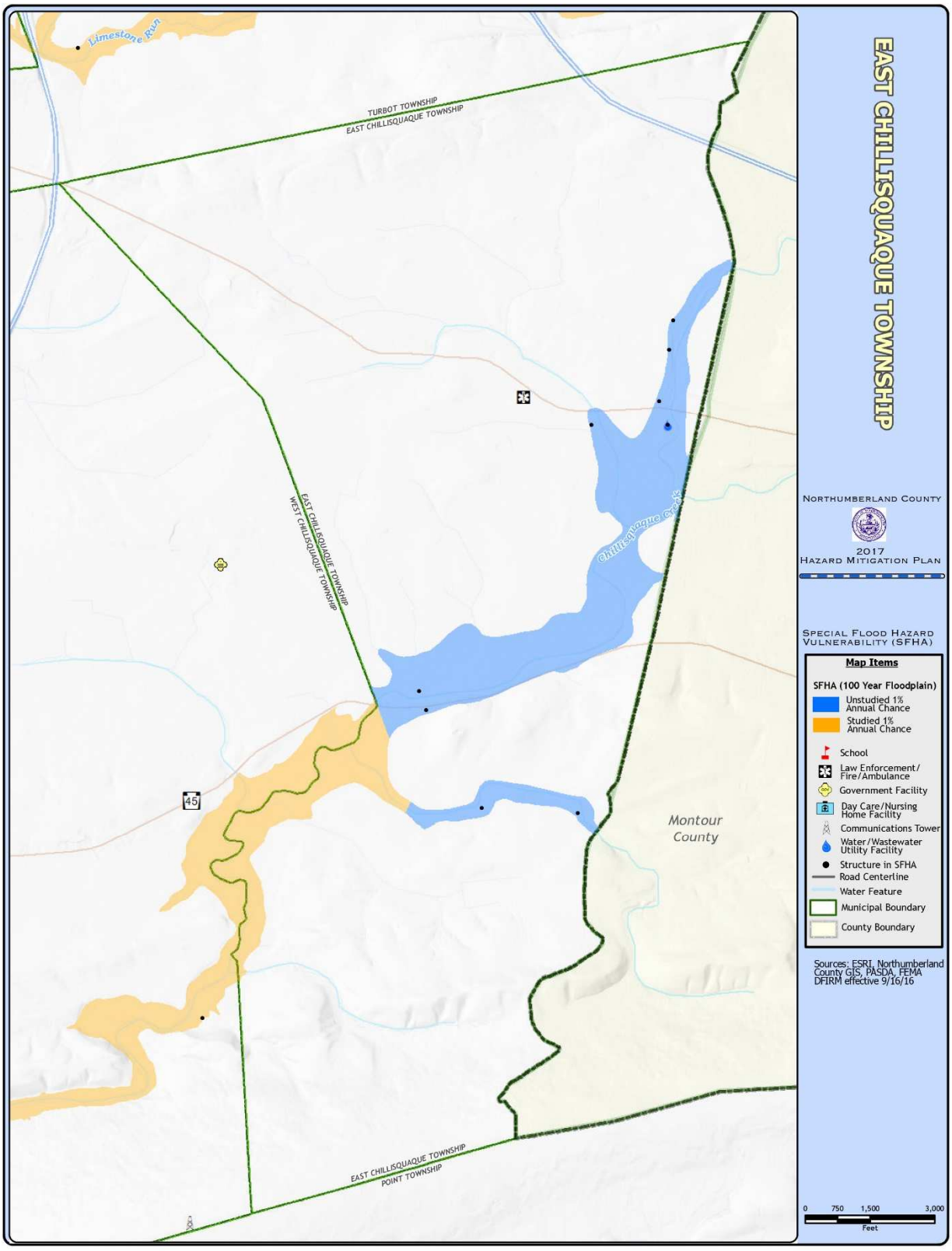
	PRINT NAME	REPRESENTING (IF APPLICABLE)	TITLE (IF APPLICABLE)
1.	Tiffany Kaseman	Assessors	Chief Assessor
2.	JAY JARRETT	WATSONTOWN BOROUGH	BOROUGH MANAGER
3.	Ed Mankowski	Upper Augusta Twp	Vice chairman etc.
4.	Rebekah Lyash	Ralpho Township	intern
5.	MARK LYASH	RALPHO TOWNSHIP	CODE/ZONING/PC
6.	Doug DIEHL	BOROUGH OF MILTON	CODE/ZONING/FPM
7.	ERIC WENDT	NORTHUMBERLAND COUNTY	IT
8.	Keith Ayers	Northld County	GIS
9.	JOHN DAVIS	HERNDON BOROUGH	RESIDENT
10.	Chuck Hopta	North'd County	Engineer
11.	Maryrose McCarthy	North'd County	Chief Clerk
12.	Stephen Jeffery	Northld County EMA	Director
13.	Lori Smoogen	Northld Co. DPS	Finance Manager
14.	Cheryl DeSoto	City of Sunbury	CRS
15.	Corey Pisarz	PennDOT	ACMM
16.			

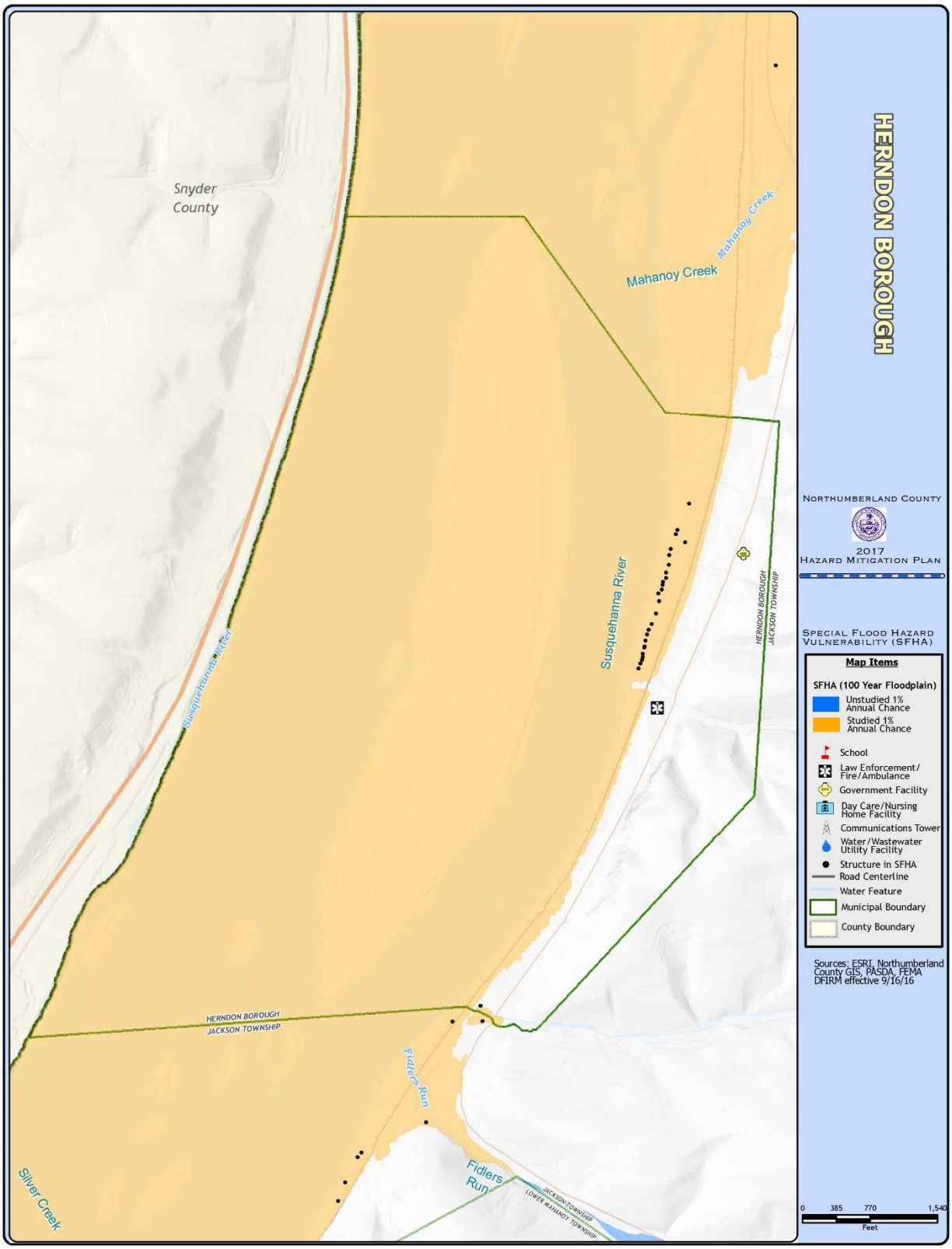
APPENDIX C
FLOOD VULNERABILTY PER MUNICIPALITY

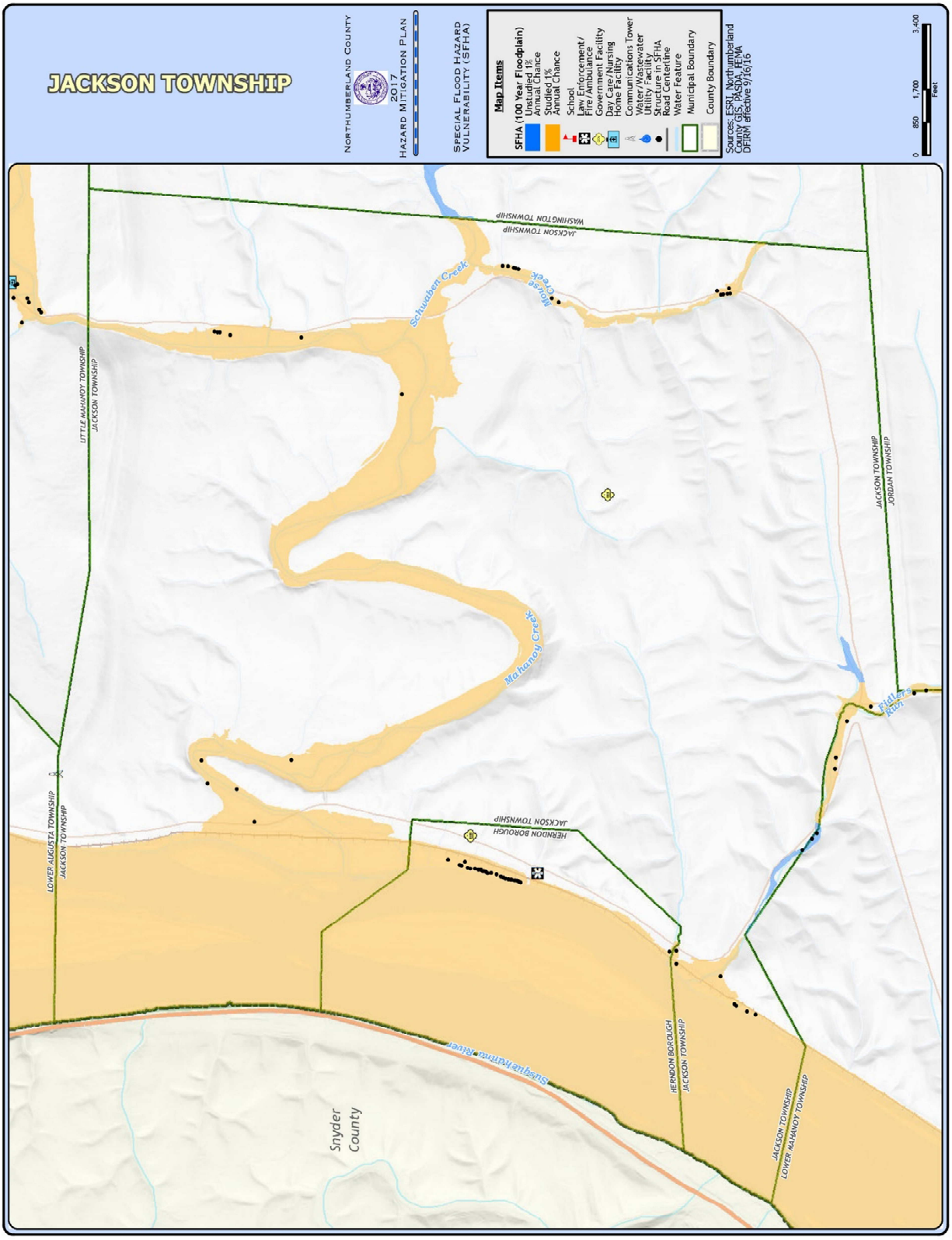

COAL TOWNSHIP
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD
VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Undetermined Risk
Annual Chance
Studied 1%
Annual Chance
School
Law Enforcement/
Fire/Ambulance
Government Facility
Day Care/Nursing
Home Facility
Communications Tower
Water/Wastewater
Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland
County GIS, PASDA, FEMA
DFIRM effective 9/16/16
0
1,300
2,600
5,200
Feet
Columbia
County
MT CARMEL TOWNSHIP
COAL TOWNSHIP
Coal Run
Quaker Run
Millers Run
Trout Run
RALPHO TOWNSHIP
COAL TOWNSHIP
Shamokin Creek
Furnace Run
Burns Run
Lick Run
SHAMOKIN TOWNSHIP
COAL TOWNSHIP
Zerbe Run
COAL TOWNSHIP
ZERBE TOWNSHIP
ZERBE TOWNSHIP
WEST CAMERON TOWNSHIP
COAL TOWNSHIP
WEST CAMERON TOWNSHIP
COAL TOWNSHIP
EAST CAMERON TOWNSHIP
61

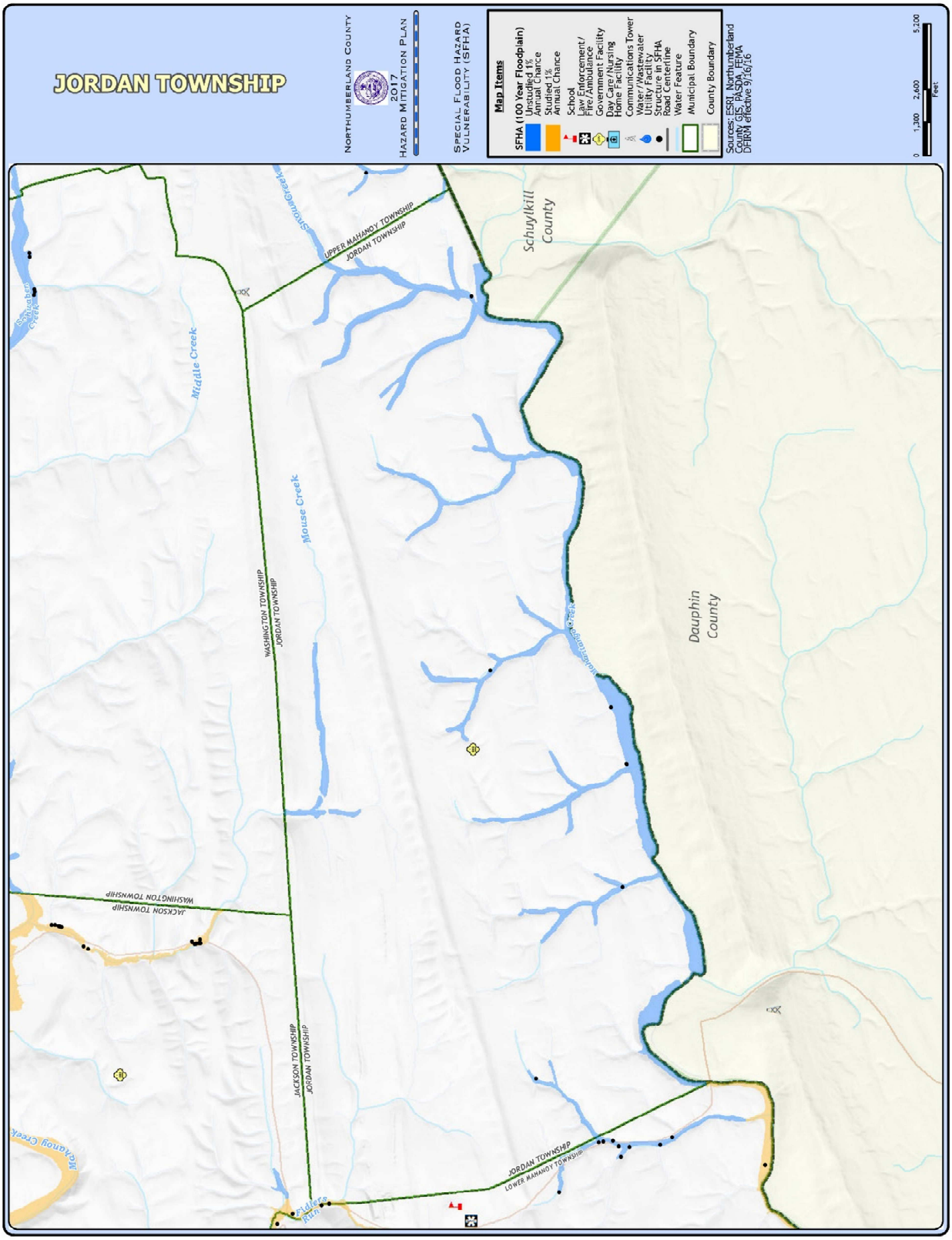

DELAWARE TOWNSHIP
Lycoming County
Union County
Delaware Run
Dry Run
Spring Run
Warrior Run
Muddy Run
West Branch Susquehanna River
DELAWARE TOWNSHIP
LEWIS TOWNSHIP
TURBOT TOWNSHIP
NORTHUMBERLAND COUNTY
2017 HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0 1,350 2,700 5,400
Feet

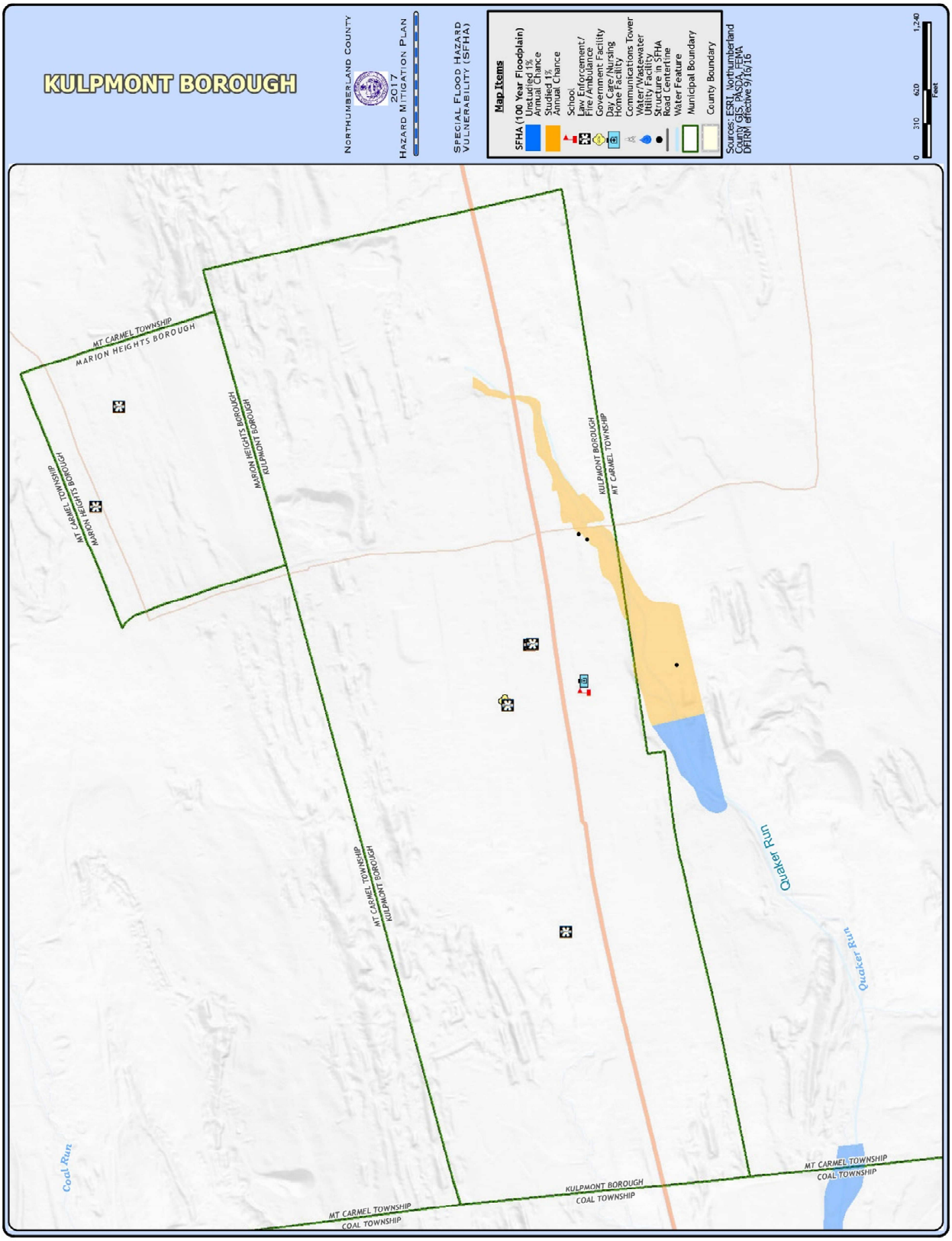

EAST CAMERON TOWNSHIP
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD
VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1%
Annual Chance
Studied 1%
Annual Chance
School
Law Enforcement /
Fire/Ambulance
Government Facility
Day Care/Nursing
Home Facility
Communications Tower
Water /Wastewater
Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland
County GIS, PASDA, FEMA
DFIRM effective 9/16/16
0
1,700
3,400
6,800
Feet
Shamokin Creek
North Branch
Shamokin Creek
MT CARMEL TOWNSHIP
KULPMONT BOROUGH
MT CARMEL TOWNSHIP
COAL TOWNSHIP
MT CARMEL TOWNSHIP
COAL TOWNSHIP
Coal Run
Quaker
Run
MT CARMEL TOWNSHIP
EAST CAMERON TOWNSHIP
Schuylkill
County
Mahanoy Creek
COAL TOWNSHIP
EAST CAMERON TOWNSHIP
EAST CAMERON TOWNSHIP
UPPER MAHANOY TOWNSHIP
RALPHO TOWNSHIP
COAL TOWNSHIP
Trout Run
Shamokin
Creek
Mahanoy Creek
61
90
125

