

**Prepared By:**

Crawford County Department of Public Safety  
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# HAZARD MITIGATION 2020 ACTION PLAN

CRAWFORD COUNTY, PENNSYLVANIA

### **Certification of Annual Review Meetings**

The Crawford County Mitigation Planning Committee (MPC) has reviewed this Hazard Mitigation Plan (HMP). See Section 8 of the Crawford County HMP for further details regarding this form.

<b>YEAR</b>	<b>DATE</b>	<b>PUBLIC OUTREACH ADDRESSED</b>	<b>SIGNATURE</b>
2016			
2017			
2018			
2019			
2020			
2021			
2022			
2023			
2024			
2025			



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# 1. EXECUTIVE SUMMARY

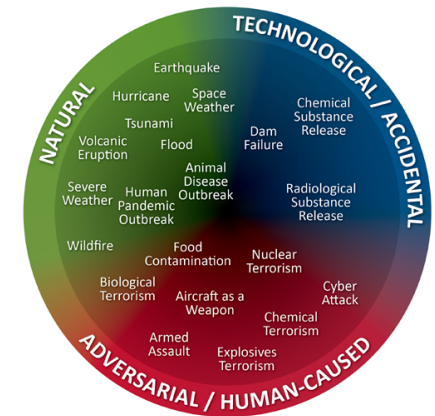
## 1.1 INTRODUCTION

This plan represents the work and updates to the 2015 Crawford County Hazard Mitigation Plan. The Crawford County Mitigation Core Team, comprised of staff from the Planning Department, GIS Department, and the Department of Public Safety, has thoughtfully responded to the need to identify hazard risk and strategize mitigation action to make Crawford County a safer place in which to live, visit, and work. Subject-matter experts in Crawford County at the local, county, state, and federal levels all assisted with updating the hazards risk and capability assessments and mitigation strategies from their access to the most current information. The GIS Department's assistance was a tremendous help. The capabilities and products that they were able to produce were a tremendous help, not only in the planning phase, but also in the response and recovery phases of all our hazards.



## 1.2 PLANNING PROCESS

The 2020 Crawford County Hazard Mitigation Plan is stronger for including more participation from the Whole Community of Crawford County including: Agencies, organizations, residents, and representatives of diverse agencies. The Crawford County Hazard Mitigation Team increased participation by 30%, and stakeholder and public participation increased three-fold over the last County Hazard Mitigation Plan update in 2015. Due to the COVID-19 Pandemic, an increase in webinars were conducted after March 2020 to gather stakeholder input, which proved easier and resulted in greater participation. Prior to the Pandemic, the Planning Team attended many organizational meetings to gather input. The increased participation means more people are informed of this important planning process and the resources available for mitigation, and more voices contributed to mitigation strategies set forth in the plan, like more historic property vulnerability and climate change analyses. FEMA's seven Lifelines were also included in the 2020 plan update, which was one of the first Hazard Mitigation Plans to do so. An area of weakness in the County-wide Hazard Mitigation Plan in previous years was the yearly review, updating of hazards, and tracking mitigation actions that were accomplished or for which funding applications were submitted. This may have come from relying solely on contractors to write and update the plan rather than county staff updating the plan as we have done this year. Through the enhanced technology of GIS and the efforts of the current staff in all three departments, the review and updating of this plan will be accomplished at a greater level than ever before on a yearly, if not sooner, basis.



## 1.3 RISK ASSESSMENT

Since 1956, 17 presidential disasters have been declared in Crawford County; 14 severe storms/flooding, 2 pandemic, and 1 blizzard. Since 2016, the below list has been the major disasters occurring in Crawford County;

1. January 11, 2018: Flooding and Ice Jam in City of Meadville, West Mead and Vernon Townships
2. October 2, 2018: Three tornado touchdowns with one impacting a long-term care center in Summerhill Township



3. July 19-20, 2019: Flooding in Hydetown Borough & Oil Creek Township.
4. March 2020: COVID-19 Pandemic County-wide
5. March 2020: Cyber Threats shut down a major hospital's computer systems and the City of Meadville Government computers in City of Meadville. Another cyber-attack affected a school district in Hayfield Township.

Past occurrences show that pandemic, utility interruption, terrorism, flooding, dam failure, hazardous materials, and severe thunderstorms, including tornado hazards, remain Crawford County's highest risks. The County is not only at risk of natural hazards, but should be prepared for increasing technological and human-made disasters as well. Key changes in this plan update include more detailed information regarding the current COVID-19 pandemic, combining lightning with tornado and severe thunderstorm, and, new this year, the addition of invasive species. Hazards removed were oil and gas hazards, which have declined over the past five years. More Crawford County specific data was obtained for the 2020 Plan update, including 9-1-1 Center Computer Aided Dispatch Data, National Weather Service weather alerts, Tier II reports, other plan integration from other county departments, and Knowledge Center and WebEOC incident reports. Reviewing the Strategic National Risk Assessment information from the National Mitigation Framework June 2016 identified the need for an all-hazards, capability-based approach for preparedness planning.

### 1.4 CAPABILITY ASSESSMENT

Hazard mitigation is most effective when it is based on an inclusive, integrated, comprehensive, long-term plan that is developed before a disaster occurs. The capability assessment was updated to reflect current capacities and resources. It provides a detailed evaluation of applicable federal, state, and local regulatory, financial, and technical resources available to support hazard mitigation. The National Mitigation Framework outlines seven core capabilities necessary for mitigation to be successful: Threats and hazard identification, Risk and disaster resilience assessment, Planning, Public information and warning, Community resilience, Long-term vulnerability reduction, and Operational coordination. (Integrating Disaster Data into Hazard Mitigation Planning A State and Local Mitigation Planning How-to-Guide February 2015, National Mitigation Framework, Second Edition June 2016)

### 1.5 MITIGATION STRATEGY

The County Hazard Mitigation Planning Team reaffirmed the goals set forth in the Mitigation Strategy with slight updates and completed a comprehensive review and update of 10 objectives and 88 actions. Mitigation actions pertain to local plans and regulations, structures and infrastructure, natural systems protection, and education and awareness. The strategy is summarized in the following five mitigation goals:



1. Protect lives, property, environmental quality, and resources of the Commonwealth, including high-risk properties.
2. Enhance consistent coordination, collaboration, and communications among stakeholders to improve response and recovery.
3. Provide a framework for active hazard mitigation planning and implementation including the Whole Community.

4. *Build legislative and other organizational support and leverage funding for mitigation efforts.*
5. *Increase awareness, understanding, and preparedness across all sectors.*

Although pandemic, utility disruption, and terrorism hazards topped the list, the majority of municipal hazard mitigation actions and projects were to mitigate flooding of roadways and communities.



Above: Mitigation Strategy using Building and Zoning Codes to elevate structures being built in flood zones in Vernon Township.

## 2. INTRODUCTION

### 2.1 BACKGROUND

Emergency Management is the discipline of identifying, managing, and avoiding risks. It is a discipline that involves preparing for a disaster before it occurs, supporting those affected by the disaster, as well as rebuilding after the natural or man-made disaster event. Emergency Management is an ever-changing process by which all individuals, groups, and communities attempt to manage hazards in an effort to avoid or reduce the impact of disasters. One method to attempt to prevent hazards from developing into disasters all together is Hazard Mitigation Planning. Hazard Mitigation Planning is a process to identify policies, capabilities, activities, and tools necessary to implement successful and sustainable mitigation actions.

#### WHY UNDERTAKE MITIGATION PLANNING?

Mitigation planning offers many benefits, including:

1. *Saving lives and property;*
2. *Saving money;*
3. *Speeding recovery following disasters;*
4. *Reducing future vulnerability through wise development and post-disaster recovery and reconstruction;*
5. *Enhancing coordination within and across participating jurisdictions;*
6. *Expediting the receipt of pre-disaster and post-disaster grant funding; and demonstrating a firm commitment to improving community health and safety.*

Typically, mitigation planning is described as having the potential to produce long-term and recurring benefits by breaking the repetitive cycle of disaster loss. A core assumption of hazard mitigation is that pre-disaster investments will significantly reduce the demand for post-disaster assistance by lessening the need for emergency response, repair, recovery and reconstruction. Furthermore, mitigation practices will enable local residents, businesses and industries to reestablish themselves in the wake of a disaster, getting the community economy back on track sooner and with less interruption.

The benefits of mitigation planning go beyond reducing hazard vulnerability. Measures such as the acquisition of regulation of land in known hazard areas can help achieve multiple community goals, such as preserving open space, improving water quality, maintaining environmental health and enhancing recreational opportunities. Thus, it is vitally important that any local mitigation planning process be integrated with other concurrent local planning efforts, and any proposed mitigation strategies must take into account other existing community goals or initiatives that will help complement or hinder their future implementation. Crawford County and participating jurisdictions have embraced this approach, identifying multiple opportunities to link the Plan with preexisting plans, programs, policies, plans and initiatives.

During the last two decades, the approach to the emergency management cycle has evolved considerably. A renewed emphasis has been placed on planning for disasters before they occur as a complement to effective response and recovery. As a result, hazard mitigation has gained increasing prominence as a critical part of emergency management. By mitigating hazards through sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards, risks can be proactively combated in a systematic manner, rather than being reacted to once they occur.

Hazard mitigation in Pennsylvania has been and will continue to be important for the same reasons it is nationally. By anticipating the nature and extent of hazards and the way they affect our communities locally, life and property has been preserved on an impressive scale. Measures aimed at mitigating the impacts of flooding have predominated in Pennsylvania due to the Commonwealth's particularly high exposure to this hazard. From acquisitions to structural elevations to flood control projects, mitigation actions pay dividends for Pennsylvanians every year. And in the process, mitigation activities have positive effects throughout the emergency management cycle. As mitigation actions reduce or eliminate losses once a disaster occurs, response and recovery assets can be better focused.

Since anticipating hazards along with a communities' exposure to those hazards is such a critical part of hazard mitigation, hazard mitigation plans must regularly be reevaluated and revised. This is done through the plan update process mandated by the Federal Department of Public Safety (FEMA) every five years.

In order to qualify for federal aid for technical assistance and post-disaster funding, local municipalities must comply with the Disaster Mitigation Act of 2000 (DMA) and its implementing regulations (44CFR, Parts 201 and 206). The Crawford County Hazard Risk Assessment (previously known as the Hazard Vulnerability Assessment) and Mitigation Plan has been prepared to meet FEMA and PEMA requirements in order for the County to be eligible for funding and technical assistance from state and federal hazard mitigation programs.

The 2020 Plan Update is the result of continuing work by the citizens of the County to develop a pre-disaster multi-hazard mitigation plan that will not only guide the County towards greater disaster resistance, but will also respect the character and needs of the community through the seven Life lines.

## **2.2 PURPOSE**

The general purpose of the 2020 Crawford County Hazard Mitigation Plan is to:

- *Protect life and property by reducing the potential for future damages and economic losses that result from natural hazards;*
- *Qualify for additional grant funding, in both the pre-disaster and post-disaster environment;*
- *Quick recovery and redevelopment following future disasters;*
- *Integrate existing flood mitigation documents;*
- *Demonstrate a firm local commitment to hazard mitigation principles; and*
- *Comply with state and federal legislative requirements tied to local hazard mitigation planning*

## **2.3 SCOPE**

The Crawford County 2020 Hazard Mitigation Plan Update has been prepared to meet requirements set forth by the Federal Emergency Management Agency (FEMA) and Pennsylvania Emergency Management Agency (PEMA) in order for the County to be eligible for funding and technical assistance from state and federal hazard mitigation programs. It will be updated and maintained to continually address those natural hazards and man-made and technological hazards determined to be of high and moderate risk as defined by the results of the risk assessment (see “Hazard Vulnerability Summary” located in Chapter 4: Risk Assessment). Other natural hazards that pose a low or negligible risk will continue to be evaluated during future updates to the Plan in order to determine if they warrant additional attention, including the development of specific mitigation measures intended to reduce their impact. This plan will be updated and FEMA approved within the five-year cycle.

## **2.4 AUTHORITY AND REFERENCE**

Authority for this guide originates from the following federal sources:

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

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

- *Pennsylvania Emergency Management Services Code. Title 35, Pa*
- *C.S. Section 101;*
- *Pennsylvania Municipalities Planning Code of 1968, Act 247 as reenacted and amended by Act 170 of 1988;*

- *Pennsylvania Stormwater Management Act of October 4, 1978. P.L. 864, No. 167.*

The following Federal Emergency Management Agency (FEMA) guides and reference documents were used to prepare this document:

- *State Mitigation Plan Review Guide, March 2015.*
- *State Mitigation Planning Key Topics Bulletins: Planning Process, July 2016.*
- *State Mitigation Planning Key Topics Bulletins: Risk Assessment, June 2016.*
- *State Mitigation Planning Key Topics Bulletins: Mitigation Capabilities, September 2016.*
- *State Mitigation Planning Key Topics Bulletins: Mitigation Strategy, October 2016.*
- *Climate Change Adaptation Policy, January 2012.*
- *Hazard Mitigation Assistance Guidance, February 2015.*
- *Integrating Disaster Data into Hazard Mitigation Planning: A State and Local Mitigation Planning How-to-Guide, February 2015*
- *Integrating Hazard Mitigation into Local Planning: Case Studies and Tools for Community Officials, March 2013.*
- *Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning: State and Local Mitigation Planning How-To Guide, May 2005.*
- *Local Mitigation Plan Review Guide, October 1, 2011.*
- *Local Mitigation Planning Handbook, March 2013.*
- *Mitigation Ideas. A Resource for Reducing Risk to Natural Hazards, January 2013.*
- *Plan Integration: Linking Local Planning Efforts, July 2015.*
- *Pre-Disaster Recovery Planning Guide for State Governments, November 2016.*
- *National Mitigation Framework Second Edition June 2016*
- *Connecting Mitigation and Electric Power September 4, 2020*
- *Connecting Mitigation and Equity September 4, 2020*
- *Connecting Mitigation to Equity September 4, 2020*
- *Connecting Mitigation and Municipal Financing September 4, 2020*
- *Connecting Mitigation and Transportation September 4, 2020*
- *Connecting Mitigation and Agriculture May 13, 2020*
- *Connecting Mitigation and Arts and Culture May 13, 2020*

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

- *Commonwealth of Pennsylvania’s All-Hazards Mitigation Planning Standard Operating Guide (SOG), October 2013 (being updated summer 2018).*
- *Hazard Mitigation Project Officer Handbook, January 2014.*

- *Pennsylvania Pre-Disaster Mitigation Program Project and Planning Funding Assistance, October 2010.*
- *Pennsylvania Silver Jackets Interagency Flood Mitigation Program Guide, October 2015.*
- *Pennsylvania Threat and Hazard Identification and Risk Assessment, December 2017.*

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

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

The following additional guidance documents produced by Crawford County were used to update this plan:

- *2016 Crawford County Commodity Flow Study, MCM Consulting Group, Incorporated*
- *2020 Crawford County Emergency Operations Plan*
- *2020 Crawford County Annual Report on Hazardous Materials Emergency Response Preparedness*
- *2014 Crawford County Comprehensive Plan*
- *2008 Crawford County Natural Heritage Inventory*
- *2018 Crawford County Housing Plan*
- *2009 Northwest Pennsylvania Greenways Plan for Crawford County*

## 3. COMMUNITY PROFILE

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The Community Profile provides a general overview of Crawford County and its municipal jurisdictions through the following five subsections:

- *Geography and Environment*
- *Populations and Demographics*
- *Data Sources*
- *Community Profiles*
- *Land Use and Development*

Crawford County was created on March 12, 1800, from part of Allegheny County and named for Colonel William Crawford. Crawford County was a frontier trading center in the 1700's through the efforts of traders like David Mead, for whom Meadville, the County seat is named. Over the next century Crawford County would establish rich agriculture and manufacturing industries. The community also would become a destination for outdoor enthusiasts.

Many people visit Conneaut Lake, the commonwealth's largest natural inland lake, and a long-standing resort community. Allegheny College, the oldest college in continuous use west of the Allegheny River, founded in 1815, continues to provide a prestigious educational resource to the region.

Crawford County's labor force is similar to that of many non-metropolitan counties in western Pennsylvania. The county has many workers in relatively low-skill manufacturing positions and in the agricultural sectors. It has relatively few workers in high-skill occupations and in high-growth sectors of the economy. The relatively high unemployment rate suggests that the growth of good, year-round jobs have not kept up with the growth of the labor force. The low percentage of people with college degrees is a concern, especially as the changing economy is reducing the demand

for unskilled and semi-skilled workers in relatively high paying manufacturing industries. These characteristics combine to generate relatively low household incomes.

A number of these characteristics may be seen as opportunities. The fact that Crawford County is a net exporter of workers to Allegheny, Butler, Clarion, Erie, Mercer, and McKean Counties in Pennsylvania, and Ashtabula County in Ohio, suggests that the potential labor force for jobs in the County is fairly high. Furthermore, prevailing wages are quite low and the County is in a good competitive position to lure industries seeking an abundant pool of inexpensive labor.

### **3.1 GEOGRAPHY AND ENVIRONMENT**

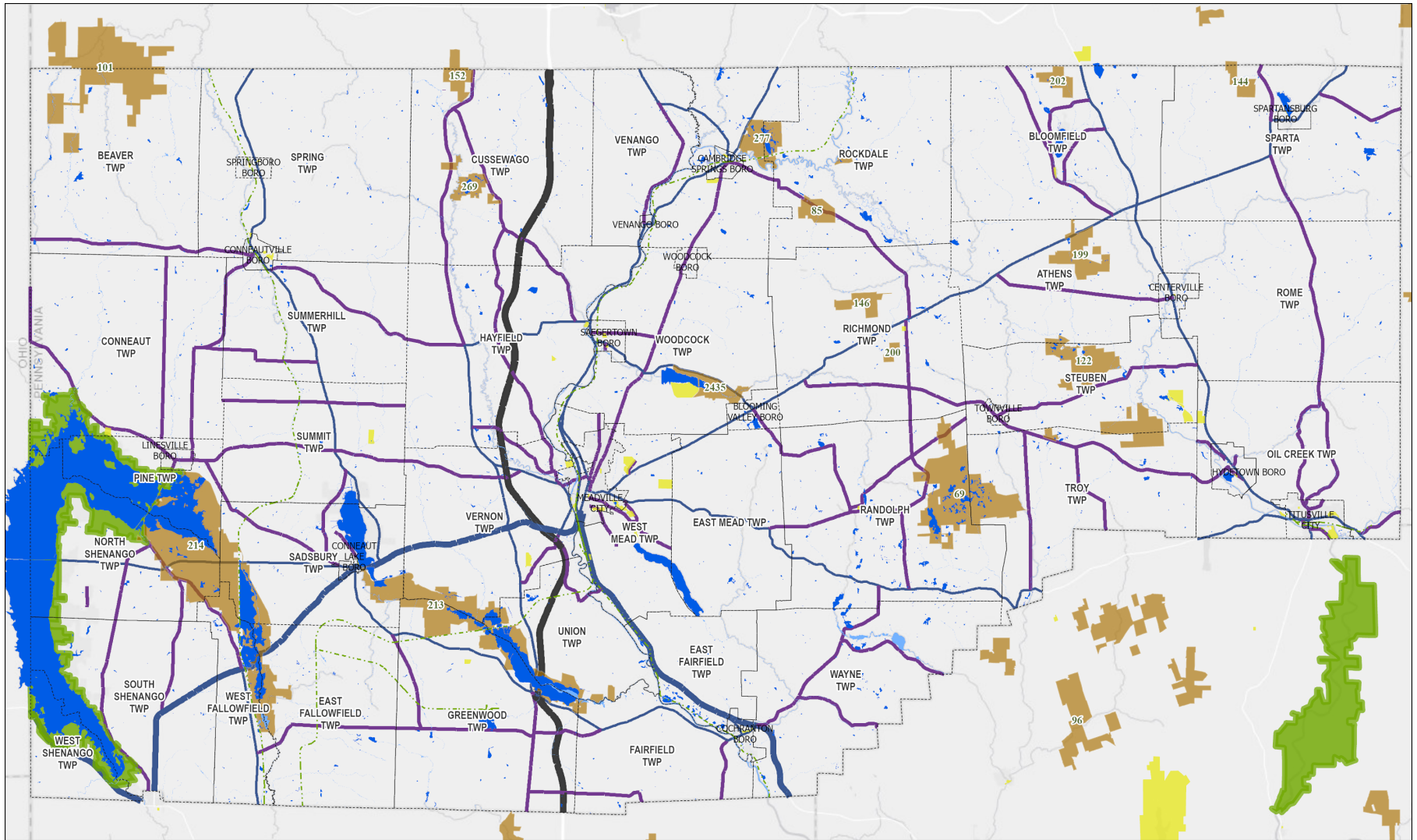
Crawford County, a 1,038 square mile rural county in northwestern Pennsylvania, lies directly south of Erie County, west of Warren and Venango Counties, and north of Mercer County along the Ohio/ Pennsylvania border. Located approximately 50 minutes from Lake Erie and two hours from Pittsburgh, Cleveland, and Buffalo, Crawford County is located at a nexus of several major markets. The County supports a robust agricultural community, a large manufacturing industry tailored to the tool and die trade, along with numerous tourist opportunities. The sparsely developed landscape is home to numerous wooded areas, glacial farmland, lakes, and wetlands. Due to the local soils and the climate, approximately 4.38% of the county's land is covered by water.

The county has a humid, continental climate. It lies in one of the coolest, snowiest regions of the Commonwealth; however, it has warm, pleasant summers. The county's highest point has an elevation of over 1,910 feet above sea level, while its lowest point has an elevation of just 850 feet. The county's topography differs widely between its eastern and western halves. The east is formed from a deeply incised high plateau, while the west is formed from a gentle plain. The entire surface has been extensively glaciated, which has heavily impacted its drainage, topography, and soils. The county contains five different soil associations. Four of these associations, which collectively cover about 78% of the county's surface, frequently exhibit restricted permeability and a high-water table.



Above: Sugar Lake- Wayne Township, Crawford County Pennsylvania

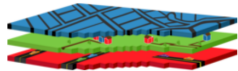
Figure 3.1-1 Crawford County Base Map



### Crawford County, Pennsylvania | Basemap



Crawford County Government  
 Crawford County Courthouse  
 903 Diamond Park  
 Meadville PA 16335  
 GIS Manager: Phillip Baranyai  
 Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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 Crawford County assumes no responsibility or liability to the accuracy or completion of these maps.