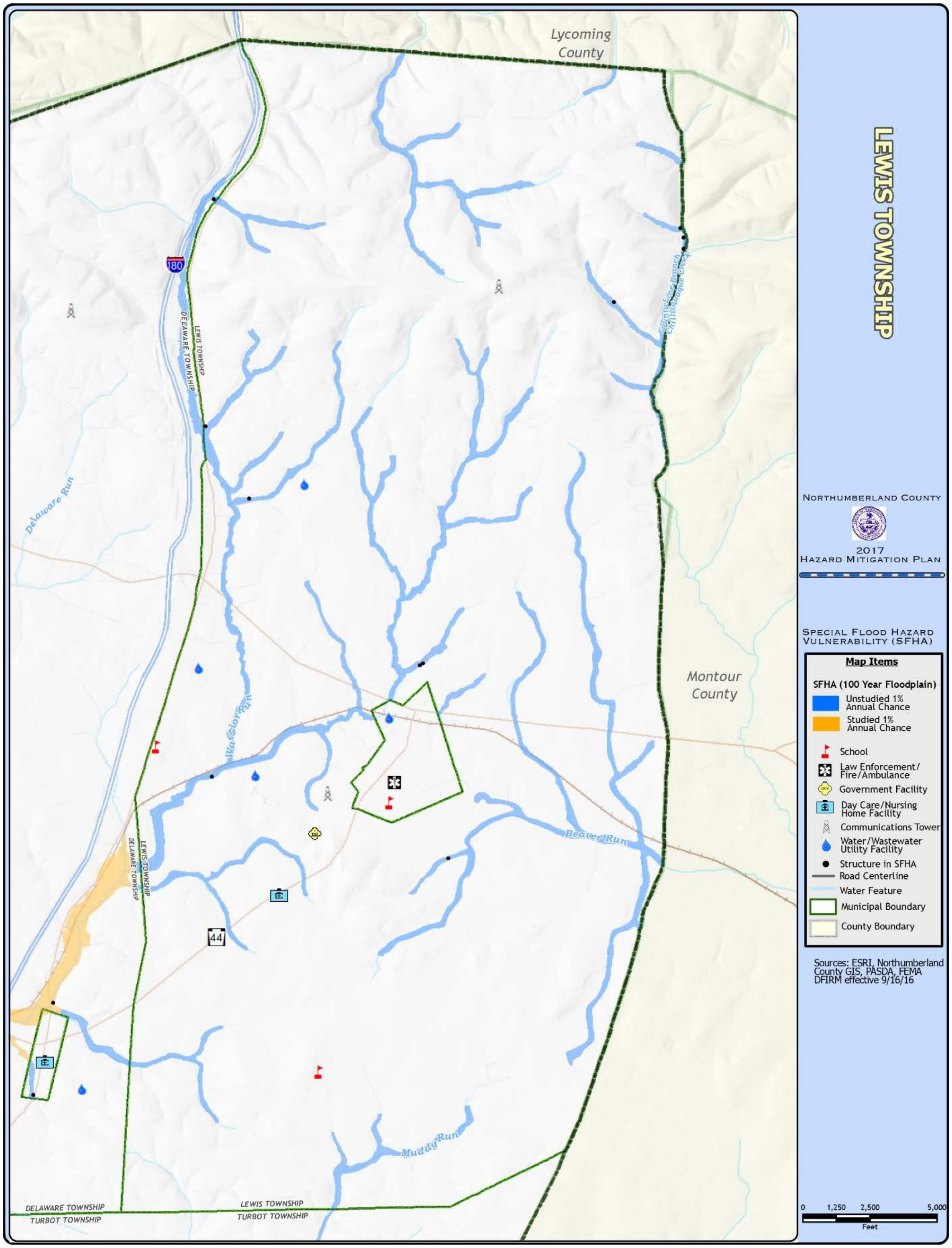

EAST CHILLISQUAQUE TOWNSHIP
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0 750 1,500 3,000
Feet
Limestone Run
TURBOT TOWNSHIP
EAST CHILLISQUAQUE TOWNSHIP
EAST CHILLISQUAQUE TOWNSHIP
WEST CHILLISQUAQUE TOWNSHIP
Chillisquaque Creek
45
Montour County
EAST CHILLISQUAQUE TOWNSHIP
POINT TOWNSHIP

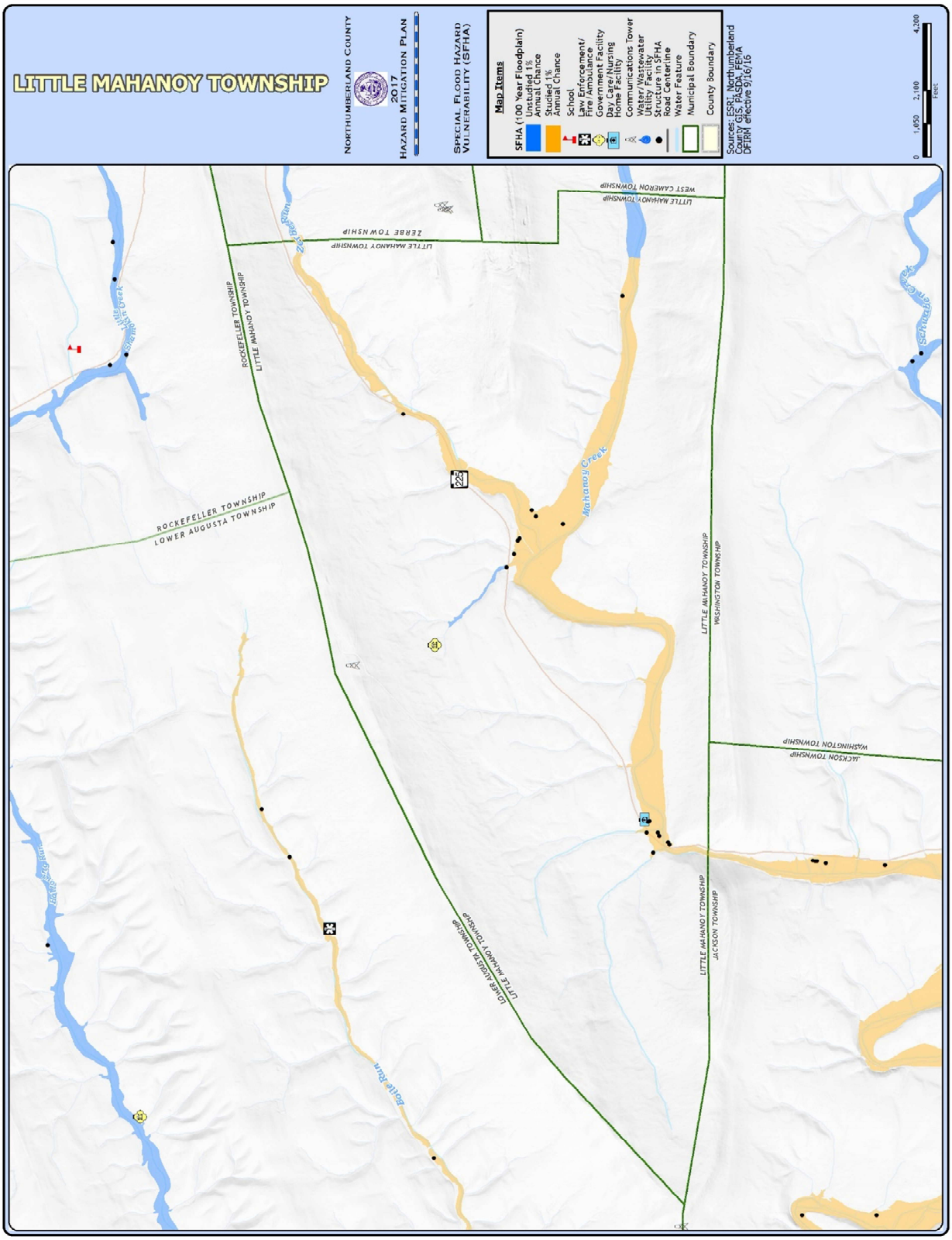

HERNDON BOROUGH
Snyder County
Mahanoy Creek
Mahanoy Creek
Susquehanna River
Susquehanna River
HERNDON BOROUGH
JACKSON TOWNSHIP
HERNDON BOROUGH
JACKSON TOWNSHIP
Fidlers Run
Fidlers Run
Silver Creek
JACKSON TOWNSHIP
LOWER MAHANOY TOWNSHIP
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0
385
770
1,540
Feet

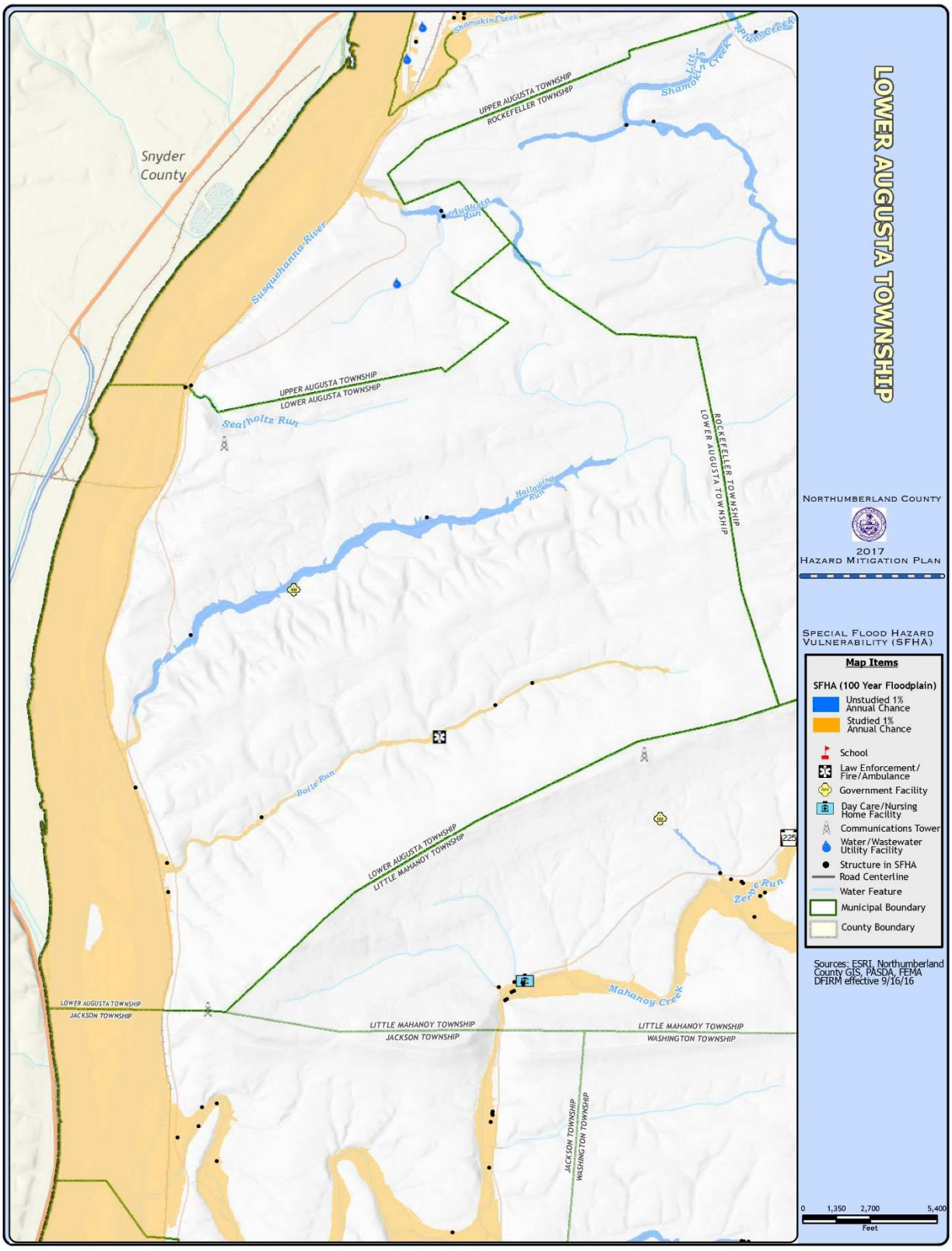

JACKSON TOWNSHIP
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD
VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1%
Annual Chance
Studied 1%
Annual Chance
School
Law Enforcement /
Fire /Ambulance
Government Facility
Day Care/Nursing
Home Facility
Communications Tower
Water/Wastewater
Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland
County GIS, PASDA, FEMA
DFIRM effective 9/16/16
0
850
1,700
3,400
Feet
Schwaben Creek
Moose Creek
Mahanoy Creek
Fiddler Run
Susquehanna River
Snyder County
JACKSON TOWNSHIP
WASHINGTON TOWNSHIP
LITTLE MAHANOY TOWNSHIP
JACKSON TOWNSHIP
JACKSON TOWNSHIP
JORDAN TOWNSHIP
LOWER AUGUSTA TOWNSHIP
JACKSON TOWNSHIP
HERNDON BOROUGH
JACKSON TOWNSHIP
HERNDON BOROUGH
JACKSON TOWNSHIP
JACKSON TOWNSHIP
LOWER MAHANOY TOWNSHIP

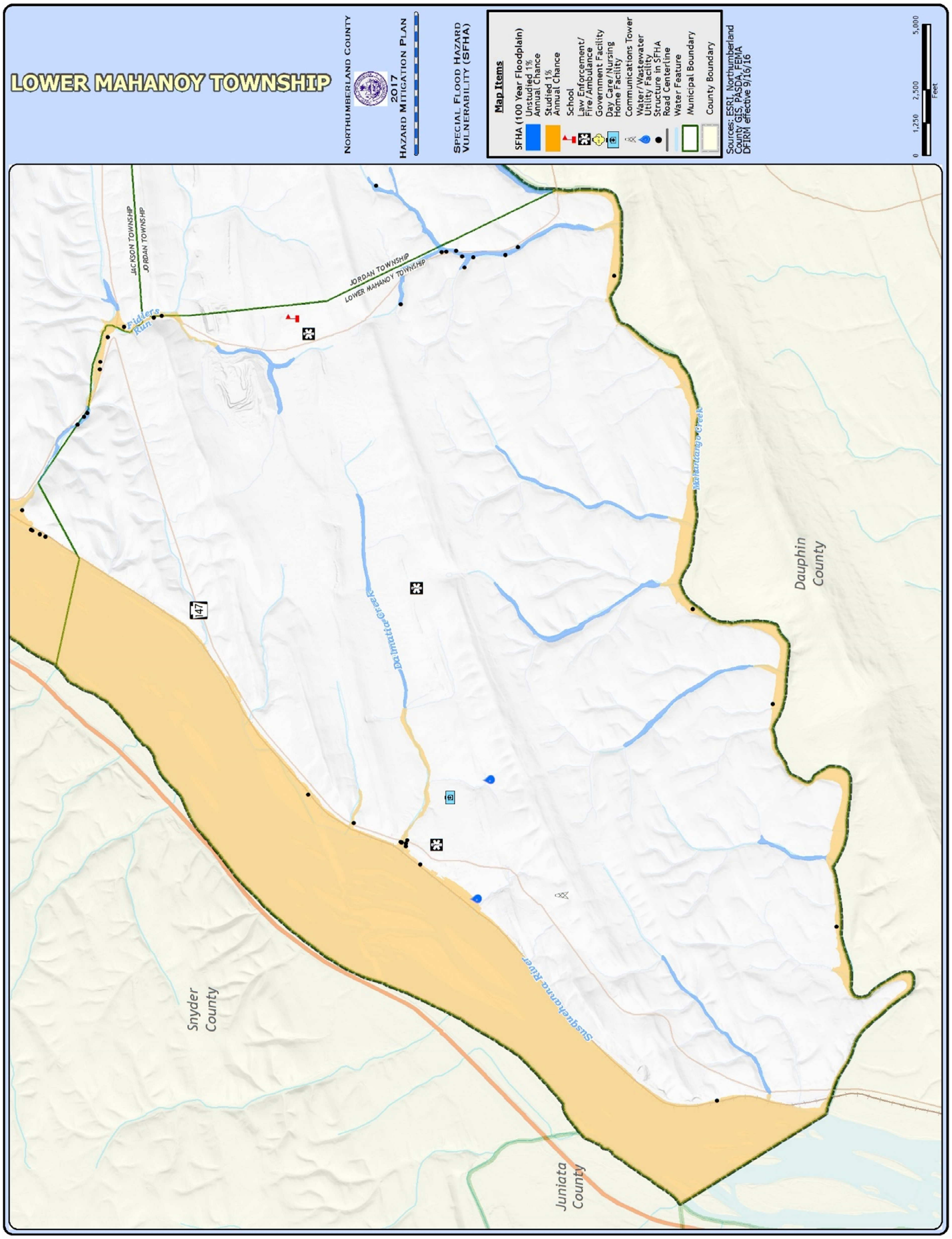

JORDAN TOWNSHIP
NORTHUMBERLAND COUNTY
2017 HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement / Fire / Ambulance
Government Facility
Day Care / Nursing Home / Clinic
Communications Tower
Water / Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0 1,300 2,600 5,200 Feet
Schuylkill County
Dauphin County
UPPER MAHANOY TOWNSHIP
JORDAN TOWNSHIP
WASHINGTON TOWNSHIP
JACKSON TOWNSHIP
LOWER MAHANOY TOWNSHIP
Middle Creek
Mouse Creek
Mahanoy Creek
Elders Run

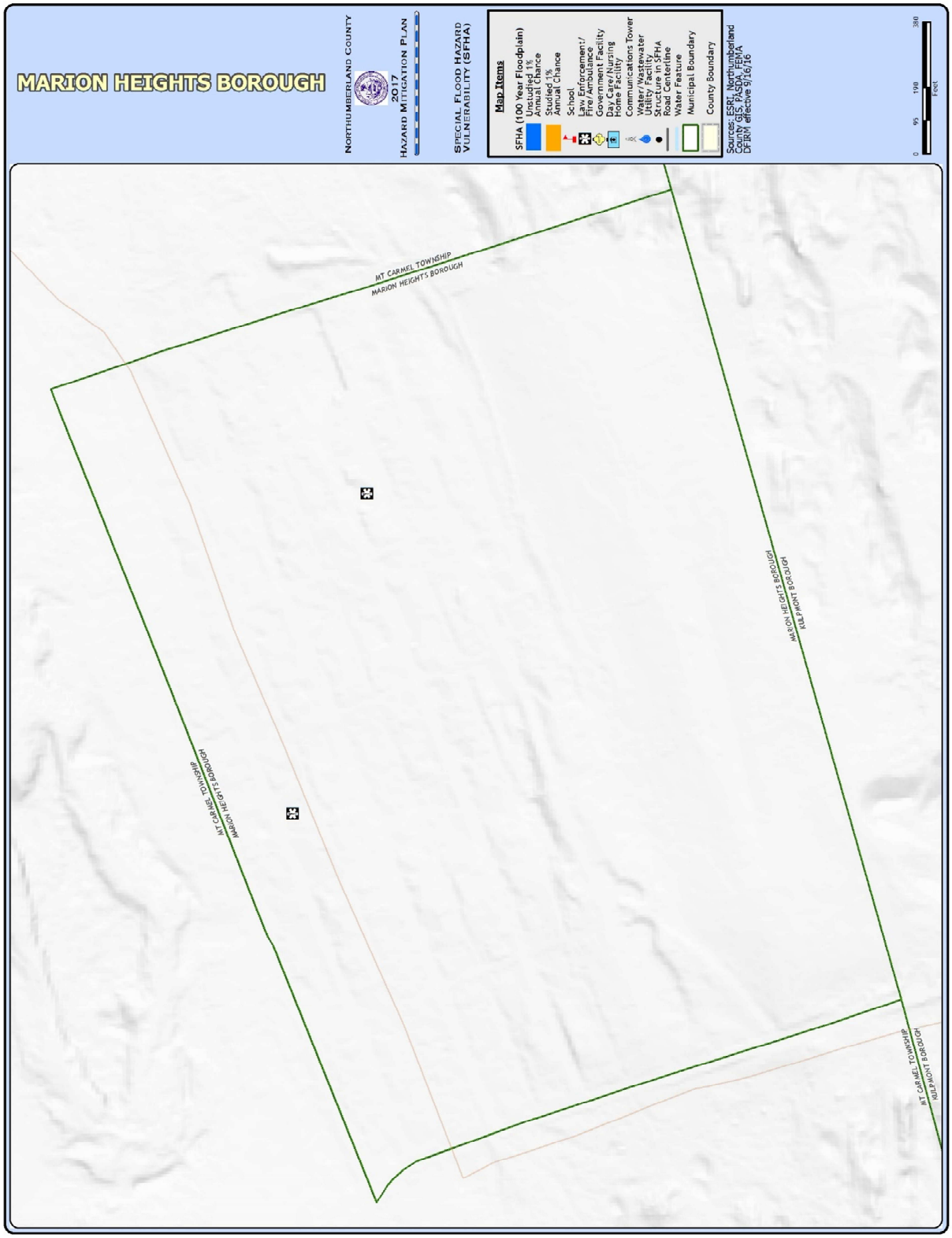

KULPMONT BOROUGH
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement / Fire / Ambulance
Government Facility
Day Care / Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0
310
620
1,240
Feet
MT CARMEL TOWNSHIP
MARION HEIGHTS BOROUGH
MARION HEIGHTS BOROUGH
KULPMONT BOROUGH
MT CARMEL TOWNSHIP
MARION HEIGHTS BOROUGH
KULPMONT BOROUGH
MT CARMEL TOWNSHIP
MT CARMEL TOWNSHIP
KULPMONT BOROUGH
Quaker Run
Quaker Run
Coal Run
MT CARMEL TOWNSHIP
COAL TOWNSHIP
KULPMONT BOROUGH
COAL TOWNSHIP
MT CARMEL TOWNSHIP
COAL TOWNSHIP

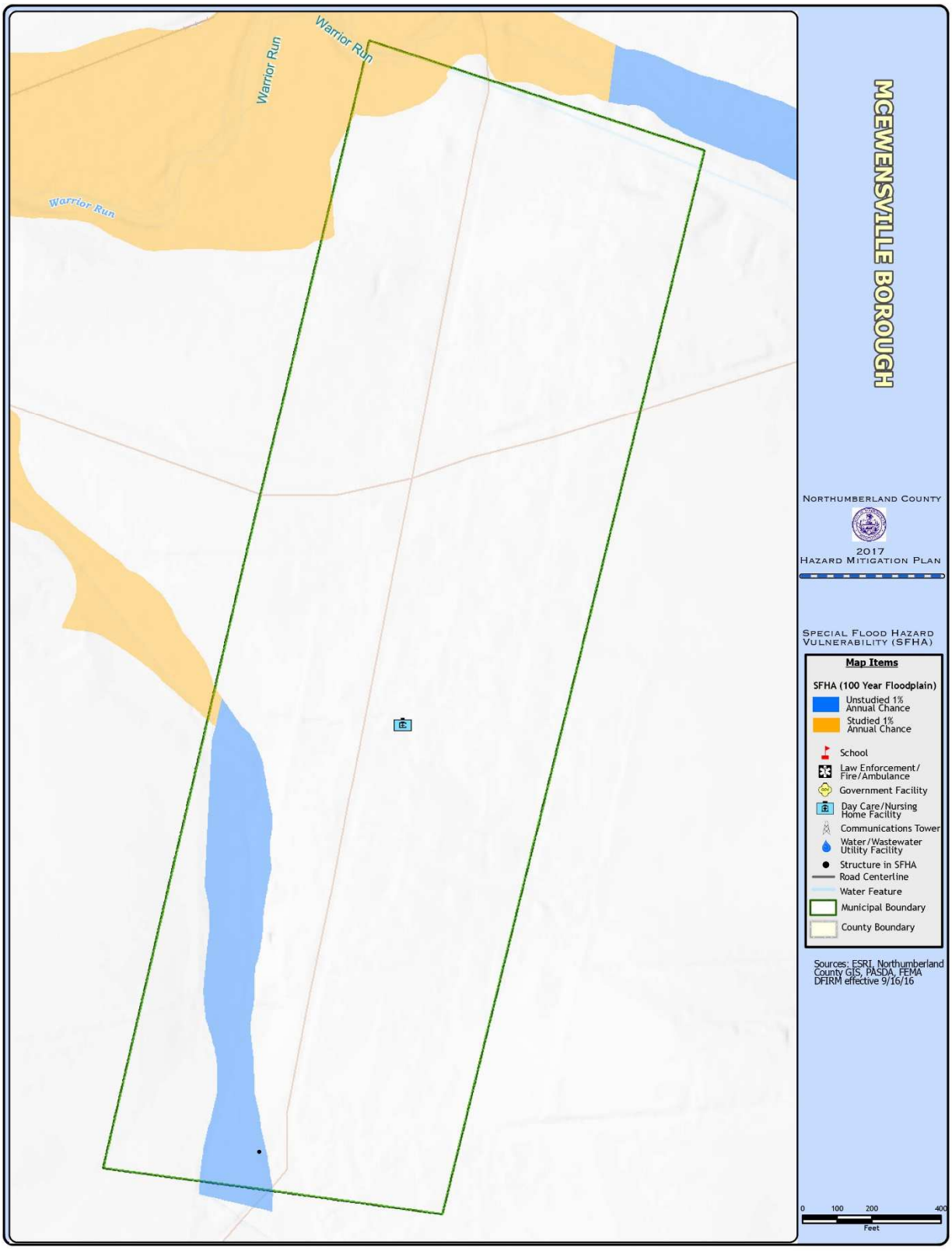

LEWIS TOWNSHIP
Northumberland County
2017
Hazard Mitigation Plan
Special Flood Hazard Vulnerability (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0 1,250 2,500 5,000
Feet
Lycoming County
Montour County
Delaware Run
Warrior Run
Beaver Run
Muddy Run
180
44
LEWIS TOWNSHIP
DELAWARE TOWNSHIP
TURBOT TOWNSHIP