Source: Pennsylvania Department of Conservation and Natural Resources



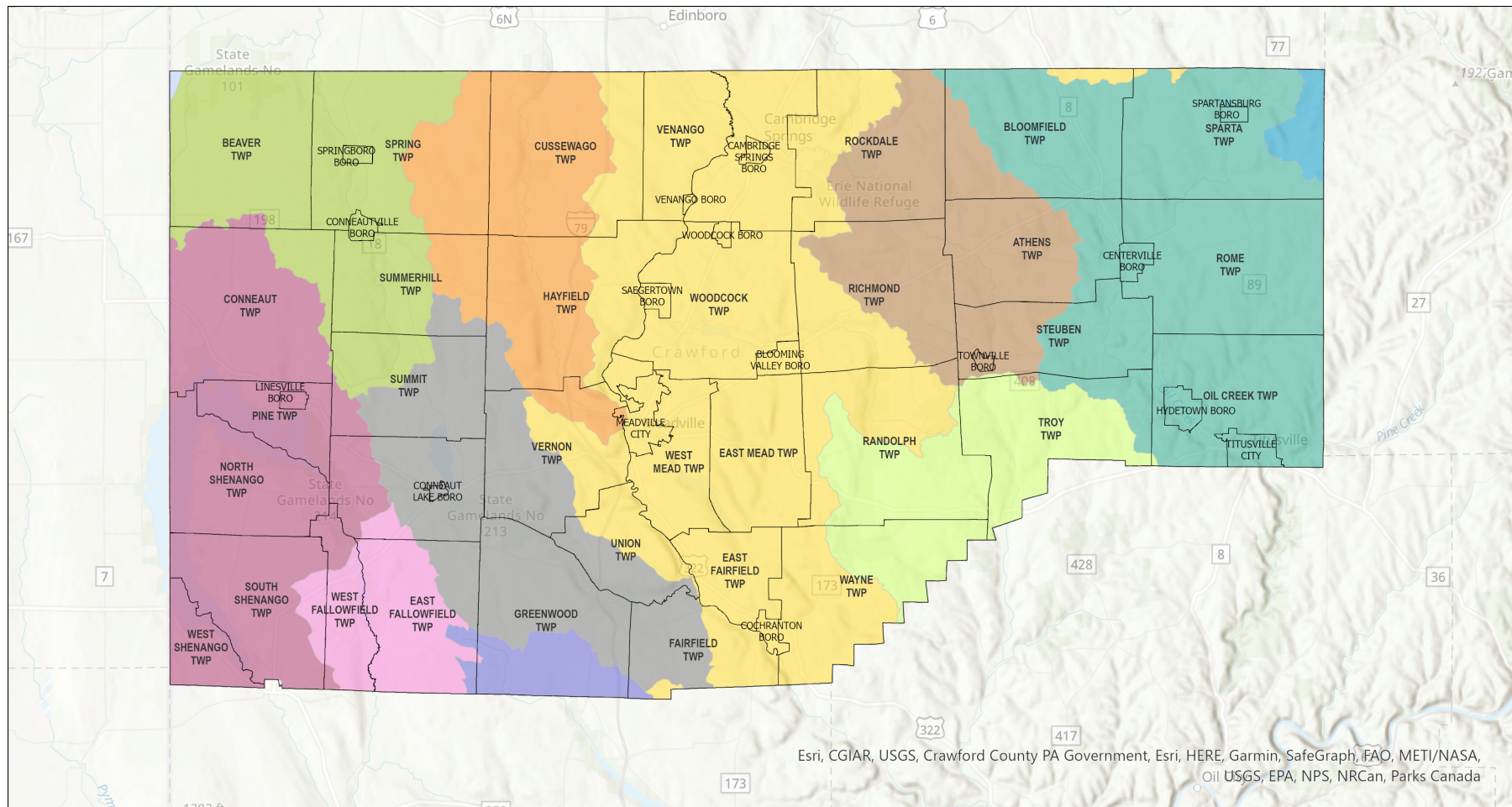
Source: Pennsylvania Game Commission



- Crawford County Municipal Boundaries
- Railroads
- Rivers / Streams
- Lakes
- Local Parks
- State Game Lands
- State Park Boundaries



Figure 3.1-2 Crawford County Watersheds

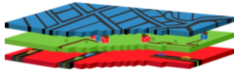


Esri, CGIAR, USGS, Crawford County PA Government, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, Oil USGS, EPA, NPS, NRCAN, Parks Canada

**Act 167 Watersheds**



Crawford County Government  
 Crawford County Courthouse  
 903 Diamond Park  
 Meadville PA 16335  
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Source: Pennsylvania Department of  
 **pennsylvania**  
 DEPARTMENT OF CONSERVATION  
 AND NATURAL RESOURCES

Conservation & Natural Resources (PA DCNR)

**Stormwater 167**

-  Ashtabula River
-  Brokenstraw Creek
-  Conneaut Creek
-  Conneaut Outlet
-  Cussewago Creek
-  French Creek - Venango County
-  Little Shenango River
-  Muddy Creek
-  Oil Creek
-  Sandy Creek
-  Shenango River
-  Sugar Creek - Allegheny River

### 3.2 COMMUNITY PROFILES

Under Pennsylvania law, there are three types of incorporated municipalities: cities, boroughs, townships. The following cities, boroughs and townships are located in Crawford County.

<p>CITY OF MEADVILLE</p>	<p>Meadville is a city in and the county seat of Crawford County. The city was founded on May 12, 1788 by a party of settlers led by David Mead. Its location was chosen well, for it lies at the confluence of Cussewago Creek and French Creek. The city is generally considered part of the Pittsburgh Tri-State and is within 40 miles of Erie, Pennsylvania. It was the first permanent establishment in northwest Pennsylvania.</p> <p>Around 1800, many of the settlers to the Meadville area came after receiving land bounties for service in the Revolutionary War. Allegheny College, the second oldest college west of the Allegheny Mountains, was founded in Meadville in 1815 and is the oldest college west of the Allegheny Mountains that has kept the same name from when it was founded. Meadville became an important transportation center after construction of the French Creek Feeder Canal in 1837 and of the Beaver and Erie Canal it connected to at Conneaut Lake and subsequent railroad development.</p> <p>The city has a total land area of 4.38 square miles. According to the 2010 Decennial Census, there were 13,388 people, 5,462 households, and 2,838 families residing in the city (US Census Bureau, 2010).</p>
<p>CITY OF TITUSVILLE</p>	<p>Titusville is a city in Crawford County. The area was first settled in 1796 by Jonathan Titus. Titusville remained a slow-growing community until the 1850's, when petroleum was discovered. On August 27, 1859 at the site of an oil spring just south of Titusville, oil was successfully drilled and extracted resulting in the birth of the modern oil industry. The city has a total land area of 2.9 square miles. According to the 2010 Decennial Census, there were 5,601 people, 2,322 households, and 1,337 families residing in the city (US Census Bureau, 2010).</p>

BLOOMING VALLEY BOROUGH	Blooming Valley Borough has a total area of approximately 2.0 square miles of which, 1.94 square miles of it is land and 0.02 square miles of it is water. According to the 2010 Decennial Census, there were 377 people, 138 households, and 95 families residing in the borough (US Census Bureau, 2010).
CAMBRIDGE SPRINGS BOROUGH	Cambridge Springs Borough has a total land area of 0.87 square miles. According to the 2010 Decennial Census, there were 2,595 people, 675 households, and 384 families residing in the borough (US Census Bureau, 2010). From the late nineteenth into the early twentieth century, Cambridge Springs was known for its mineral springs. It was a resort town featuring a variety of hotels including the Rider Hotel, which burned down in 1931. The last one of these hotels, the Riverside Inn, was listed in the National Register of Historic Places. It burned down in 2017.
CENTERVILLE BOROUGH	Centerville Borough has a total land area of 1.77 square miles. According to the 2010 Decennial Census, there were 218 people, 87 households, and 58 families residing in the borough (US Census Bureau, 2010).
CONNEAUT LAKE BOROUGH	Conneaut Lake Borough has a total land area of 0.36 square miles. According to the 2010 Decennial Census, there were 653 people, 322 households, and 171 families residing in the borough (US Census Bureau, 2010). The area was founded in 1799 as Evansburg, named for Abner Evans, a local farmer. It took the name of the neighboring lake in 1892.
CONNEAUVILLE BOROUGH	Conneautville Borough has a total area of 1.04 square miles, of which 1.03 square miles of it is land and 0.01 square mile is water. According to the 2010 Decennial Census, there were 774 people, 317 households, and 208 families residing in the borough (US Census Bureau, 2010). Conneautville was founded in 1814 by Alexander Power, a surveyor and engineer. Conneautville was first called Powerstown or made reference to as Power's Tract. Power wanted it called Conneautville after the Indian name Conneaut or Conneautee, meaning Snow Place.
COCHRANTON BOROUGH	Cochranton Borough has a total land area of 1.2 square miles. According to the 2010 Decennial Census, there were 1,136 people, 460 households, and 320 families residing in the borough (US Census Bureau, 2010).
HYDETOWN BOROUGH	Hydetown Borough was established in 1862 and has a total land area of 2.25 square miles. According to the 2010 Decennial Census, there were 526 people, 233 households, and 153 families residing in the borough (US Census Bureau, 2010).
LINESVILLE BOROUGH	Linesville Borough has a total land area of 0.77 square miles. According to the 2010 Decennial Census, there were 1,040 people, 449 households, and 273 families residing in the borough (US Census Bureau, 2010). Linesville was settled by Amos Line who established a mill at the site in 1820. The area was laid out in 1825 and was first known as Line's Mills, but the name was changed to Linesville Station in 1864. It was not known as Linesville until 1883 and was incorporated from Pine Township on March 22, 1862. One chief point of interest in the area is Pymatuning Lake which is said to be the largest man-made lake in Pennsylvania. It was created in the 1930's as a Depression-era Civilian Conservation Corps (CCC) project.
SAEGERTOWN BOROUGH	Saegertown Borough has a total land area of 1.54 square miles. According to the 2010 Decennial Census, there were 997 people, 351 households, and 224 families residing in the borough (US Census Bureau, 2010).
SPARTANSBURG BOROUGH	Spartansburg Borough has a total area of 0.71 square miles, of which, 0.68 square miles of it is land and 0.03 square miles of it is water. According to the 2010 Decennial Census, there were 305 people, 126 households, and 89 families residing in the borough (US Census Bureau, 2010).

SPRINGBORO BOROUGH	Springboro Borough was incorporated in 1866 and has a total land area of 0.83 square miles. According to the 2010 Decennial Census, there were 477 people, 179 households, and 125 families residing in the borough (US Census Bureau, 2010).
TOWNVILLE BOROUGH	Townville Borough was established in 1831 and has a total land area of 0.51 square miles. According to the 2010 Decennial Census, there were 323 people, 130 households, and 99 families residing in the borough (US Census Bureau, 2010).
VENANGO BOROUGH	Venango Borough has a total land area of 0.27 square miles. According to the 2010 Decennial Census, there were 239 people, 97 households, and 70 families residing in the borough (US Census Bureau, 2010).
WOODCOCK BOROUGH	Woodcock Borough has a total land area of 0.66 square miles. According to the 2010 Decennial Census, there were 157 people, 58 households, and 47 families residing in the borough (US Census Bureau, 2010).

ATHENS TOWNSHIP	Athens Township has a total area of 28.31 square miles of which, 28.27 square miles of it is land and 0.04 square miles of it is water. According to the 2010 Decennial Census, there were 734 people, 285 households, and 217 families residing in the township (US Census Bureau, 2010).
BEAVER TOWNSHIP	Beaver Township has a total land area of 36.65 square miles. According to the 2010 Decennial Census, there were 902 people, 316 households, and 248 families residing in the township (US Census Bureau, 2010).
BLOOMFIELD TOWNSHIP	Bloomfield Township has a total area of 38.24 square miles, of which, 37.91 square miles of it is land and 0.33 square miles is water. According to the 2010 Decennial Census, there were 1,919 people, 748 households, and 536 families residing in the township (US Census Bureau, 2010).
CAMBRIDGE TOWNSHIP	Cambridge Township has a total area of 21.59 square miles, of which, 21.45 square miles of it is land and 0.14 square miles is water. According to the 2010 Decennial Census, there were 1,563 people, 618 households, and 449 families residing in the township (US Census Bureau, 2010).
CONNEAUT TOWNSHIP	Conneaut Township has a total area of 41.66 square miles, of which, 40.88 square miles of it is land and 0.78 square miles is water. According to the 2010 Decennial Census, there were 1,476 people, 579 households, and 411 families residing in the township (US Census Bureau, 2010).
CUSSEWAGO TOWNSHIP	Cussewago Township has a total area of 40.93 square miles, of which, 40.83 square miles of it is land and 0.1 square miles is water. According to the 2010 Decennial Census, there were 1,559 people, 596 households, and 442 families residing in the township (US Census Bureau, 2010).
EAST FAIRFIELD TOWNSHIP	East Fairfield Township has a total land area of 12.84 square miles. According to the 2010 Decennial Census, there were 922 people, 357 households, and 268 families residing in the township (US Census Bureau, 2010).
EAST FALLOWFIELD TOWNSHIP	East Fallowfield Township has a total area of 28.9 square miles, of which, 28.05 square miles of it is land and 0.04 square miles is water. According to the 2010 Decennial Census, there were 1,620 people, 505 households, and 395 families residing in the township (US Census Bureau, 2010).

EAST MEAD TOWNSHIP	East Mead Township has a total area of 23.29 square miles, of which, 22.86 square miles of it is land and 0.43 square miles is water. According to the 2010 Decennial Census, there were 1,493 people, 590 households, and 419 families residing in the township (US Census Bureau, 2010).
FAIRFIELD TOWNSHIP	Fairfield Township has a total area of 19.34 square miles, of which, 19.32 square miles of it is land and 0.02 square miles is water. According to the 2010 Decennial Census, there were 1,023 people, 410 households, and 304 families residing in the township (US Census Bureau, 2010).
GREENWOOD TOWNSHIP	Greenwood Township has a total area of 36.61 square miles, of which, 36.43 square miles of it is land and 0.18 square miles is water. According to the 2010 Decennial Census, there were 1,454 people, 561 households, and 398 families residing in the township (US Census Bureau, 2010).
HAYFIELD TOWNSHIP	Hayfield Township has a total area of 38.9 square miles, of which, 38.84 square miles of it is land and 0.06 square miles is water. According to the 2010 Decennial Census, there were 2,940 people, 1,173 households, and 883 families residing in the township (US Census Bureau, 2010).
NORTH SHENANGO TOWNSHIP	North Shenango Township has a total area of 26.15 square miles, of which, 18.75 square miles of it is land and 7.4 square miles is water. According to the 2010 Decennial Census, there were 1,410 people, 675 households, and 399 families residing in the township (US Census Bureau, 2010).
OIL CREEK TOWNSHIP	Oil Creek Township has a total land area of 32.2 square miles. According to the 2010 Decennial Census, there were 1,877 people, 772 households, and 539 families residing in the township (US Census Bureau, 2010).
PINE TOWNSHIP	Pine Township has a total area of 12.6 square miles, of which, 6.52 square miles of it is land and 6.08 square miles is water. According to the 2010 Decennial Census, there were 462 people, 200 households, and 143 families residing in the township (US Census Bureau, 2010).
RANDOLPH TOWNSHIP	Randolph Township has a total area of 43.08 square miles, of which, 42.75 square miles of it is land and 0.33 square miles is water. According to the 2010 Decennial Census, there were 1,782 people, 647 households, and 494 families residing in the township (US Census Bureau, 2010).
RICHMOND TOWNSHIP	Richmond Township has a total area of 36.76 square miles, of which, 36.69 square miles of it is land and 0.07 square miles is water. According to the 2010 Decennial Census, there were 1,475 people, 539 households, and 405 families residing in the township (US Census Bureau, 2010).
ROCKDALE TOWNSHIP	Rockdale Township has a total area of 36.21 square miles, of which, 36.03 square miles of it is land and 0.18 square miles is water. According to the 2010 Decennial Census, there were 1,506 people, 534 households, and 404 families residing in the township (US Census Bureau, 2010).
ROME TOWNSHIP	Rome Township has a total land area of 41.34 square miles. According to the 2010 Decennial Census, there were 1,840 people, 537 households, and 420 families residing in the township (US Census Bureau, 2010).
SADSBURY TOWNSHIP	Sadsbury Township has a total area of 25.07 square miles, of which, 23.67 square miles of it is land and 1.4 square miles is water. According to the 2010 Decennial Census, there were 2,933 people, 1,373 households, and 841 families residing in the township (US Census Bureau, 2010).

SOUTH SHENANGO TOWNSHIP	South Shenango Township has a total area of 29.93 square miles, of which, 26.57 square miles of it is land and 3.36 square miles is water. According to the 2010 Decennial Census, there were 2,037 people, 887 households, and 607 families residing in the township (US Census Bureau, 2010).
SPARTA TOWNSHIP	Sparta Township has a total area of 42 square miles, of which, 41.81 square miles of it is land and 0.19 square miles is water. According to the 2010 Decennial Census, there were 1,832 people, 556 households, and 432 families residing in the township (US Census Bureau, 2010).
SPRING TOWNSHIP	Spring Township has a total area of 45.69 square miles, of which, 45.68 square miles of it is land and 0.01 square miles is water. According to the 2010 Decennial Census, there were 1,548 people, 607 households, and 426 families residing in the township (US Census Bureau, 2010).
SUMMIT TOWNSHIP	Summit Township has a total area of 24.56 square miles, of which, 24.54 is land and .02 is water. According to the 2010 Census, there were 1,236 people, 321 households, 212 families residing in the township (US Census Bureau, 2010)
STEUBEN TOWNSHIP	Steuben Township has a total area of 24.56 square miles, of which, 24.54 square miles of it is land and 0.02 square miles is water. According to the 2010 Decennial Census, there were 804 people, 321 households, and 212 families residing in the township (US Census Bureau, 2010).
SUMMERHILL TOWNSHIP	Summerhill Township has a total area of 25.4 square miles, of which, 25.38 square miles of it is land and 0.02 square miles is water. According to the 2010 Decennial Census, there were 1,236 people, 405 households, and 298 families residing in the township (US Census Bureau, 2010).
TROY TOWNSHIP	Troy Township has a total area of 31.73 square miles, of which, 31.69 square miles of it is land and 0.04 square miles is water. According to the 2010 Decennial Census, there were 1,235 people, 449 households, and 348 families residing in the township (US Census Bureau, 2010).
UNION TOWNSHIP	Union Township has a total area of 15.89 square miles, of which, 15.8 square miles of it is land and 0.09 square miles is water. According to the 2010 Decennial Census, there were 1,010 people, 436 households, and 283 families residing in the township (US Census Bureau, 2010).
VENANGO TOWNSHIP	Venango Township has a total area of 16.91 square miles, of which, 16.88 square miles of it is land and 0.03 square miles is water. According to the 2010 Decennial Census, there were 997 people, 364 households, and 263 families residing in the township (US Census Bureau, 2010).
VERNON TOWNSHIP	Vernon Township has a total area of 29.57 square miles, of which, 29.56 square miles of it is land and 0.01 square miles is water. According to the 2010 Decennial Census, there were 5,630 people, 2,491 households, and 1,620 families residing in the township (US Census Bureau, 2010).  The township is known as the “Golden Link” for its central location between Meadville and Conneaut Lake. Vernon Township is the business center of Crawford County and is home to many major stores, hotels, restaurants, and other various businesses.
WAYNE TOWNSHIP	Wayne Township has a total area of 35.51 square miles, of which, 35.24 square miles of it is land and 0.27 square miles is water. According to the 2010 Decennial Census, there were 1,539 people, 554 households, and 437 families residing in the township (US Census Bureau, 2010).

WEST FALLOWFIELD TOWNSHIP	West Fallowfield Township has a total area of 11.71 square miles, of which, 11.6 square miles of it is land and 0.11 square miles is water. According to the 2010 Decennial Census, there were 605 people, 245 households, and 166 families residing in the township (US Census Bureau, 2010).
WEST MEAD TOWNSHIP	West Mead Township has a total area of 18.79 square miles, of which, 18.29 square miles of it is land and 0.50 square miles is water. According to the 2010 Decennial Census, there were 5,249 people, 2,174 households, and 1,504 families residing in the township (US Census Bureau, 2010).
WEST SHENANGO TOWNSHIP	West Shenango Township has a total area of 9.01 square miles, of which, 6.83 square miles of it is land and 2.18 square miles is water. According to the 2010 Decennial Census, there were 504 people, 223 households, and 137 families residing in the township (US Census Bureau, 2010).
WOODCOCK TOWNSHIP	Woodcock Township has a total area of 32.91 square miles, of which, 32.38 square miles of it is land and 0.53 square miles is water. According to the 2010 Decennial Census, there were 2,856 people, 1,015 households, and 760 families residing in the township (US Census Bureau, 2010).

### 3.3 POPULATION AND DEMOGRAPHICS

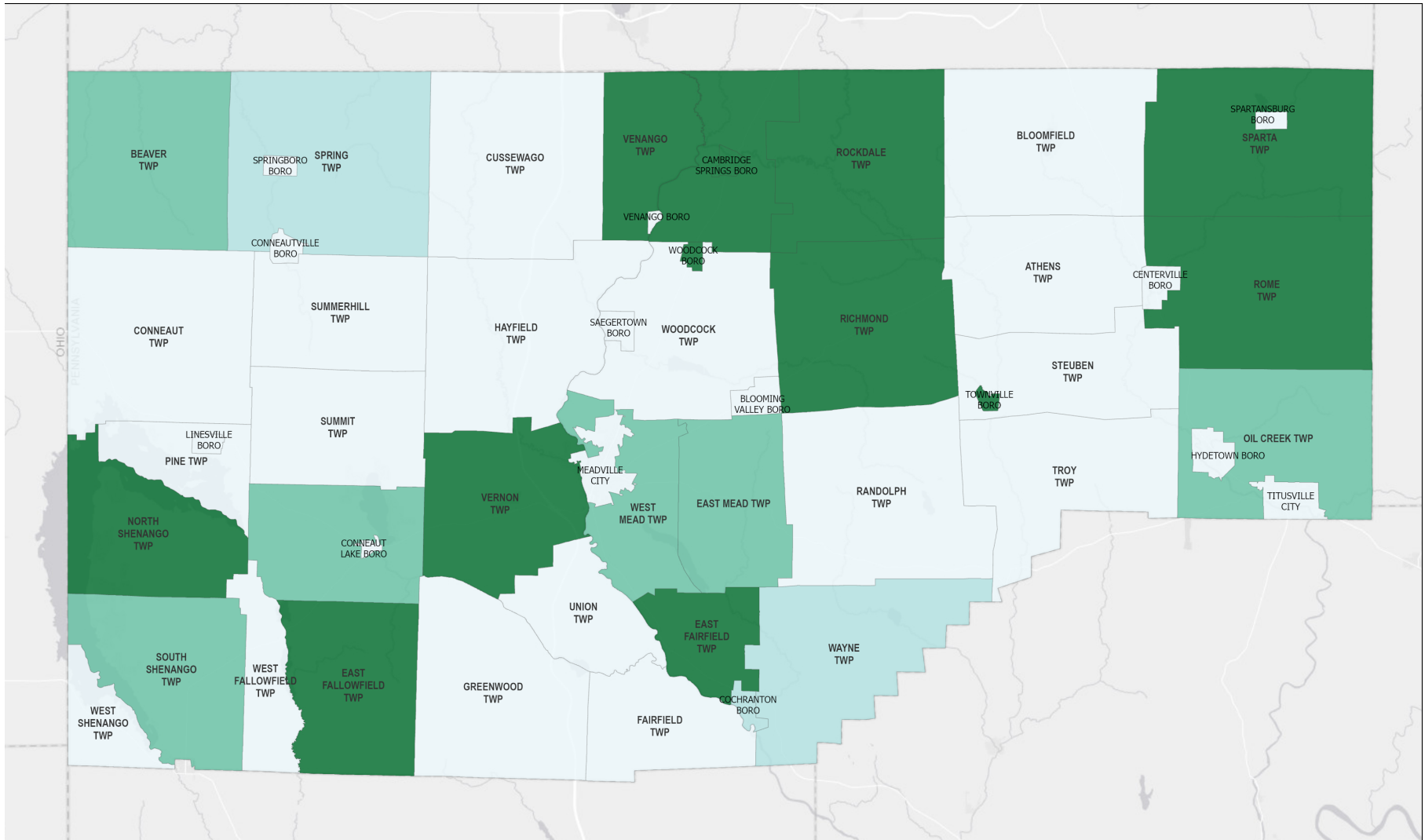
As of the Census Data ACS 2019 1-year there were 84,629 people, 35,387 households, and 29,726 families residing in the county. Of the county's total population, 24% were under the age of 18 and 29% were over the age of 60, with a median age of 43.9 years. The population density was approximately 83.6 people per square mile. There were 45,003 housing units at an average density of one unit per ten acres. The racial makeup of the county was 95% White, 2% Black or African American, 0% Native American, 1% Asian, 0% from other races, and 2% from two or more races. Out of the total population, 1% of the population identified as Hispanic or Latino of any race.


Out of the 35,387 households in the county, 64% were married couples family households of which 26.2% had children under the age of 18 living with them. Of the 23,187 family households in the county, 64% were married couples living together (husband-wife family), 14% had a female householder with no husband present. Of the 11,841 non-family households in the county, 9,823 households were made up of individuals living alone. For non-family households with a householder living alone, 4,206 or 42% were made up of adults aged 65 years or over. The average household size was 2.3. Between the 2010 Decennial Census and 2019 ACS, Crawford County experienced a 4,136 person decrease in total population.

The per capita income was \$26,318 and the median household income was \$49,428. 11.4% of the residents live below the poverty line comprising of 17% of children under age 18 and 7% of seniors 65 and older. The mean travel time to work is 22.3 minutes comprising of 79% those driving alone, 9% carpooled, 5% walked, 5% worked at home with no one taking public transit or bicycle. of the 45,003 housing units, 79% occupied and 71% owner occupied and 77% are single units. [www.censusreporter.org](http://www.censusreporter.org).

However, population gains were seen in four areas of the county, as displayed in Figure 3.3-1. Communities with high population densities have higher hazard vulnerability and loss potential, so as these areas continue to grow and densify, these communities might become more vulnerable to hazards. For example, population growth and its associated development is likely to create increases in loss potential, as more people may be living in areas prone to hazards, such as flooding, landslides, and dam failure. For example, Cambridge Township and East Fallowfield Township are experiencing a growth in population but also have high-hazard dams. As more people live in these communities and near these high-hazard dams, the community's hazard vulnerability and loss potential increase for dam failure.

Figure 3.3-1 Crawford County Population Change, 2000 - 2010






**Population Change by Municipality**

Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff

This map is subject to change at any time after date of issuance.  
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Source: US Census Bureau



**Municipality Census Population**

**Percent of change between 2000 & 2010**

- Strong Negative Growth (-50 to -1.5)
- Modest Negative Growth (> -1.5 to -0.76)
- Flat Growth (> -0.76 to 0.74)
- Modest Positive Growth (> 0.74 to 1.5)
- Strong Positive Growth (> 1.5 to 50)



### 3.4 LAND USE AND DEVELOPMENT

Of the 51 incorporated municipalities in Crawford County, there are:

- 2 cities
- 14 boroughs
- 35 townships

Many factors contributed to the existing land use pattern throughout the county. Among the most significant are: topography, natural cover, suitability of soil for agriculture or building purposes, the course of rivers and waterways, floodplains, former trails, existing roadways, early settlement patterns, and local regulations. All of these factors are also important to future land development in Crawford County. Factors that should be considered to a greater degree in future development include:

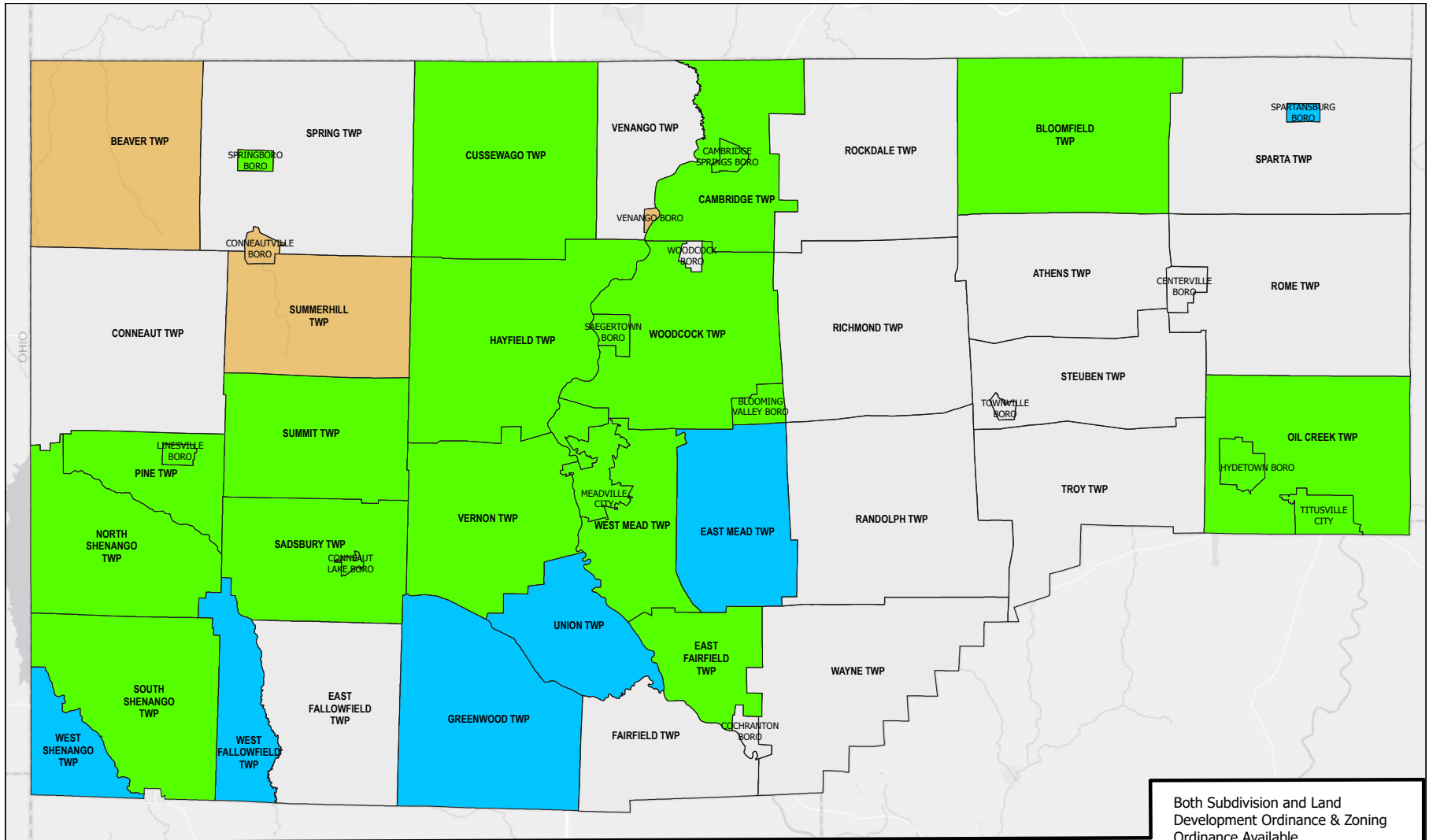
- *Land use and interrelationships*
- *Existing development*
- *Infrastructure such as sewer and water*
- *Underlying geologic structure*
- *Depth to bedrock*
- *Soil characteristics – suitability for development*
- *Slope*
- *Seasonal depth of water table*
- *Subsurface drainage*
- *Floodplain areas*
- *Wetlands and marshlands*
- *Large water bodies*
- *Environmental factors; e.g., fire hazards, heavily traveled thoroughfares, surface water pollution, etc.*
- *Utilities, mass transportation, and major highways*

Land use activities include forestry, farming, industry/commerce and residence. According to Crawford County’s 2014 Comprehensive Plan, soils suitable for agricultural uses cover 89% of the County, or 593,673 acres, and are found in every municipality of the county. Prime agricultural soils cover 17.2% of the county’s total land area, or 114,350 acres (Troy Township, Oil Creek Township, and Randolph Township contain the highest area among all the municipalities).

Development is controlled by land use regulations, such as local zoning ordinances as well as subdivision and land development ordinances (SALDO), that are derived from a community’s comprehensive plan. Throughout Crawford County, 27 municipalities in the county have a zoning ordinance in place, 29 have SALDOs, 38 have a comprehensive plan, and 22 have adopted all three. Currently, there are no county-wide land use regulations in Crawford County. Figure 3.4-1 displays the communities that have adopted regulations.

In order for land use planning to be effective in not only managing future growth, but managing future growth away from areas prone to hazards, Crawford County Planning along with elected and municipal officials will need to develop methods to incentivize local communities to develop new land use regulations or update existing regulations.

Figure 3.4-1 Crawford County Land Use Regulations



Both Subdivision and Land Development Ordinance & Zoning Ordinance Available

■ Yes

Subdivision and Land Development Ordinance Only?

■ Yes

Zoning Ordinance Only?

■ Yes

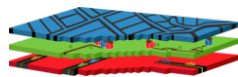
No Ordinance Available

■ Neither Ordinance available

### Municipal Ordinance Inventory



Crawford County Government  
 Crawford County Courthouse  
 903 Diamond Park  
 Meadville PA 16335  
 GIS Manager: Phillip Baranyai  
 Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



Source: Crawford County Planning



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Table 3.4-1 Crawford County Land Use Regulations

Crawford County Municipal Ordinances							
Name	Zoning	SALDO	Comprehensive Plan	Stormwater	Floodplain	Uniform Construction	Property Maintenance
Athens Township				X	X		
Beaver Township	X		X	X	X		
Bloomfield Township	X	X	X	X	X	X	X
Blooming Valley Borough	X	X	X	X	X		X
Cambridge Springs Borough	X	X	X	X	X	X	X
Cambridge Township	X	X	X	X	X		
Centerville Borough				X	X		
Cochranton Borough			X	X	X		X
Conneaut Lake Borough	X	X	X	X			X
Conneaut Township			X	X	X	X	X
Conneautville Borough	X		X		X		X
Cussewago Township	X	X	X	X	X	X	
East Fairfield Township	X	X	X	X	X		
East Fallowfield Township				X	X		
East Mead Township		X	X	X	X		
Fairfield Township				X	X		
Greenwood Township		X	X	X	X	X	
Hayfield Township	X	X	X	X	X		X
Hydetown Borough	X	X	X	X	X		X
Linesville Borough	X	X		X	X	X	X
Meadville City	X	X	X	X	X	X	X
North Shenango Township	X	X	X	X	X	X	
Oil Creek Township	X	X	X	X	X	X	
Pine Township	X	X	X		X	X	
Randolph Township			X	X	X		
Richmond Township			X	X	X	X	
Rockdale Township				X	X	X	
Rome Township				X	X	X	

Name	Zoning	SALDO	Comprehensive Plan	Stormwater	Floodplain	Uniform Construction	Property Maintenance
Sadsbury Township	X	X	X	X	X	X	
Saegertown Borough	X	X	X	X	X		X
South Shenango Township	X	X	X	X	X	X	X
Sparta Township	X		X	X	X		
Spartansburg Borough		X		X	X	X	
Spring Township			X	X	X		
Springboro Borough	X	X	X	X	X	X	
Steuben Township				X	X		
Summerhill Township	X		X	X	X		
Summit Township	X	X	X	X	X	X	X
Titusville City	X	X	X	X	X		X
Townville Borough				X	X		
Troy Township				X	X		
Union Township		X	X	X	X		
Venango Borough	X			X	X	X	
Venango Township			X	X	X	X	
Vernon Township	X	X	X	X	X	X	
Wayne Township			X	X	X	X	
West Fallowfield Township		X	X		X	X	X
West Mead Township	X	X	X	X	X	X	X
West Shenango Township		X	X	X	X	X	
Woodcock Borough					X	X	X
Woodcock Township	X	X	X	X	X	X	X

Crawford County has already taken direct and indirect steps to preserve farmland through land use planning by employing Agricultural Security Areas (land classified as agricultural districts), establishing agricultural easements, and using land assessment techniques that prioritize property values based on improvements to the land. Additional goals expressed by the county in the 2014 Comprehensive Plan to protect farmlands include:

- *“Target farmland preservation easement purchases in rural and agricultural landscapes.*
- *Encourage development within designated growth areas and to allow appropriate-scale agricultural uses in all districts, to deflect encroachment into prime agricultural lands.*
- *Limit sprawl and encourage cluster developments through the encouragement of mixed-use planned unit development (PUDs).*
- *Protect and enhance ground water recharge, in-stream resources, first order perennial streams, sensitive resources (including high quality and exceptional value watersheds), and riparian buffers to preserve water quality and quantity.”*

Figures 3.4-2 and 3.4-3 display the current and future land use and development areas in Crawford County. Commercial development is expected to occur along a key transportation corridor in the County, US 322, in Vernon Township located west of the City of Meadville. This area has the highest concentration of commercial activity in the county, access to the other transportation routes, and high traffic volumes. Reinvestment in properties along the area has been ongoing over the past decade.

Other development areas expected in the county include Greenwood Township and eastern areas of the county, specifically the area between Titusville and Hydetown along with areas around Canandota, Conneaut, and Pymatuning Lakes. Future development areas and trends should be monitored closely so that appropriate measures can be taken to lessen the risk of impact from hazards in these areas. As an example Titusville and Hydetown are located in the section of Crawford County that is most vulnerable to landslides. Additional development in these areas increases vulnerability to risk as well as potential loss, and therefore hazard mitigation measures should be considered when developing in these areas.

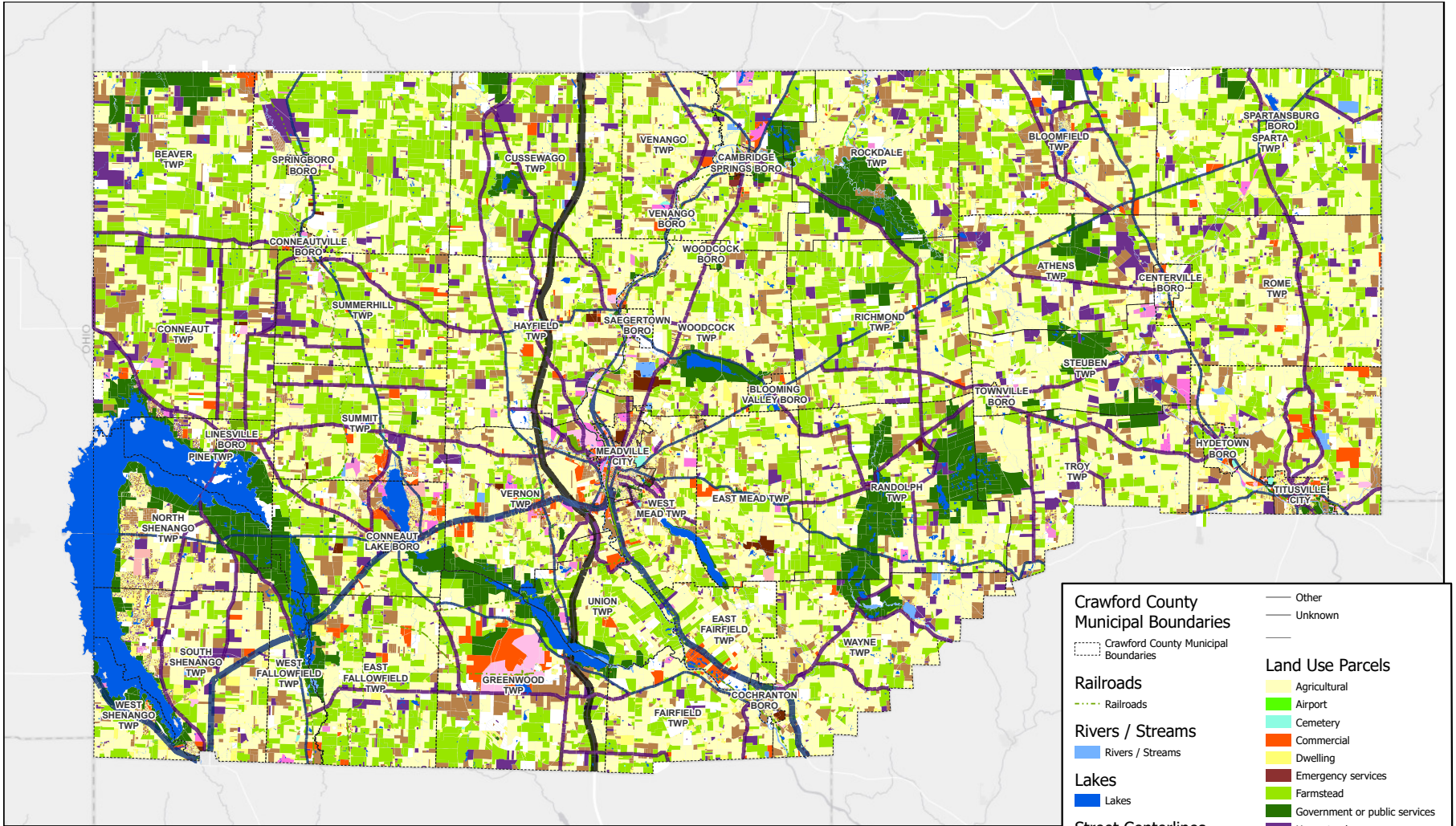
### **3.5 DATA SOURCES AND LIMITATIONS**

The Crawford County tax assessment parcel database was used as an inventory of properties throughout the County. In order to effectively evaluate the type of properties vulnerable to individual hazards, the consultant team converted the parcels to their centroids and used the land use categorization captured in the parcel database as the property use. Land use categories were reviewed and consolidated as needed. For example, single family residential, rural residential, and multifamily residential parcel land uses were consolidated to “residential.” Properties with no land use description were retained in the vulnerability analysis with the land use type “Unknown.” Analyses contained in this plan were supplemented by data from various government and non-government agency sources as described below.

This HMP evaluates the vulnerability of the County’s critical facilities. The list of critical facilities provided in Appendix E – Critical Facilities was developed based on information available from the Crawford County Department of Public Safety (EMA), the Crawford County Geographic Information Systems (GIS) Department, PEMA, and FEMA. For the purposes of this plan, critical facilities are those entities that are essential to the health and welfare of the community. This includes airports, emergency response, medical services, law enforcement, SARA Title III facilities, schools, and mobile communications.

The countywide Digital Flood Insurance Rate Map (DFIRM), August 16, 2012, was downloaded from the FEMA Map Service Center. This data provides

Figure 3.4-2 Crawford County Current Land Use

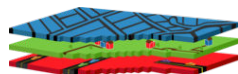


<b>Crawford County Municipal Boundaries</b>	— Other
--- Crawford County Municipal Boundaries	— Unknown
<b>Railroads</b>	<b>Land Use Parcels</b>
--- Railroads	■ Agricultural
<b>Rivers / Streams</b>	■ Airport
■ Rivers / Streams	■ Cemetery
<b>Lakes</b>	■ Commercial
■ Lakes	■ Dwelling
<b>Street Centerlines - Major Roads</b>	■ Emergency services
■ Interstate	■ Farmstead
■ Ramp	■ Government or public services
■ Major Arterial	■ Homestead
■ Minor Arterial	■ Industrial
■ Major Collector	■ Lodging
■ Minor Collector	■ Manufactured home park
■ Local	■ Medical facility
■ Service	■ Nature conservation
■ 4 Wheel Drive	■ Railroad
■ Recreation	■ Recreation or entertainment
■ Resource	■ Religious organization
	■ School
	■ Social or civic organization
	■ To be determined
	■ Utility
	■ Vacant land

### Current Land Use Plan



Crawford County Government  
 Crawford County Courthouse  
 903 Diamond Park  
 Meadville PA 16335  
 GIS Manager: Phillip Baranyai  
 Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff

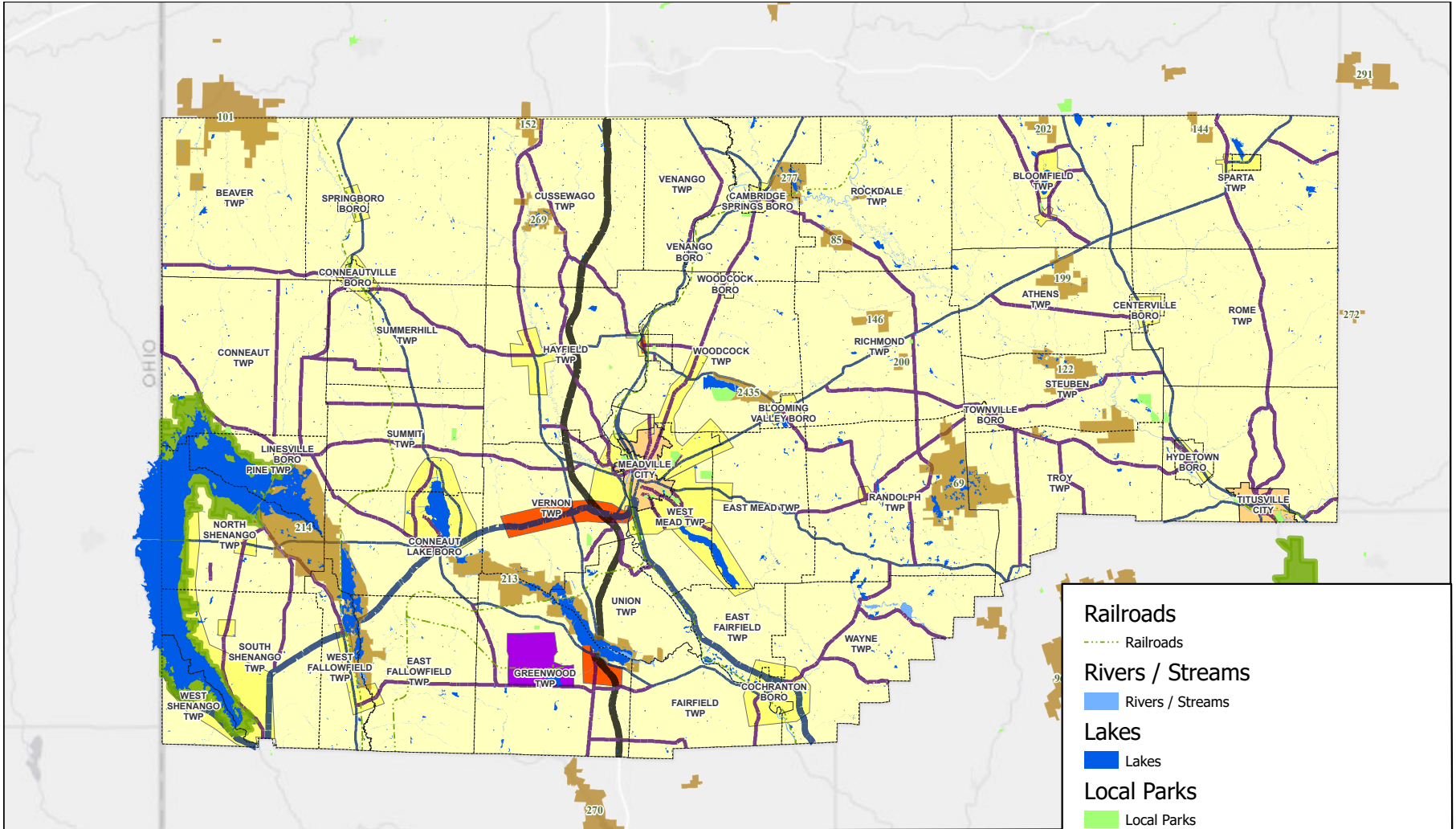


Source: Crawford County Planning



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Figure 3.4-3 Crawford County Future Land Use

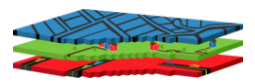


- Railroads**  
 Railroads
- Rivers / Streams**  
 Rivers / Streams
- Lakes**  
 Lakes
- Local Parks**  
 Local Parks
- State Game Lands**  
 State Game Lands
- State Park**  
 State Park Boundaries
- Future Land Use Plan (2014)**  
 Agricultural / Rural  
 Commercial  
 Industrial  
 Urban Area  
 Village / Residential

**Future Land Use Plan**



Crawford County Government  
 Crawford County Courthouse  
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 Meadville PA 16335  
 GIS Manager: Phillip Baranyai  
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Source: Crawford County Planning



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flood frequency and elevation information used in the flood hazard risk assessment. Other GIS datasets including major roads and railroads were provided by Crawford County. Additional data for the base map was provided by the Pennsylvania Department of Transportation, Pennsylvania Game Commission, National Hydrography dataset and the Pennsylvania Department of Conservation and Natural Resources.

Additional information used to complete the risk assessment for this plan was taken from various government agency and non-government agency sources. Those sources are cited where appropriate throughout the plan and on each map with full references listed in Appendix A – Bibliography. It should be noted that numerous GIS datasets were obtained from the Pennsylvania Spatial Data Access (PASDA) website (<http://www.pasda.psu.edu/>). PASDA is the official public access geospatial information clearinghouse for the Commonwealth of Pennsylvania. PASDA was developed by the Pennsylvania State University as a service to the citizens, governments, and businesses of the Commonwealth. PASDA is a cooperative project of the Governor’s Office of Administration, Office for Information Technology, Geospatial Technologies Office and the Penn State Institutes of Energy and the Environment of the Pennsylvania State University.

In order to assess the vulnerability of different jurisdictions to the hazards, data on past occurrences of damaging hazard events was gathered. For a number of historic natural-hazard events, the National Climatic Data Center (NCDC) database was utilized. NCDC is a division of the US Department of Commerce’s National Oceanic and Atmospheric Administration (NOAA). Information on hazard events is compiled by NCDC from data gathered by the National Weather Service (NWS), another division of NOAA. NCDC then presents it on their website in various formats. The data used for this plan came the US Storm Events database, which “documents the occurrence of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce” (NOAA, 2006).

HAZUS-MH is a powerful risk assessment methodology for analyzing potential losses from floods, hurricane winds and earthquakes. In HAZUS-MH, current scientific and engineering knowledge is coupled with the latest GIS technology to produce estimates of hazard-related damage before, or after, a disaster occurs. HAZUS version 2.1 was used to estimate losses for floods in Crawford County; this plan incorporates an enhanced analysis, meaning that county-specific data was incorporated into the model to make it more precise. Because of the large number of A Zones in Crawford County, the project team took a hybrid approach to the analysis. For the AE Zones, the consultant team created a depth grid depicting the 1%-annual-chance flood using the DFIRM data and cross sections. For the A Zones, the consultant team allowed Hazus to delineate the hydrology and the floodplain using a 10-meter DEM. This was done to efficiently capture flooding countywide. The results were then merged into a single GIS layer of economic losses. Where census blocks overlapped between the AE and A Zone scenario, the AE Zone results superseded the A Zone results, as they were considered more precise and generally showed higher losses. For more information on the enhanced analysis methodology used for this plan’s flood model, please see Appendix F.



# 4. PLANNING PROCESS

## 4.1 UPDATE PROCESS AND PARTICIPATION SUMMARY

Local hazard mitigation planning is the process of organizing community resources, identifying and assessing hazard risks, and determining how to best minimize or manage those risks. This process results in a hazard mitigation plan that identifies specific mitigation actions, each designed to achieve both short term planning objectives and a long-term community vision. To ensure the functionality of each mitigation action, responsibility is assigned to a specific individual, department or agency along with a schedule for its implementation. Plan maintenance procedures are established to implement, as well as evaluate and enhance the plan as necessary. Developing clear plan maintenance procedures ensures that Crawford County's Hazard Mitigation Plan remains a current, dynamic and effective planning document over time.

The planning process used in Crawford County was based on Section 322 of the Disaster Mitigation Act of 2000 and supporting guidance developed by FEMA and PEMA. The planning process included the following steps:

- *Establish a core planning team*
- *Conduct 5-Year Plan Review*
- *Review and update the Hazard Vulnerability Assessment*
- *Develop Capabilities Assessment*
- *Update the Mitigation Strategy*
- *Complete mitigation plan*
- *Provide to FEMA/PEMA for review*
- *Advertise opportunity for public comment*
- *Present to municipalities for adoption*
- *Adopt and implement mitigation plan*

The Crawford County Hazard Mitigation Steering Committee was responsible for preparing the County's 2020 Hazard Mitigation Plan (HMP). The 2020 HMP was an update to the County's 2015 Hazard Mitigation Plan. The 2015 process was initiated by Michael Baker International and supported by the Crawford County Mitigation Planning Committee, PEMA and FEMA representatives.