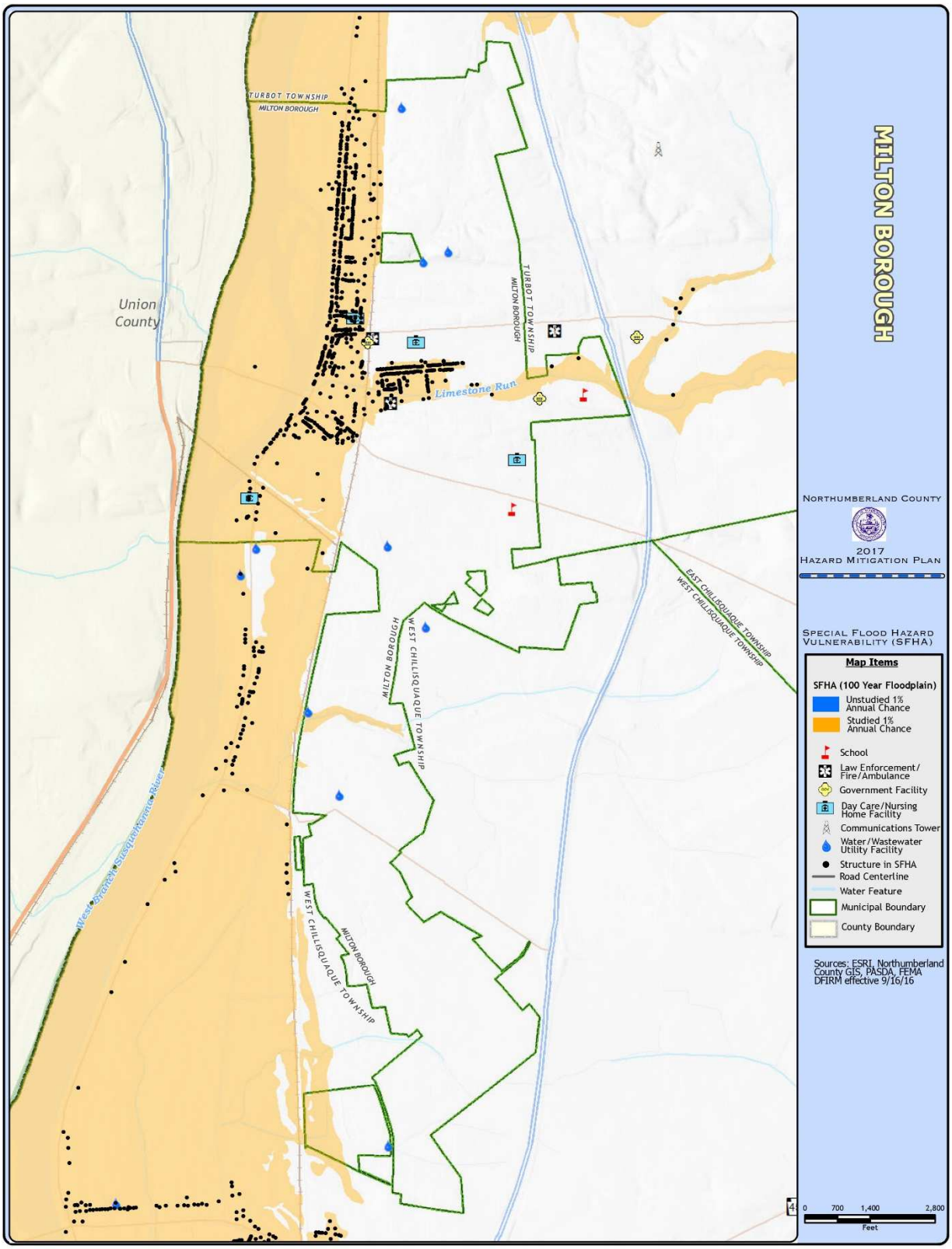

LITTLE MAHANOY TOWNSHIP
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1%
Annual Chance
Studied 1%
Annual Chance
School
Law Enforcement/ Fire/Rescue
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0
1,050
2,100
4,200
Feet
ROCKEFELLER TOWNSHIP
LOWER AUGUSTA TOWNSHIP
LITTLE MAHANOY TOWNSHIP
ZERBE TOWNSHIP
WEST CAMERON TOWNSHIP
WASHINGTON TOWNSHIP
JACKSON TOWNSHIP
Mahanoy Creek
Bolle Run
Zerbe Run
Shamokin Creek

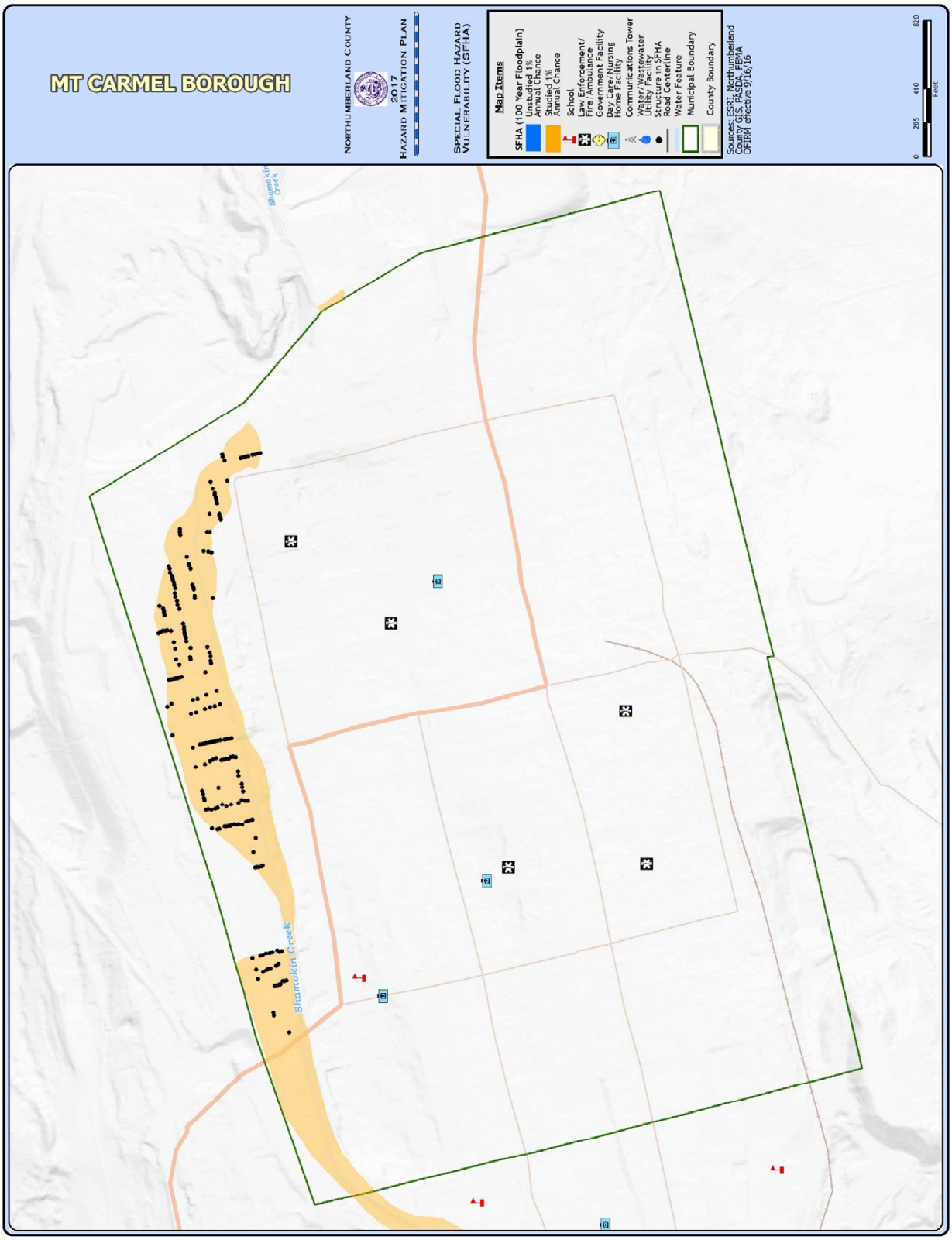

LOWER AUGUSTA TOWNSHIP
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0 1,350 2,700 5,400
Feet
Snyder County
Susquehanna River
Shamokin Creek
Little Shamokin Creek
Shamokin Creek
Augusta Run
Seaholtz Run
Halloping Run
Bolle Run
Zerbe Run
Mahanoy Creek
UPPER AUGUSTA TOWNSHIP
ROCKEFELLER TOWNSHIP
UPPER AUGUSTA TOWNSHIP
LOWER AUGUSTA TOWNSHIP
ROCKEFELLER TOWNSHIP
LOWER AUGUSTA TOWNSHIP
LOWER AUGUSTA TOWNSHIP
LITTLE MAHANOY TOWNSHIP
LOWER AUGUSTA TOWNSHIP
JACKSON TOWNSHIP
LITTLE MAHANOY TOWNSHIP
JACKSON TOWNSHIP
LITTLE MAHANOY TOWNSHIP
WASHINGTON TOWNSHIP
JACKSON TOWNSHIP
WASHINGTON TOWNSHIP

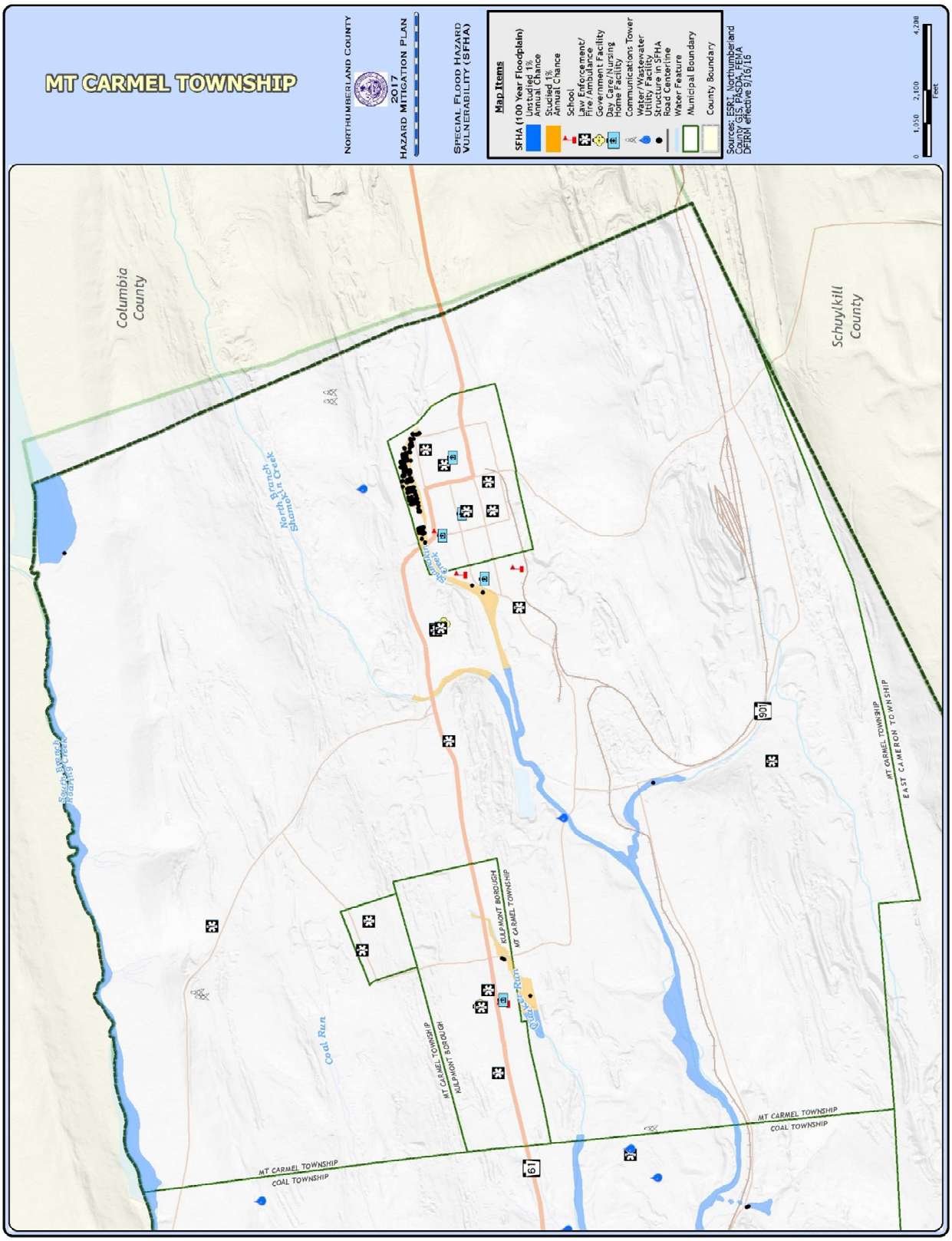

LOWER MAHANOY TOWNSHIP
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0
1,250
2,500
5,000
Feet
JACKSON TOWNSHIP
JORDAN TOWNSHIP
LOWER MAHANOY TOWNSHIP
Fiddlers Run
147
Dalmatia Creek
Mahantango Creek
Susquehanna River
Dauphin County
Snyder County
Juniata County

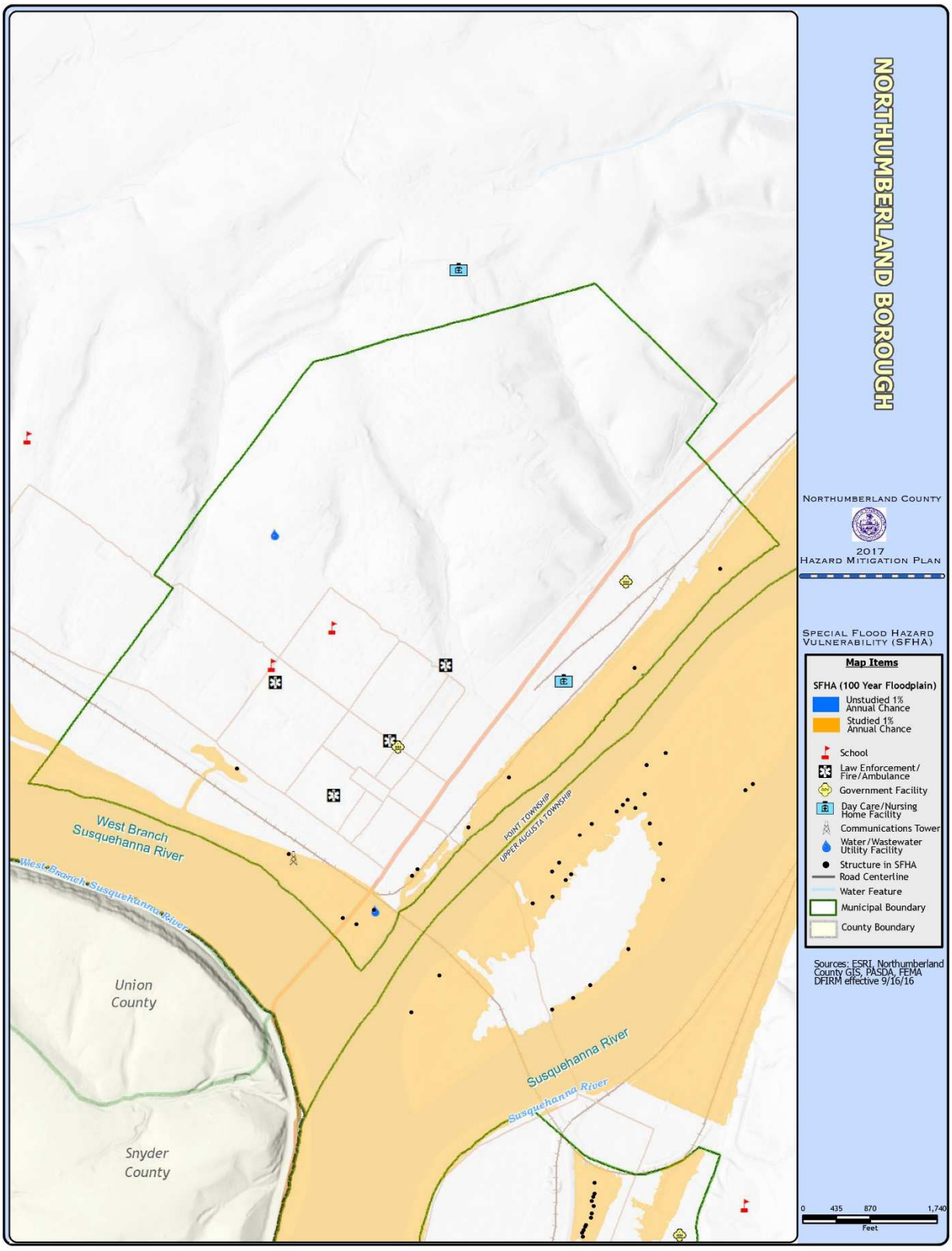

MARION HEIGHTS BOROUGH
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD
VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1%
Annual Chance
Studied 1%
Annual Chance
School
Law Enforcement/
Fire/Ambulance
Government Facility
Day Care/Nursing
Home Facility
Communications Tower
Water/Wastewater
Utility Facility
Structures in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland
County GIS, PASDA, FEMA
DFIRM effective 9/16/16
0
95
190
380
Feet
MT CARMEL TOWNSHIP
MARION HEIGHTS BOROUGH
MARION HEIGHTS BOROUGH
RALPHO BOROUGH
MT CARMEL TOWNSHIP
MARION HEIGHTS BOROUGH
MT CARMEL TOWNSHIP
RALPHO BOROUGH

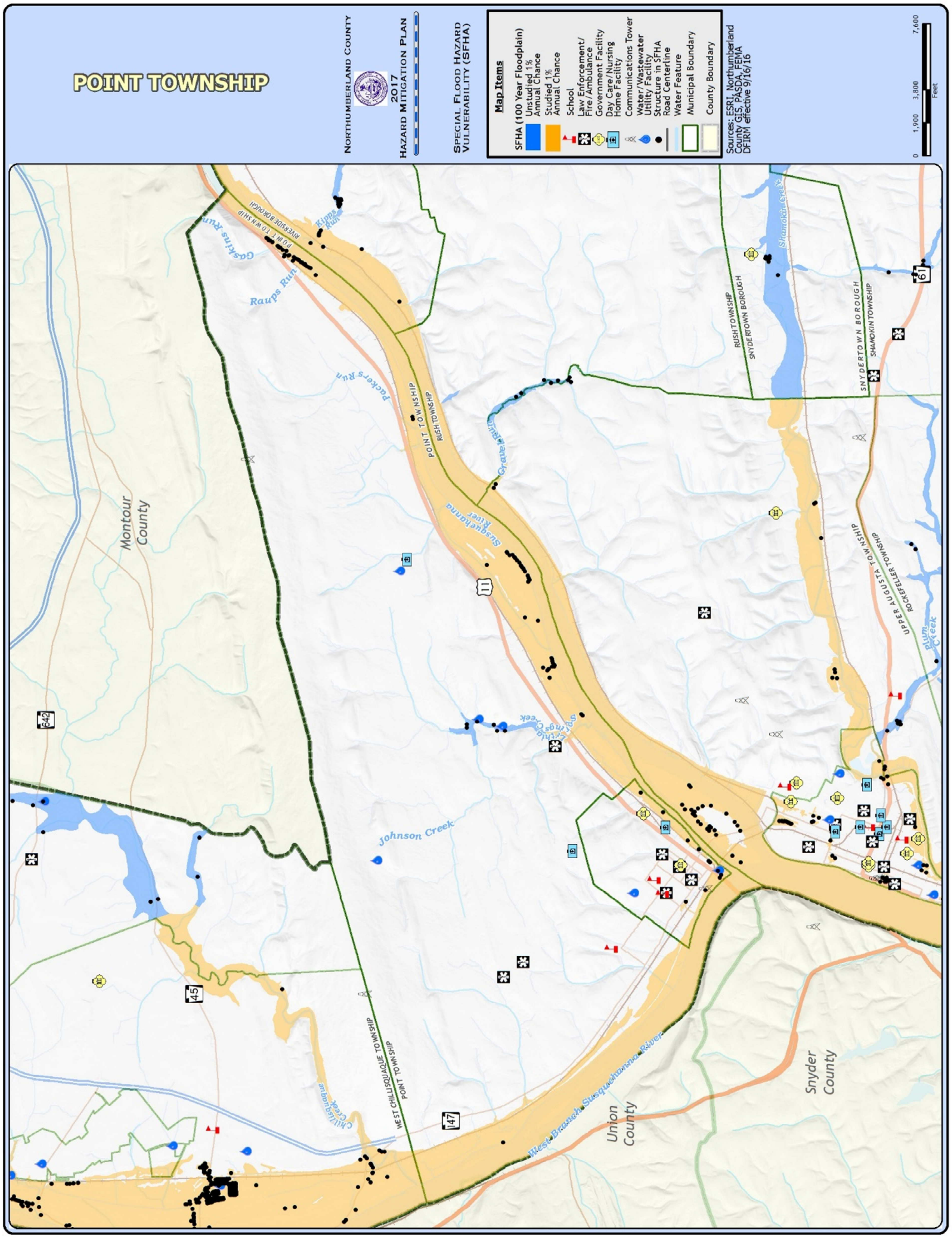

Warrior Run
Warrior Run
Warrior Run
MCEWENSVILLE BOROUGH
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0
100
200
400
Feet

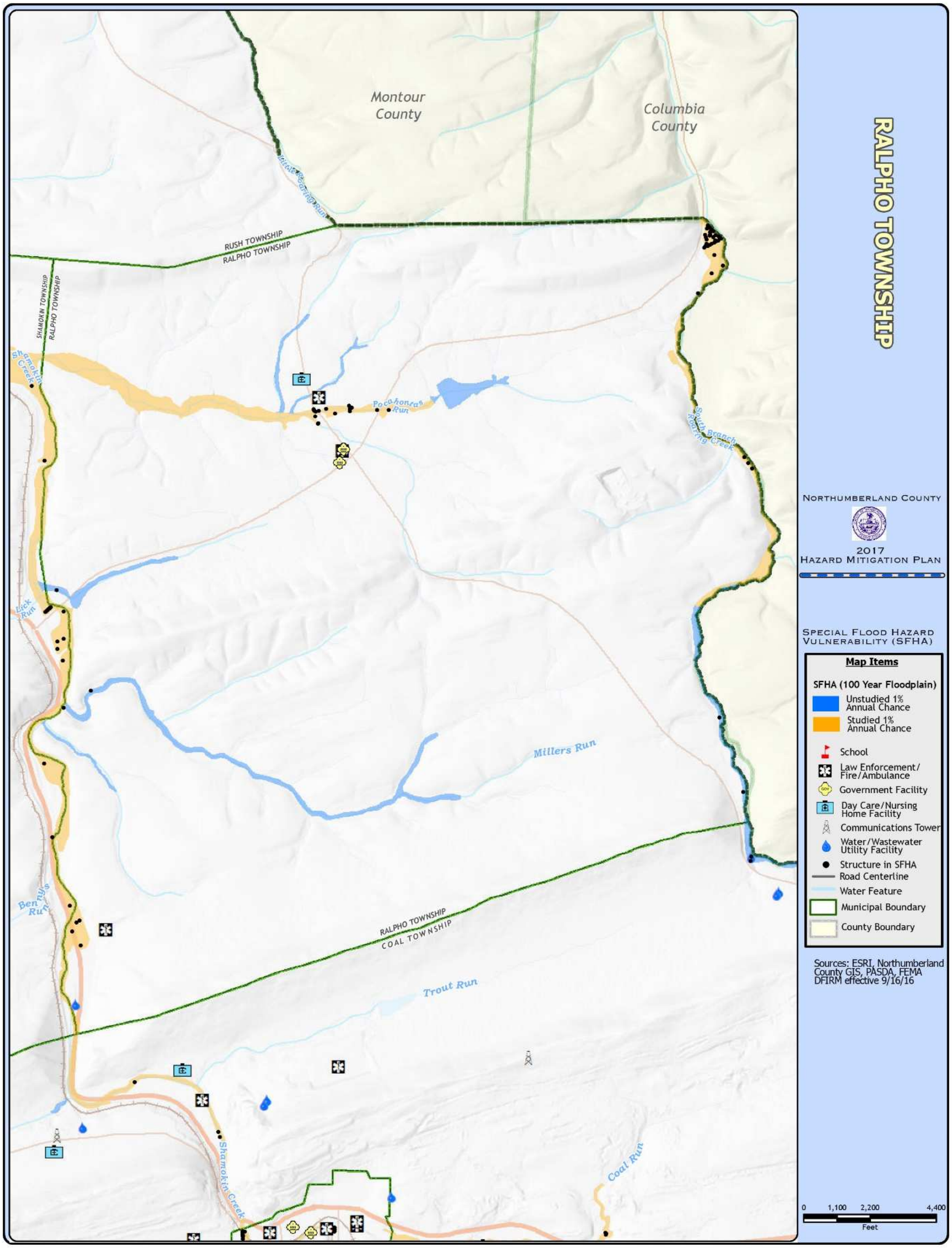

MILTON BOROUGH
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0 700 1,400 2,800
Feet
TURBOT TOWNSHIP
MILTON BOROUGH
Union County
Limestone Run
WEST CHILLISQUAQUE TOWNSHIP
EAST CHILLISQUAQUE TOWNSHIP
West Branch Susquehanna River