The 2020 HMP update was jointly led by the Crawford County Department of Public Safety and the Crawford County Planning Office. The 2020 HMP follows an outline by the Pennsylvania Emergency Management Agency (PEMA, 2019), which provides a standardized format for all local hazard mitigation plans in the Commonwealth of Pennsylvania. As a result, the format of the 2020 Crawford County HMP contrasts slightly with the 2015 Crawford County HMP. A summary of the update process used for each section of this plan included in Sections 4.1, 5.1, 6.1, and 7.1. A total of 39 out of 51 municipalities participated in the plan update. The 2020 Hazard Mitigation Plan Update was completed in January, 2021.

## 4.2 THE PLANNING TEAM

During development of the 2020 Crawford County HMP, the following individuals served as members of the Crawford County Hazard Mitigation Steering Committee (HMSC):

- *Zachary Norwood, Planning Director, Crawford County Planning Office*
- *Allen Clark, EMA Coordinator, Crawford County Department of Public Safety*
- *Don Bovard, Operations and Training Officer, Crawford County Department of Public Safety*
- *Phil Baranyai, GIS Manager, Crawford County Planning Office*
- *Jill Allen, Planner, Crawford County Department of Public Safety*

In order to represent the diverse stakeholders in the County, the HMPSC developed a diversified list of potential planning team members, discussed in more detail in Section 3.4. The HMPSC worked throughout the process to plan and hold meetings, collect information, and conduct public outreach.

The stakeholders listed below in Table 3.2-1 served on the planning team, by attending meetings, completing assessments, surveys, and worksheets, and/or submitting comments. The planning team consisted of county and local officials including municipal supervisors and council members, emergency management coordinators, and the other identified stakeholders.

**Table 4.2-1 Planning Participants**

<b>Participants in the 2020 Crawford County HMP Update</b>	
<b>Municipality/ Organization</b>	<b>Participant</b>
Athens Township	Leslie Burton, Gary Rankin
Beaver Township	Brenda Braden, Robert Thompson
Bloomfield Township	Michelle Taylor, Jerry Kalkbrenner
Blooming Valley Borough	Brenda Wetsell, Mark Nickerson
Cambridge Township	Debra Merritt, David Birchard
Cambridge Spring Borough	
Centerville Borough	Gina Thomas, Peter Collins
Cochranton Borough	Bob Jehn, Susan Armburger
Conneaut Lake Borough	Christine Morian, John Treacy
Conneaut Township	Telce Varee, George Greig

Municipality/ Organization	Participant
Conneautville Borough	Allen Clark, Jerry Carless
Cussewago Township	
East Fairfield Township	Lori Guianen
East Fallowfield Township	Donna Kean
East Mead Township	Lea Ann Coston, Bill Coston
Fairfield Township	
Greenwood Township	Brenda Braden, Robert Byers
Hayfield Township	Jennifer McClymonds, Jack Mahoney
Hydetown Borough	Craig Farrar, Patricia Myer, Phil Myer, Randy Winkleman, Marc Bavas
Linesville Borough	Kevin McGrath
Meadville – City	Andy Walker & Gary Johnson
North Shenango Township	Donna Kean, Dan Dickey
Oil Creek Township	April Averill, Dave Christy
Pine Township	
Randolph Township	Joi Fultz, Don Sutter
Richmond Township	Rhonda Phillips, Bill Taylor
Rockdale Township	Jill Reese
Rome Township	
Sadsbury Township	Lyle Hoovler, Rose Mumau, Tim Latta
Saegertown Borough	Charles Lawrence
South Shenango Township	Rebecca Andrew, Jamie Fries
Spartansburg Borough	Jamie Ditzler
Sparta Township	
Spring Township	Shelby Field, Terry Bechtel
Springboro Borough	Tammy Rowland, Tiffany McCray, Michael Furdiga
Steuben Township	
Summerhill Township	Brenda Braden
Summit Township	Brenda Braden, Duane Agnew
Titusville – City	Neil Fratus, Mike Wonderling

<b>Municipality/ Organization</b>	<b>Participant</b>
Townville Borough	Leslie Battin, Justin Sullivan
Troy Township	Joy Strain
Union Township	Jason Spencer
Venango Borough	Amy Wellington, James Walsh
Venango Township	Jill Dunlap
Vernon Township	Robert Horvat
Wayne Township	Mary Kennedy
West Fallowfield Township	Brenda Williams
West Mead Township	Jill Dunlap, Don Bovard
West Shenango Township	Carrie McElhaney, Tom Rimko
Woodcock Borough	Sharron Diley
Woodcock Township	Renee Hayes, Chuck Lawrence

### **4.3 MEETINGS AND DOCUMENTATION**

The following meetings were held during the plan update process. Invitations, agendas, sign-in sheets, and minutes for these meetings are included in Appendix C. The meetings were led by Allen Clark, Crawford County Department of Public Safety and Zach Norwood, Crawford County Planning Department.

- February 22, 2019: DPS and Planning Staff Meeting
- March 21, 2019: Crawford County Local Emergency Planning Committee Meeting
- March 21, 2019: Crawford County Borough’s Association Meeting
- May 2, 2019: Crawford County Safe Kids Coalition Meeting
- May 10, 2019: Crawford County Community Council Meeting
- May 15, 2019: DPS and Planning Staff Meeting
- May 22, 2019: Crawford County Township Association Meeting
- June, 2019: NW Crawford County Regional Emergency Management Agency

- June 15, 2019: Crawford County Local Emergency Planning Committee Meeting
- July 3, 2019: DPS & Planning Staff Meeting
- September 26, 2019: Kickoff Meeting was held at the East Mead Volunteer Fire Department to introduce the project to local municipalities, inform community representatives of the HMP update process and schedule, and collect local information perceived hazards in the County. Municipalities were sent a survey asking what their top hazards were in their municipality.
- January 30, 2020: DPS & Planning Staff Meeting

Due to the COVID-19 Pandemic work on updating the HMP was tabled until both Departments staff were back to work and when the Departments had time to commit to this project.

- August 6, 2020: DPS, GIS, and Planning Staff Meeting
- August 12, 2020: Penelec and PennPower Meeting with DPS Staff regarding utilities
- August 20, 2020: HMP Team Skype Planning Meeting
- September 8, 2020: KEMA Coffee Break starts at 10am. Topic- FEMA FMA and BRIC
- September 15, 2020: Crawford County Local Emergency Planning Committee Meeting
- September 23, 2020: Risk Assessment and Mitigation Solutions Meeting was held via GoToMeeting webinar with the HMPSC. The meeting provided an overview of potential hazards in Crawford County and the relevant risk factor ranking of these hazards.
- Nov. 1- 13, 2020: Crawford County Department of Public Safety's Operations and Training Officer called each Municipality that did not respond yet to the HVA or enter an action/project to walk them through completing each task. He either spoke to them on the phone or left a voicemail message. He then followed up with an e-mail to them and copied their municipal EMA Coordinator.
- November 17, 2020: Hazard Mitigation Planning GoToMeeting webinars were held at 9 a.m., 2 p.m., and 6 p.m. to accommodate additional municipal participation in the HMP planning process. The meeting reviewed content covered in the Hazard Mitigation Planning Workshop and provided participants the opportunity to complete a hazard risk evaluation and mitigation strategy through the GIS HUB.
- November 19, 2020: Draft Plan Review Public Meeting to review the draft plan was held via GoToMeeting Webinar at 9 a.m. In addition to the public, municipalities and other stakeholders were invited to attend. This meeting, along with the public comment period, was advertised via a legal notice in the Meadville Tribune on November 9, 2020.

The meeting included a review of the HMP process, 2020 hazards and risk assessment, outreach, and the mitigation action plan. Attendees were informed that an electronic copy of the draft HMP update would be available for download and review on the project website starting on October 6, 2020 at <https://2020-hazard-mitigation-plan-crawfordcountypa.hub.arcgis.com/> Comments and information received from the Draft Plan Review Meeting were incorporated into the Draft HMP Update before posting to the project website.

November 25, 2020: Crawford County EMA Coordinator participated in the FEMA Region III Coffee Break Session on the topic of incorporating the FEMA Seven Lifelines into Hazard Mitigation Planning with FEMA Region II.

December 18, 2020: Crawford County Planning and Public Safety reviewed the plan for the final time.

#### **4.4 PUBLIC, STAKEHOLDER & JURISDICTION PARTICIPATION**

Each municipality was given multiple opportunities to participate in the HMP update process through direct invitation to all meetings held, as well as an opportunity to comment on a final draft of the HMP. The actions/tools listed below were distributed with meeting invitations and at meetings to solicit data, information, and comments from all 51 local municipalities in Crawford County.

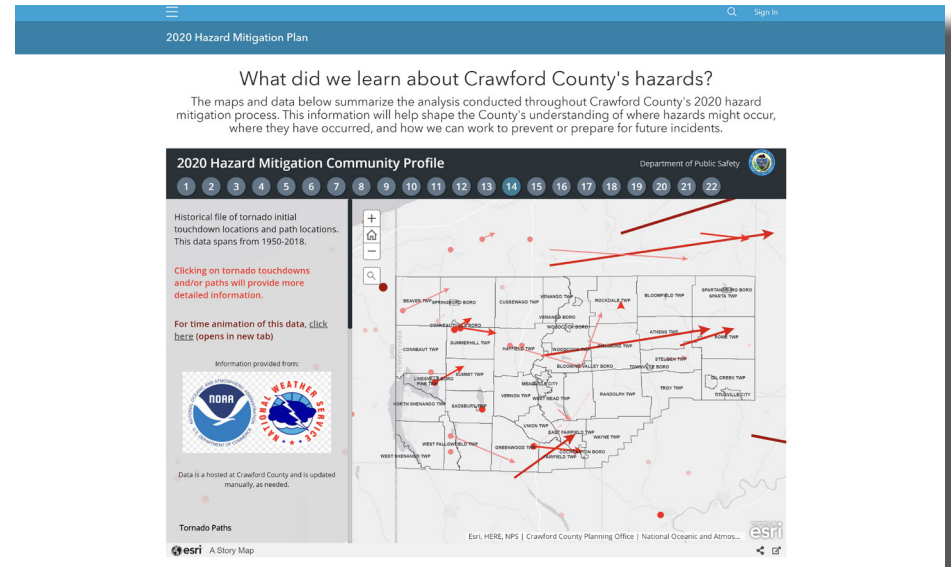
1. *Hazard-Risk Evaluation Worksheet: Identify what their top hazards in their municipality is.*
2. *Mitigation Action Evaluation and Development: The following forms were distributed to help communities evaluate and modify mitigation goals for the 2020 HMP:*
  - *Mitigation Ideas: Assists communities with brainstorming mitigation actions.*
  - *New Mitigation Action Form: Collects information on new mitigation actions developed by communities.*

Public comment was encouraged throughout the planning process. A public notice was posted in the Meadville Tribune on November 9, 2020. The preparation of this plan update involved surveys and a planning meeting as an opportunity for communities, agencies, businesses, academia, non-profits, and other interested parties to be involved in the planning process.

Stakeholder were encouraged to review the project website: <https://2020-hazard-mitigation-plan-crawfordcountypa.hub.arcgis.com/>. A snapshot of the project website is provided below. The website included general resources pertaining to hazard mitigation planning and posting of upcoming events and project announcements. The 2015 plan and 2020 updated maps were also posted to the project website beginning May 26, 2020 to solicit public comment and will remain posted and available until approval pending adoption has been received. No comments were received on the draft plan.



Above: Meadville Tribune Public Notice



Above: Crawford County Hazard Mitigation Plan Webpage (<https://2020-hazard-mitigation-plan-crawfordcountypa.hub>)

- > Public Safety Home
- > 911 Addressing
- > Affiliated Services
- > Ambulance Services
- > Events
- > Fire Departments
- > LEPC
- > Links
- > Public Safety Newsletters
- > Public Safety Staff
- > Police Departments

## CRAWFORD COUNTY PUBLIC SAFETY DEPARTMENT

**LOCATION**  
632 Pine St., Meadville, PA 16335

**CONTACT INFORMATION**  
Emergency: 9-1-1  
Administrative Phone Number: (814) 724-8110  
Administrative After Hours: (814) 724-2548

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### Crawford County 2020 Hazard Mitigation Plan Update

**Please click on the link below and review the hazards that impact Crawford County, volunteer to serve on the Review Team, and enter a mitigation project or action.**

<https://2020-hazard-mitigation-plan-crawfordcountypa.hub.arcgis.com/>

**CONTACT US**

Phone: 814-333-7300  
After Hours: 814-724-2548

Fax: N/A

632 Pine St.  
Meadville, PA 16335

Above: Crawford County GIS Facebook Page

Above: Crawford County Department of Public Safety Website ([www.crawfordcountypa.net](http://www.crawfordcountypa.net))

## 4.5 MULTI-JURISDICTIONAL PLANNING

This hazard mitigation plan was developed using a multi-jurisdictional approach. County-level departments had resources such as technical expertise and data which local jurisdictions lacked. However, the county could not develop the plan on its own. To undertake this county-wide planning effort, involvement from local municipalities was critical to the collection of local knowledge related to hazard events. Local municipalities also have the legal authority to enforce compliance with land use planning and development issues. The County undertook an intensive effort to involve all municipalities in the planning process through invitations, phone calls, webinars, GIS HUB surveys, and multiple meeting times.

Table 3.5-1 documents jurisdictional participation described in Section 3.3 and other involvement from each jurisdiction throughout the planning process. Each municipality was emailed or mailed invitations to all meetings. An HMP teleconference was held to give jurisdictions that previously were unable to physically attend any other meeting an opportunity to participate. Surveys and forms were emailed or mailed to jurisdictions along with letters requesting that local information be provided, and the forms (with instructions) were also posted to the HMP update website. A copy of all invitations, worksheets, forms, and participation documentation can be found in Appendix C. As stated previously, 39 out of 51 municipalities participated in the 2020 HMP update process. In addition, a number of additional stakeholders participated and contributed valuable information during the planning process, and are as follows:

- *Geoffrey Domowicz, American Red Cross*
- *Greg Beveridge, Crawford County DPS*
- *Nicholas O'Brien, PA Army National Guard*
- *James Pratt, Crawford County SCUBA Team*
- *Alison Piatt, Crawford County Coroner's Office*
- *Chauncey Miller, Parker LORD – Saegertown*
- *Terry Beck, Meadville Medical Center*
- *Daniel Bickel, PA Department of Conservation and Natural Resources – Pymatuning State Park*
- *Evan Hasko, Meadville Fire Department*
- *Christine Krzysiak, Crawford County Treasurer*
- *Charles Lawrence, Saegertown Borough Manager & EMA Coordinator*
- *Scott Schell, Crawford County Coroner*
- *Dan Whalen, Linesville Pine Joint Municipal Authority*
- *David Dickson, PENNCREST School District*
- *Joe Galbo, Crawford County Chief Assessor*
- *John Bauer, Crawford-Venango Fire School*
- *Jim Cihon, Crawford Amateur Radio Society*
- *Sarah Dickey, Meadville Medical Center*
- *Francis F. Weiderspahn, Jr., Crawford County Commissioner*
- *John Christopher Soff, Crawford County Commissioner*
- *Heather A. Palm, PA Department of Agriculture*
- *Dustin Wyant, PA Department of Environmental Protection*
- *Steven Nickell, Universal Pressure Pumping*
- *Eric Henry, Crawford County Commissioner*
- *David Powers, Crawford County Sheriff*
- *Joseph Lobdell, PA State Police – Meadville Station Commander*
- *Kim Combs, Titusville Area Hospital*
- *Stephanie Ace, Crawford County Disaster Crisis Outreach Referral Team*
- *William McClincy, EMMCO West, Inc.*
- *Eric Mosbacher, PA Department of Environmental Protection*
- *Brian Pilarcik, Crawford County Conservation District*
- *Stephanie Keebler, Titusville Area School District*
- *Gary Knox, PA Department of Health*
- *Joseph Lamey, Titusville Fire Department*
- *Dustin LeGoullon, Titusville Police Department*
- *Matthew Linse, Hospital & Healthcare Association of Pennsylvania*



- *Scott Sjolander, Urban and Community Forestry Penn State Extension – Crawford County*
- *Timothy Glasspool, PENNCREST School District*
- *Penny Gledhill, Greenleaf Corporation*
- *Keith Gushard, Meadville Tribune*
- *William Malia, PA Emergency Management Agency*
- *Brian Maginnis, Titusville Area Hospital*
- *Amy Jewitt, Invasive Species Coordinator, PA Natural Heritage Program, Western Pennsylvania Conservancy*
- *Randy Taylor, Northern Tier Healthcare Coalition*
- *Crawford County VOAD Distribution Group*
- *Amanda Bruce, MMC WIC Program*
- *Angela Morton, CC Drug & Alcohol Executive Commission*
- *Annette Wilkins, The Special Kids Network - Elks*
- *Becky Pears, Crawford County Drug and Alcohol Commission*
- *Beth Mallory, Bethesda Children's Home*
- *Carrie Dinsmore, MMC WIC Program*
- *Caryl Waggett, Allegheny College - Healthy Homes-Healthy Children*
- *Christian Smith, Early Learning Resource Center / WIC*
- *Cindy Schick, PA State Police*
- *Connie Gainor, YMCA*
- *Donna Johnson, ARC of Crawford, Warren, & Forest Counties*
- *Emily Chase, Families First Early Head Start/CSV*
- *Emily Scanlon, Vesta*
- *Frank Kasper, Crawford County Human Services*
- *Jamie McKalip, Meadville Medical Center - Pediatrics*
- *Jan Anderson, NW District PA Dept. of Health*
- *Jason Nesbitt, Center for Family Services*
- *Jayme Ferry, CC Drug & Alcohol Executive Commission*
- *Jenny Tompkins, Crawford County Drug and Alcohol Commission*
- *Jessica Glenn, IU5 ELECT Program*
- *Jill Staaf, Meadville Fire Department*
- *Joe Barnhart, Crawford County Human Services*
- *John Hartnett, Not One More / NWPA*
- *Joshua Kaufer, PennDOT Safety Press Officer*
- *Julia Covert, CC Drug & Alcohol Executive Commission*
- *Kandy Foote, CC Drug & Alcohol Executive Commission*
- *Kelly Lucas, Children Health Network*
- *Kelly Schreck, Families First Early Head Start/CSV*
- *Kerry Risco, Penn State Shenango*
- *Kim Combs, Titusville Area Hospital Emergency Department*
- *Lee Scandinaro, CC System of Care, MARC, Meadville Neighborhood Center*
- *Lisa Snyder, NW District PA Dept. of Health*
- *Madeira Paraskos, Conneaut Lake Area Ambulance Service*
- *Mary Lakari, PA Chapter American Academy of Pediatrics*
- *Mathew DiTullio, Bayada Pediatrics*
- *Melissa Knapp, Families First Early Head Start/CSV*
- *Michelle McGee-Morrison, PA State Police*
- *Mike Tautin, Meadville Police Department*
- *Nathan Latimer, CC Drug & Alcohol Executive Commission*
- *Nicolas Mogel, Meadville Police Department*
- *Paige Colao, AmeriCorps VISTA/CCODC*
- *Pamela Smith, Crawford County Sheriff's Department*
- *Paula Di Gregory, Tobacco & Nicotine Services Coordinator*
- *Raymond Ferry, Independent Consumer Advocate*
- *Rosamond Learn, Fairview / Fairmont Outreach Center*
- *Rose Hilliard, Women's Services*
- *Sarah Miller, Fairview / Fairmont Outreach Center*
- *Sharon Demaison, Meadville Medical Center*
- *Stephanie Nye, Women's Services*
- *Tori Gatto, Meadville Medical Center - Trauma*

- *Vince Trenga, Meadville Police Department*
- *William Stuckey, PA State Police Liquor Control*
- *Conneaut Lake Borough EMA*
- *Lakeland Regional EMA*
- *Active Aging, Inc.*
- *Arista Care of Park Avenue*
- *Asera Care Hospice*
- *Alzheimer's Association - Erie Office/Greater PA Chapter*
- *Bethesda Lutheran Services*
- *Center for Family Services*
- *CHAPS*
- *Child to Family Connections*
- *Community Health Services, Inc. WIC and ELRC*
- *Community Health Services, Inc.*
- *Crawford County Assistance Office*
- *Crawford County Domestic Relations*
- *Crawford County Drug & Alcohol Executive Commission, Inc.*
- *Crawford County Human Services*
- *Crawford County School for Adult Education - CCSAE*
- *Crawford Heritage Community Foundation*
- *Darlings Home Care*
- *Erie Home for Children and Adults, Inc.*
- *Fairview/Fairmont Outreach*
- *Families First Early Head Start*
- *Family Services of NWPA*
- *Hands*
- *Kindred Hospice*
- *Life - NWPA*
- *Marquette Savings Bank*
- *Meadville Area Free Clinic*
- *Meadville Housing Authority*
- *Meadville Neighborhood Center*
- *Meadville YMCA Association*
- *MLK Scholarship*
- *Northwestern Legal Services*
- *Not One More Northwest PA*
- *Parkside Psychological*
- *Penn State Extension*
- *Rescare/CareerLink*
- *Self-Determination Housing Project of PA, Inc.*
- *St. James Haven*
- *The ARC of Crawford County*
- *Unitarian Universalist Church of Meadville*
- *Vallonia Industries*
- *Veteran's Affairs*
- *Women's Services*
- *Epidemiology Research Associate – Informatics, NW Pennsylvania Department of Health, Bureau of Epidem.*
- *Community Health Nurse Supervisor, NW Department of Health, Bureau of Community Health Systems*
- *Northwestern Pennsylvania Emergency Response Group*
- *Erie County Department of Public Safety*
- *Warren County Department of Public Safety*
- *Forest County Emergency Management Agency*
- *Venango County Office of Emergency Services*
- *Mercer County Department of Public Safety*
- *Bill Bradfield, CFM, NFIP Program Manager PA Emergency Management Agency*
- *Ashtabula County, Ohio Emergency Management Agency*
- *Pennsylvania Emergency Management Agency – Western Area Office*
- *Pennsylvania Emergency Management Agency – Bureau of Recovery*
- *Federal Emergency Management Agency – Region III*

**Table 4.5-1 Crawford County 2020 HMP Update Community Participation**

MUNICIPALITY	KICK OFF MEETING	STRATEGIES WEBINAR	RISK ASSESSMENT EXERCISE	MITIGATION STRATEGY REVIEW
Athens Township			X	X
Beaver Township	X	X	X	X
Bloomfield Township			X	X
Blooming Valley Borough			X	X
Cambridge Township		X	X	X
Cambridge Spring Borough				
Centerville Borough			X	X
Cochranton Borough	X		X	
Conneaut Lake Borough		X		X
Conneaut Township		X	X	X
Conneautville Borough	X	X	X	X
Cussewago Township				
East Fairfield Township			X	X
East Fallowfield Township	X	X	X	X
East Mead Township	X	X	X	X
Fairfield Township				
Greenwood Township	X	X	X	X
Hayfield Township		X	X	X
Hydetown Borough	X	X	X	
Linesville Borough	X		X	X
Meadville – City	X	X	X	X
North Shenango Township	X	X	X	X
Oil Creek Township				X
Pine Township		X		
Randolph Township			X	
Richmond Township			X	
Rockdale Township		X	X	X
Rome Township				
Sadsbury Township	X	X	X	X
Saegertown Borough	X	X	X	X

MUNICIPALITY	KICK OFF MEETING	STRATEGIES WEBINAR	RISK ASSESSMENT EXERCISE	MITIGATION STRATEGY REVIEW
South Shenango Township			X	X
Spartansburg Borough				X
Sparta Township				
Spring Township			X	X
Springboro Borough		X	X	X
Steuben Township				
Summerhill Township	X	X	X	X
Summit Township	X	X	X	X
Titusville – City			X	X
Townville Borough			X	X
Troy Township			X	X
Union Township			X	
Venango Borough			X	X
Venango Township	X	X	X	X
Vernon Township	X		X	X
Wayne Township		X	X	X
West Fallowfield Township		X	X	X
West Mead Township	X	X	X	X
West Shenango Township				X
Woodcock Borough		X	X	X
Woodcock Township	X		X	X

Crawford County Department of Public Safety extended formal invitations, in-person meetings, GoToMeeting webinars, e-mails, and telephone calls in an attempt to coordinate with all municipalities to assist them with participation. Invitations were extended to all 51 of Crawford County’s municipalities for each meeting. Copies of the letters can be found in APPENDIX A.

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 Crawford County Emergency Operation Plans, and local zoning ordinances. These mechanisms were discussed at community meetings and are described in Section 5.2. In addition to the discussion at the community meetings, the Crawford HMPSC reviewed all available technical information provided within these planning mechanisms. These planning mechanisms enhance the county’s mitigation strategy and are therefore incorporated into several of the mitigation actions identified in Section 6.4.

## FEMA's Seven Community Lifeline Overview



The 2017 Hurricane Season FEMA After-Action Report identified the need to create a new operational prioritization and response tool which would: Characterize the incident and identify the root causes of priority issue areas in order to create effective solutions, and distinguish the highest priorities and most complex issues from other incident information. Lifelines is a construct for outcome-based stabilization of efforts. Lifelines also enables the continuous operation of government functions and critical business, and is essential to human health and safety and economic security. Lifelines are designed to highlight priority areas and interdependencies, focus attention on actions being taken, communicate coordination efforts towards stabilization, and integrate information. Each Lifeline is comprised of multiple Components and Essential Elements of information needed to stabilize the incident.

The reason for Lifelines is that decision-makers must rapidly determine the scope, complexity, and interdependent impacts of an incident. Applying the lifelines construct allows decision-makers to:

- *Rapidly determine whether an incident is large (complicated) or complex*
- *Prioritize and focus response efforts to maintain or restore the most critical services and infrastructure*
- *Ensure limited resources can go toward a common goal that requires involvement across the whole community (root cause analysis vs. cascading impacts)*
- *Promote a response that fosters better integration and communication across the whole community since lifeline management transcends public and private sector boundaries*

A root cause analysis is conducted asking the status or “what”, Impact or “So What”, actions the “Now What”, and any limiting factors.

The seven Lifelines and corresponding Components are;

1. **Safety and Security:** *Law Enforcement/Security, Search and Rescue, Fire Services, Government Service, Community Safety*
2. **Food, Water, Sheltering:** *Food, Water, Shelter, Agriculture*
3. **Health and Medical:** *Medical Care, Patient Movement, Public Health, Fatality Management, Medical Supply Chain*

4. **Energy:** Power Grid, Fuel
5. **Communications:** Infrastructure, Alerts, Warnings, Messages, 911 and Dispatch, Responder Communications, Finance
6. **Transportation:** Highway/Roadway/Motor Vehicle, Mass Transit, Railway, Aviation, Maritime
7. **Hazardous Material:** Facilities, HAZMAT Pollutants, Contaminants

Colors Indicate Lifeline or Component Condition

- **Unknown:** Grey Indicates the extent of disruption and impacts to lifeline services is unknown (Unknown)
- **Unstable:** Red Indicates lifeline services disrupted and no solution identified or in progress (Unstable, no solution in progress)
- **Stabilizing:** Yellow Indicates lifeline services disrupted but solution in progress with estimated time to stabilization identified (Unstable, solution in progress)
- **Stable:** Green Indicates lifeline services are stabilized, re-established, or not impacted (Stable) Note: Green Components may still be severely impacted Administrative:
- **Blue:** Blue does not indicate an operational status or condition; it is used for administrative purposes, such as presentations and briefings

FEMA Community Lifelines Implementation Toolkit Version 2.0 November 2019

## 5. RISK ASSESSMENT

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### 5.1 UPDATE PROCESS SUMMARY

A key step in preventing disaster losses in Crawford County is developing a comprehensive understanding of the hazards that pose risks to the communities. The following terms can be found throughout this plan.

**Hazard:** Event of physical conditions that have the potential to cause fatalities, injuries, property damage, infrastructure damage, agriculture loss, damage to the environment, interruption of business, other types of harm or loss

**Risk:** Product of a hazard's likelihood of occurrence and its consequences to society.

**Vulnerability:** Degree of susceptibility and resilience of the community and environment to hazards.

Source: FEMA, July 24, 2020



A risk assessment provides a factual basis for activities proposed by the County in their mitigation strategy. Hazards that may affect Crawford County are identified and defined in terms of location and geographic extent, magnitude of impact, previous events, and likelihood of future occurrence. The Risk Assessment section of the Crawford County HMP update utilizes existing data and analysis from the previous Federal Department of Public Safety (FEMA)-approved HMP as well as more recent data and analysis on hazards occurring during the last five years.

As Crawford County grows and changes, so too do its hazards and vulnerabilities. In 2020, Crawford County profiled the following hazards ranked in order of magnitude;

- *Pandemic and Infectious Disease (humans and animals)*
- *Utility Interruption (Electric, Natural Gas, Wireless, Internet, Broadcast, Water, Fuel, 911)*
- *Terrorism (Cyber, Bomb Threats, Active Shooter, Chemical, & Biological)*
- *Flood, Flash Flooding, Ice Jams*
- *Dam Failure*
- *Hazardous Materials / Environmental Hazards*
- *Tornado, Windstorm, Lightning Strike*
- *Winter Storm*
- *Land Slide*
- *Earthquake*
- *Drought*
- *Invasive Species*

In the 2020 HMP, hazard names were again refined to best match the Commonwealth of Pennsylvania Standard Operating Guidance and neighboring counties hazard mitigation plans. In addition, the HMPSC evaluated the development, population, and growth trends in the County and the Pennsylvania Standard List of Hazards and the 2019 Pennsylvania SSAHMP. The HMPSC assessed the change in risk for all hazards identified in the 2015 plan and voted on which hazards not previously identified, but included in the Pennsylvania Standard State List of Hazards, had the potential to impact Crawford County using the Evaluation of Identified Hazard and Risk Form (found in Appendix C). Invasive Species was a new hazard that was identified and included in the 2020 HMP and Pandemic rose to the top of the list due to the real-world incident the United States is currently experiencing.

Refinement in hazards took place: Combining all utilities under one heading, adding all terrorism incidents under one heading, moving lightning to severe thunderstorms, adding new hazard of invasive species to the list. Removed hazards were unconventional oil and gas extraction.

In 2019 Crawford County EMA Coordinator was selected to assist the Pennsylvania Emergency Management Agency is reviewing and advising on a state-wide Threat and Hazard Identification and Risk Assessment (THIRA) for the 2021 State Homeland Security Grant Program. This Commonwealth standardized process along with RTIPP would be completed in 2020 for use in 2021. Unfortunately, due to the COVID-19 Pandemic, this project was not able to be completed and executed and the RTIPP training courses were cancelled.

In the 2020 HMP a standard HVA Matrix was used by Crawford, Erie, Forest, and Warren Counties comprising the Northwestern Emergency Response Group for Homeland Security. This matrix looks and weighs the probability, impact, warning time, duration response, duration of recovery, how prepared we are, and the spatial extent the hazard has on the county as whole. This process was also used in completing the 2021 Threat and Hazard Identification and Risk Assessment, State Preparedness Report, and State Homeland Security Grant Program Application.

The Figure 5.1-1 is an example of local data collection process as recommended by FEMA in Integrating Disaster Data into Hazard Mitigation Planning which was followed by Crawford County in collecting data for this HMP update and the integration of GIS into the process.

The Figure 5.1-2 outlines the Hazard Vulnerability Analysis used in the Northwestern PA Emergency Response Group partnering counties breaking down further some of the hazards by specific time and special amount. (Crawford County HVA 2020)

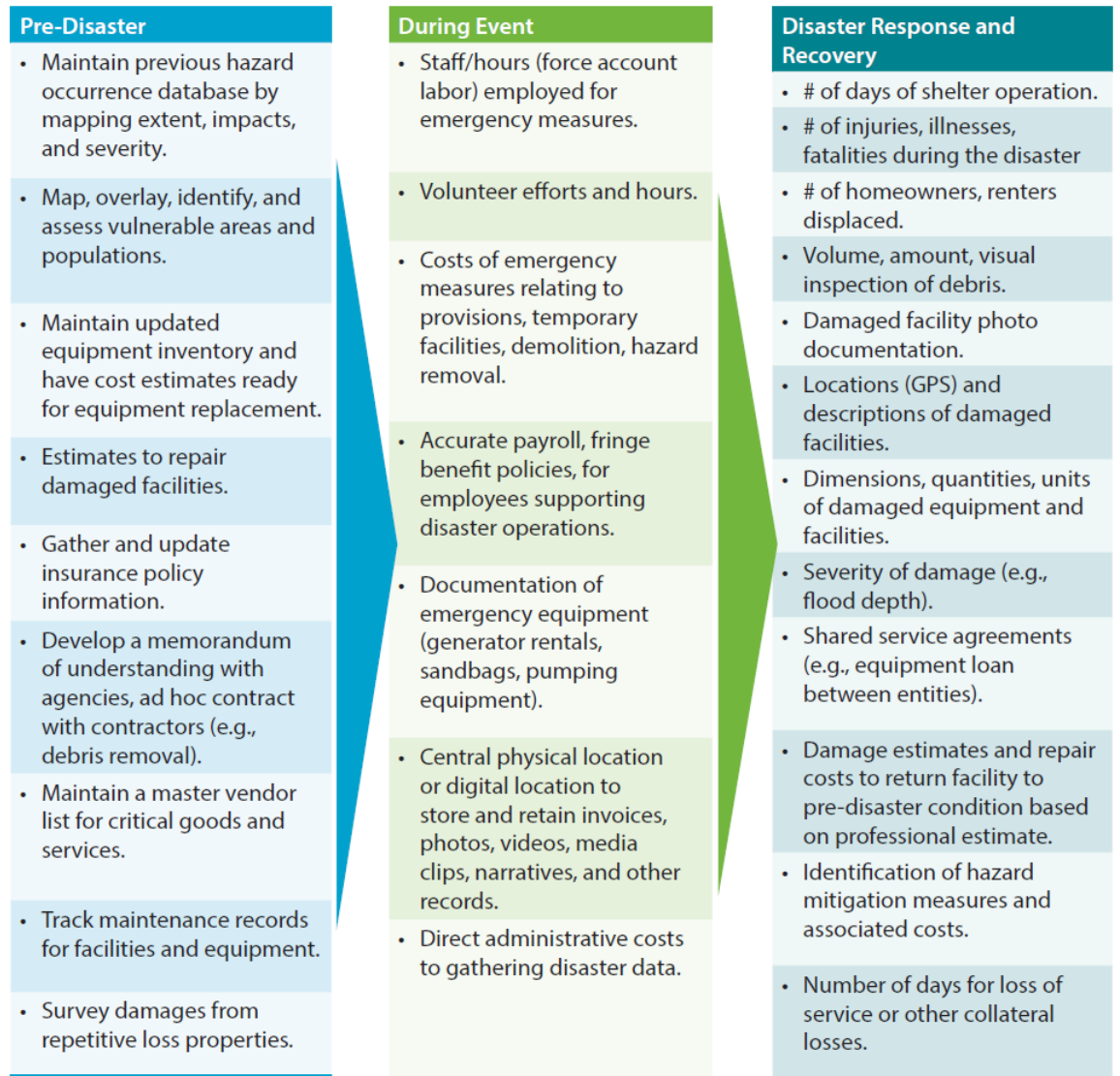


Figure 5.1-1 : Local Data Collection Process



EVENTS	Probability 30%					Impact 30%			Warning Time 10%			Duration Response 5%				Duration Recovery 10%			Preparedness 5%			Spatial Extent 10%			Grand Total									
	High	Likely	Possible	Unlikely	None	Catastrophic	Critical	Limited	Neg- ligible	No Warning	Upto 12hrs	Upto 24hrs	More than 24 hr	>24HRS	6 TO 12hrs	3 to 5hrs	<3 hrs	Months	weeks	days	Poor	Fair	Good	>25% of County		11 to 24% of Co.	1 to 10% of Co.	<1%						
														5.00				5.00			5.00			5.00										
Epidemic	30.00					22.5				10.00				5.00				10.00			5.00			10.00									92.50	
Communication Disruption Wireless Phone	30.00						22.50			10.00					4.00					3.33	3.34		10.00									83.17		
Communication Disruption Internet/Fiber optic		22.50					22.50			10.00					4.00					3.33	3.34		10.00									75.67		
Communication Disruption Cable/Local Broadcast	30.00							15.00		10.00					4.00					3.33	3.34		10.00									75.67		
Cyber Attack County Gov	30.00						22.50			10.00					4.00					3.33		1.66		10.00			3.33					74.82		
Fuel Shortage			15.00				22.50				6.67			5.00				10.00			5.00			10.00								74.17		
Snow Fall	30.00							15.00		10.00					4.00					3.33		1.66		10.00								73.99		
Dam Failure			15.00			30					6.67			5.00				10.00			3.34							3.33				73.34		
Cyber Attack Local Bus/Industry	30.00						22.50			10.00					4.00					3.33	3.34								0.00			73.17		
Flood	30.00							15.00			6.67				4.00				6.67			1.66			6.67							70.67		
Electrical Disruption 100%- Regionally- 1month						0.00	30			10.00				5.00				10.00			5.00			10.00								70.00		
Electrical Disruption 100% Nationwide- 4 months						0.00	30			10.00				5.00				10.00			5.00			10.00								70.00		
Bomb Threat		22.50					22.50			10.00					4.00				6.67		3.34								0.00				69.01	
Communication Disruption 9-1-1 outage			15.00				22.50			10.00				4.00					6.67	3.33	3.34			10.00								68.17		
Electrical Disruption 50% outage-4 days-30-					7.50		22.50			10.00				5.00					6.67		5.00			10.00									66.67	
Electrical Disruption 100%-4 days- 30-						0.00	30			10.00				5.00					6.67		5.00			10.00									66.67	
Electrical Disruption 100%- 2 days - 90-						0.00	30			10.00				5.00					6.67		5.00			10.00									66.67	
Electrical Disruption 100%- 1 week 70-						0.00	30			10.00				5.00					6.67		5.00			10.00									66.67	
Tornado F2		22.50						15.00		10.00					4.00				6.67			3.34							3.33				64.84	
Severe Thunderstorm	30.00							15.00		10.00						1.00			3.33			1.66							3.33				64.32	
Blizzard			15.00				22.50				6.67				4.00				3.33			1.66	10.00										63.16	
Water Disruption 72 hours		22.50						15.00		10.00						3.00			6.67			3.34							0.00				60.51	
Space WeatherG4 Severe			15.00					15.00		10.00							1.00			3.33	5.00			10.00									59.33	
Space Weather G5 Extreme			15.00					15.00		10.00							1.00			3.33	5.00			10.00									59.33	
Electrical Disruption 50% 2 days- 90-						0.00	22.50			10.00				5.00					6.67		5.00			10.00									59.17	
Ice Storm .25 inch or less			15.00					15.00			6.67			5.00						3.33		3.34		10.00									58.34	
Ice Storm .50 inch or more				7.50			22.50				6.67			5.00						3.33		3.34		10.00									58.34	
Tornado F5			15.00					15.00		10.00				4.00					6.67			3.34							3.33				57.34	
Unavailability of Supplies 6 months				7.50				15.00		10.00				5.00					10.00		5.00								3.33				55.83	
Active Shooter External			15.00					15.00		10.00				5.00						6.67		3.34								0.00				55.01
Active Shooter Internal			15.00					15.00		10.00				5.00						6.67		3.34								0.00				55.01
Drought				7.50			22.50					0.00	5.00					10.00				3.34				6.67								55.01
Electrical Disruption 10% outage-2 days - 90-			15.00					15.00		10.00				5.00						3.33		3.34							3.33					55.00
Terrorism Chemical				7.50				15.00		10.00				5.00				10.00				3.34								3.33				54.17
Terrorism, Biological				7.50				15.00		10.00				5.00				10.00				3.34								3.33				54.17
Petroleum Spill	30.00								7.50	10.00						1.00				3.33		1.66								0.00				53.49
Transportation I79 Closed for 24 hours			15.00					15.00		10.00				5.00						3.33		1.66							3.33					53.32
Water Disruption Waterswys Contamination			15.00					15.00		10.00					3.00				6.67			3.34								0.00				53.01
Temperature Extremes		22.50						15.00				0.00	4.00							3.33		3.34							3.33					51.50
Sewer Disruption Small area 3 days			15.00					15.00		10.00							1.00			3.33		3.34							3.33					51.00
Sewer Disruption Large area 3 days			15.00					15.00		10.00							1.00			3.33		3.34							3.33					51.00
Special Events	30.00											0.00								3.33		1.66							0.00					50.99
Information System			15.00						7.50	10.00				5.00						6.67		3.34							3.33					50.84
Unavailability of Supplies 1 month				7.50				15.00		10.00				5.00						3.33	5.00								3.33					49.16
Cyber Attack Critical Infrastructure			15.00					15.00		10.00					4.00					3.33		1.66								0.00				48.99
Water Disruption 1 month				7.50				15.00		10.00					3.00			10.00				3.34								0.00				48.84
Pipeline Incident			15.00					15.00		10.00					3.00					3.33		1.66								0.00				47.99
Train Derailment			15.00					15.00		10.00					3.00					3.33		1.66								0.00				47.99
Mass Casualty			15.00					15.00		10.00						1.00				3.33		3.34								0.00				47.67
Electrical Disruption 10% outage-4 days-30-					7.50			15.00		10.00				5.00							3.33	3.34							3.33					47.50
Industrial Incident		22.50							7.50	10.00											3.33		1.66							0.00				45.99
Transportation I79 Closed for 6 months								15.00		1																								

Hazard Ranking based on Risk Factor (RF) methodology							
Hazard Risk	Hazard	Risk Assessment Category					Risk Factor
		Probability	Impact	Spatial Exten	Warning Time	Duration	
High	Pandemic	4	4	4	4	4	4
	Utility Interruption	3	3	3	4	2	3
	Terrorism	3	3	2	4	3	3
	Flooding	4	2	3	3	3	3
	Dam Failure	1	3	3	4	3	2.8
	HazMat	3	3	1	4	2	2.6
	Tornado	3	2	3	4	1	2.6
Moderate	Winter Storm	3	2	3	1	2	2.2
Low	Land Slide	1	1	2	4	2	2
	Earthquake	1	2	2	4	1	2
	Drought	1	2	3	2	1	1.8
	Invasive Species	4	2	1	1	1	1.8

Hazard profiles were then developed in order to define the characteristics of each hazard as they apply to Crawford County.

Hazard identification and profiling, a vulnerability assessment was conducted for each hazard to identify the impact of both natural and human-made hazard events on people, buildings, infrastructure, and the community, as appropriate. Each hazard is discussed in terms of its potential impact on individual communities, including the types of structures that may be at risk. This assessment allows the County and its municipalities to focus on and prioritize local mitigation efforts on areas that are most likely to be damaged or require early response to a hazard event. A vulnerability analysis was performed which identifies structures, critical facilities, and/or populations that may be impacted during hazard events and describes what events can do to physical, social, and economic assets.

Category	2014	2015	2016	2017	2018	2019	2020	Total
Severe Weather	8	2	7	3	14	16	3	53
HazMat	4	6	8	10	5	9		42
Transportation	13	5	5	6	3	7	3	42
Fires	3	11	4	4	2	6		30
Water	3	5	4	9	5		1	27
Flood	6	3	1	7	3			20
Power Outage	1	1	4		2	5	1	14
Water Rescue	2		7	1		1	2	13
Motor Vehicle	3	2	4					9
Firefighter Injury	2	4	2					8
Terrorist Activity			2		2	2		6
Aircraft			2	1	1		1	5
Resource Request	2		2					4
Bomb Threat	2		1					3
911 Outage	1				1			2
Pandemic							1	1

Knowledge Center and WebEOC State Reported Incidents  
Records maintained by Crawford County DPS

<b>Weather Alert</b>	<b>2020</b>	<b>2019</b>	<b>2018</b>	<b>2017</b>	<b>Total</b>
<b>Severe Thunderstorm Warning</b>	<b>7</b>	<b>21</b>	<b>1</b>	<b>22</b>	<b>51</b>
<b>Winter Weather Advisory</b>	<b>5</b>	<b>20</b>	<b>9</b>	<b>8</b>	<b>42</b>
<b>Areal Flood Advisory</b>	<b>2</b>	<b>11</b>	<b>1</b>	<b>2</b>	<b>16</b>
<b>Winter Storm Warnings</b>		<b>4</b>	<b>4</b>	<b>5</b>	<b>13</b>
<b>Winter Storm Watch</b>		<b>2</b>	<b>2</b>	<b>5</b>	<b>9</b>
<b>Tornado Warning</b>		<b>2</b>	<b>5</b>		<b>7</b>
<b>Areal Flood Warning</b>	<b>2</b>	<b>4</b>			<b>6</b>
<b>Severe Thunderstorm Watch</b>	<b>5</b>		<b>1</b>		<b>6</b>
<b>Areal Flood Watch</b>		<b>2</b>	<b>3</b>		<b>5</b>
<b>Wind Chill Advisory</b>		<b>2</b>	<b>3</b>		<b>5</b>
<b>Flash Flood Warning</b>		<b>4</b>			<b>4</b>
<b>Lake Effect Snow Warning</b>	<b>1</b>	<b>1</b>		<b>2</b>	<b>4</b>
<b>Wind Advisory</b>			<b>1</b>	<b>3</b>	<b>4</b>
<b>Flash Flood Watch</b>	<b>1</b>	<b>1</b>	<b>1</b>		<b>3</b>
<b>Freeze Advisory</b>	<b>2</b>				<b>2</b>
<b>Tornado Watch</b>		<b>1</b>		<b>1</b>	<b>2</b>
<b>Thunderstorm Warning</b>				<b>1</b>	<b>1</b>
<b>Wind Chill Watch</b>		<b>1</b>			<b>1</b>
<b>Wind Chill Warning</b>		<b>1</b>			<b>1</b>

**Weather Alerts Issued by the National Weather Service,  
Cleveland Ohio**  
Records maintained by Crawford County DPS

## 5.2 HAZARD IDENTIFICATION

Pennsylvania’s disaster history helps provide direction on the identification of hazards and their significance both at the state and local level. PEMA maintains a historical log of all disasters that have occurred in the Commonwealth dating back to 1955. An analysis of the past occurrences of each hazard is the first step toward predicting the future susceptibility to that hazard. By noting the hazards of the past, Crawford County and its municipalities will be able to better understand and prepare for future natural and human-made disasters.

### 5.2-1 TABLE OF PRESIDENTIAL 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 5.2-1 identifies Presidential Disaster and Emergency Declarations issued between 1955 through 2014 that have affected Crawford County. Presidential actions provide preliminary information on previous hazard events.

#### 5.2-1 Presidential Disaster & Emergency Declarations

DECLARATION NUMBER	DATE	EVENT
FEMA-4506-DR-PA	03/2020	COVID-19 Pandemic
FEMA EM-3441-PA		COVID-19 Pandemic
FEMA-4149-DR-PA	10/2013	Severe Storms
FEMA-3356-EM-PA	10/2012	Hurricane Sandy
FEMA-*3235-EM-PA	09/2005	Hurricane Katrina Evacuation Assistance
FEMA-1557-DR-PA	09/2004	Tropical Storm Ivan
FEMA-1555-DR-PA	09/2004	Severe storms and flooding associated with Tropical Storm Frances
FEMA-1485-DR-PA	08/2003	Severe storms, tornadoes and flooding
FEMA-1330-DR-PA	07/1996	Flooding
FEMA-1120-DR-PA	06/1996	Flooding
FEMA-1093-DR-PA	01/1996	Flooding
FEMA-1085-DR-PA	01/1996	Blizzard
FEMA-737-DR-PA	06/1985	Severe storms, high winds and tornadoes
FEMA-641-DR-PA	06/1981	Severe storms and flooding
FEMA-537-DR-PA	07/1977	Severe storms and flooding
FEMA-340-DR-PA	06/1972	Tropical Storm Agnes
FEMA-58-DR-PA	05/1956	Severe storms

June 26 to July 11, 2013 Federal Disaster Declaration Status – Now Closed the Preliminary Damage Assessment (PDA) for Crawford County closed

with the issuance of disaster declaration # DR-4149. Crawford County had 12 municipalities apply for assistance. Two entities withdrew the application process. A total of \$676,739.96 has been approved for the 10 municipalities that were eligible for assistance.

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

**5.2-2 SUMMARY OF HAZARDS**

As described in Section 4.1, at the initiation of the plan update process, the HMPSC reviewed the Pennsylvania Standard List of Hazards to evaluate new and changing hazards in Crawford County. Following a review of the hazards considered in the 2015 HMP, the 2019 Standard State All-Hazard Mitigation Plan, and the Standard List of Hazards, the HMPSC decided that the 2020 plan update should identify, profile, and analyze 12 hazards. The hazards include all hazards profiled in the 2015 plan and the addition of invasive species. Table 5.2-2 contains a complete list of the 12 hazards identified for hazard profiling in the 2020 HMP update. Hazard profiles are included in Section for each of these hazards.