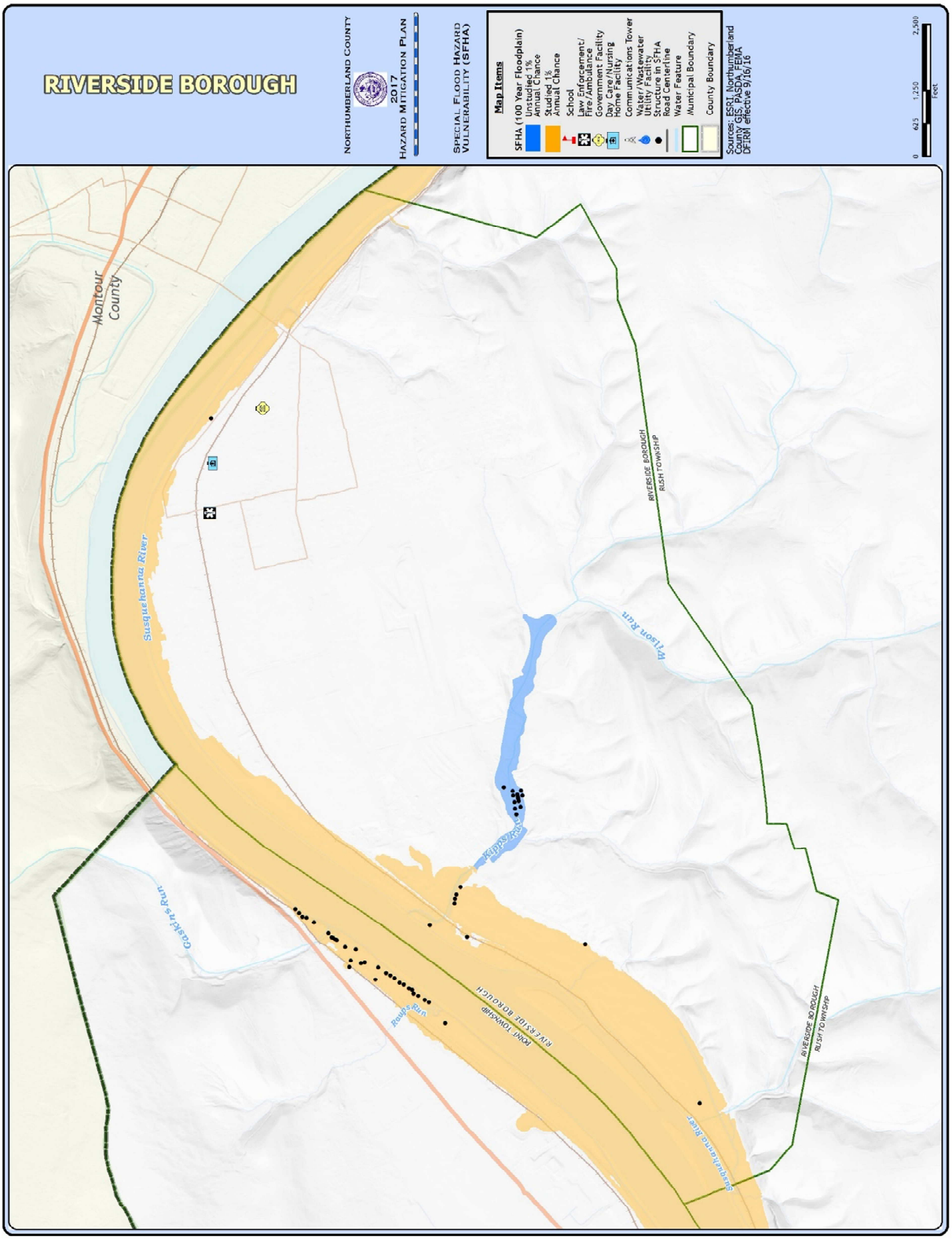

MT CARMEL BOROUGH
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1%
Annual Chance
Studied 1%
Annual Chance
School
Law Enforcement/
Emergency Service
Government Facility
Day Care/Nursing
Home Facility
Communications Tower
Water/Wastewater
Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland
County GIS, PASDA, FEMA
DFIRM effective 9/16/16
0
205
410
820
Feet
Shamokin Creek
Shamokin Creek

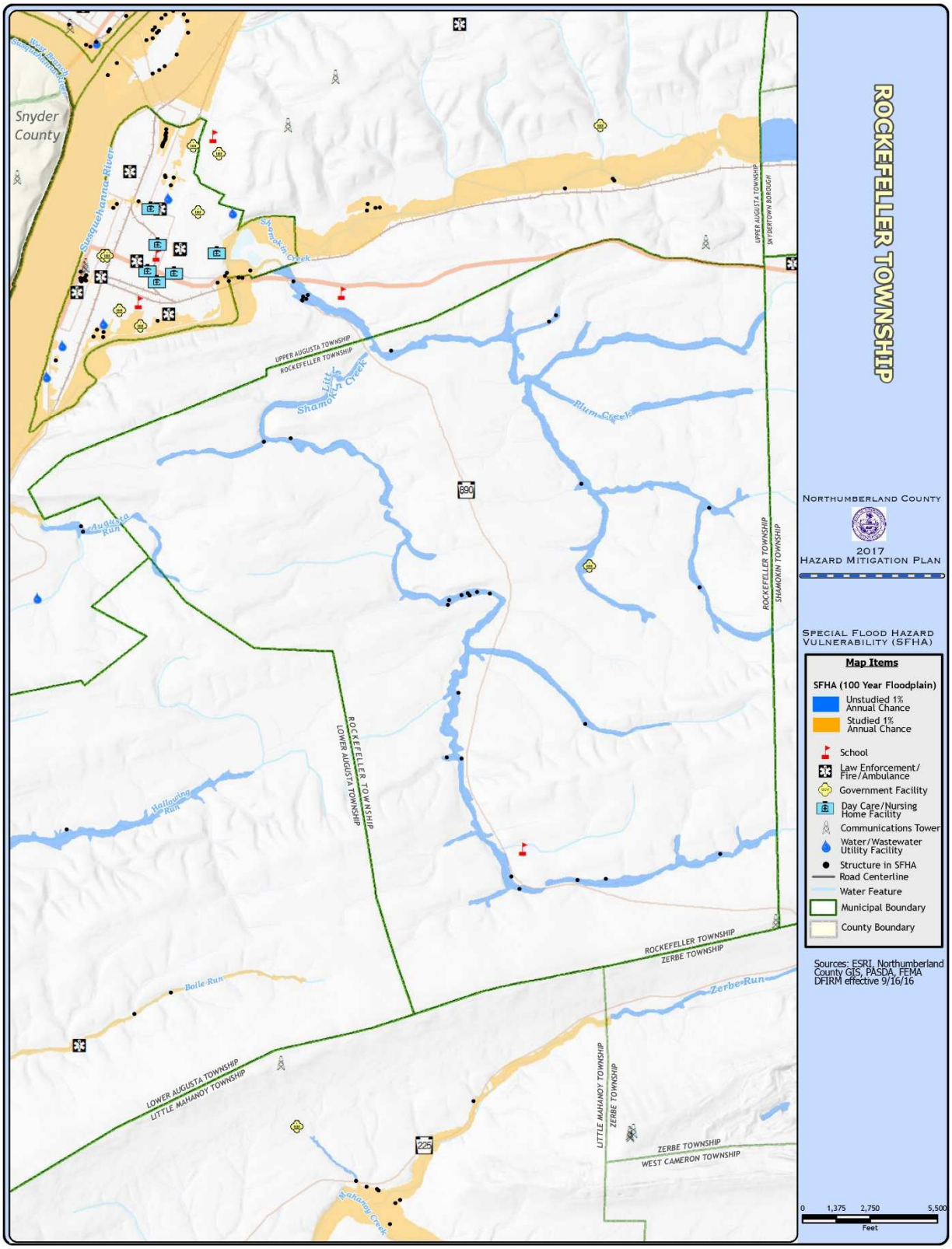

MT CARMEL TOWNSHIP
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD
VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1%
Annual Chance
Studied 1%
Annual Chance
School
Law Enforcement/
Fire/Ambulance
Government Facility
Day Care/Nursing
Home Facility
Communications Tower
Water/Wastewater
Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland
County GIS, PASDA, FEMA
DFIRM effective 9/16/16
0
1,050
2,100
4,200
Feet
Columbia
County
Schuylkill
County
North Branch
Shamokin Creek
Shamokin Creek
Rocky Branch
Roaring Creek
Coal Run
Quaker Run
KULPMONT BOROUGH
MT CARMEL TOWNSHIP
MT CARMEL TOWNSHIP
EAST CAMERON TOWNSHIP
MT CARMEL TOWNSHIP
COAL TOWNSHIP
MT CARMEL TOWNSHIP
COAL TOWNSHIP
MT CARMEL TOWNSHIP
KULPMONT BOROUGH
61
90

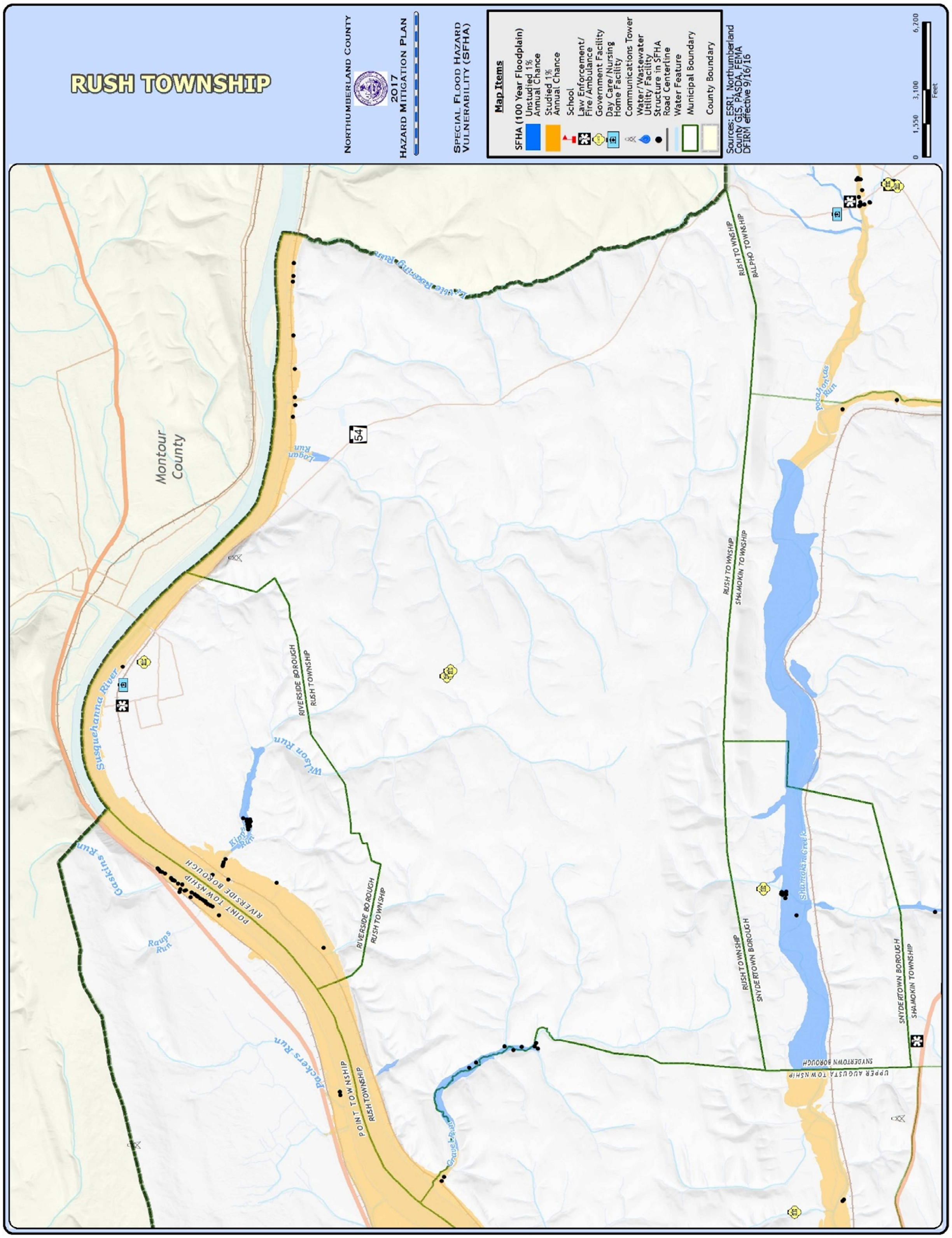

NORTHUMBERLAND BOROUGH
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0 435 870 1,740
Feet
West Branch Susquehanna River
West Branch Susquehanna River
POINT TOWNSHIP
UPPER AUGUSTA TOWNSHIP
Union County
Snyder County
Susquehanna River
Susquehanna River

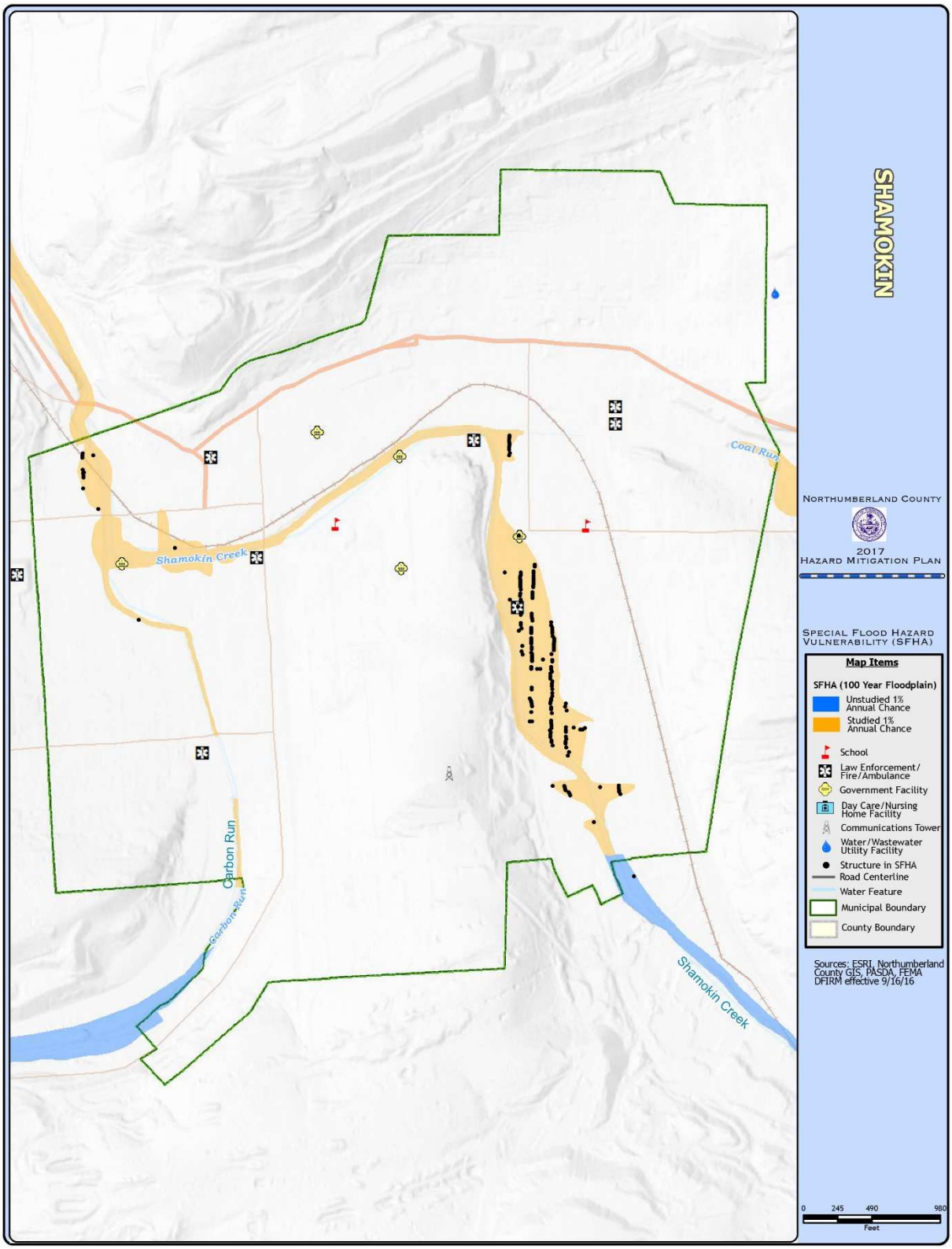

POINT TOWNSHIP
Northumberland County
2017
Hazard Mitigation Plan
Special Flood Hazard Vulnerability (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0 1,900 3,800 7,600
Feet
Montour County
Union County
Snyder County
Susquehanna River
West Branch Susquehanna River
Johnson Creek
Packers Run
Raups Run
Gaskins Run
Kipps Run
Chillisquaque Creek
Shamokin Creek
Plum Creek
POINT TOWNSHIP
RUSH TOWNSHIP
SNYDERTOWN BOROUGH
SHAMOKIN TOWNSHIP
UPPER AUGUSTA TOWNSHIP
ROCKEFELLER TOWNSHIP
WEST CHILLISQUAQUE TOWNSHIP
RIVERSIDE BOROUGH
11
61
642
45
147

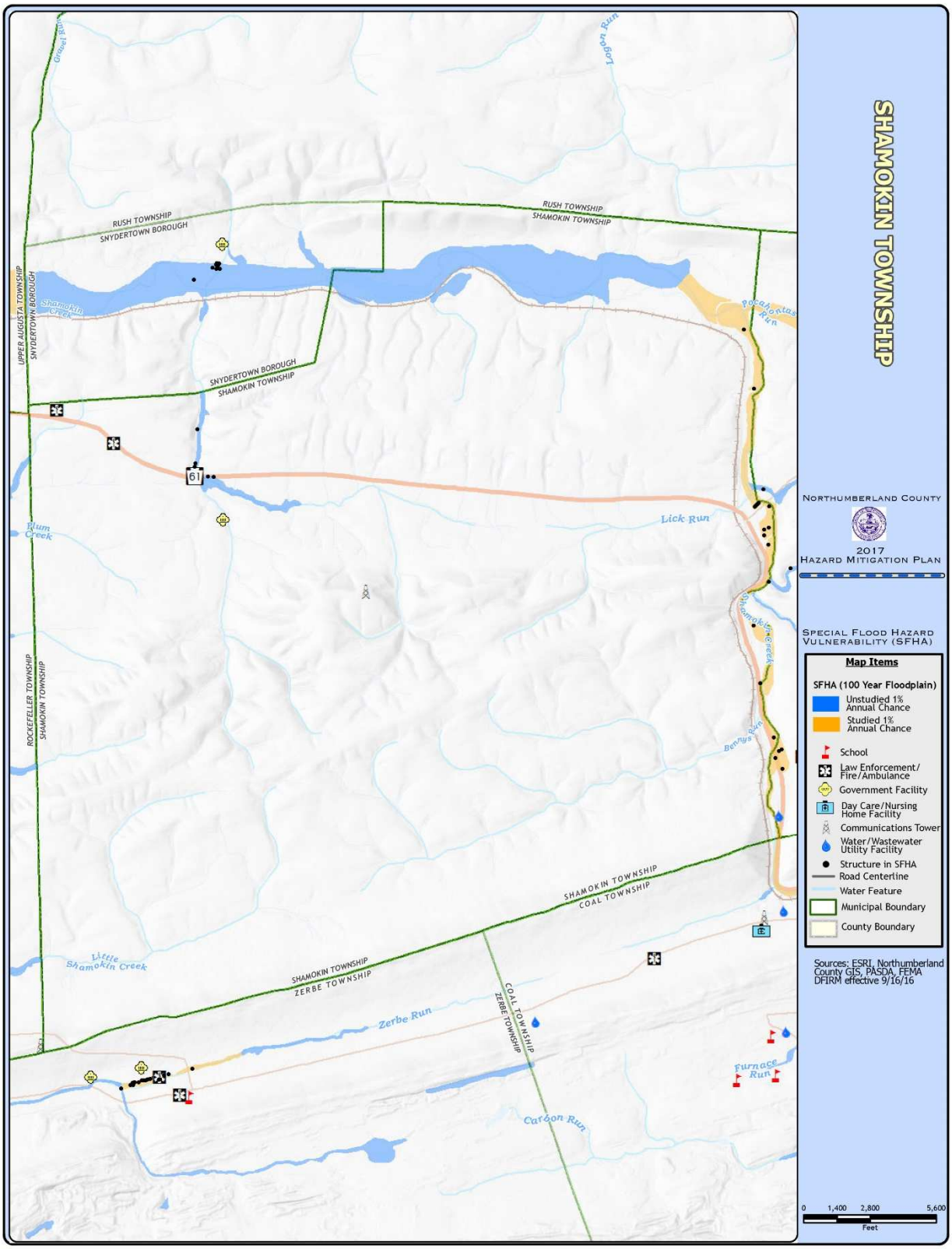

Montour County
Columbia County
RALPHO TOWNSHIP
RUSH TOWNSHIP
RALPHO TOWNSHIP
SHAMOKIN TOWNSHIP
RALPHO TOWNSHIP
Pocahontas Run
South Branch Roaring Creek
Lick Run
Millers Run
Bennys Run
RALPHO TOWNSHIP
COAL TOWNSHIP
Trout Run
Shamokin Creek
Coal Run
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0 1,100 2,200 4,400
Feet

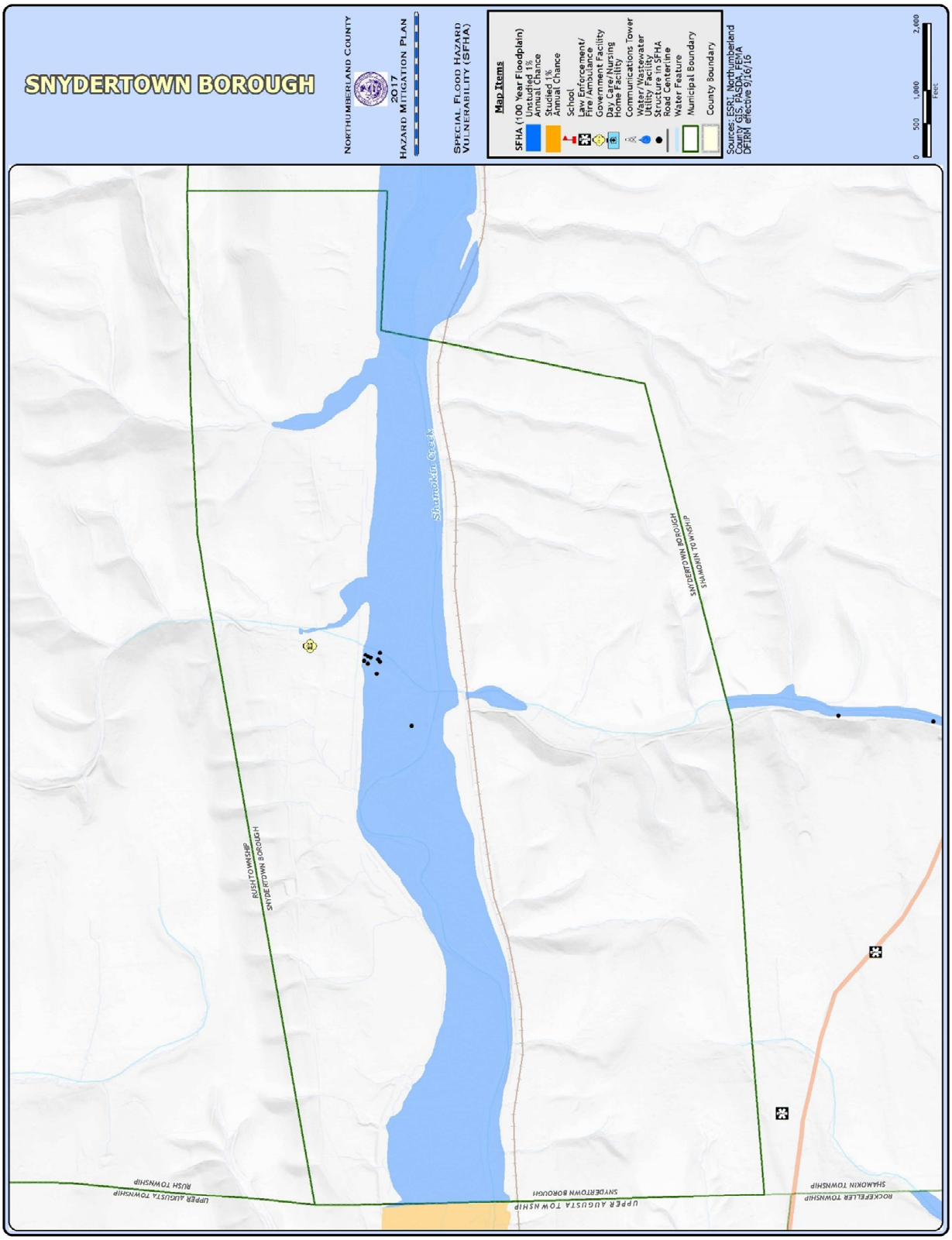

RIVERSIDE BOROUGH
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0
625
1,250
2,500
Feet
Montour County
Susquehanna River
RIVERSIDE BOROUGH
RUSH TOWNSHIP
Mitson Run
Kipps Run
Gaskin Run
Roupp Run
RUSH TOWNSHIP
RIVERSIDE BOROUGH
RIVERSIDE BOROUGH
RUSH TOWNSHIP
Susquehanna River

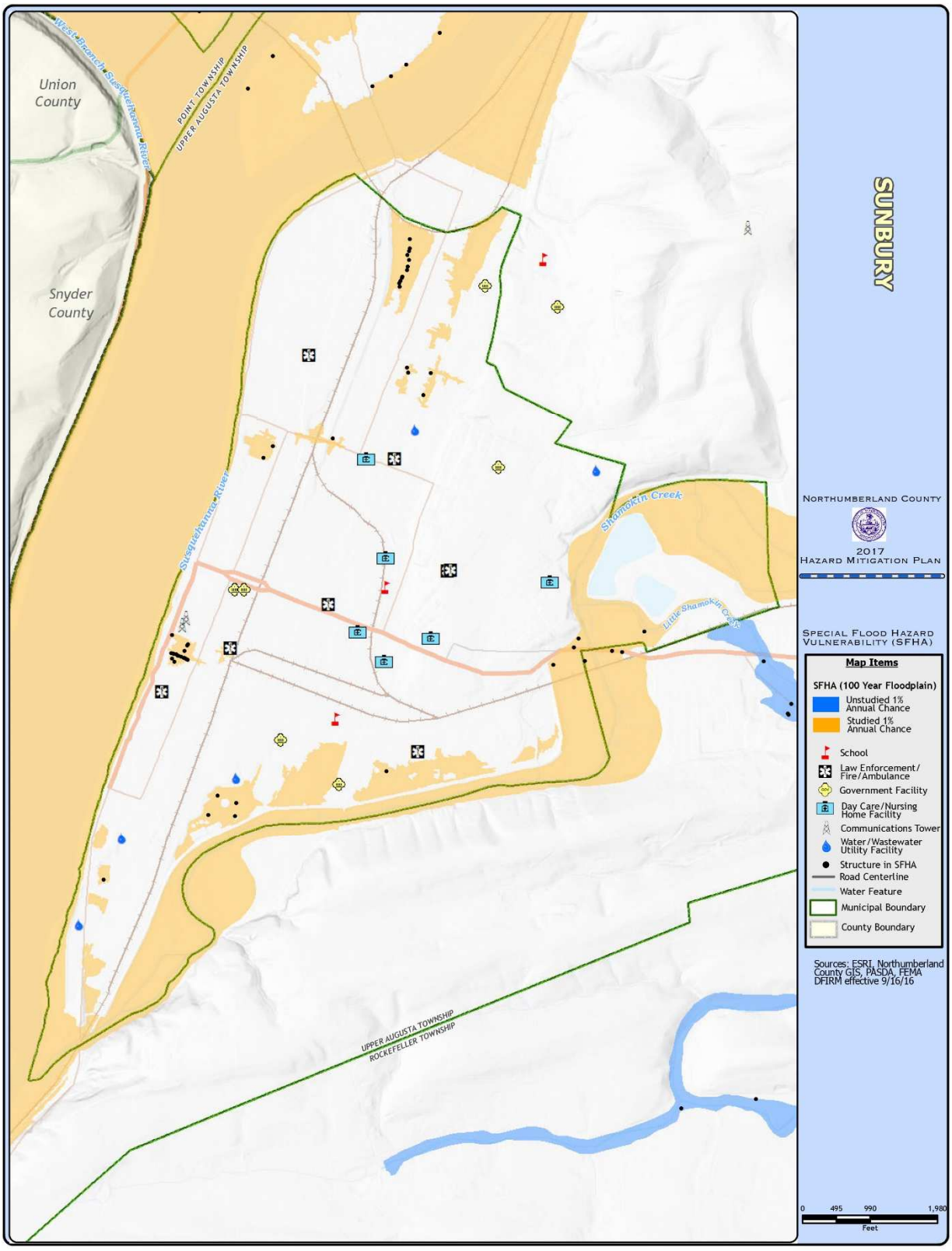

ROCKEFELLER TOWNSHIP
Snyder County
Susquehanna River
Shamokin Creek
Little Shamokin Creek
Plum Creek
Augusta Run
Hallowing Run
Bolle Run
Zerbe Run
Mahanoy Creek
UPPER AUGUSTA TOWNSHIP
ROCKEFELLER TOWNSHIP
SHAMOKIN TOWNSHIP
SNYDERTOWN BOROUGH
LOWER AUGUSTA TOWNSHIP
LITTLE MAHANOY TOWNSHIP
ZERBE TOWNSHIP
WEST CAMERON TOWNSHIP
890
225
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0 1,375 2,750 5,500
Feet

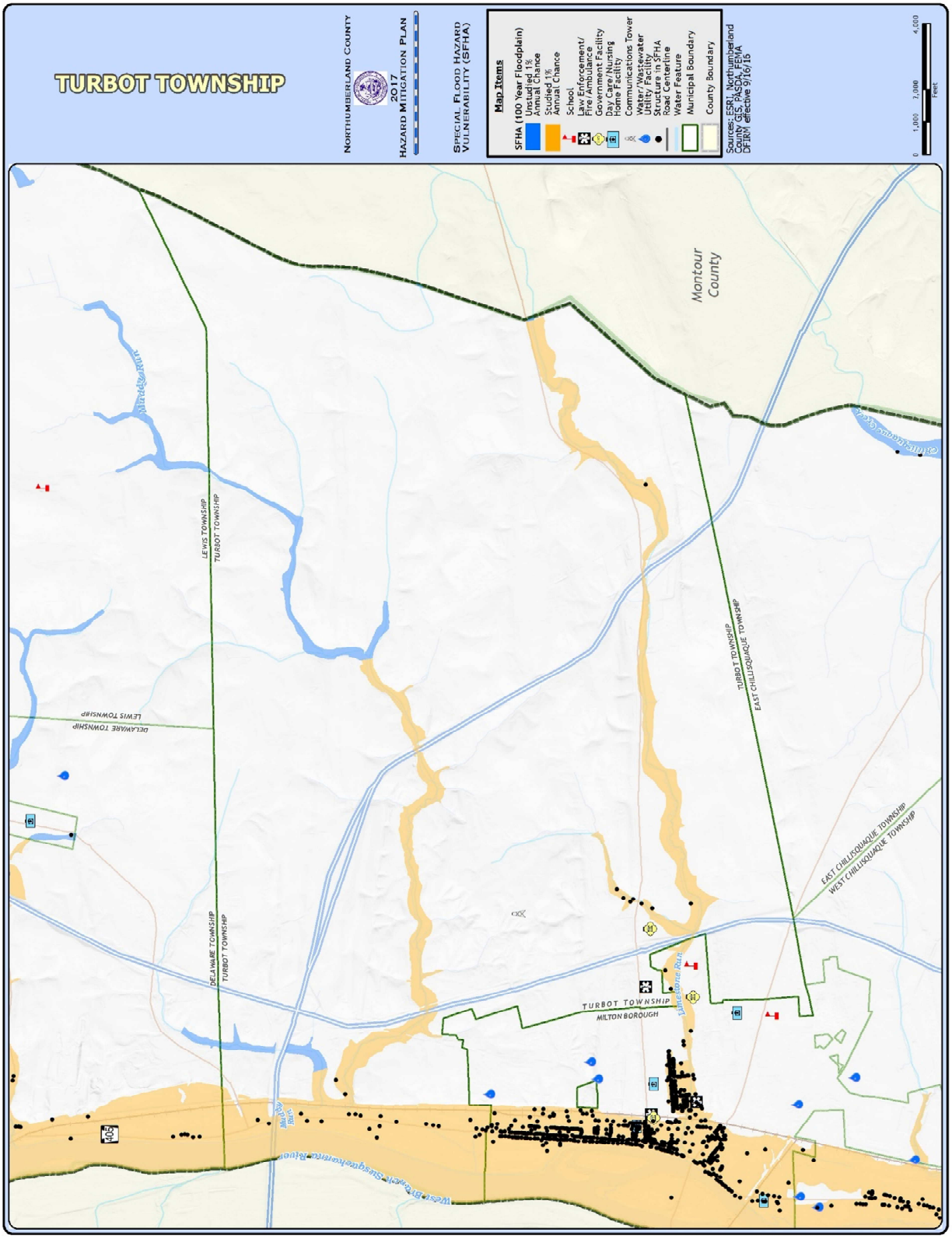

RUSH TOWNSHIP
Northumberland County
2017
Hazard Mitigation Plan
Special Flood Hazard Vulnerability (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0
1,550
3,100
6,200
Feet
Montour County
Susquehanna River
Logan Run
Wilson Run
Kipps Run
Gaskins Run
Raups Run
Packers Run
Gravel Run
Pocahontas Run
Shamokin Creek
54
RIVERSIDE BOROUGH
RUSH TOWNSHIP
POINT TOWNSHIP
RUSH TOWNSHIP
RALPHO TOWNSHIP
SHAMOKIN TOWNSHIP
SNYDERTOWN BOROUGH
UPPER AUGUSTA TOWNSHIP

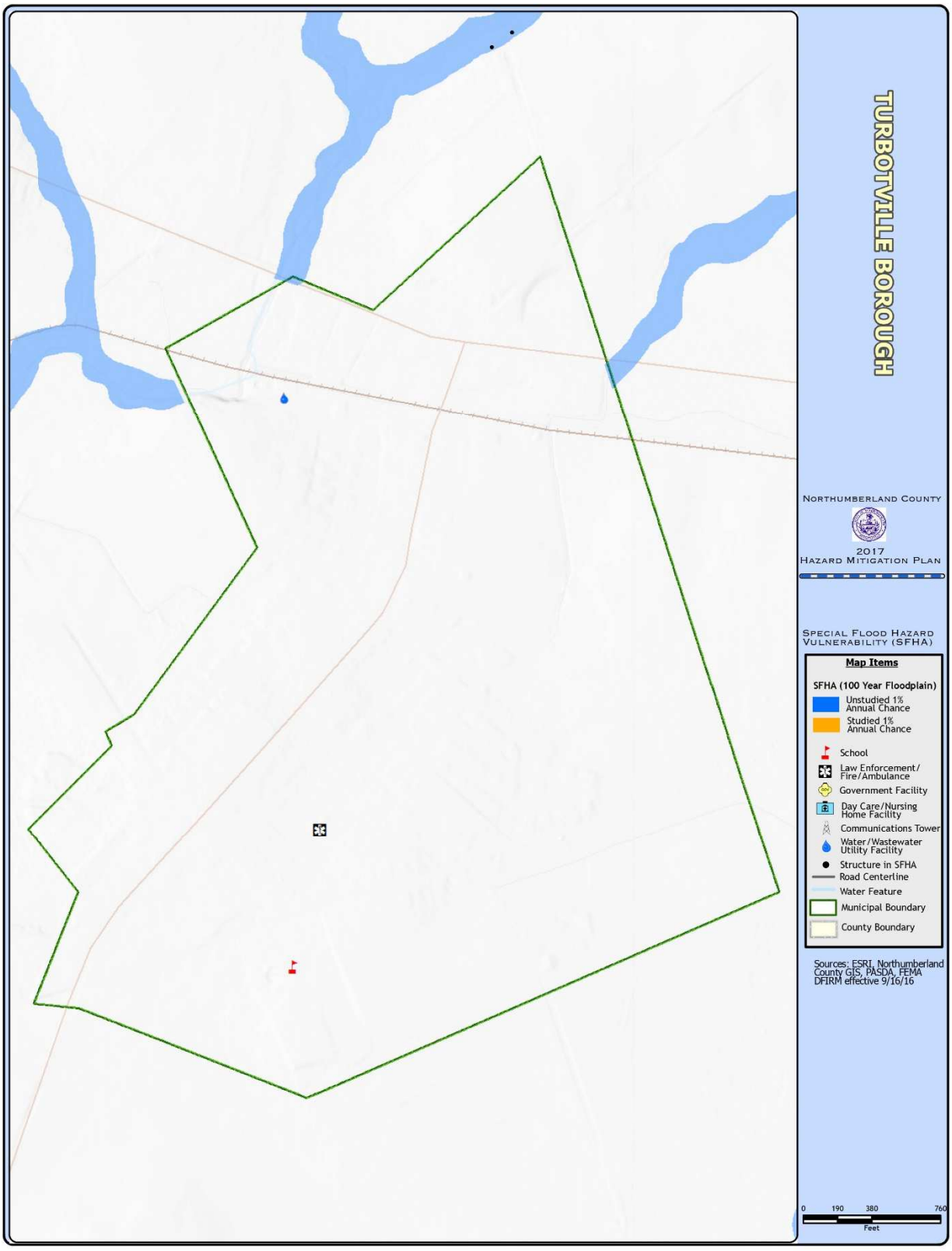

SHAMOKIN
Shamokin Creek
Coal Run
Carbon Run
Garbon Run
Shamokin Creek
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0
245
490
980
Feet

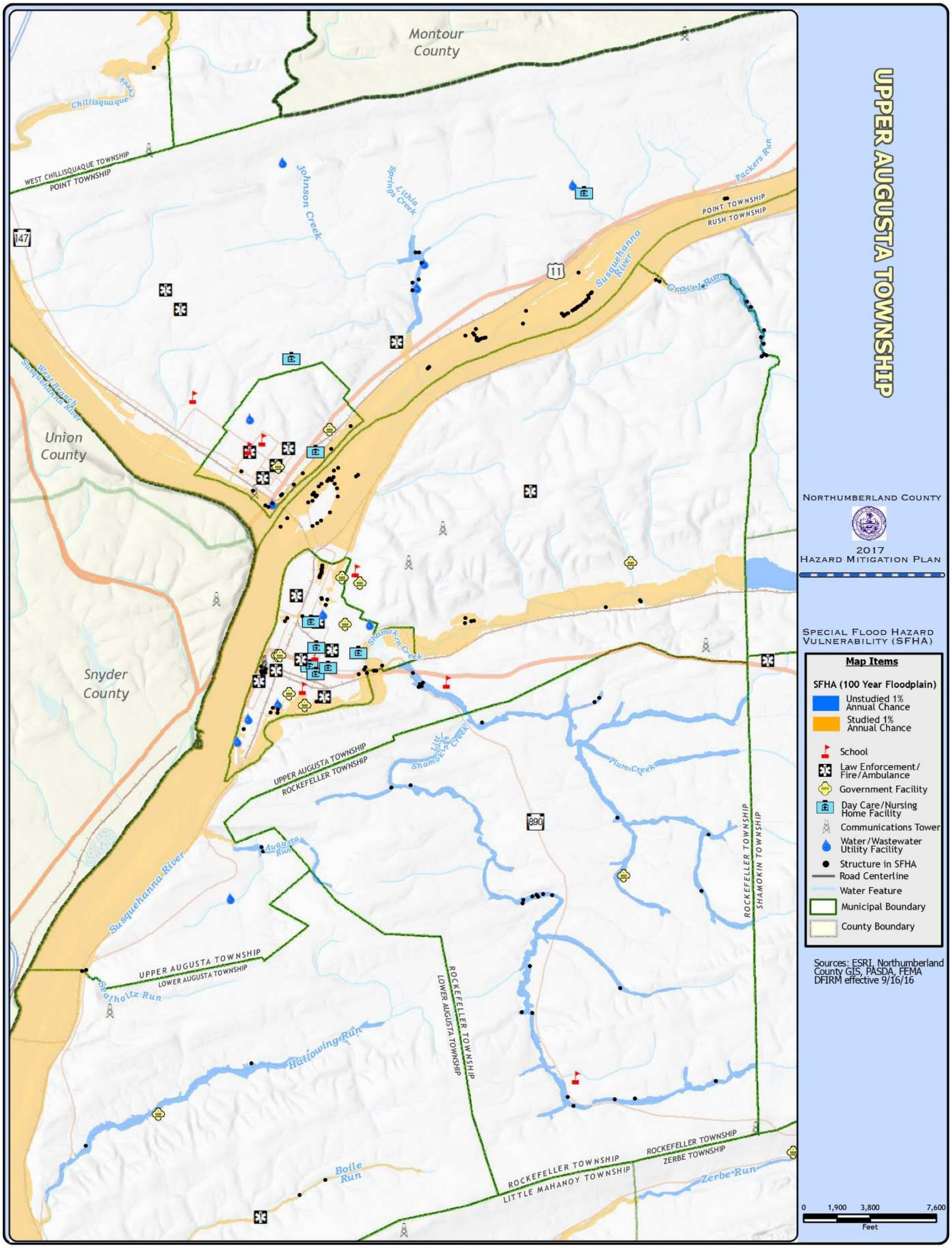

SHAMOKIN TOWNSHIP
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0 1,400 2,800 5,600
Feet
RUSH TOWNSHIP
SNYDERTOWN BOROUGH
RUSH TOWNSHIP
SHAMOKIN TOWNSHIP
SNYDERTOWN BOROUGH
SHAMOKIN TOWNSHIP
UPPER AUGUSTA TOWNSHIP
SNYDERTOWN BOROUGH
ROCKEFELLER TOWNSHIP
SHAMOKIN TOWNSHIP
SHAMOKIN TOWNSHIP
COAL TOWNSHIP
SHAMOKIN TOWNSHIP
ZERBE TOWNSHIP
COAL TOWNSHIP
ZERBE TOWNSHIP
Logan Run
Gravel Run
Shamokin Creek
Pocahontas Run
Lick Run
Rum Creek
Shamokin Creek
Bennys Run
Little Shamokin Creek
Zerbe Run
Furnace Run
Carbon Run
61

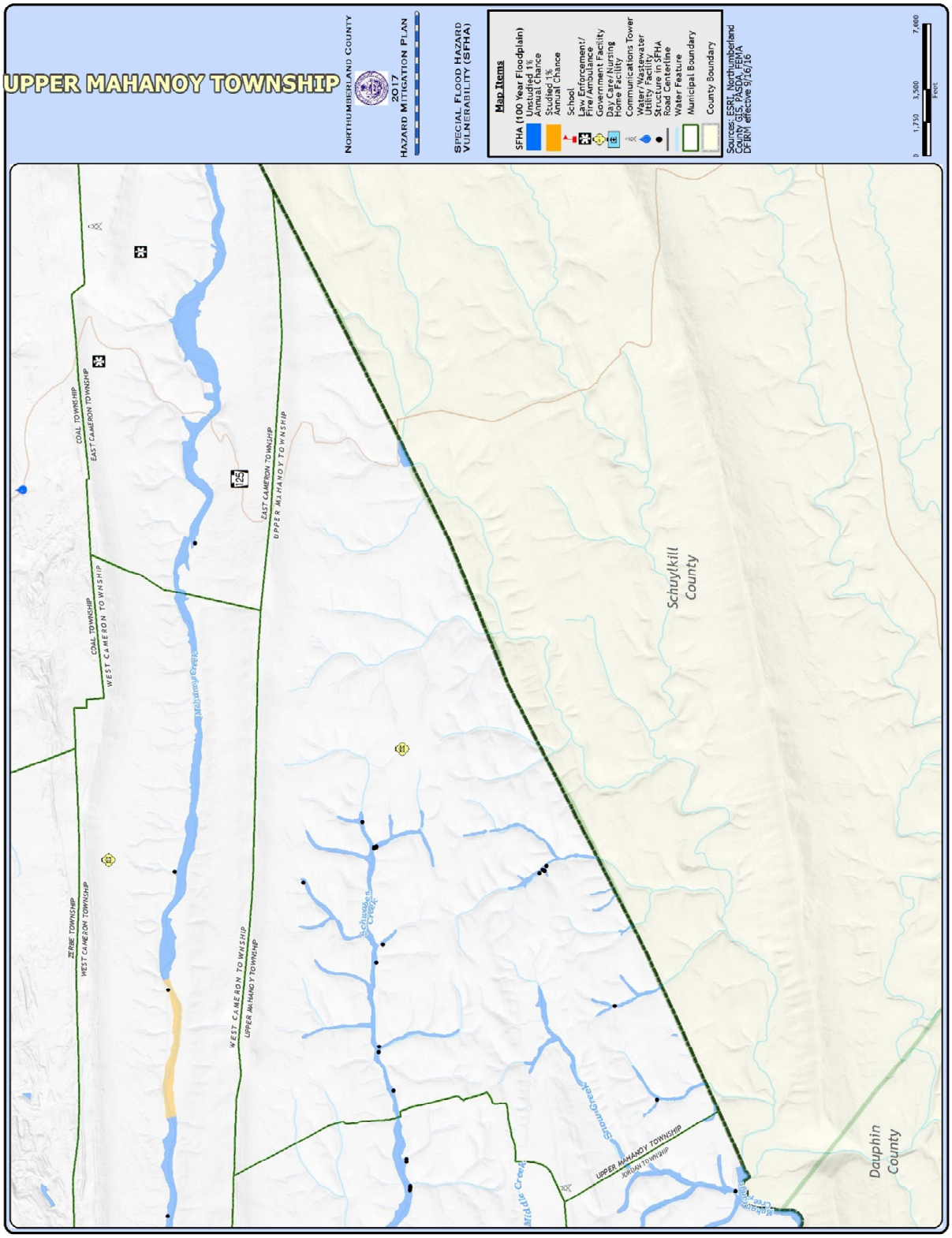

SNYDERTOWN BOROUGH
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD
VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1%
Annual Chance
Studied 1%
Annual Chance
School
Law Enforcement/
Fire/Rescue
Government Facility
Day Care/Nursing
Home Facility
Communications Tower
Water/Wastewater
Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland
County GIS, PASDA, FEMA
DFIRM effective 9/16/16
0
500
1,000
2,600
Feet
Shamokin Creek
RUSH TOWNSHIP
SNYDERTOWN BOROUGH
SHAMOKIN TOWNSHIP
UPPER AUGUSTA TOWNSHIP
SNYDERTOWN BOROUGH
UPPER AUGUSTA TOWNSHIP
RUSH TOWNSHIP
ROCKEFELLER TOWNSHIP
SHAMOKIN TOWNSHIP