PROFILED HAZARDS	DESCRIPTION	TYPE
Pandemic	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.	Natural
Utility Interruption	<p>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:</p> <p>Fuel or Resource Shortage; resulting from supply chain breaks or secondary to other hazard events</p> <p>Information Technology Failure; due to software bugs, viruses, or improper use</p> <p>Ancillary Support Equipment; electrical generating, transmission, system control, and distribution-system equipment for the energy industry</p> <p>Public Works Failure; damage to or failure of highways, flood control systems, deep-water ports and harbors, public buildings, bridges, dams</p> <p>Telecommunications System Failure; Damage to data transfer, communications, and processing equipment</p> <p>Transmission Facility or Linear Utility Accident; liquefied natural gas leakages, explosions, facility problems</p>	Human-Made

**5.2-2 Hazards Profile Definitions**

PROFILED HAZARDS	DESCRIPTION	TYPE
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 active shooter incidents	Human-Made
Flash Flood, 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. Winter flooding can include ice jams which occur when warm temperatures and heavy rain cause snow to melt	Natural
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. Today there are approximately 3,200 dams and reservoirs throughout Pennsylvania	Human-Made
Hazardous Materials	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. Environmental hazards include the following: Hazardous material releases; at fixed facilities or as such materials are in transit and including toxic chemicals, infectious substances, bio hazardous waste and any materials that are explosive, corrosive, flammable, or radioactive. Air or Water Pollution; the release of harmful chemical and waste materials into water bodies or the atmosphere, for example. Superfund Facilities; hazards originating from abandoned hazardous waste sites listed on the National Priorities List. Manure Spills; involving the release of stored or transported agricultural waste. Product Defect or Contamination; highly flammable or otherwise unsafe consumer products and dangerous foods	Human-Made

PROFILED HAZARDS	DESCRIPTION	TYPE
Tornado, Severe Thunderstorm	<p>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 windblown 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, &amp; F5 tornadoes between 1950-1998 ranges from &lt;1 to 15 per 3,700 square mile area across Pennsylvania. 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</p>	Natural
Winter Storm	<p>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.</p>	Natural
Land Slide	<p>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, rock falls, 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.</p>	Natural

PROFILED HAZARDS	DESCRIPTION	TYPE
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.	Natural
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	Natural
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 eco-logical systems	Natural

*National Risk Index (NRI) ID: C42039 Crawford County, Pennsylvania. October 2020*

The National Risk Index is a new, online mapping application from FEMA that identifies communities most at risk to 18 natural hazards. This application visualizes natural hazard risk metrics and includes data about expected annual losses, social vulnerabilities and community resilience. The general information is below and the specific information for each hazard is listed within the hazard assessment.



**National Risk Index (NRI) ID: C42039 Crawford County, Pennsylvania. October 2020**

County Info		Ratings Summary	
Population (2016)	88,765	Risk Index	Relatively Low
Building Value (\$)	9,548,325,000	Expected Annual Loss	Relatively Low
Agricultural Value (\$)	107,270,000	Social Vulnerability	Relatively Moderate
Area (sq mi)	1,012	Community Resilience	Relatively High

Overview Risk Index	
Rating	Relatively Low
Score	12.96
National Percentile	73.55
State Percentile	85.07
<b>Expected Annual Loss</b>	
Rating	Relatively Low
Score	15.78
National Percentile	72.37
State Percentile	77.61
Total (\$)	8,053,186
Building Value (\$)	6,269,645
Population	0.24
Population Equiv. (\$)	1,743,771
Agricultural Value (\$)	39,770

Community Resilience	
Rating	Relatively High
Score	55.58
National Percentile	62.51
State Percentile	25.37
Source Value	2.78

Social Vulnerability	
Rating	Relatively Moderate
Score	39.5
National Percentile	55.32
State Percentile	73.13
Source Value	0.29

**Abbreviations:**

“Population Equiv.” = Population Equivalency  
 “Expo.” = Exposure  
 “HLR” = Historic Loss Ratio  
 “EAL” = Expected Annual Loss

This is the October 2020 release of the National Risk Index

### 5.3 HAZARD PROFILES

Disaster frequency and its effects or severity are an important basis for planning emergency response and mitigation. Natural hazards tend to reoccur on a predictable seasonal basis, where human-caused or technological events tend to change over time with advancements in technology and methods of operation. Five criteria were selected to assure a systematic and comprehensive approach to analyze each hazard:

- **Location and Extent:** *The location and extent of the county's vulnerability to a certain hazard can vary throughout the county. The maximum threat or worst-case disaster should be considered for each hazard. However, secondary effects cause many hazards to be regional hazards affecting many areas with differing impacts.*
- **Range and Magnitude:** *Each individual hazard poses certain threats to the county and its municipalities. It is important to identify what hazards pose the greatest threat and focus mitigation actions toward those hazards.*
- **Past Occurrence:** *A record of past events is particularly helpful to evaluate hazards. Past records of the County's hazards also offer valuable information when tempered with the knowledge of preventative efforts, changes in preventative efforts, and advancements in technology that may reduce the frequency or severity of such an event.*
- **Future Occurrence:** *The probability of an occurrence in the future is another important factor to consider when preparing for an all-hazards response. An event that occurs annually with relatively minor impact may deserve more emphasis than a major event that occurs once every 50 to 100 years.*
- **Vulnerability Assessment:** *The susceptibility of a community to destruction, injury, or death resulting from a hazard event defines the degree of vulnerability. The degree of vulnerability may be related to geographic location, as with floodplains, the type of facilities or structure, or the socioeconomics of a given area. Additionally, certain population groups may be more vulnerable to some hazards because of immobility or their inability to take protective action.*
- **Community Lifelines** *were integrated into each hazard profile listing the components and essential elements of information needed to stabilize and mitigate the incident. This section is broken down into three areas; Planning Factors, Stabilization Target, and County Assistance Lines of Efforts which reflect the mitigation actions and strategies.*



**TRANSPORTATION:** Highway/Roadway (Roads, Bridges), Railway (Freight, Passenger), Aviation (Commercial (e.g. cargo/passenger), General, Military), Pipeline, Mass Transit (Bus, Rail, Ferry)



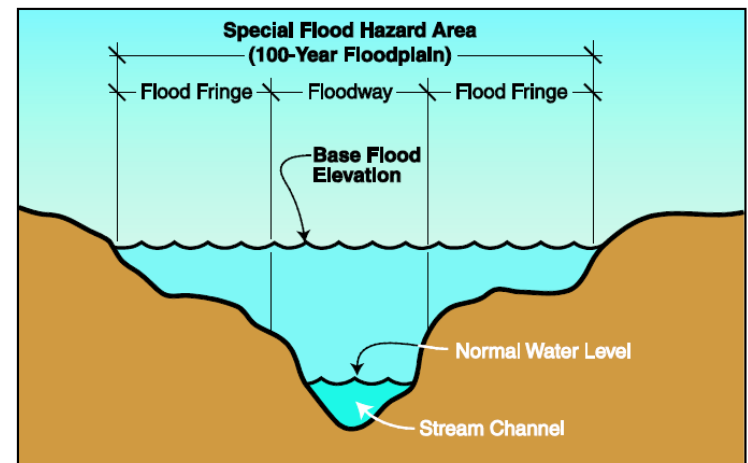
**FOOD, WATER, SHELTERING:** Food (Commercial Food Distribution, Commercial Food Supply Chain, Food Distribution Programs), Water (Drinking Water Utilities, Wastewater Systems, Commercial Water Supply Chain), Shelter, Agriculture (Animal and Agriculture)

## 5.3-1 FLOOD, FLASH FLOOD, ICE JAM

### LOCATION AND EXTENT

A flood is a natural event for rivers and streams and occurs when a normally dry area is inundated with water. For inland areas like Western Pennsylvania, excess water from snowmelt or rainfall accumulates and overflows onto the stream banks and adjacent floodplains. As illustrated in Figure 4.3.1-1, floodplains are lowlands, adjacent to rivers, streams and creeks that are subject to recurring floods. Flash floods, usually resulting from heavy rains or rapid snowmelt, can flood areas not typically subject to flooding, including urban areas. Extreme cold temperatures can cause streams and rivers to freeze, causing ice jams and creating flood conditions. The size of the floodplain is described by the recurrence interval of a given flood. Flood recurrence intervals are explained in more detail in Section 4.3.4.4. 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% annual chance of occurring.

Floods are considered hazards when people and property are affected. Nationwide, hundreds of floods occur each year, making it one of the most common hazards in all 50 states and U.S. territories. In Pennsylvania, flooding occurs commonly and can occur during any season of the year from a variety of sources. Every two to three years, serious flooding occurs along one or more of Pennsylvania's major rivers or streams, and it is not unusual for this to occur several years in succession. 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 water. Fast-moving water can wash buildings off their foundations and sweep vehicles downstream. Pipelines, bridges, and other infrastructure can be damaged when high water combines with flood debris. Basement flooding can cause extensive damage. Flooding can cause extensive damage to crop lands and bring about the loss of livestock. Several factors determine the severity of floods, including rainfall intensity and duration, topography, and ground cover.



Riverine flooding originates from a body of water, typically a river, creek, or stream, as water levels rise onto normally dry land. Water from snowmelt, rainfall, freezing streams, ice flows, or a combination thereof, causes the river or stream to overflow its banks into adjacent floodplains. Winter flooding usually occurs when ice in the rivers creates dams or streams freeze from the bottom up during extreme cold spells. Spring flooding is usually the direct result of melting winter snow packs, heavy spring rains, or a combination of the two.

Flash floods can occur anywhere when a large volume of water flows or melts over a short time period, usually from slow moving thunderstorms or rapid snowmelt. Because of the localized nature of flash floods, clear definitions of hazard areas do not exist. These types of floods often occur rapidly with significant impacts. Rapidly moving water, only a few inches deep, can lift people off their feet, and only a depth of a foot or two, is needed to sweep cars away. Most flood deaths result from flash floods.

Urban flooding is the result of development and the ground's decreased ability to absorb excess water without adequate drainage systems in place. Typically, this type of flooding occurs when land uses change from fields or woodlands to roads and parking lots. Urbanization can increase runoff two to six times more than natural terrain. (National Oceanic and Atmospheric Administration, 1992) The flooding of developed areas may occur when the amount of water generated from rainfall and runoff exceeds a storm water system's capability to remove it.

Ice Jams are stationary accumulations of ice that restrict flow. Ice jams can cause considerable increases in upstream water levels, while at the same time, downstream water levels may drop. Types of ice jams include freeze up jams, breakup jams, or combinations of both. When an ice jam releases, the effects downstream can be similar to that of a flash flood or dam failure. Ice jam flooding generally occurs in the late winter or spring.

In Western Pennsylvania, including Crawford County, there are seasonal differences in the causes for floods. 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, although the snowpack is generally moderate during most winters. In addition, the Commonwealth occasionally receives intense rainfall from tropical storms in late summer and early fall. Most of the municipalities in Crawford County have flood prone areas. The streams prone to flooding include: French Creek, Cussewago Creek, Conneaut Creek, Oil Creek, and Mill Run.

The National Flood Insurance Program (NFIP), for which FIRMs are published, identifies the 1% annual chance flood. This 1% annual chance flood event is used to delineate the special flood hazard area (SFHA) and identify Base Flood Elevations. Figure 5.3-1.1 illustrates these terms. The SFHA serves as the primary regulatory boundary used by FEMA, the Commonwealth of Pennsylvania and Crawford County local governments.

The Effective Countywide DFIRMs were released for Crawford County and all communities on August 16, 2012. 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. These final FIRMs for Crawford 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% and 0.2% annual chance event. All of the municipalities in the County have identified SFHAs. The following map illustrates the flood hazard areas in Crawford County. Detailed SFHAs are delineated for all or a portion of the following streams:

- *French Creek*
- *Conneaut Outlet*
- *Conneaut Creek*

Other streams and tributaries have approximate SFHAs (A Zones).

- *Cussewago Creek*
- *Oil Creek*

Most of Crawford County’s municipalities are flood prone. Some of the more low-lying areas where the floodplain is most prevalent exist in Rockdale Township, Steuben Township, Vernon Township, Pine Township, North Shenango Township, South Shenango Township, Conneaut Township, Cussewago Township, Hayfield Township, and the City of Meadville. In recent years, flooding of residential properties has increased in Sadsbury Township and Oil Creek Township.

### *RANGE OF MAGNITUDE*

The severity of flooding in Crawford County is determined by a number of local factors, including river basin topography, precipitation patterns, recent soil moisture conditions, and groundcover/vegetative state. Crawford County and its municipalities have many river and small tributaries that are highly susceptible to flooding. The properties in and near the identified floodplains of Crawford County are subject to flooding events on an almost annual basis. Floodplain management, flood control structures, hazard mitigation, and flood relief funds are strategies that have reduced Crawford County’s annual flood damages.

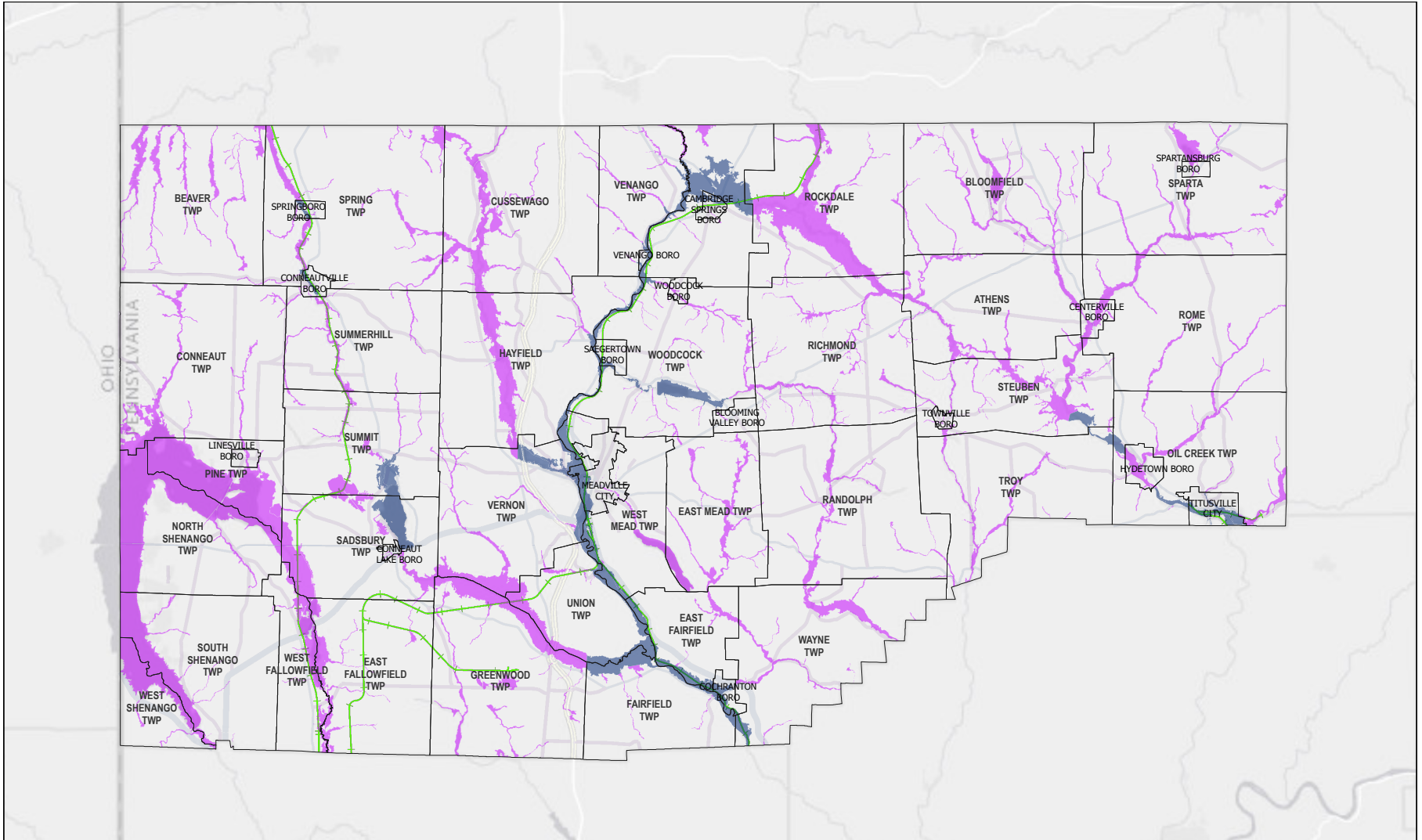
Crawford County and its municipalities are susceptible to seasonal differences. In the winter and early spring (February to April), flooding has occurred as a result of heavy rainfall on dense snowpack throughout contributing watersheds, although the snowpack is generally moderate during most winters. Winter floods also have resulted from runoff of intense rainfall on frozen ground, and local flooding has been exacerbated by ice jams in rivers, streams and creeks.

The largest flood to impact Crawford County in recent years occurred on July 21, 2003. Its impact to the county was unprecedented resulting in approximately \$40,000,000 in property damage. The worst-case scenario for Crawford County would be for a similar event to reoccur – a flood event impacting the entire county and resulting in high property damage and injury or loss of life.

### *PAST OCCURRENCE*

Crawford County has a long history of flooding problems, suffering damage from numerous major floods, and localized flash flooding. The following table contains information on Crawford County’s flooding-related events that date back to 1892. The following table provides information on 59 significant flood events that are known to have occurred between 1892 and 2020 in Crawford County. Based on historical and anecdotal evidence, it is clear that there is a relatively high frequency of flooding in the county. The flood events documented here resulted in a total of approximately \$81.6 million in total reported property damages. The most significant property damage reported for these events was on July 21, 2003 when widespread flooding affected communities throughout Crawford County. The State Hazard Mitigation Plan from October 2019 reports 77 number of flood events between 1950 and 2017 (NCEI, 2018) and a total of 406 flood claims since 1978 with a total of \$1,626,490 dollars of paid claims during that same period (FEMA 2018).

Figure 5.3-1.1 Crawford County Special Flood Hazard Areas

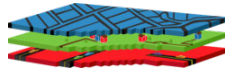


**Special Flood Hazard Areas (1% annual chance zones)**

Source: Federal Emergency Management Agency (FEMA)



Crawford County Government  
 Crawford County Courthouse  
 903 Diamond Park  
 Meadville PA 16335  
 GIS Manager: Phillip Baranyai  
 Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



**FEMA**

FEMA 100Yr Flood NFHL zones

- Zone A | Approx 1% annual change flood zone
- Zone AE | Detailed 1% annual change flood zone

Railroads

- Railroads

This map is subject to change at any time after date of issuance.  
 Data used for map creation is approximate and should not be used for site specific decision making.  
 Crawford County assumes no responsibility or liability to the accuracy or completion of these maps.

**Table 5.3-1.1 Crawford County Flood Damage**

LOCATION	DATE	DETAILS	PROPERTY DAMAGE
County Wide	7/19/2019	A backdoor frontal boundary was moving slowly northeast to southeast across northwest Pennsylvania during the evening of July 19th. A line severe thunderstorm blew down trees across rural Crawford County. Thunderstorm, Wind, and Flash Flood	\$1,200,000.00
Spring Township and Hartstown Area	7/5/2019	Flash Flooding in Springboro where Springboro Road and North Hickernell Road were impassable. In Hartstown water was running over Main Street and Adamsville Road. Numerous roads closed.	\$-
West Fallowfield Township	6/1/2018	Flash Flooding According to USGS records it was the second highest flow recorded at the Pymatuning Weir Gauge Station. The highest flow was recorded on September 9, 2004 as a result of Hurricane Ivan. This event appears to be the worst flash flood on Sugar Run since the start of data collection in 1933. Residents in four private homes/cottages in the Douthette Allotment below the dam were evacuated and the structures received minor flood damage due to water on the first floor.	\$100,000.00
Meadville, Vernon Township, West Mead Township, & County Wide	1/11-12/2018	11 State Roads closed from heavy rains & melting snow	\$1,300,000.00
East Fallowfield Township	5/28/2017	Flash Flood Event: Radar estimated rainfall amounts over 4 over southern Crawford County. This occurred with multiple rounds of rain between 3 and 6 PM.	\$225,000.00
County Wide	1/12/2017	Flash Flood Widespread flooding occurred with one water rescue at Mercer Pike. Clear Lake Dam Spartansburg plan activation	\$30,000.00
County Wide	2/2/2016	3 State Roads closed from heavy rains & melting snow	\$-
East Titusville	6/25/2014	Flash Flood	\$500,000.00
Cochranton	6/18/2014	Flash Flood	\$10,000.00
Beaver Center	5/14/2011	Flash Flood	\$10,000.00
Venango	8/10/2009	3" rainfall in 2 hours caused flash flood conditions	\$50,000.00
Southwest Crawford County	7/31/2009	4" rainfall due to severe thunderstorm caused flash flood conditions; both private & public property significantly impacted	\$750,000.00
Countywide	7/28/2006	4" rainfall due to severe thunderstorms caused flash flood conditions; several evacuations throughout the county; hundreds of homes and public infrastructure sustained damages	\$1,500,000.00

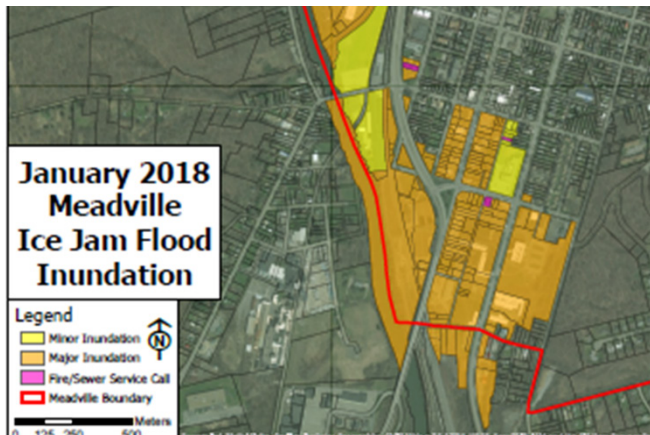
LOCATION	DATE	DETAILS	PROPERTY DAMAGE
Southern Crawford County	7/27/2006	3" rainfall due to severe thunderstorms caused overland/riverine flooding that resulting in private & public property damage	\$250,000.00
Countywide	1/1/2005	Flooding caused by snow/ice melt & rainfall	\$800,000.00
Countywide	9/19/2004	Tropical Storm Ivan	\$2,575,000.00
Countywide	9/19/2004	Tropical Storm Frances	\$11,500,000.00
Countywide	5/22/2004	Heavy rainfall caused flash flood conditions that resulted in private & public property damage	\$1,800,000.00
Countywide	5/21/2004	Severe thunderstorms resulted in heavy rainfall that caused flash flood conditions; significant private and public property damage	\$4,100,000.00
Countywide	7/21/2003	Heavy rainfall averaged 2" per hour throughout the day resulting severe flooding; several evacuations; significant private & public property damage	\$40,000,000.00
Countywide	7/19/1996	Flooding caused by heavy rainfall; significant debris, road closures, public/private infrastructure damage; residential basement cave-in in Saegertown Borough; evacuations along French Creek near Cochranon Borough; 50 evacuations in Conneautville; 80 homes damaged in Meadville & Meadville Medical Center had severe damage reported; 100 homes, 16 businesses impacted countywide	\$1,500,000.00
Springboro Borough; Conneautville Borough	6/19/1996	Flooding caused by heavy rainfall; few evacuations; Springboro sustained severe damages; St. Rt. 18 sustained severe damages; South Center Road was completely washed out	\$1,170,000.00
Saegertown Borough	6/7/1996	Flooding caused by heavy rainfall	\$15,000.00
Countywide	5/9/1996	Flooding caused by heavy rainfall	\$30,000.00
Meadville, City of	2/21/1996	Flooding caused by heavy rainfall combined with snowmelt & ice jamming resulted in localized flooding along French Creek & Hare Creek	Unknown
Saegertown Borough	8/15/1995	3" rainfall in less than 2 hours resulted in flash flood conditions	\$3,000.00
Springboro Borough	7/25/1995	Flooding caused by heavy rainfall	\$10,000.00
Countywide	6/25/1995	Flooding caused by heavy rainfall	\$20,000.00
Countywide	8/28/1994	Flooding caused by heavy rainfall; Route 27 was closed; Damages reported at Conneaut Lake Park; injuries reported in Fallowfield Township; Countywide power outages	\$50,000.00



LOCATION	DATE	DETAILS	PROPERTY DAMAGE
Countywide	8/13/1994	Flooding caused by heavy rainfall	\$500,000.00
Spartansburg Borough	6/13/1994	3" of rainfall in less than 3 hours resulting in flash flood conditions near Canadohta Lake; 20 campers rescued by first responders; basements flooded	\$50,000.00
Countywide	4/13/1994	Widespread small stream flooding	None
Meadville, City of	12/31/1990	Riverine flooding from French Creek resulted in evacuations in Meadville's fifth ward	Unknown
Titusville, City of	7/15/1990	Flash flood resulting in damages reported throughout the business district & residential area along Church Run	Unknown
Northern Crawford County	7/2/1987	Residential basement flooding resulting in minor damages; roads in the area were closed	Unknown
Conneautville Borough; Cambridge Springs Borough	7/7/1986	Flash flooding washed away roads and damaged bridges in the area	Unknown
Countywide	3/30/1960	Flooding caused by snow/ice melt; 210 evacuated	\$1,601,000.00
Countywide	1/21/1959	Flooding caused by snow/ice melt; 2000 evacuated	\$5,651,637.00
Countywide	3/7/1956	Flooding caused by heavy rainfall	\$1,206,666.00
Countywide	10/16/1954	Flooding caused by heavy rainfall	\$1,173,333.00
Countywide	1/4/1951	Flooding caused by snow/ice melt; some evacuated	\$776,000.00
Countywide	12/4/1950	Flooding caused by snow/ice melt	\$1,380,000.00
Countywide	3/21/1948	Flooding caused by heavy rainfall; many evacuated	\$1,473,333.00
Unknown (Isolated)	4/6/1947	Flooding caused by heavy rainfall; 150 evacuated; 1 death	Unknown
Countywide	12/29/1942	Flooding caused by snow/ice melt	\$776,000.00
Countywide	1/24/1937	Flooding caused by snow/ice melt	\$259,000.00
Unknown	3/25/1939	Research indicates date flood occurred but no other data recorded	Unknown
Unknown	2/27/1936	Research indicates date flood occurred but no other data recorded	Unknown
Unknown	1/18/1929	Research indicates date flood occurred but no other data recorded	Unknown
Unknown	3/12/1920	Research indicates date flood occurred but no other data recorded	Unknown
Unknown	2/20/1918	Research indicates date flood occurred but no other data recorded	Unknown
Unknown	3/28/1916	Research indicates date flood occurred but no other data recorded	Unknown
Unknown	5/14/1914	Research indicates date flood occurred but no other data recorded	Unknown

LOCATION	DATE	DETAILS	PROPERTY DAMAGE
Unknown (Isolated)	3/25/1913	Flooding resulted in damages to a distillery & to a business area	\$10,000 (Distillery) \$20,000 (Business Area)
Countywide	2/15/1908	Flooding caused by snow/ice melt resulting in evacuations	Unknown
Countywide	1/22/1904	Flooding caused by snow/ice melt resulting in evacuations	Unknown
Countywide	2/28/1902	Flooding caused by snow/ice melt	Unknown
Unknown (Isolated)	05/15/1893	Heavy rainfall caused flooding at a racetrack	\$20,000.00
Countywide	06/04/1892	Unknown	\$125,000.00
<b>Total</b>			<b>\$84,519,969.00</b>

The most significant flooding and ice jam event in Crawford County since the 2015 HMP was written was in January 2018. Thursday, January 11th, 2018 Runoff resulted in flooded roadways and increased volumes in streams and creeks. 21:30 first PennDOT RCRS report received for state route closed due to flooding. Closures on 14 state routes reported by 11:47 on Sunday, January 14th, 2018. All were opened by 08:43 on Thursday, January 18th, 2018. Friday, January 12th, 2018. Ice jam on French Creek resulted in the very rapid rise of the water level. 02:27 first USGS Water Alert was received for French Creek at Meadville – 13.21 feet. Set to alert at 11.00 feet (Action Stage). Last alert received at 15:53 on Tuesday, January 23rd, 2018 (11.16 feet). French Creek at Meadville crested at 16.90 feet (3rd highest ever recorded). By Friday, January 19th, 2018 the ice jam was over 4 river miles long. Municipalities affected: City of Meadville, & Townships of Union, Vernon, & West Mead. Ice jam mitigation efforts: Nothing feasible.