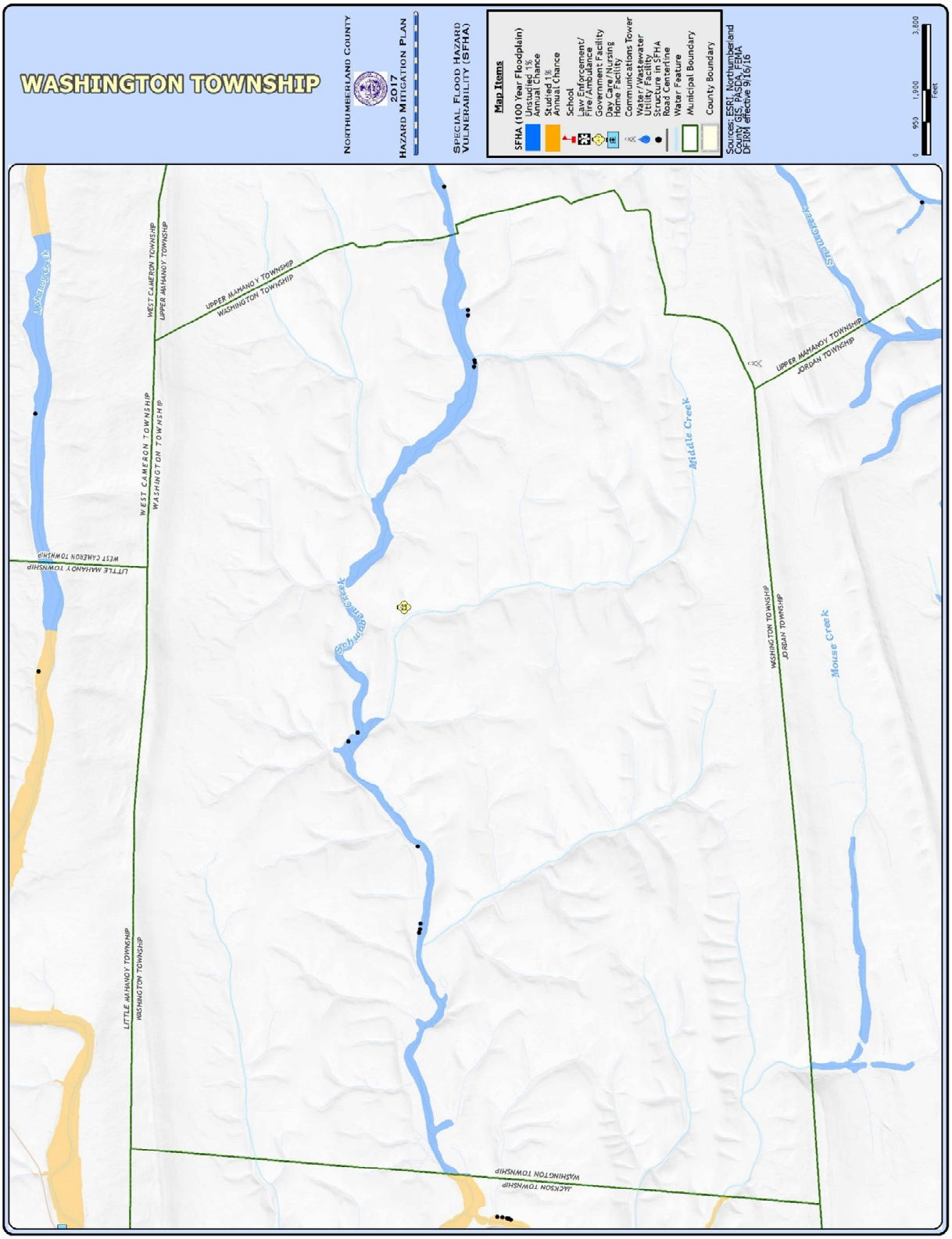

Union County
Snyder County
West Branch Susquehanna River
POINT TOWNSHIP
UPPER AUGUSTA TOWNSHIP
Susquehanna River
Shamokin Creek
Little Shamokin Creek
UPPER AUGUSTA TOWNSHIP
ROCKEFELLER TOWNSHIP
SUNBURY
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0 495 990 1,980
Feet

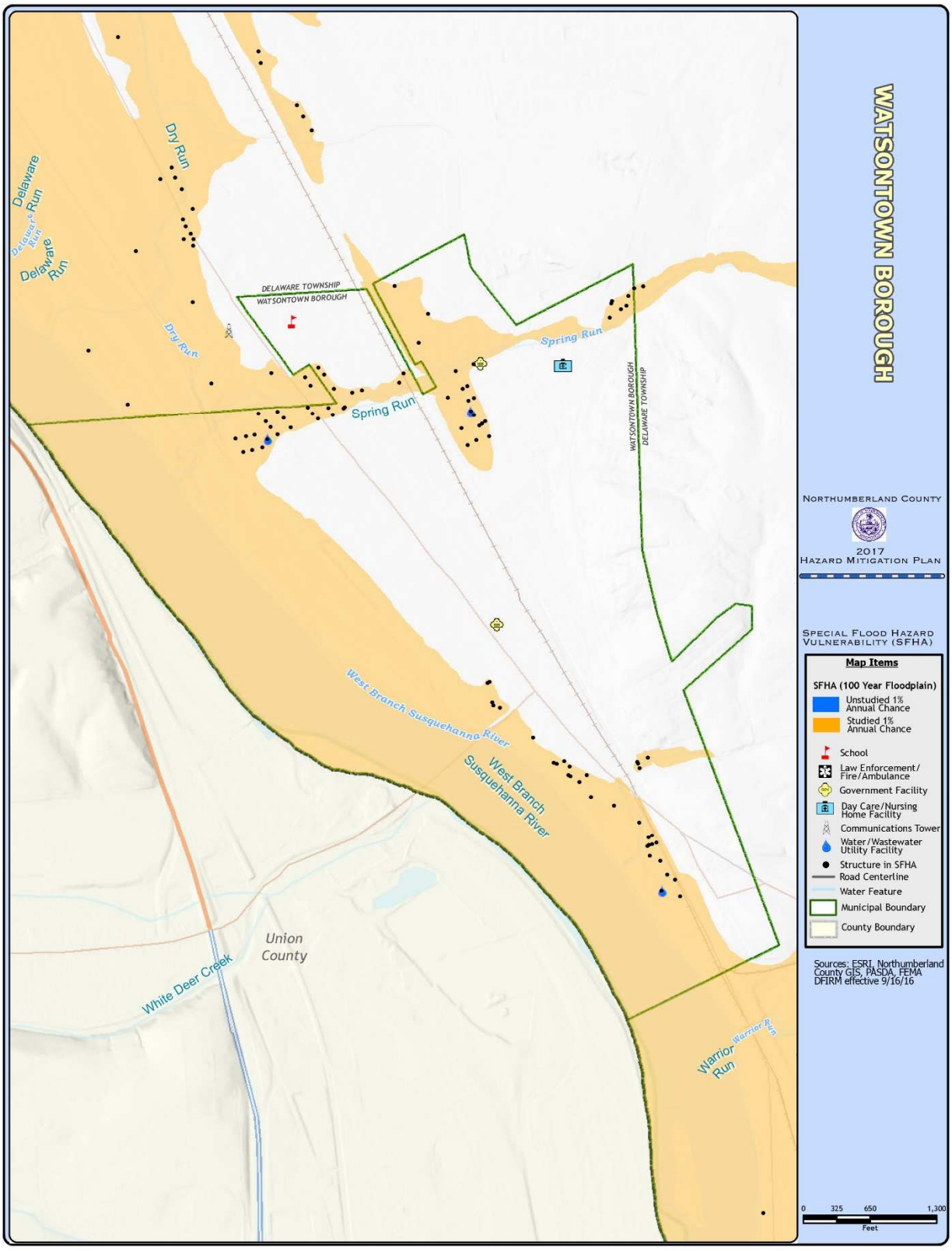

TURBOT TOWNSHIP
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD
VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1%
Annual Chance
Studied 1%
Annual Chance
School
Law Enforcement/
Fire/Ambulance
Government Facility
Day Care/Nursing
Home Facility
Communications Tower
Water/Wastewater
Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland
County GIS, PASDA, FEMA
DFIRM effective 9/16/16
0
1,000
2,000
4,000
Feet
Montour
County
LEWIS TOWNSHIP
TURBOT TOWNSHIP
DELAWARE TOWNSHIP
LEWIS TOWNSHIP
DELAWARE TOWNSHIP
TURBOT TOWNSHIP
EAST CHILLISQUAQUE TOWNSHIP
EAST CHILLISQUAQUE TOWNSHIP
WEST CHILLISQUAQUE TOWNSHIP
TURBOT TOWNSHIP
MILTON BOROUGH
Limestone Run
West Branch Susquehanna River
405

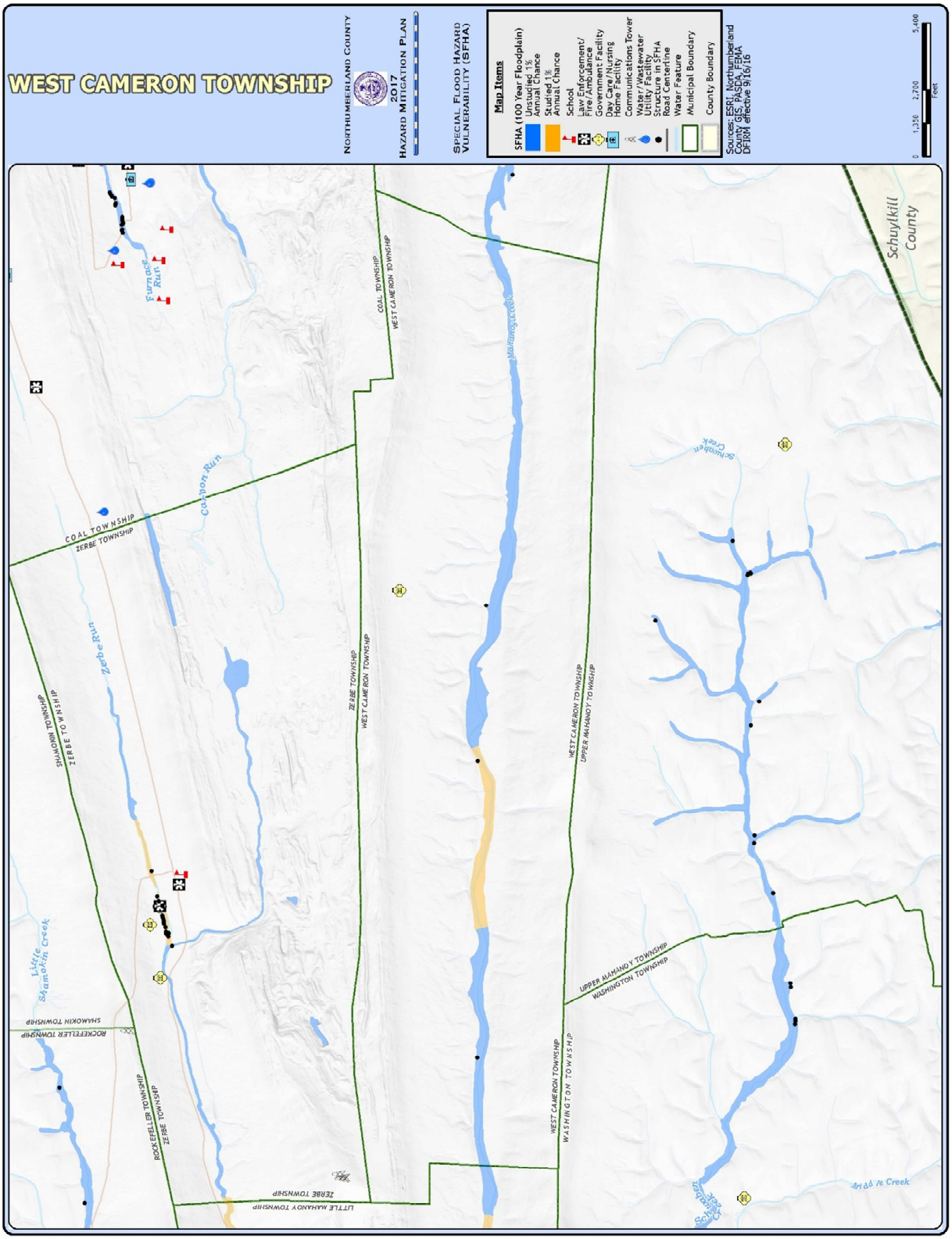

TURBOTVILLE BOROUGH
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0
190
380
760
Feet

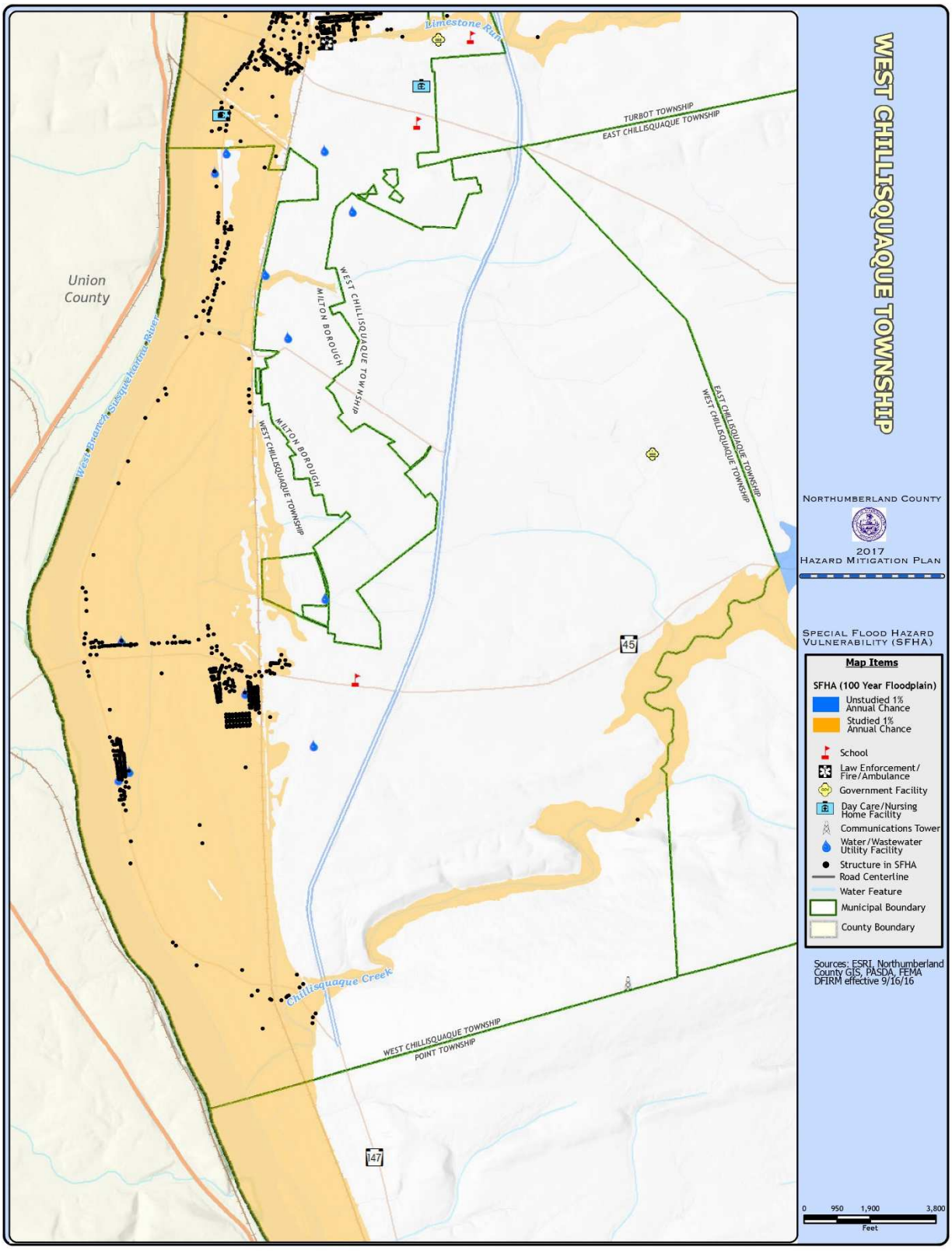

UPPER AUGUSTA TOWNSHIP
Northumberland County
2017
Hazard Mitigation Plan
Special Flood Hazard Vulnerability (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0 1,900 3,800 7,600
Feet
Montour County
Union County
Snyder County
WEST CHILLISQUAQUE TOWNSHIP
POINT TOWNSHIP
RUSH TOWNSHIP
UPPER AUGUSTA TOWNSHIP
ROCKEFELLER TOWNSHIP
LOWER AUGUSTA TOWNSHIP
SHAMOKIN TOWNSHIP
LITTLE MAHANOY TOWNSHIP
ZERBE TOWNSHIP
Chillisquaque Creek
Johnson Creek
Lithia Springs Creek
Packers Run
Susquehanna River
West Branch Susquehanna River
Gravel Run
Shamokin Creek
Little Shamokin Creek
Plum Creek
Augusta Run
Shalholtz Run
Hallowing Run
Boile Run
Zerbe Run
147
11
890

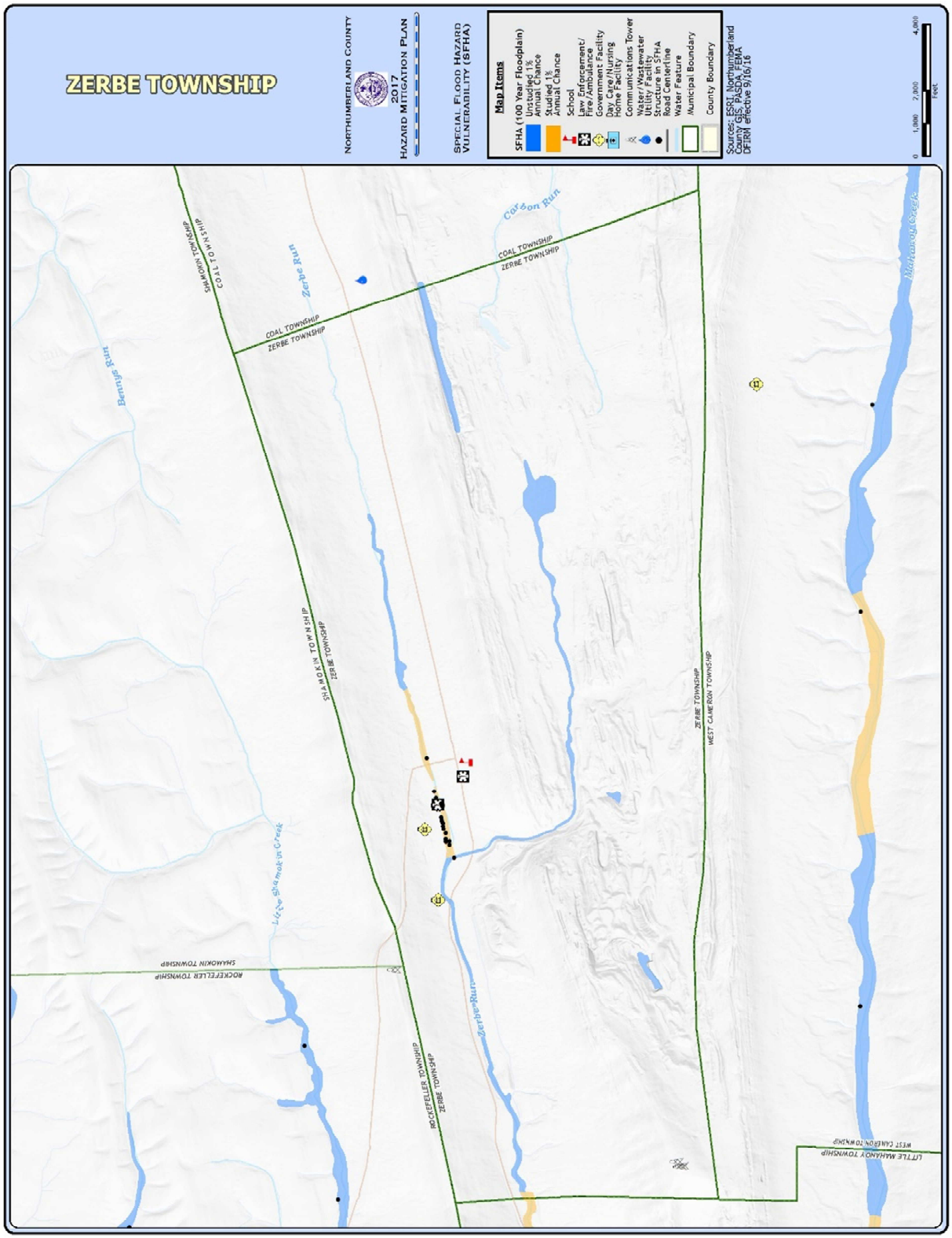

UPPER MAHANOY TOWNSHIP
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD
VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1%
Annual Chance
Studied 1%
Annual Chance
School
Law Enforcement/
Fire/Ambulance
Government Facility
Day Care/Nursing
Home Facility
Communications Tower
Water/Wastewater
Utility Facility
Structures in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland
County GIS, PASDA, FEMA
DFIRM effective 9/16/16
0
1,750
3,500
7,000
Feet
Schuylkill
County
Dauphin
County
COAL TOWNSHIP
EAST CAMERON TOWNSHIP
COAL TOWNSHIP
WEST CAMERON TOWNSHIP
ZERBE TOWNSHIP
WEST CAMERON TOWNSHIP
WEST CAMERON TOWNSHIP
UPPER MAHANOY TOWNSHIP
EAST CAMERON TOWNSHIP
UPPER MAHANOY TOWNSHIP
UPPER MAHANOY TOWNSHIP
JORDAN TOWNSHIP
Schuylkill River
Schuylkill Creek
Middle Creek


WASHINGTON TOWNSHIP
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PA DCNR, FEMA DFIRM effective 9/16/16
0
950
1,900
3,800
Feet
WEST CAMERON TOWNSHIP
UPPER MAHANOY TOWNSHIP
WASHINGTON TOWNSHIP
LITTLE MAHANOY TOWNSHIP
JORDAN TOWNSHIP
JACKSON TOWNSHIP
Middle Creek
Shamokin Creek
Mouse Creek


WATSONTOWN BOROUGH
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0 325 650 1,300
Feet
Dry Run
Delaware Run
DELAWARE TOWNSHIP
WATSONTOWN BOROUGH
Spring Run
West Branch Susquehanna River
Union County
White Deer Creek
Warrior Run


WEST CAMERON TOWNSHIP
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, FEMA DFIRM effective 9/16/16
0
1,350
2,700
5,400
Feet
Schuylkill County
Furnace Run
Coal Run
Zerbe Run
Little Shamokin Creek
Shamokin Creek
COAL TOWNSHIP
ZERBE TOWNSHIP
WEST CAMERON TOWNSHIP
SHAMOKIN TOWNSHIP
ROCKEFELLER TOWNSHIP
UPPER MAHANOY TOWNSHIP
WASHINGTON TOWNSHIP
LITTLE MAHANOY TOWNSHIP


WEST CHILLISQUAQUE TOWNSHIP
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1% Annual Chance
Studied 1% Annual Chance
School
Law Enforcement/ Fire/Ambulance
Government Facility
Day Care/Nursing Home Facility
Communications Tower
Water/Wastewater Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland County GIS, PASDA, FEMA DFIRM effective 9/16/16
0 950 1,900 3,800
Feet
Limestone Run
TURBOT TOWNSHIP
EAST CHILLISQUAQUE TOWNSHIP
Union County
WEST CHILLISQUAQUE TOWNSHIP
MILTON BOROUGH
West Branch Susquehanna River
EAST CHILLISQUAQUE TOWNSHIP
WEST CHILLISQUAQUE TOWNSHIP
45
Chillisquaque Creek
WEST CHILLISQUAQUE TOWNSHIP
POINT TOWNSHIP
147


ZERBE TOWNSHIP
NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
SPECIAL FLOOD HAZARD
VULNERABILITY (SFHA)
Map Items
SFHA (100 Year Floodplain)
Unstudied 1%
Annual Chance
Studied 1%
Annual Chance
School
Law Enforcement/
Fire/Ambulance
Government Facility
Day Care/Nursing
Home Facility
Communications Tower
Water/Wastewater
Utility Facility
Structure in SFHA
Road Centerline
Water Feature
Municipal Boundary
County Boundary
Sources: ESRI, Northumberland
County GIS, PASDA, FEMA
DFIRM effective 9/16/16
0
1,000
2,000
4,000
Feet
Corson Run
Zerbe Run
Bennys Run
Shamokin Creek
Little Shamokin Creek
Zerbe Run
COAL TOWNSHIP
ZERBE TOWNSHIP
SHAMOKIN TOWNSHIP
ZERBE TOWNSHIP
ROCKEFELLER TOWNSHIP
ZERBE TOWNSHIP
WEST CAMERON TOWNSHIP
LITTLE MAHANOY TOWNSHIP

APPENDIX E
HAZARD ANALYSIS RESULTS

APPENDIX E – HAZARD ANALYSIS RESULTS

Summary

Nearly ninety percent of federal disaster declarations are for flood events. For this reason, our potential loss estimate and hazard analysis focuses on flooding impacts within the 100 year flood plain as recognized by the most current FEMA DFIRM data. The predictability of flooding allows us to accurately portray the impact from a monetary standpoint more so than for rockslides, landslides, straight line winds/tornadic activity, blizzard conditions and dam failure all of which have the ability to cripple communities throughout the county. Inevitably, flooding along both branches of the Susquehanna River and many of the larger tributaries draining into the Susquehanna watershed makes this our largest concern.

The Department of Geographic Information Systems of the County of Northumberland conducted an analysis of the structures impacted by the 1% annual chance flood hazard (100-year flood hazard). Utilizing the 1% annual chance special flood hazard areas (FEMA), tax parcels (Northumberland County GIS), and building centroids (Northumberland County GIS) – the Department identified those at risk structures impacted by a flood hazard. Using those at risk structures, were able to determine the associated structures' valuation data maintained by the county Assessment Office.

Northumberland County's assessed values are used for ad valorem taxation purposes only. They are a market value derived from our base year cost tables; Northumberland County currently has a base year of 1972. Current assessed values cannot be communicated as true market value because of the difference between base year and current or actual year. The State provides each assessment office with a common level ratio to apply to assessed values in order to equate them to a more realistic, market based value. If assessments are used to represent loss without applying the common level ratio, totals would be considerably skewed away from values that would represent true loss. The common level ratio for 2016-2017 for Northumberland County is 25.6%; the ratio is used to explain that after all valid sales in our county are reviewed and compared against the assessment for the corresponding parcel, the average assessment represents 25.6% of what a property could possibly sell for on an open market.

Using the following formula, (building assessed value divided by .256), the structures valuation was converted from 1972 market value to 2016-2017 market value. To simulate the estimated loss for a 1% annual flood event, 25% was applied to each structures 2017 market valuation. The map below shows all parcels that intersect the SFHA and their corresponding values.

The estimated loss for a 1% annual chance flood hazard was summarized by municipality and classified by structure land use (Northumberland County GIS , 2017).

Parcels Affected in the 100 Year SFHA in Northumberland County by Municipality

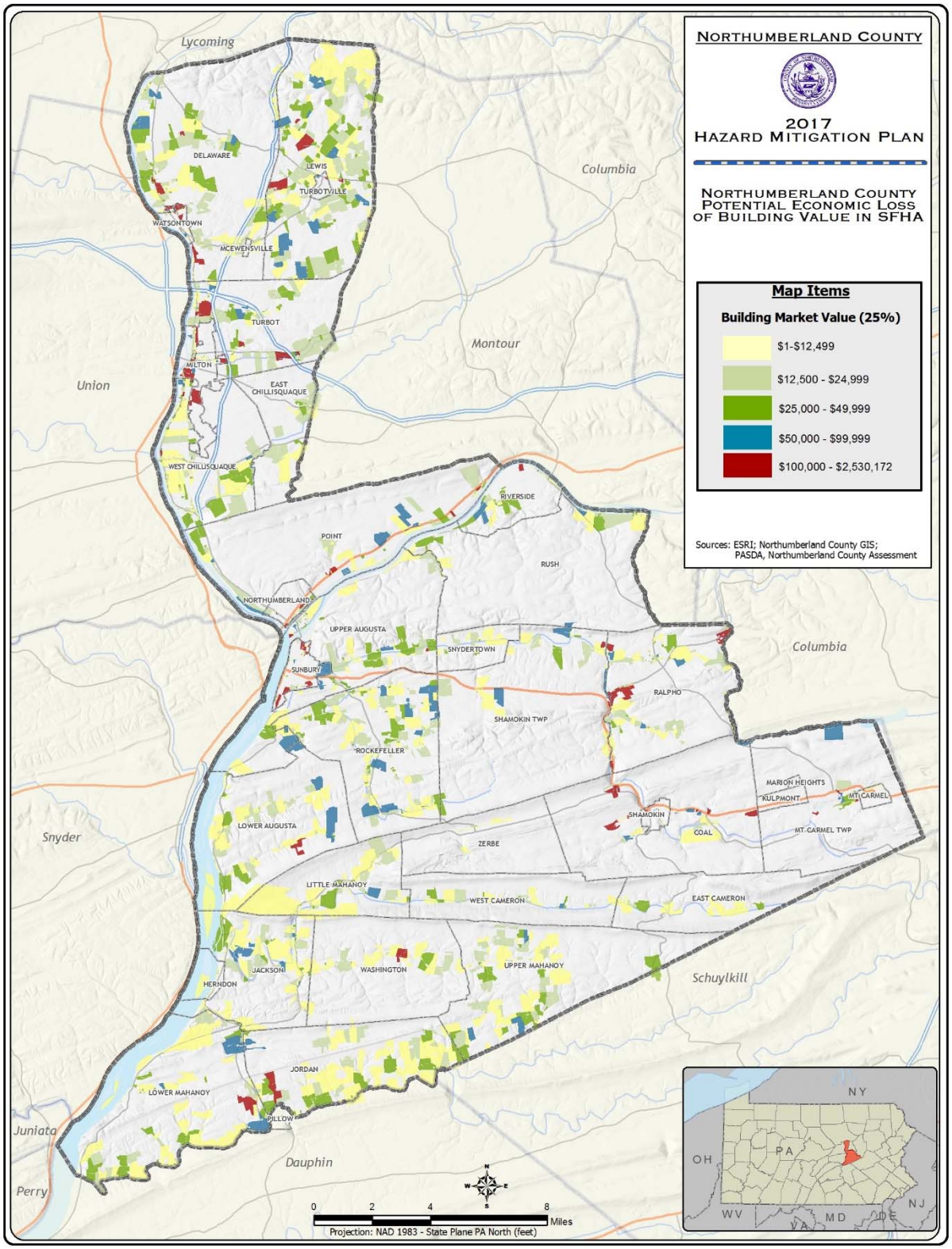
	PARCELS IN SFHA WITH ADDRESSED STRUCTURE	2016-2017 FAIR MARKET BUILDING VALUE OF STRUCTURES IN SFHA	ESTIMATED LOSS (25%)
COAL Township	77	$3,242,148	$810,537.00
DELAWARE Township	139	$9,569,029	$2,392,257.25
EAST CAMERON Township	1	$28,867	$7,216.75
EAST CHILLISQUAQUE Township	9	$426,093	$106,523.25
HERNDON Borough	25	$969,609	$242,402.25
JACKSON Township	25	$1,425,820	$356,455.00
JORDAN Township	8	$1,134,259	$283,564.75
KULPMONT Borough	2	$85,898	$21,474.50
LEWIS Township	8	$534,688	$133,672.00
LITTLE MAHANOY Township	15	$606,837	$151,709.25
LOWER AUGUSTA Township	8	$487,462	$121,865.50
LOWER MAHANOY Township	24	$1,103,045	$275,761.25
MARION HEIGHTS Borough	0	$0.00	$0.00
MCEWENSVILLE Borough	1	$29,297	$7,324.25
MILTON Borough	573	$52,159,218	$13,039,804.50
MOUNT CARMEL Borough	192	$3,831,020	$957,755.00
MOUNT CARMEL Township	4	$172,109	$43,027.25
NORTHUMBERLAND Borough	11	$2,307,226	$576,806.50
POINT Township	64	$3,175,356	$793,839.00
RALHO Township	47	$4,928,908	$1,232,227.00
RIVERSIDE Borough	12	$869,396	$217,349.00
ROCKEFELLER Township	24	$1,566,719	$391,679.75
RUSH Township	12	$634,729	$158,682.25
SHAMOKIN City	173	$3,441,915	$860,478.75
SHAMOKIN Township	16	$4,291,760	$1,072,940.00
SNYDERTOWN Borough	9	$359,336	$89,834.00
SUNBURY City	29	$11,434,180	$2,858,545.00
TURBOT Township	30	$1,515,510	$378,877.50
TURBOTVILLE Borough	0	$0.00	$0.00
UPPER AUGUSTA Township	42	$2,758,318	$689,579.50
UPPER MAHANOY Township	38	$728,907	$182,226.75
WASHINGTON Township	10	$478,476	$119,619.00
WATSONTOWN Borough	74	$6,596,528	$1,649,132.00
WEST CAMERON Township	3	$78,282	$19,570.50
WEST CHILLISQUAQUE Township	358	$12,955,776	$3,238,944.00
ZERBE Township	18	$636,250	$159,062.50
TOTAL	2,081	$134,562,971	$33,640,742.75

Northumberland County Parcels with Building Assessed Values in SFHA by generalized Land Use type

LandUse Code	LandUse Description	COUNT
A	AGRICULTURE	75
C	COMMERCIAL	236
E	EXEMPT	74
G	GARAGE	8
I	INDUSTRIAL	24
P	PUBLIC UTILITY	7
Q	BUILDING	10
R	RESIDENTIAL	1408
M	MOBILE HOME	191
V	VACANT	47
Y	CABIN	1

Northumberland County Parcels with Building Assessed Values in SFHA by detailed Land Use type

LandUse Code	LandUse Description	COUNT
0	EXEMPT	163
1000	RES. - 3 OR LESS LIVING UNITS	1429
1100	TRL, MH, MOD/NO BSMT, DOUBLEWIDES	60
1500	SEASONAL HOUSING	1
2000	LOTS (LESS THAN 10 ACRES)	83
2500	INDUSTRIAL VACANT	3
3000	INDUSTRIAL WITH BUILDING	19
3500	COMMERCIAL VACANT	13
4000	COMMERCIAL W/BLDG ASSD OVR $20,000	135
4500	COMMERCIAL W/BUILDING	82
5000	AGRICULTURAL (10+ ACRES & BUILDING)	70
5500	AGRICULTURAL VACANT (10+ AC)	6
9000	MISCELLANEOUS	13
9800	LAND (MORE THAN 10 AC)	4


NORTHUMBERLAND COUNTY
2017
HAZARD MITIGATION PLAN
NORTHUMBERLAND COUNTY
POTENTIAL ECONOMIC LOSS
OF BUILDING VALUE IN SFHA
Map Items
Building Market Value (25%)
$1-$12,499
$12,500 - $24,999
$25,000 - $49,999
$50,000 - $99,999
$100,000 - $2,530,172
Sources: ESRI; Northumberland County GIS;
PASDA, Northumberland County Assessment
Lycoming
Columbia
Montour
Union
Snyder
Juniata
Perry
Dauphin
Schuylkill
DELAWARE
LEWIS
TURBOTVILLE
WATSONTOWN
MCEWENSVILLE
TURBOT
MILTON
EAST CHILLISQUAQUE
WEST CHILLISQUAQUE
RIVERSIDE
POINT
RUSH
NORTHUMBERLAND
UPPER AUGUSTA
SNYDERTOWN
SUNBURY
RALPHO
SHAMOKIN TWP
ROCKEFELLER
MARION HEIGHTS
KULPMONT
MT. CARMEL
SHAMOKIN
COAL
MT. CARMEL TWP
LOWER AUGUSTA
ZERBE
LITTLE MAHANOY
WEST CAMERON
EAST CAMERON
JACKSON
WASHINGTON
UPPER MAHANOY
HERNDON
JORDAN
LOWER MAHANOY
PILLOW
0 2 4 8
Miles
Projection: NAD 1983 - State Plane PA North (feet)
NY
PA
OH
WV
VA
MD
DE
NJ

APPENDIX G
2017 MITIGATION ACTIONS

COMMUNITY(IES):	Northumberland County
ACTION NO. 1	**ACTION:** Disseminate informational pamphlets or mailings and/or create websites and social media for Northumberland County residents that explain the risks of hazards, outline precautionary measures that can be taken to help reduce the impacts of a disaster to themselves and their property, and emphasize the values of hazard mitigation.
Mitigation Technique Category:	Public Education and Awareness
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland County staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within one year, then an annual distribution.

COMMUNITY(IES):	Northumberland County
ACTION NO. 2	ACTION: Develop an informational website with information on the hazards that can effect the County, how residents can protect themselves from disaster, and mitigation actions the County and municipalities are taking to help reduce the risks.
Mitigation Technique Category:	Public Education and Awareness, Property Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland County staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Continuous

COMMUNITY(IES):	Northumberland County and all Municipalities.
ACTION NO. 3	ACTION: Cooperate with local media to produce regular public service announcements or news releases on hazard risk, safety, and the importance of mitigation.
Mitigation Technique Category:	Public Education and Awareness, Structural Project Implementation, Property Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland County staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Continuous

COMMUNITY(IES):	Northumberland County
ACTION NO. 4	ACTION: Coordinate with FEMA, PEMA, PA DCED, and any other appropriate agencies on developing and implementing a natural hazard awareness curriculum in local schools.
Mitigation Technique Category:	Public Education and Awareness, Structural Project Implementation, Property protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire,
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within one year, then annual assemblies.

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 5	ACTION: Disseminate informational pamphlets or mailings and/or create websites and social media on hazard mitigation for property owners in the 1 percent annual chance floodplain or owners of Repetitive and Severe Repetitive Loss structures.
Mitigation Technique Category:	Public Education and Awareness, Property protection
Hazard(s)	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm,
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County & municipal Staff
Lead Agency/Department:	Local Municipalities (NFIP & CRS) with County support
Implementation Schedule:	Completion within one year.

COMMUNITY(IES):	Northumberland County
ACTION NO. 6	ACTION: Develop informational workshops on hazard risks and hazard mitigation for property owners in high-risk areas.
Mitigation Technique Category:	Public Education and Awareness, Property Protection,
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within one year, then annual meetings.

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 7	ACTION: Investigate avenues for real estate disclosure for properties in the 1 percent annual chance floodplain.
Mitigation Technique Category:	Public Education and Awareness
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm
Potential Funding Sources:	FEMA, PEMA, PA DCED, County and municipal Staff
Lead Agency/Department:	Local municipalities with County support
Implementation Schedule:	Completion within one year.

COMMUNITY(IES):	Northumberland County and all municipalities.
ACTION NO. 8	ACTION: Assist municipalities in developing policies and procedures related to hazard mitigation, especially for municipalities that are vulnerable to direct impacts from possible levee failure.
Mitigation Technique Category:	Prevention, Public Education and Awareness, Structural Project Implementation, Emergency Services, Property Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County staff, Municipal Emergency Management, Northumberland County Department of Public Safety staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Continuous

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 9	ACTION: Investigate a County fund to facilitate voluntarily acquiring, elevating, or retrofitting structures in hazard-prone areas.
Mitigation Technique Category:	Public Education and Awareness, Property Protection, Structural Project Implementation
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm,
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County staff, SEDA-COG, ACT 105 OF 2010, Municipal Floodplain Managers
Lead Agency/Department:	Northumberland County Planning
Implementation Schedule:	Completion within one year with continued investments

COMMUNITY(IES):	Northumberland County and alll municipalities
ACTION NO. 10	ACTION: Enforce forest and vegetation management policies along the West and North Branch of the Susquehanna River floodplain.
Mitigation Technique Category:	Prevention, Public Education and Awareness, Natural Resource Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Tornado, Windstorm, Tsunami, Wildfire, Dam Failure, Levee Failure, Urban Fire or Explosion, Environmental Hazards.
Potential Funding	PA DCNR, PA DEP, Northumberland County and municipality staff
Lead Agency/Department:	Local municipalities with County support
Implementation Schedule:	Continous.

COMMUNITY(IES):	Northumberland County and all municipalities.
ACTION NO. 11	ACTION: Enforce urban forestry and landscape management policies for Drainage & Stormwater Management.
Mitigation Technique Category:	Prevention, Public Education and Awareness, Natural Resource Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Tornado, Windstorm, Tsunami, Wildfire, Dam Failure, Levee Failure, Urban Fire or Explosion, Environmental Hazards.
Potential Funding Sources:	PA DCNR, PA DEP, Northumberland County Planning staff
Lead Agency/Department:	Local municipalities with County support
Implementation Schedule:	Continous.

COMMUNITY(IES):	Northumberland County and all municipalities.
ACTION NO. 12	ACTION: Develop a plan of hazard mitigation best management practices that can be shared with other Counties.
Mitigation Technique Category:	Prevention
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland County staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within one year, then an annual meeting with other Counties is to be setup.

COMMUNITY(IES):	Northumberland County and all municipalities.
ACTION NO. 13	ACTION: Enforce sediment and erosion control regulations for all Land Development Planning, especially for floodplain areas.
Mitigation Technique Category:	Prevention, Public Education and Awareness
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland County staff, Northumberland County Conservation District, municipal staff, PA DEP
Lead Agency/Department:	Local municipalities with County support
Implementation Schedule:	Continuous

COMMUNITY(IES):	Northumberland County and all municipalities.
ACTION NO. 14	ACTION: Work with state and federal officials to enforce dumping regulations along the North & West Branch of the Susquehanna River, especially the recreational areas.
Mitigation Technique Category:	Prevention, Natural Resource Protection
Hazard(s)	Flood, Flash Flood, Environmental Hazards
Potential Funding Sources:	PA DCED, PA DEP, PA DCNR, Northumberland County staff
Lead Agency/Department:	Local municipalities with County support
Implementation Schedule:	Completion within one year.

COMMUNITY(IES):	Northumberland County and all municipalities.
ACTION NO. 15	ACTION: Work with state and federal officials to enforce wetlands development regulations for all Land Development Planning to protect the Natural Resources..
Mitigation Technique Category:	Prevention, Natural Resource Protection
Hazard(s)	Flood, Flash Flood, Environmental Hazards
Potential Funding Sources:	PA DCED, PA DEP, PA DCNR, Northumberland County staff
Lead Agency/Department:	Local municipalities with County support
Implementation Schedule:	Completion within one year.

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 16	ACTION: Identify potential locations to construct levees or floodwalls to protect communities subject to flooding along the West Branch of the Susquehanna River.
Mitigation Technique Category:	Structural Project Implementation
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm
Potential Funding Sources:	PA DCED, U.S. ARMY CORP. Northumberand County, effected Municipalities
Lead Agency/Department:	Local municipalities with County support
Implementation Schedule:	As funding becomes available.

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 17	ACTION: Mitigate properties by elevation, acquisition & demolition, relocation or wet/dry floodproofing of properties in the hazard areas, notably the 1 percent annual chance floodplain.
Mitigation Technique Category:	Property Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm,
Potential Funding Sources:	FEMA, PEMA, PA DCED, U.S.ARMY CORP, Hazard Mitigation Grants, Northumberland County & Municipal staff
Lead Agency/Department:	Local municipalities with County support
Implementation Schedule:	Continuous.

COMMUNITY(IES):	Northumberand County, and all communities
ACTION NO. 18	ACTION: Track Opioid use within each municipality, assist and support law enforcement activities to eliminate and prohibit the manufacturing, distribution and use of Opioids in Northumberland
Mitigation Technique Category:	Property Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm,
Potential Funding Sources:	FEMA, PEMA, PA DCED, U.S.ARMY CORP, Hazard Mitigation Grants, Northumberland County & Municipal staff
Lead Agency/Department:	Northumberand County Department of Public Safety
Implementation Schedule:	Continuous.

COMMUNITY(IES):	Northumberand County, and all communities
ACTION NO. 19	ACTION: Regularly inspect and maintain bridges, culverts, and levees for the protection from hazards and structural failures..
Mitigation Technique Category:	Structural Project Implementation
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, PA DCED, U.S.ARMY CORP, PennDOT, Hazard Mitigation Grants, Northumberland County & Municipal staff
Lead Agency/Department:	Northumberand County Department of Public Safety
Implementation Schedule:	Continuous.

COMMUNITY(IES):	Northumberand County, and all communities
ACTION NO. 20	ACTION: Develop a stream corridor restoration plan to protect the Susquehanna River banks, stream and creek banks from washout & erosion.
Mitigation Technique Category:	Structural Project Implementation, Natural Resources Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Earthquake, Extreme Temperatures, Hurrican, Tropical Storm, Nor'easter, Landslide, Tornado, Windstorm, Tsunami, Dam Failure, Levee Failure, Environmental Hazards, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, PA DCED, U.S.ARMY CORP, Northumberand County staff
Lead Agency/Department:	Northumberand County Planning
Implementation Schedule:	Within five years.

COMMUNITY(IES):	Northumberland County and all communities.
ACTION NO. 21	ACTION: Create and maintain a database and map of all critical facilities in the County for Emergency and Hazard Planning.
Mitigation Technique Category:	Emergency Services
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland County Staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Continuous

COMMUNITY(IES):	Northumberland County and all communities.
ACTION NO. 22	ACTION: Inspect critical facilities regularly to ensure they comply with standard codes and can structurally withstand the impacts of a disaster.
Mitigation Technique Category:	Prevention, Property Protection, Structural Project Implementation
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, PA DCED, Hazard Mitigation Grants, Northumberland County and Municipal staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within 2 years.

COMMUNITY(IES):	Northumberland County and all communities.
ACTION NO. 23	ACTION: Participate in the hazard mitigation planning process.
Mitigation Technique Category:	Public Education and Awareness, Prevention
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland County staff
Lead Agency/Department:	Local municipalities with County support
Implementation Schedule:	Continuous.

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 24	ACTION: Enforce floodplain development regulations to ensure proper floodproofing and
Mitigation Technique Category:	Prevention
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm,Dam Failure, Levee Failure
Potential Funding Sources:	Northumberland County & Municipal staff
Lead Agency/Department:	Municipal Floodplain Managers with County support
Implementation Schedule:	Continuous

COMMUNITY(IES):	Northumberland County and all communities.
ACTION NO. 25	ACTION: Offer technical assistance to municipalities to develop, address, or enforce floodplain, zoning, hillside development regulations, subdivision and development regulations, design review standards, and environmental review standards.
Mitigation Technique Category:	Prevention, Property Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland County & Municipal staff
Lead Agency/Department:	Local municipalities with County support
Implementation Schedule:	Continuous

COMMUNITY(IES):	Northumberland County and all communities.
ACTION NO. 26	ACTION: Develop stormwater management plans and regulations for those watersheds in the County that do not currently have a plan.
Mitigation Technique Category:	Prevention, Structural Project Implementation
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland County, FEMA, PEMA, PA DCED, Hazard Mitigation Grants, Northumberland County & Municipal staff
Lead Agency/Department:	Northumberland County Planning
Implementation Schedule:	Completion within 1 year.

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 27	ACTION: Purchase of easement/development rights in hazard-prone areas, specifically the 1 percent annual chance floodplain to limit floodplain development.
Mitigation Technique Category:	Property Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm, Dam Failure, Levee Failure
Potential Funding Sources:	FEMA, PEMA, PA DCED, Hazard Mitigation Grants, Northumberland County & Municipal staff
Lead Agency/Department:	Municipal Floodpalin Managers with County support
Implementation Schedule:	As funds become available.

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 28	ACTION: Promote open space preservation for flood water storage without causing damages.
Mitigation Technique Category:	Natural Resource Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm, Dam Failure, Levee Failure
Potential Funding Sources:	PA DCED, PA DEP, PA DCNR, Northumberland County & Municipal staff
Lead Agency/Department:	Local Municipalities with County support
Implementation Schedule:	Continuous

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 29	ACTION: Require special use permits for hazard-prone areas according to the Floodplain Ordinances..
Mitigation Technique Category:	Prevention
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm,
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County & Municipal staff
Lead Agency/Department:	Municipal Floodplain Managers with County support
Implementation Schedule:	Continous

COMMUNITY(IES):	Northumberland County and all municipalities
ACTION NO. 30	ACTION: Promote natural resource planning especially for public awareness and recreational
Mitigation Technique Category:	Public Education and Awareness, Prevention, Natural Resounce Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland County Planning staff
Lead Agency/Department:	Northumberland County Planning
Implementation Schedule:	Continuous

COMMUNITY(IES):	Northumberland County and all municipalities
ACTION NO. 31	ACTION: Review, evaluate, and discuss designated growth areas in existing County and Local plans to ensure development will occur out of hazard-prone areas.
Mitigation Technique Category:	Public Education and Awareness, Property Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland County Planning staff
Lead Agency/Department:	Northumberland County Planning
Implementation Schedule:	Continuous

COMMUNITY(IES):	Northumberland County and all municipalities
ACTION NO. 32	ACTION: Review planned infrastructure to ensure that it will be developed outside of hazard-prone
Mitigation Technique Category:	Public Education and Awareness, Property Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland County Planning staff
Lead Agency/Department:	Northumberland County Planning
Implementation Schedule:	Continuous

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 33	ACTION: Recommend, encourage, and assist communities to participate in the National Flood Insurance Program (NFIP) Community Rating System (CRS).
Mitigation Technique Category:	Public Education and Awareness, Property Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm, Dam Failure, Levee Failure
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County staff, Municipal Floodplain Managers
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Continuous

COMMUNITY(IES):	Northumberland County and all municipalities
ACTION NO. 34	ACTION: Encourage regional development of plans and procedures with other Counties and Municipalities.
Mitigation Technique Category:	Prevention
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	PA DCED, Northumberland County staff,
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within two years.