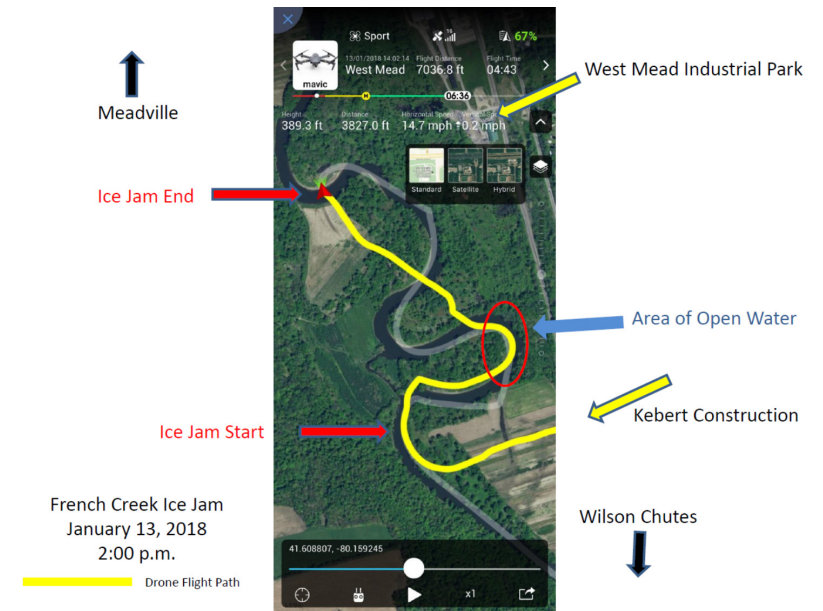


Above: 2018 Ice Jam

The following definition of RL and SRL properties from the Hazard Mitigation Assistance (HMA) Unified Guidance from February 2015 reflects changes made in the Biggert-Waters Flood Insurance Reform Act of 2012. A Repetitive Loss property is a structure covered by a contract for flood insurance made available under the NFIP that:

1. Has incurred flood-related damage on two occasions, in which the cost of the repair, on the average, equaled or exceeded 25 percent of the market value of the structure at the time of each such flood event; and
2. At the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage. A Severe Repetitive Loss property is a structure that:

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



The NFIP defines Repetitive Loss as 2 or more claims of at least \$1,000 over a 10 year rolling period. According to the October 2019, Pennsylvania State Hazard Mitigation Plan, there were 25 repetitive loss properties in Crawford County, one of which has been mitigated (PEMA, 2013). The mitigated property was a single-family home in Steuben Township. Table 4.3.1-2 shows the number of repetitive loss properties by municipality.

A total of 25 repetitive loss claims have been recorded since 1989. The City of Titusville has had a total of 7 claims, which is the highest number of claims in Crawford County. While specific addresses cannot be released due to the privacy act, the goal of identifying these properties is to determine what locations flood repetitively and seek to mitigate the problem therefore reducing flood damage. As of 2013, there were no severe repetitive loss properties reported by PEMA in Crawford County.

Total and mitigated Repetitive Loss properties in Crawford County. Data from PA RL & SRL Inventory (January 2018) (PA Hazard Mitigation Plan October 2019)

COUNTY	SINGLE FMLY		2-4 FAMILY		ASSMD CONDO		OTHER RESID		NON		TOTAL	
	TOTAL	MIT	TOTAL	MIT	TOTAL	MIT	TOTAL	MIT	TOTAL	MIT	TOTAL	MIT
Crawford	23	4	1	0	0	0	0	0	4	0	28	4

**Table 4.3.1-2 Summary of Repetitive Loss (FEMA, 2013)**

Municipality	Structure Type			Sum of Rep Loss Properties
	2-4 Family	Non-Resident	Single Family	
CONEAUTVILLE BOROUGH		1		1
FAIRFIELD TOWNSHIP			2	2
MEADVILLE CITY OF	1	1		2
OIL CREEK TOWNSHIP			1	1
SADSBURY TOWNSHIP			1	1
STEUBEN TOWNSHIP			5	5
SUMMIT TOWNSHIP			2	2
TITUSVILLE CITY		3	4	7
TROY TOWNSHIP			1	1
VENANGO TOWNSHIP			1	1
VERNON TOWNSHIP			1	1
WOODCOCK TOWNSHIP			1	1
<b>TOTAL</b>	<b>1</b>	<b>5</b>	<b>19</b>	<b>25</b>

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-standard homeowner’s and renter’s 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 the 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.

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, or 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 of the municipalities in Crawford County are participating in the Regular Program.

The minimum floodplain management requirements include:

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

In addition, Regular Program communities are eligible to participate in the NFIP’s CRS Program. 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, no municipalities in Crawford County participate in CRS, but this has been identified as a potential mitigation strategy by the Planning Team.

Table 4.3.1-3 lists the Crawford County municipalities participating in the NFIP, their initial FIRM identification date, and their current effective map dates. Data on claims paid for historical losses by municipality.

**Table 4.3.1-3 National Flood Insurance Policy Participation**

COMMUNITY	PARTICIPATION STATUS	TOTAL PREMIUM AND COVERAGE	INITIAL FIRM IDENTIFIED	CURRENT EFFECTIVE MAP DATE
Athens Township	Participating	\$0	7/2/1982	8/16/2012
Beaver Township	Participating	\$492,200	9/10/1982	8/16/2012
Bloomfield Township	Participating	\$4,619,900	9/1/1986	8/16/2012
Blooming Valley Borough	Participating	\$0	11/17/1978	8/16/2012
Cambridge Springs Borough	Participating	\$5,034,200	8/2/1990	8/16/2012
Cambridge Township	Participating	\$1,043,400	9/10/1984	8/16/2012
Centerville Borough	Participating	\$90,000	5/1/1986	8/16/2012
Cochranton Borough	Participating	\$2,995,000	6/4/1990	8/16/2012
Conneaut Lake Borough	Participating	\$613,300	8/10/1979	8/16/2012
Conneaut Township	Participating	\$28,000	9/10/1984	8/16/2012
Conneautville Borough	Participating	\$1,162,700	9/18/1987	8/16/2012
Cussewago Township	Participating	\$35,700	9/10/1984	8/16/2012
East Fairfield Township	Participating	\$345,600	6/18/1990	8/16/2012
East Fallowfield Township	Participating	\$350,000	9/24/1984	8/16/2012
East Mead Township	Participating	\$210,000	9/1/1986	8/16/2012
Fairfield Township	Participating	\$2,674,800	8/2/1990	8/16/2012

COMMUNITY	PARTICIPATION STATUS	TOTAL PREMIUM AND COVERAGE	INITIAL FIRM IDENTIFIED	CURRENT EFFECTIVE MAP DATE
Greenwood Township	Participating	\$14,000	9/10/1984	8/16/2012
Hayfield Township	Participating	\$1,445,500	8/2/1990	8/16/2012
Hydetown Borough	Participating	\$1,441,600	4/17/1985	8/16/2012
Linesville Borough	Participating	\$901,000	6/5/1985	8/16/2012
Meadville, City of	Participating	\$23,765,800	6/1/1977	8/16/2012
North Shenango Township	Participating	\$420,000	10/1/1986	8/16/2012
Oil Creek Township	Participating	\$2,853,900	8/15/1990	8/16/2012
Pine Township	Participating	\$0	6/19/1985	8/16/2012
Randolph Township	Participating	\$35,000	7/18/1985	8/16/2012
Richmond Township	Participating	\$62,000	9/1/1986	8/16/2012
Rockdale Township	Participating	\$28,000	5/1/1986	8/16/2012
Rome Township	Participating	\$0	1/7/1983	8/16/2012
Sadsbury Township	Participating	\$10,321,500	8/19/1991	8/16/2012
Saegertown Borough	Participating	\$1,226,000	6/18/1990	8/16/2012
South Shenango Township	Participating	\$1,258,400	7/3/1985	8/16/2012
Sparta Township	Participating	\$700,000	1/28/1983	8/16/2012
Spartansburg Borough	Participating	\$0.00	11/23/1979	8/16/2012
Spring Township	Participating	\$0.00	9/1/1986	8/16/2012
Springboro Borough	Participating	\$878,800	9/30/1987	8/16/2012
Steuben Township	Participating	\$834,000	7/16/1990	8/16/2012
Summerhill Township	Participating	\$50,000	6/25/1982	8/16/2012
Summit Township	Participating	\$8,003,400	5/19/1987	8/16/2012
Titusville, City of	Participating	\$12,918,900	2/15/1978	8/16/2012
Townville Borough	Participating	\$0	2/15/1985	8/16/2012
Troy Township	Participating	\$721,800	6/18/1990	8/16/2012
Union Township	Participating	\$76,500	2/15/1985	8/16/2012
Venango Borough	Participating	\$614,900	6/18/1990	8/16/2012
Venango Township	Participating	\$1,186,100	2/1/1985	8/16/2012
Vernon Township	Participating	\$6,468,700	7/16/1990	8/16/2012

COMMUNITY	PARTICIPATION STATUS	TOTAL PREMIUM AND COVERAGE	INITIAL FIRM IDENTIFIED	CURRENT EFFECTIVE MAP DATE
Wayne Township	Participating	\$606,300	7/16/1990	8/16/2012
West Fallowfield Township	Participating	\$175,000	7/3/1985	8/16/2012
West Mead Township	Participating	\$5,587,300	6/15/1977	8/16/2012
West Shenango Township	Participating	\$0	2/1/1985	8/16/2012
Woodcock Borough	Participating	\$0	1/17/1985	8/16/2012
Woodcock Township	Participating	\$1,286,700	6/18/1990	8/16/2012

The below Table shows the number and type of hazards that are associated with this hazard over four years.

Weather Alert	2020	2019	2018	2017	Total
Areal Flood Advisory	2	11	1	2	16
Areal Flood Warning	2	4			6
Areal Flood Watch		2	3		5
Flash Flood Warning		4			4
Flash Flood Watch	1	1	1		3

### *FUTURE OCCURRENCE*

Flooding remains a highly likely occurrence throughout the identified flood hazard areas of Crawford County. Smaller floods caused by heavy rains and inadequate drainage capacity will be more frequent, but not as costly as the large-scale floods which may occur at much less frequent intervals. While the potential for flood is always present, Crawford County does have policies and regulations for development that should help lessen potential damage due to floods.

The Flood Insurance Rate Maps (FIRMs) for Crawford County produced by FEMA have built-in probability information, most notably the 1% annual flood zone. In general, these maps are based on the updated and improved FEMA digital FIRMs (D-FIRMs). In terms of future occurrence and in this case, flood recurrence, most floods are classified based on recurrence interval (probability). Table 4.3.1-4 shows a general range of flood recurrence intervals and their probabilities of occurrence.

**Table 4.3.1-4**

FLOOD RECURRENCE INTERVALS	CHANCE OF OCCURRENCE IN ANY GIVEN YEAR (%)
10 Year Event	10% Annual Chance
50 Year Event	2% Annual Chance
100 Year Event	1% Annual Chance
500 Year Event	0.2% Annual Chance

The NFIP recognizes the 1%-annual-chance flood as the base flood, the standard for identifying properties subject to federal flood insurance purchase requirements. A 1%-annual-chance flood is a flood which has a 1% chance of occurring over a given year. DFIRMs and FIRMs published by FEMA can be used to identify areas subject to the 1%- and 0.2%-annual-chance flooding. Areas subject to 2%- and 10%-annual-chance events are not shown on maps; however, water surface elevations associated with these events are included in the flood source profiles contained in associated Flood Insurance Study Reports. The most recent Flood Insurance Study for each county in Pennsylvania is available from the FEMA Map Service Center (<http://www.msc.fema.gov>)

Although the probability of a flood can be difficult to quantify, based on historical record of 59 recorded flood events since 1892, it can reasonably be assumed that this type of event has occurred once every 2.2 years from 1892 through 2020.

Current Year (2020) subtracted by Historical Year (1892) = 128 Years on Record

Years on Record (128) divided by Number of Historical Events (59) = 2.1695

Furthermore, the historic frequency calculates that there is a 46.09% chance of this type of event occurring each year. On the whole, the probability of a flood, flash flood, or ice jam event is considered likely as defined by the Risk Factor Methodology probability criteria (see Table 4.4.1-1).

### VULNERABILITY ASSESSMENT

RISK FACTOR (RF) Value 3.0

The vulnerability assessment for the flood hazard includes findings of the qualitative assessment conducted, existing vulnerability and future vulnerability. As described above in the Past Occurrence section of this hazard, Crawford County has experienced 59 significant flood events in the past 128 years amounting to \$84.5 million dollars in reported property damage, providing evidence that Crawford County, historically, is vulnerable to the flood hazard and that flood events occur on a fairly frequent basis.

According to the qualitative assessment performed using the RF tool, the flood hazard scored a RF value of 3.0 (from a scale of 0 to 4, with 4 being the highest risk level). Table 4.3.1-5 summarizes the risk levels assigned to each RF category.

Hazard	Risk Assessment Category					Risk Factor
	Probability	Impact	Spatial Extent	Warning Time	Duration	
Flooding	4	2	3	3	3	3

Several streams in Crawford County are still subject to flooding. The problem areas include: French Creek, Cussewago Creek, Conneaut Creek, Oil Creek, and Mill Run. Intermittent flooding does occur due to low lying areas and seasonal ice jams.



An important component of the vulnerability of Crawford County communities is its participation in the NFIP. Table includes the number of NFIP policies, claims, and substantial damage claims per municipality. The City of Meadville has the highest number of policies, the City of Titusville has had the most claims, and Steuben Township has had the most substantial damage claims. As seen from Table a number of communities (8) have no effective policies and subsequently had no claims or substantial damage claims.

Municipality	# Policies	# Claims	# Substantial Damage Claims
Athens Township	0	1	0
Beaver Township	3	0	0
Bloomfield Township	48	0	0
Blooming Valley Borough	0	0	0
Cambridge Springs Borough	24	3	1
Cambridge Township	6	2	1
Centerville Borough	1	3	0
Cochranton Borough	40	10	0
Conneaut Lake Borough	6	6	0
Conneaut Township	1	0	0
Conneautville Borough	13	11	1
Cussewago Township	1	0	0
East Fairfield Township	6	9	1
East Fallowfield Township	1	0	0
East Mead Township	1	1	0
Fairfield Township	23	20	1
Greenwood Township	1	1	0
Hayfield Township	11	2	0
Hydetown Borough	10	2	0
Linesville Borough	6	1	0
Meadville, City of	118	45	0
North Shenango Township	2	1	0
Oil Creek Township	13	16	0
Pine Township	0	0	0
Randolph Township	1	0	0
Richmond Township	1	0	0
Rockdale Township	1	0	0

**Table 4.3.1-6 NFIP Policies and Claims**

<b>Municipality</b>	<b># Policies</b>	<b># Claims</b>	<b># Substantial Damage Claims</b>
Rome Township	0	0	0
Sadsbury Township	59	7	0
Saegertown Borough	12	2	0
South Shenango Township	11	3	0
Sparta Township	2	0	0
Spartansburg Borough	0	0	0
Spring Township	0	0	0
Springboro Borough	10	2	0
Steuben Township	5	24	2
Summerhill Township	1	0	0
Summit Township	36	20	1
Titusville, City of	80	56	0
Townville Borough	0	0	0
Troy Township	5	14	1
Union Township	1	1	0
Venango Borough	4	0	0
Venango Township	10	3	1
Vernon Township	37	12	0
Wayne Township	4	1	0
West Fallowfield Township	1	0	0
West Mead Township	16	0	0
West Shenango Township	0	0	0
Woodcock Borough	0	0	0
Woodcock Township	12	5	0
<b>TOTAL</b>	<b>644</b>	<b>284</b>	<b>10</b>

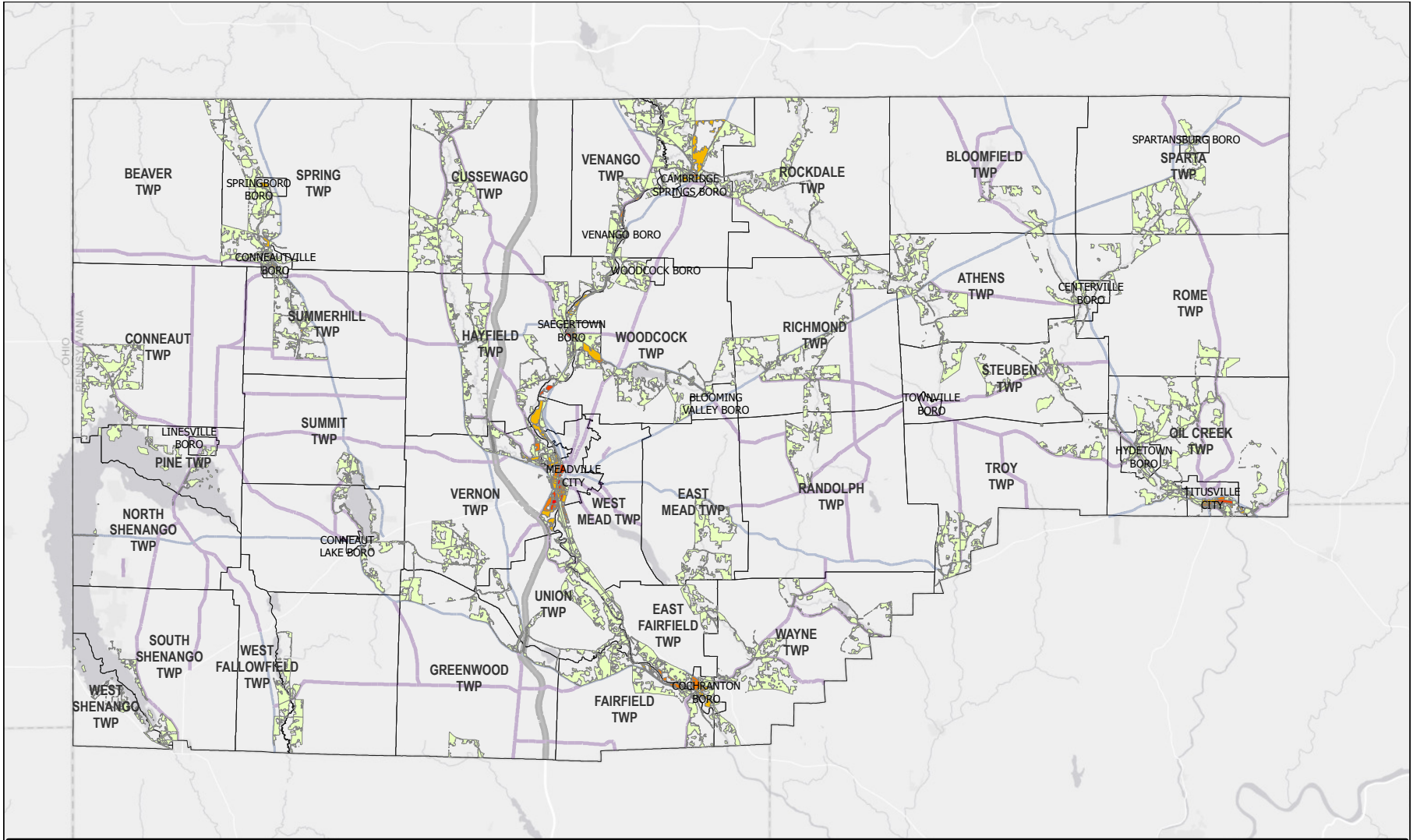
Table 4.3.1-7 displays the number of structures, critical facilities, and populations intersecting the SFHA. The number of vulnerable structures was calculated by overlaying the structures with the SFHA. Similarly, the estimated population in the SFHA was calculated by overlaying the centroids of the 2010 Census blocks with the SFHA; while clearly an estimate, using the block centroid helps to minimize overestimation of flood prone populations. Table shows the number of structures in the SFHA by generalized land use type. Unsurprisingly, most vulnerable structures are residential properties.