COMMUNITY(IES):	Northumberland County and all municipalities
ACTION NO. 35	ACTION: Encourage departments responsible for creating and storing data related to parcels, centerlines, buildings, addresses, hydrology, and hazards to develop and enforce data maintenance policies.
Mitigation Technique Category:	Prevention
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County & Municipal staff
Lead Agency/Department:	Northumberland County Information Services
Implementation Schedule:	Continuous

COMMUNITY(IES):	Northumberland County and all municipalities
ACTION NO. 36	ACTION: Encourage the development of data-sharing policies and agreements between departments and organizations responsible for data creation, management, and use.
Mitigation Technique Category:	Prevention
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County & Municipal staff
Lead Agency/Department:	Northumberland County Information Services
Implementation Schedule:	Continuous

COMMUNITY(IES):	Northumberland County and all municipalities
ACTION NO. 37	ACTION: Develop and maintain hazard occurrence databases to record information on hazards such as date and time of occurrence, duration of disaster, amount of damage, numbers of injuries, etc., for repetitive hazard profiling and for prediction & early warning planning & notifications.
Mitigation Technique Category:	Prevention, Emergency Services
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County & Municipal staff
Lead Agency/Department:	Northumberland County Information Services
Implementation Schedule:	Continuous

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 38	ACTION: Develop detailed databases on parcels and buildings in and out of the 1 percent annual chance floodplain. The data could include first-floor elevations, number of stories, basements, value of the structure, acreage of parcel in the floodplain, etc.
Mitigation Technique Category:	Prevention
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm, Dam Failure, Levee Failure
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County & Municipal staff
Lead Agency/Department:	Northumberland County Information Services
Implementation Schedule:	Continuous

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 39	ACTION: Work with the Federal Emergency Management Agency (FEMA) to update current NFIP floodplain maps and determine base flood elevations for the county.
Mitigation Technique Category:	Prevention
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm, Dam Failure, Levee Failure
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County & Municipal staff
Lead Agency/Department:	Local Municipalities with County support
Implementation Schedule:	Couninuous

COMMUNITY(IES):	Northumberland County and Municipalities with dams & levees
ACTION NO. 40	ACTION: Ensure that all critical facilities, including local dams and levees, have updated Emergency Response Plans.
Mitigation Technique Category:	Prevention, Emergency Services
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland County Department of Public Safety & Municipal staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Continuous

COMMUNITY(IES):	Northumberland County
ACTION NO. 41	ACTION: Develop and distribute a list of contact persons for each organization that may play a part in emergency response, services, relief, or hazard mitigation actions and planning.
Mitigation Technique Category:	Public Education and Awareness, Emergency Services
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland County Department of Public Safety & Municipal staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within one year.

COMMUNITY(IES):	Northumberland County and all Municipalities.
ACTION NO. 42	ACTION: Encourage the heads of each department or organization involved in emergency response, services, relief, or hazard mitigation to meet several times a year to discuss hazard mitigation planning and training.
Mitigation Technique Category:	Emergency Services
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland County staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Continuous.

COMMUNITY(IES):	Northumberland County
ACTION NO. 43	ACTION: Disseminate informational brochures or mailings and/or create websites and social media for organizations involved in emergency response, services, relief, or hazard mitigation.
Mitigation Technique Category:	Public Education and Awareness, Emergency Services
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County Department of Public Safety
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within one year.

COMMUNITY(IES):	Northumberland county and all Municipalities
ACTION NO. 44	ACTION: Inventory all available equipment and technology used for emergency response, for hazard planning, and EOP resource listing .
Mitigation Technique Category:	Emergency Services
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland county and Municipal staff
Lead Agency/Department:	Northumberland county Department of Public Safety
Implementation Schedule:	Continuous

COMMUNITY(IES):	Northumberland county and all Municipalities
ACTION NO. 45	ACTION: Develop evacuation routes and an evacuation plan to be used in the event of a disaster.
Mitigation Technique Category:	Public Education and Awareness, Emergency Services
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland County and Municipal staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Continuous

COMMUNITY(IES):	Northumberland county and all Municipalities
ACTION NO. 46	ACTION: Encourage homeowners to install appropriate venting devices to alleviate radon concentrations from within homes.
Mitigation Technique Category:	Public Education and Awareness
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland county and all Municipalities, PEMA, PA DCED
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within one year.

COMMUNITY(IES):	Northumberland county and all Municipalities
ACTION NO. 47	ACTION: Require all municipalities in Northumberland County to create and adopt an Emergency Operations Plan and provide a copy to the County Dept. of Public Safety.
Mitigation Technique Category:	Prevention, Emergency Services
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland county and Municipal staff, PEMA, PA DCED
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within one year.

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 48	ACTION: Develop a Mitigation Plan for Repetitive and Severe Repetitive Loss properties.
Mitigation Technique Category:	Prevention
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland county and Municipal staff,
Lead Agency/Department:	Northumberland County Planning
Implementation Schedule:	Completion within one year.

COMMUNITY(IES):	Northumberland County and all Municipalities
ACTION NO. 49	ACTION: Recommend, encourage, and assist communities in the adoption of the 2017 NC HMP.
Mitigation Technique Category:	Public Education and Awareness, Prevention
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, Northumberland County Department of Public Safety staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within one year.

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 50	ACTION: Municipalities shall require Building Permits for any work done to any structures located in the 1 percent annual chance floodplain.
Mitigation Technique Category:	Public Education and Awareness
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm, Dam Failure, Levee Failure
Potential Funding Sources:	FEMA, PA DCED, Municipal staff
Lead Agency/Department:	Municipal Floodpalin Managers with County support
Implementation Schedule:	Continuous

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 51	ACTION: Recommend and encourage municipalities to amend their floodplain ordinance to prohibit Manufactured (Mobile) Homes in the 1 percent annual chance floodplain.
Mitigation Technique Category:	Public Education and Awareness, Prevention
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm, Dam Failure, Levee Failure
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County Department of Public Safety, Municipal Floodplain Managers
Lead Agency/Department:	Municipal Floodpalin Managers with County support
Implementation Schedule:	Completion within one year.

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 52	ACTION: Assist municipalities in developing policies and procedures related to hazard mitigation, especially for municipalities that are vulnerable to direct impacts from possible dam failure.
Mitigation Technique Category:	Public Education and Awareness, Prevention, Emergency Services
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Avalanche/Glacier, Costal Erosion, Drought, Dust/Sand Storm, Earthquake, Expansive Soils, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Tsunami, Wildfire, Volcano, Building or Structure Collapse, Civil Disturbance, Dam Failure, Disorientation, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County Department of Public Safety & Municipal Floodplain Managers & Municipal EMA staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within one year.

COMMUNITY(IES):	Northumberland County and all Municipalities
ACTION NO. 53	ACTION: Develop a Northumberland County Post-Disaster Recovery & Reconstruction Ordinance using the model ordinance included in the APA/FEMA PAS Report # 483/484.
Mitigation Technique Category:	Prevention, Emergency Services
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County Department of Public Safety & Municipal Floodplain Managers & Municipal EMA staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within two years.

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 54	ACTION: Recommend, encourage and assist municipalities in enforcing their floodplain ordinances.
Mitigation Technique Category:	Public Education and Awareness, Prevention, Property Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm, Dam Failure, Levee Failure
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County Department of Public Safety & Municipal Floodplain Managers
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Continuous.

COMMUNITY(IES):	Northumberland County and all Municipalities
ACTION NO. 55	ACTION: Assist municipalities in obtaining computer equipment, training, usage, and creating databases on local hazards for local Municipalities without equipment, etc..
Mitigation Technique Category:	Public Education and Awareness
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County staff, Northumberland County department of Public Safety, Municipal Managers/Supervisors, local College IT Departments, College Interns
Lead Agency/Department:	Northumberland County Information Services
Implementation Schedule:	Completion within two years.

COMMUNITY(IES):	Northumberland County and all Municipalities
ACTION NO. 56	ACTION: Northumberland County to provide annual review/maintenance/update meetings on the 2017 NC HMP for local municipalities, stakeholders, etc. over the next 5 years.
Mitigation Technique Category:	Public Education and Awareness
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland County Department of Public Safety staff
Lead Agency/Department:	Northumberland County Department of Public Safety staff
Implementation Schedule:	Minimum of one meeting every 6 months

COMMUNITY(IES):	Northumberland County and all Municipalities
ACTION NO. 57	ACTION: Conduct annual hazard emergency management training exercises/drills with County and local municipalities.
Mitigation Technique Category:	Public Education and Awareness, Emergency Services
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland County Department of Public Safety staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Conutinuous

COMMUNITY(IES):	Northumberland County and all Municipalities
ACTION NO. 58	ACTION: Disseminate informational pamphlets or mailings and/or create websites and social media for to residents of mobile home/trailer (Manufactured Home) parks on how and why to anchor mobile homes/trailers to protect against severe windstorms and flood events.
Mitigation Technique Category:	Public Education and Awareness
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Earthquake, Hurrican, Tropical Storm, Nor'easter, Tornado, Windstorm, Dam Failure, Levee Failure,
Potential Funding Sources:	FEMA, PEMA, PA DCED, Hazard Mitigation Grants, Northumberland County staff, Municipal Floodplain Managers, Municipal Building Code Officials
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within one year.

COMMUNITY(IES):	Northumberland County and all Municipalities
ACTION NO. 59	ACTION: Conduct routine inspections, regular maintenance, and annual tests on all emergency communications equipment, public address systems, and alert sirens to ensure unhindered operation during an emergency event.
Mitigation Technique Category:	Public Education and Awareness, Emergency Services
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, Municipal Emergency Management staff, Northumberland County Department of Public Safety and Municipal staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within one year, then continuous.

COMMUNITY(IES):	Northumberland County and all Municipalities
ACTION NO. 60	ACTION: Maintain response actions to hazards that are consistent with County-level EOP.
Mitigation Technique Category:	Public Education and Awareness, Emergency Services
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, Municipal Emergency Management staff, Northumberland County Department of Public Safety
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within one year, then continuous.

COMMUNITY(IES):	Northumberland County and all Municipalities
ACTION NO. 61	ACTION: Ensure that a planned, coordinated, technologically advanced, and effective public warning dissemination program exists at the local level.
Mitigation Technique Category:	Public Education and Awareness, Prevention, Emergency Services
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, Municipal Emergency Management staff, Northumberland County Department of Public Safetyff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within one year, then continuous.

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 62	ACTION: Develop a technical proficiency at the municipal level for conducting post-disaster damage assessments and regulating reconstruction activities to ensure compliance with NFIP substantial damage/substantial improvement requirements and the PA UCC.
Mitigation Technique Category:	Public Education and Awareness, Prevention, Property Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm, Dam Failure, Levee Failure
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County GIS staff, Municipal Floodplain Managers, Municipal Zoning Officers, Municipal Building Code Officials
Lead Agency/Department:	Municipal Floodplain Managers with County support
Implementation Schedule:	Continuous.

COMMUNITY(IES):	Northumberland County and all Municipalities
ACTION NO. 63	ACTION: Develop a technical proficiency at the municipal level for assisting local residents and business owners in hazard mitigation measures that are to be incorporated in reconstruction activities.
Mitigation Technique Category:	Public Education and Awareness, Property Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County staff, Municipal Floodplain Managers and Municipal Zoning Officers and Municipal Building Code Officials
Lead Agency/Department:	Municipal Floodplain Managers with County support
Implementation Schedule:	Continuous.

COMMUNITY(IES):	Northumberland County and all Municipalities
ACTION NO. 64	ACTION: Improve communications between the public and emergency management services through online information.
Mitigation Technique Category:	Public Education and Awareness, Emergency Services
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County Department of Public Safety staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Continuous

COMMUNITY(IES):	Northumberland County and all Municipalities
ACTION NO. 65	ACTION: Develop and implement a post-disaster recovery and mitigation training program for local officials.
Mitigation Technique Category:	Public Education and Awareness, Prevention, Emergency Services
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County, Northumberland County Department of Public Safety, Municipal Floodplain Managers, Municipal Zoning Officers, Municipal Building Code Officials
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within one year.

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 66	ACTION: Maintain a partnering relationship with the NWS Mid-Atlantic River Forecast Center to enhance the existing Susquehanna River Basin Flood Forecast and Warning System via the Advanced Hydrologic Prediction Services Program.
Mitigation Technique Category:	Public Education and Awareness
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, PA DCED, USGS, Northumberland County and Municipal staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within two years.

COMMUNITY(IES):	Northumberland County and all Municipalities
ACTION NO. 67	ACTION: Develop new or revise existing County and local municipal Subdivision and Land Development Ordinances, Comprehensive Plans, Erosion and Soil Ordinances, and Stormwater Ordinances to regulate the location and construction of buildings and other infrastructure in the known hazard areas.
Mitigation Technique Category:	Public Education and Awareness, Prevention, Structural Project Implementation, Property Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County Planning staff, Northumberland County Conservation District
Lead Agency/Department:	Northumberland County Planning
Implementation Schedule:	Completion within two years.

COMMUNITY(IES):	Northumberland County and all Floodplain Municipalities
ACTION NO. 68	ACTION: Encourage municipal compliance with NFIP and PA Act 166 floodplain development regulations and/or encourage more restrictive requirements, as appropriate by conducting training and inspection workshops.
Mitigation Technique Category:	Public Education and Awareness, Prevention, Property Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm, Dam Failure, Levee Failure
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County Department of Public Safety staff, Municipal Floodplain Managers, Municipal Zoning Officers, Municipal Building Code Officials
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Continuous.

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 69	ACTION: Maintain a flood damage reduction/prevention public education program utilizing the Northumberland County Department of Public Safety website and social media including but not limited to the development of informative training for local officials on NWS "Storm Ready", FEMA, PEMS, and NFIP Programs.
Mitigation Technique Category:	Public Education and Awareness, Property Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Dust/Sand Storm, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Lightning Strike, Tornado, Windstorm, Tsunami, Dam Failure, Levee Failure
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County Department of Public Safety staff, Municipal Floodplain Managers, Municipal Zoning Officers, Municipal Building Code Officials
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Continuous.

COMMUNITY(IES):	Northumberland County and all Municipalities
ACTION NO. 70	ACTION: Continue participation in the National Weather Service "Storm Ready" Program.
Mitigation Technique Category:	Public Education and Awareness, Emergency Services
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Dust/Sand Storm, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Lightning Strike, Tornado, Windstorm, Tsunami, Dam Failure, Levee Failure
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County Department of Public Safety staff,
Lead Agency/Department:	Northumberland County Department of Public Safety & Planning
Implementation Schedule:	Continuous.

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 71	ACTION: Coordinate with FEMA, PEMA, and PA DCED to ensure that affected County/municipal residents are aware of the Biggert-Waters legislation, the FEMA sponsored updated flood mapping for the Susquehanna River Basin, the availability and benefits of obtaining federally backed flood insurance. Encourage uninsured affected County/municipal residents to purchase flood insurance, and to inform residents outside of the SFHA that they are also eligible to purchase flood insurance through the NFIP.
Mitigation Technique Category:	Public Education and Awareness
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm, Dam Failure, Levee Failure
Potential Funding Sources:	FEMA, PEMA, PA DCED, Northumberland County Department of Public Safety staff, Municipal Floodplain Managers, Municipal CRS staff,S EDA-COG
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within two years.

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 72	ACTION: When funding becomes available, preform acquisitions, foundation stabilizations, demolitions, elevations, remodeling, retrofitting, relocations, dry and wet floodproofing on flood hazard prone homes and commercial structures in accordance with the currently adopted community floodplain ordinances, PA UCC building codes, and the minimum NFIP standards, as required.
Mitigation Technique Category:	Public Education and Awareness, Property Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm, Dam Failure, Levee Failure
Potential Funding Sources:	FEMA, PEMA, PA DCED, Hazard Mitigation Grants, SEDA-COG, Municipal matching funding, Municipal Floodplain Manager / Zoning / Building Code Staff, Northumberland County Department of Public Saferty
Lead Agency/Department:	Local Municipalities with County support.
Implementation Schedule:	When funding becomes available.

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 73	ACTION: Coordinate with local municipality and or PennDOT on the potential feasibility of replacing, removing or enlarging those roads, bridges and culvert stream crossings that are identified as being unable to pass the 10 year frequency flood flow.
Mitigation Technique Category:	Public Education and Awareness, Structural Project Improvements
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm, Dam Failure, Levee Failure
Potential Funding Sources:	FEMA, PEMA, PA DCED, Hazard Mitigation Grants, PennDot, Northumberland County Department of Public Safety and Engineering staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within five years.

COMMUNITY(IES):	Northumberland County and all Municipalities.
ACTION NO. 74	ACTION: Conduct drainage system and ditch maintenance & upgrades throughout the municipalities to prevent roadway flooding. Ensure existing drainage systems are adequate and functioning properly in order to reduce impacts related to flash flooding and storm water/runoff.
Mitigation Technique Category:	Public Education and Awareness, Structural Project Improvements
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm, Dam Failure, Levee Failure
Potential Funding Sources:	FEMA, PEMA, PA DCED, Hazard Mitigation Grants, PennDot, Northumberland County Department of Public Safety and Engineering staff
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within five years.

COMMUNITY(IES):	Northumberland County and all Municipalities
ACTION NO. 75	ACTION: Conduct routine stream and river bank maintenance to keep them free of obstructions to flow and to prevent flooding problems.
Mitigation Technique Category:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm, Dam Failure, Levee Failure, Environmental Hazards
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm, Dam Failure, Levee Failure
Potential Funding Sources:	FEMA, PEMA, PA DCED, Hazard Mitigation Grants, U.S. Army Corp., PA DEP, PennDot, Northumberland County Engineering staff, Municipal Highway Directors/Roadmasters and staff
Lead Agency/Department:	Northumberland County Engineering
Implementation Schedule:	Continuous.

COMMUNITY(IES):	Coal Township, Delaware Township, East Cameron Township, East Chillisquaque Township, Herndon Borough, Jackson Township, Jordan Township, Kulpmont Borough, Lewis Township, Little Mahanoy Township, Lower Augusta Township, Lower Mahanoy Township, McEwensville Borough, Milton Borough, Mount Carmel Borough, Mount Carmel Township, Northumberland Borough, Point Township, Ralpho Township, Riverside Borough, Rockefeller Township, Rush Township, Shamokin City, Shamokin Township, Snydertown Borough, Sunbury City, Turbot Township, Upper Augusta Township, Upper Mahanoy Township, Washington Township, Watsontown Borough, West Cameron Township, West Chillisquaque Township, Zerbe Township
ACTION NO. 76	ACTION: Maintain and improve the Sunbury Levee System, and any other levees, in order to provide more effective flood protection from the potential impacts from upstream community floodwalls and levees.
Mitigation Technique Category:	Public Education and Awareness, Structural Project Implementation, Natural Resource Protection
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Hurrican, Tropical Storm, Dam Failure, Levee Failure
Potential Funding Sources:	FEMA, PEMA, PA DCED, Hazard Mitigation Grants, U.S. Army Corp., PA DEP, PA DCNR, PennDot, Northumberland County Department of Public Safety and Engineering staff, Municipal Engineering
Lead Agency/Department:	Local Municipalities with County support.
Implementation Schedule:	Continuous.

COMMUNITY(IES):	Northumberland County and all municipalities with gas line installations and structures.
ACTION NO. 77	ACTION: Review and monitor Emergency Operations Plans for gas line installations and structures.
Mitigation Technique Category:	Public Education and Awareness, Emergency Services, Prevention
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	The Gas Company, Northumberland County Department of Public Safety and Engineering staff, and Municipal staff.
Lead Agency/Department:	Local Municipalities with County support.
Implementation Schedule:	Continuous.

COMMUNITY(IES):	Northumberland County and all municipalities with gas line installations and structures.
ACTION NO. 78	ACTION: Review and monitor stormwater runoff from gas line installations and structures.
Mitigation Technique Category:	Public Education and Awareness, Property Protection, Prevention, Structural Project Implementation
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	The Gas Company, Northumberland County Engineering and Municipal Engineering staff, Northumberland County and Municipal Planning staff, Municipal Zoning staff,Municipal Highway/Roadmaster staff.
Lead Agency/Department:	Local Municipalities with County support.
Implementation Schedule:	Continuous.

COMMUNITY(IES):	Northumberland County
ACTION NO. 79	**ACTION:** To provide the Executive Summary in the spanish language.
Mitigation Technique Category:	Public Education and Awareness, Property Protection, Prevention, Structural Project Implementation
Hazard(s) Addressed:	Flood, Flash Flood, Ice Jam, Winter Storm, Drought, Earthquake, Extreme Temperatures, Hailstorm, Hurrican, Tropical Storm, Nor'easter, Invasive Species, Landslide, Lightning Strike, Pandemic, Radon Exposure, Tornado, Windstorm, Wildfire, Building or Structure Collapse, Civil Disturbance, Dam Failure, Drowning, Levee Failure, Nuclear Incidents, Terrorism, Urban Fire or Explosion, War and Criminal Activity, Opioids, Environmental Hazards, Utility Interruptions, Transportation Accidents, Subsidence/Sinkholes.
Potential Funding Sources:	Northumberland County staff,
Lead Agency/Department:	Northumberland County Department of Public Safety
Implementation Schedule:	Completion within two years.

APPENDIX H
FLASH FLOODING

This appendix was constructed by soliciting information from each Municipalities local knowledge of flash flood prone areas. Although "Flooding" has been profiled in the plan as the most prevalent hazard to this area, the Northumberland County Hazard Mitigation Planning Team feels that identifying these flash flood areas as a reference/response tool is just as important. This is due the expedited timeline that is presented for warning/action time, but the same critical threat to life and/or property loss is still just as high.

The following list identifies very specific areas within each Municipality where flash flooding has repetitively affected their communities negatively. These impacts have included displacement of residents, property loss, road and infrastructure damage, or travel impacts causing detours.

This appendix can be a critical piece of information that can be easily accessed as well as integrated into other emergency plans at the County and local levels.

Coal Township
Quaker Run - Ranshaw Village - Residential Flooding - Note: flood mitigation project starting spring 2017
Shamokin Creek - Uniontown Village - residential Flooding - Note: flood mitigation project starting spring 2017
East Chillisquaque Township
Snyder Road at the Covered Bridge, Covered bridge was knocked of its embutments in 2011 and almost lost
Washouts on Vogt Road, repaired in 2011 after Flooding
Mount Carmel Township
Mount Carmel Nursing Home - Flash Flooding around in prior years
Northumberland Borough
The underpass on Route 11 floods. This creates a problem in that traffic must be detoured.
Point Township
Ridge Rd at Spruce Hollow
Spruce Hollow at Roush Road
Riverside Borough
Susquehanna River on the north side of the municipal boundary
Kipps run western section of the borough
Shamokin Township
Both Ends of Irish Valley Road and select sites on SR 61
Sunbury City
Reagan St Underpass
Sunbury Municipal Authority
The water filtration plant is located in an area prone to floodig. We have mitigated most problems over the last
twenty years by raising equipment in the building above 1% event. This allows us to still produce potable water
when the lower portion of the building may be under water.
Upper Augusta Township
Little Shamokin Creek from Rt 890 starting at Rockefeller Township line to Route 61 to Sunbury City Limits.
Route 61 underpass (end of Market St near Municipal Authority)
Also route 61, follow creek to Municipal Authority where there are two bridges. One owned by North Shore
Railroad and the other by the AOAA.
Washington Township
Low Lying areas around Schweben Creek - Potential Impact is closing portions of state route 3010.

APPENDIX I
RESOURCES

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