**Table 4.3.1-7 Community Flood Vulnerability for Crawford County**

<b>Municipality</b>	<b>Total structures within Municipality</b>	<b>Total structures within SFHA</b>	<b>Percent of structures in SFHA</b>	<b>Total Critical facilities within Municipality</b>	<b>Total Critical facilities within SFHA</b>	<b>Percent of Critical facilities within SFHA</b>
Athens Township	385	42	10.91%	0	0	0.00%
Beaver Township	422	6	1.42%	31	1	3.23%
Bloomfield Township	1,642	399	24.30%	2	0	0.00%
Blooming Valley Borough	164	1	0.61%	2	0	0.00%
Cambridge Springs Borough	641	35	5.46%	11	1	9.09%
Cambridge Township	743	60	8.08%	5	0	0.00%
Centerville Borough	126	10	7.94%	2	0	0.00%
Cochranton Borough	514	99	19.26%	3	1	33.33%
Conneaut Lake Borough	350	3	0.86%	6	0	0.00%
Conneaut Township	877	2	0.23%	32	0	0.00%
Conneautville Borough	351	19	5.41%	1	0	0.00%
Cussewago Township	734	3	0.41%	35	3	8.57%
East Fairfield Township	452	42	9.29%	1	0	0.00%
East Fallowfield Township	619	2	0.32%	11	1	9.09%
East Mead Township	687	4	0.58%	7	0	0.00%
Fairfield Township	638	155	24.29%	5	0	0.00%
Greenwood Township	722	6	0.83%	3	1	33.33%
Hayfield Township	1,418	44	3.10%	31	1	3.23%
Hydetown Borough	286	38	13.29%	1	0	0.00%
Linesville Borough	558	8	1.43%	1	0	0.00%
Meadville City	4,851	503	10.37%	41	3	7.32%
North Shenango Township	1,904	6	0.32%	1	0	0.00%
Oil Creek Township	992	43	4.33%	7	1	14.29%
Pine Township	422	7	1.66%	5	0	0.00%
Randolph Township	783	0	0.00%	5	0	0.00%

Municipality	Total structures within Municipality	Total structures within SFHA	Percent of structures in SFHA	Total Critical facilities within Municipality	Total Critical facilities within SFHA	Percent of Critical facilities within SFHA
Richmond Township	681	0	0.00%	2	0	0.00%
Rockdale Township	670	8	1.19%	1	0	0.00%
Rome Township	738	2	0.27%	0	0	0.00%
Sadsbury Township	2,274	31	1.36%	22	1	4.55%
Saegertown Borough	387	21	5.43%	11	1	9.09%
South Shenango Township	1,852	68	3.67%	2	0	0.00%
Sparta Township	704	4	0.57%	0	0	0.00%
Spartansburg Borough	166	1	0.60%	1	0	0.00%
Spring Township	701	7	1.00%	71	2	2.82%
Springboro Borough	206	11	5.34%	2	1	50.00%
Steuben Township	469	24	5.12%	0	0	0.00%
Summerhill Township	504	4	0.79%	49	1	2.04%
Summit Township	1,354	120	8.86%	22	2	9.09%
Titusville City	2,321	230	9.91%	16	7	43.75%
Townville Borough	139	1	0.72%	0	0	0.00%
Troy Township	633	28	4.42%	0	0	0.00%
Union Township	477	7	1.47%	2	0	0.00%
Venango Borough	112	15	13.39%	1	0	0.00%
Venango Township	462	47	10.17%	1	0	0.00%
Vernon Township	2,899	103	3.55%	63	2	3.17%
Wayne Township	752	48	6.38%	4	0	0.00%
West Fallowfield Township	353	2	0.57%	0	0	0.00%
West Mead Township	2,311	17	0.74%	13	0	0.00%
West Shenango Township	410	7	1.71%	2	0	0.00%
Woodcock Borough	64	0	0.00%	0	0	0.00%
Woodcock Township	1,206	77	6.38%	5	0	0.00%
<b>Totals</b>	<b>44,126</b>	<b>2,420</b>	<b>5.48%</b>	<b>539</b>	<b>30</b>	<b>5.57%</b>

Figure 4.3.4.2: Total Economic Loss Estimates (FEMA)

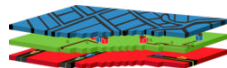


**Total economic loss estimates - FEMA | HAZUS analysis**

Source: Federal Emergency Management Agency (FEMA)



Crawford County Government  
 Crawford County Courthouse  
 903 Diamond Park  
 Meadville PA 16335  
 GIS Manager: Phillip Baranyai  
 Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



**FEMA**

FEMA - HAZUS: Total Economic Loss  
 Total loss estimates (In dollars)

- 0 - 2073
- 2074 - 7378
- 7379 - 17319
- 17320 - 28162
- 28163 - 68626

This map is subject to change at any time after date of issuance.  
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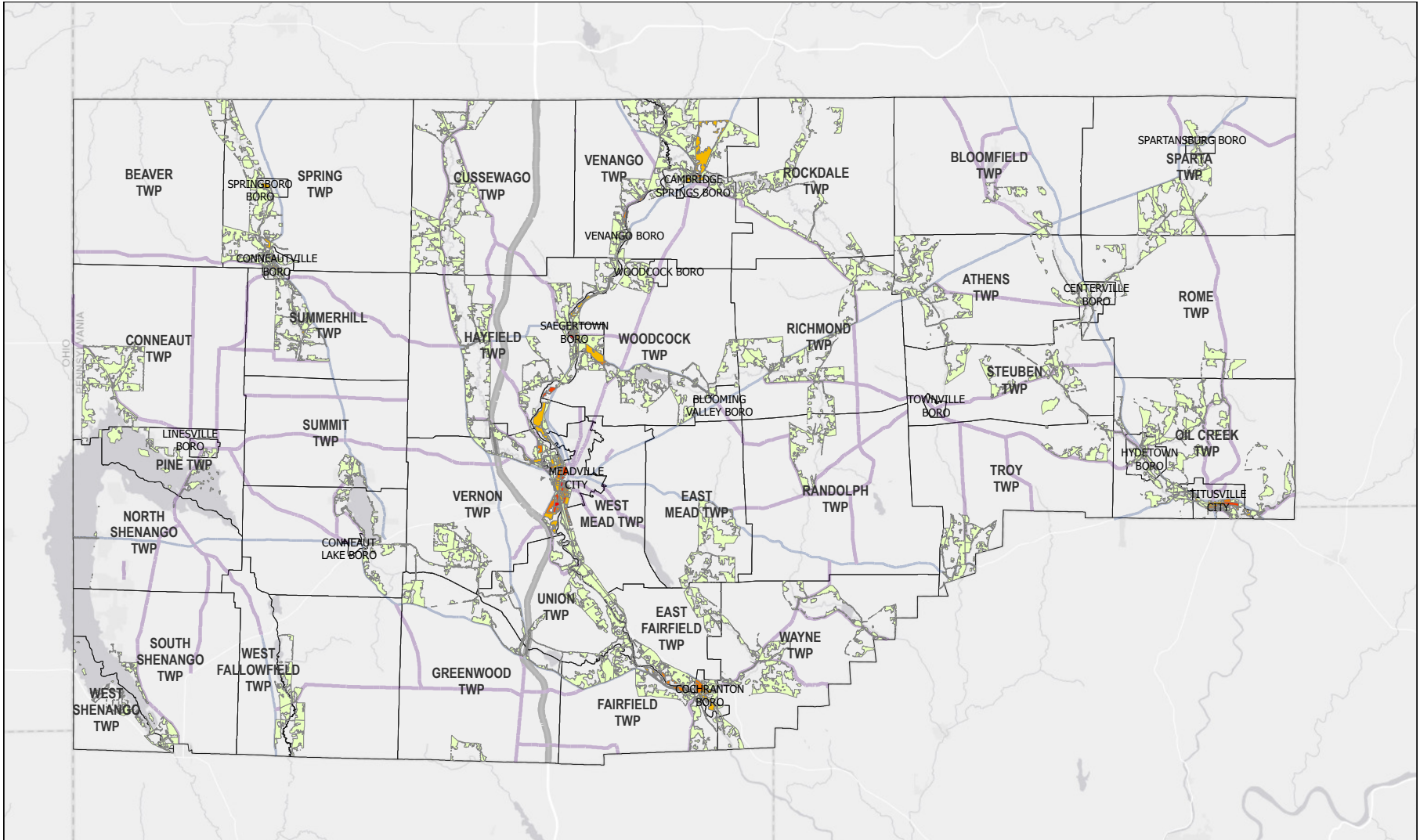
Riverine Flooding			
Number of Events	57	Risk Score	30.71
Annualized Frequency	2.59	Risk Rating	Relatively Hurricane
Expo. - Building Value (\$)	960,076,885	Number of Events	4
Expo. - Population	5,559	Annualized Frequency	0.02
Expo. - Population Equiv. (\$)	41,137,982,758	Expo. - Building Value (\$)	9,523,013,497
Expo. - Agricultural Value (\$)	3,807,806	Expo. - Population	88,124
Expo. - Total (\$)	42,101,867,449	Expo. - Population Equiv. (\$)	652,118,193,993
HLR- Buildings	0	Expo. - Total (\$)	661,641,207,490
HLR- Population	0	HLR- Buildings	0
HLR- Agriculture	0	HLR- Population	0
HLR- Overall Rating	Very Low	HLR- Overall Rating	Very Low
EAL- Building Value (\$)	4,237,075	EAL- Building Value (\$)	462
EAL- Population	0	EAL- Population	0
EAL- Population Equiv. (\$)	319,496	EAL- Population Equiv. (\$)	14,972
EAL- Agricultural Value (\$)	501	EAL- Total (\$)	15,434
EAL- Total (\$)	4,557,072	EAL Score	5.77
EAL Score	41.24	EAL Rating	Very Low
EAL Rating	Relatively High	Risk Score	3.67
		Risk Rating	Very Low

There are a total of 30 existing critical facilities within the 1% annual chance area. These facilities include 1 EMS Station, 3 schools, and 26 SARA Title III facilities. Table below summarizes this information and the following map of these areas. A flood at any of the SARA Facilities in Crawford County could result in the release of hazardous materials, which could contaminate air, water, and soils and even cause death and injuries. The flooding of schools and airports would disrupt daily life and travel for county residents, while the flooding of the Fire/EMS facility in Titusville could disrupt emergency response capabilities.

**Table 4.3.1-8 Existing Critical Facilities in 1% Annual Chance AreaCounty**

Facility Name	Municipality	Type of Facility
L&B Energy Llp- Quick, John W#1	Beaver Township	SARA Facility
Cambridge Springs Water Plant	Cambridge Springs Borough	SARA Facility
Cochranton Jr/Sr High School	Cochranton Borough	School
L&B Energy Llp- Shidemantle 4	Cussewago Township	SARA Facility
L&B Energy Llp- Shidemantle, Richard #7	Cussewago Township	SARA Facility
L&B Energy Llp- Shidemantle 2	Cussewago Township	SARA Facility
Diversified- Horne 11,12	East Fallowfield Township	SARA Facility
Range Resources- 51-10 Kebert 8	Greenwood Township	SARA Facility
L&B Energy Llp- Houck, Cw #1	Hayfield Township	SARA Facility
Channellock Inc Plant 1	Meadville, City Of	SARA Facility
Peters' Heat Treating, Inc.- Meadville	Meadville, City Of	SARA Facility
Second District Elem School	Meadville, City Of	School
Baillie Lumber Co.	Oil Creek Township	SARA Facility
Conneaut Lake Joint Mun Auth	Sadsbury Township	SARA Facility
Saegertown Area Sewer Authority	Saegertown Borough	SARA Facility
Kastle- McBride, J.W. #1	Spring Township	SARA Facility
Kastle- Robson Unit #1	Spring Township	SARA Facility
Northwest Crawford County Sewer Authority	Springboro Borough	SARA Facility
Range Resources- 11-2 Sokolosky 1	Summerhill Township	SARA Facility
Ac-School Services, Inc.	Summit Township	SARA Facility
Range Resources- Park Golf Course Unit #1	Summit Township	SARA Facility
Aym Llc- Corbett Corporation Bulk Plant	Titusville, City Of	SARA Facility
Emergycare – Titusville	Titusville, City Of	Fire/EMS
International Waxes Inc	Titusville, City Of	SARA Facility
Roser Technologies, Inc.	Titusville, City Of	SARA Facility
Titusville Area Middle School	Titusville, City Of	School
Titusville Wastewater Plant	Titusville, City Of	SARA Facility
Universal Stainless & Alloy Products	Titusville, City Of	SARA Facility
Advanced Cast Products Inc	Vernon Township	SARA Facility
Meadville Area Water Authority	Vernon Township	SARA Facility

Figure 4.3.4-3: Critical Facilities in Special Flood Hazard Areas

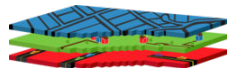


**Total economic loss estimates - FEMA | HAZUS analysis**

Source: Federal Emergency Management Agency (FEMA)



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Infrastructure systems such as transportation, water systems, sewer systems and businesses located in the 1% annual chance area are also



vulnerable to flooding. Sewer, stormwater and underground well water infrastructure are vulnerable to riverine, stormwater and seepage floods. Per the 2014 Crawford County Comprehensive Plan Update, there are 57 non-municipal and 12 municipal sanitary sewer systems that service the County. Not uncommon, severe flooding may shut down arterial parts of transportation systems. Roads that are frequently closed throughout Crawford County due to flooding are listed. Flooding of these roadways could isolate neighborhoods, potentially limiting first response, or access to major population centers like Meadville and Titusville. For example, US 19 frequently experiences flooding in Meadville City, Greenwood Township, and Union Township. As a major travel corridor, closing this roadway at any of these locations could greatly limit travel and response capabilities throughout Crawford County. Businesses may also be forced to close temporarily due to lack of patronage and/or employee absences. The disruption of delivery would also have negative impacts on the local economy. Small businesses are particularly vulnerable to temporary closures and property damage. Following is a list of the most common roadways that become flooded frequently.

Aside from structures and infrastructure, flooding can have a substantial impact on the natural environment. The most significant threat posed by floods to the natural environment is the potential damage to the fish and wildlife habitat. A low frequency flood event occurring in French Creek, Cussewago Creek, Conneaut Creek, Oil Creek, and/or Mill Run may result in significant damages to delicate riparian vegetation. The runoff associated with development and increased impervious surfaces has increased the occurrence of flooding in populated areas within the county. Building in the floodplain may damage ecosystems, a flood induced by encroachment on the floodplain may further this damage by introducing toxins, debris, and significant amounts of sediment to the system. In turn, this could affect a watercourse's flow velocity or discharge which may further increase losses to the ecosystem by removing riparian vegetation and result in new problems downstream to both natural environment and manmade infrastructure.

Road Name	From	To	Mun/State	Municipality
McClelland St	SR 99	Plank Rd	State	Cambridge Springs
Miller Station Rd	SR 6	Miller Hill Rd	State	Cambridge Twp
Sparta St	Garland St	White Rd	State	Centerville
Townhall Rd	SR 285	SR 322	State	Fairfield Twp
Townhall Road	SR 285	SR 322	State	Fairfield Twp
Geneva Rd	South Watson	SR 19	State	Greenwood Twp
Mercer Pike	Swamp Rd		State	Greenwood Twp
Mercer Pike	Brooks Crossing Rd	Kennedy Hill Rd	State	Greenwood Twp
SR 19	Swamp Rd		State	Greenwood Twp
SR 19	SR 285		State	Greenwood Twp
SR 19	Smock Dr	Rung Rd	State	Greenwood Twp
Main Street	Church St	SR 19	State	Greenwood Twp
Columbia Ave	Race St	Lincoln Ave	City	Meadville
French Creek Parkway	Smock Br	Mead Ave	City	Meadville
French St	S of Mead Ave		City	Meadville
Linden St	Libery St	French Creek Parkway	City	Meadville
Mead Ave	Bypass Hwy	SR 102	City	Meadville
Mercer St. Bridge	East to City		City	Meadville
Park Ave	Linden St	Williow St	City	Meadville
Race Street	Spring St	Lincoln Ave	City	Meadville
South Main St	Linden St	Franklin Pike	State	Meadville
South Main St	Clark St	Linden St	State	Meadville
Spring St	Lincoln Ave	Cussewago	State	Meadville
Spring St	Lincoln Ave	Baldwin St	State	Meadville
US 322	Park Ave	Bypass	City	Meadville
US 6/19	US 322		City	Meadville
US 6/19	Arch St		City	Meadville
Williow St	at FC Parkway		City	Meadville
Britton Run Rd	Church St	SR 77	State	Sparta Twp
Mystic Park Rd	Stroup Rd	Dutch Rd	State	Steuben Twp
Hill Rd	Canal Rd	SH 18	Twp	Summerhill Twp
Wilson Chutes	Heckman Rd	SR 322	State	Union Twp
McMichael Rd	Brown Hill Rd	SR 285	Twp	Vernon Twp
S Watson Run	Bailey Rd	Geneva Rd	Twp	Vernon Twp
SR 173	Lippert Rd	Richie Rd	State	Wayne Twp
Wilson Chutes	SR 322	Mercer Pike	State	West Mead Twp

Additional information on flood vulnerability and losses in Crawford County, including the 1%-annual-chance flood event results from HAZUS, FEMA's loss estimation software, is provided:

### *Climate Change Affecting Flooding in Pennsylvania*

Governor Wolf Announces Plan to Address Flooding Caused by Climate Change. As communities across Pennsylvania increasingly experience flooding caused by intense, short-duration storms due to climate change, Governor Tom Wolf today announced executive actions that will support communities that are impacted by flooding. "The dangers brought on by climate change are affecting Pennsylvania communities right now, endangering both lives and livelihoods. These types of storms often fail to reach the thresholds for federal disaster aid, which leave municipalities and the state struggling to cover millions of dollars in recovery costs," Gov. Wolf said. "We need to take immediate steps to mitigate those dangers and protect Pennsylvanians, especially as so many are already struggling financially due to the COVID-19 pandemic." The governor announced a plan that will address flood hazard mitigation by requiring the State Planning Board to develop a series of recommendations and best practices relative to land use, planning, zoning, and storm water management, with the emphasis on reducing the incidence of flash flooding in communities that impacts citizens and businesses. The State Planning Board will establish state goals and strategic investments to assist municipalities, which will then be incorporated by state agencies into their appropriate funding applications. According to a 2015 Department of Environmental Protection Climate Impacts Assessment, Pennsylvania has seen a 10 percent increase in average yearly precipitation over the last century. By 2050, the average yearly precipitation is projected to increase by another 8 percent.

For many parts of the commonwealth, 2018 was the wettest year on record, with heavy rains demonstrating that our flood mitigation planning and infrastructure has not kept up with changing precipitation patterns. Many of these storms we are experiencing due to climate change are intense over a very short duration. Due to the short duration of these types of storms, the damages from these events rarely reach the thresholds for the commonwealth to request federal disaster aid assistance. There are two programs within the Federal Emergency Management Agency that can provide federal aid after a flooding disaster: public assistance and individual assistance. Public assistance provides reimbursements to state, county and local governments and eligible nonprofits for costs associated with response and recovery efforts. Each county included in a public assistance request must meet a cost threshold based on population and, in turn, the commonwealth overall must meet a threshold of \$19.5 million in damage costs. Individual assistance includes a wide range of programs for homeowners and renters, including cash grants, housing or home repair assistance. The Hazard Mitigation Grants Program available after a Presidentially Declared Disaster.

In 2018 in Pennsylvania, more than 5,000 homes were damaged in a series of incidents, but no single incident met the threshold. That year there was also approximately \$63 million in public infrastructure damages alone that were not reimbursable through federal disaster programs. Federal data shows that every dollar spent on mitigation saves on average, six dollars in recovery, so mitigation not only saves lives and property but it's also the fiscally smart thing to do.

Major rehabilitations to Pennsylvania's 120 flood control facilities, such as flood walls, levees, and channel improvements, are the responsibility of the commonwealth. Of those, only 68 of those facilities meet the eligibility criteria established by the Army Corps of Engineers Emergency Rehabilitation Program. The rest are ineligible for rehabilitation coverage under this program. That means costly repairs to these facilities after flood events would be borne by the sponsor municipality and the commonwealth. Additionally, as land is developed for residential and commercial use, stormwater runoff can cause stream impairment. With increased precipitation projected in the years to come, it is critical that we lay the groundwork now to implement flood hazard mitigation efforts and protect our communities and businesses. As weather conditions continue to change, major storms and flooding have the potential to devastate counties across the state. These are spaces that are important to us—our homes, our family and neighbors' homes. It's the financial stability of our favorite small businesses, and our places of employment. The work we do today will better prepare us for not only the immediate impact of severe storms and flooding, but also the long-term recovery that follows.

As the 2019-20 legislative session comes to an end, there is currently no imminent plan by lawmakers to address this issue or to consider the governor's Restore Pennsylvania plan, which would provide funding to help towns and cities prepare for flooding and severe weather, upgrade flood walls and levees, replace high-hazard dams, and conduct stream restoration and maintenance, as well as establish a disaster relief trust fund to assist Pennsylvanians who suffer losses that are not compensated by the federal government. December 2020.

### *Crawford County Community Lifeline Integration*

Components and Essential Elements of information needed to stabilize and mitigate the incident within the Lifelines for this hazard within the lifeline(s) include;

#### *Lifeline Planning Factors (Maximum anticipated or known impacts)*

- *Number of people seeking short-term public shelter*
- *Number of households' w/o potable water on H+1*
- *Percent of water systems with at least moderate damage*
- *Number of wastewater leaks/breaks*
- *Percent of grocery stores w/o power*
- *Number of highway bridges with at least moderate damage*
- *Number of railway bridges with at least moderate damage*
- *Number of airport runways with at least moderate damage*
- *Number of port facilities with at least moderate damage*

#### *Lifeline Stabilization Target*

- *All survivors, their pets, and service animals have access to food, water, and sanitation. Sheltering, including cellular reception, capacity, accessibility, and wrap-around services, is supporting the displaced population. Sufficient resources are in place to sustain agricultural requirements.*
- *Multimodal routes (air, rail, road, port) are clear of debris and accessible by normal or alternate means.*

#### *County Assistance Lines of Efforts*

- *Incorporate Flood Mitigation in Local Planning*
- *Form Partnerships to Support Floodplain Management*
- *Limit or Restrict Development in Floodplain Areas*
- *Adopt and Enforce Building Codes and Development Standards*
- *Improve Stormwater Management Planning*
- *Adopt Policies to Reduce Stormwater Runoff*
- *Improve Flood Risk Assessment*
- *Join or Improve Compliance with NFIP (National Flood Insurance Program)*
- *Manage the Floodplain Beyond Minimum Requirements*
- *Participate in the CRS (Community Rating System)*
- *Establish Local Funding Mechanisms for Flood Mitigation*
- *Remove Existing Structures from Flood Hazard Areas*
- *Improve Stormwater Drainage Capacity*
- *Conduct Regular Maintenance for Drainage Systems and Flood Control Structures*
- *Elevate or Retrofit Structures and Utilities*
- *Flood proof Residential and Non-Residential Structures*
- *Protect Infrastructure*
- *Protect Critical Facilities*
- *Construct Flood Control Measures*
- *Protect and Restore Natural Flood Mitigation Features*
- *Preserve Floodplains as Open Space*
- *Increase Awareness of Flood Risk and Safety*
- *Educate Property Owners about Flood Mitigation Techniques*



**Food, Water, Sheltering:** Food (Commercial Food Distribution, Commercial Food Supply Chain, Food Distribution Programs), Water (Drinking Water Utilities, Wastewater Systems, Commercial Water Supply Chain), Shelter, Agriculture (Animal and Agriculture)

## 5.3-2 DROUGHT

### LOCATION AND EXTENT

Drought is one of the most complicated and least understood natural hazards.

Drought is defined as a deficiency of precipitation experienced over an extended period of time, usually a season or more. Droughts increase the risk of other hazards, like wildfires, flash floods, and landslides or debris flows. This hazard is of particular concern in Pennsylvania due to the prevalence of farms and other water-dependent industries, water-dependent recreation uses, and residents who depend on wells for drinking water (Pennsylvania Hazard Mitigation Plan Standard Operating Guide, 2020).

Drought is a special type of disaster because its occurrence does not require evacuation of an area nor does it constitute an immediate threat to life or property. People are not suddenly rendered homeless or without food and clothing. The primary impact of a drought is economic hardship, but it does, in the end, resemble other types of disasters in that victims can be deprived of their livelihoods, and communities can suffer economic decline.

The following is an excerpt from the National Drought Mitigation Center: Drought is a hazard of nature. We can't see it ignite, like a fire, or predict where it is likely to touch down, as we do a tornado. Like its natural hazard cousins, however, drought can leave a trail of destruction that may even include loss of life. And while we might refer to a fire's crackle or the roar of a tornado, a drought hazard does not announce its arrival. In fact, those familiar with drought call it a "creeping phenomenon," because what may first appear to be merely a dry spell can only be discerned in hindsight as the early days of a drought. Drought's stealthy reputation is also based on the way its effects vary from region to region. A week without rain might be considered a drought in a tropical climate like Bali, while a gap of only seven days between rains might be unusual in Libya, a desert area where annual rainfall is less than seven inches (180 millimeters). Drought can even co-exist with record rainfall! In the most general sense, drought is defined as a deficiency of precipitation over an extended period of time (usually a season or more), resulting in a water shortage. The effects of this deficiency are often called drought impacts. Natural impacts of drought can be made even worse by the demand that humans place on a water supply (National Drought Mitigation Center, 2020).

Droughts can range from minor to severe, short-term to long-term with a variety of determining factors such as precipitation, soil moisture, and river levels. A minor, short-term drought can slip by unnoticed while a long-term severe drought can impact the agricultural economy, natural resources, and even public water supplies. Monitoring of drought conditions occurs nationally, and various indices, such as the Palmer Index, indicate the level of drought.

The effects of drought become apparent with a longer duration because more and more moisture related activities are affected. Non-irrigated croplands are most susceptible to moisture shortages. Rangeland and irrigated agricultural lands do not feel the effects as quickly as the non-irrigated, cultivated acreage, but their yields can also be greatly reduced due to drought. Reductions in yields due to moisture shortages are often aggravated by wind-induced soil erosion.

In periods of severe drought, forest and range fires can destroy the economic potential of the livestock industry and wildlife habitat in and adjacent to the fire areas. Under extreme drought conditions, lakes, reservoirs, and rivers can be subject to severe water shortages, which greatly restrict the use of their water supplies. An additional hazard resulting from drought conditions can be insect infestation.

Drought risk is based on a combination of the frequency, severity, and spatial extent of drought (the physical nature of drought) and the degree to which a population or activity is vulnerable to the effects of drought. The degree of Crawford County's vulnerability to drought depends on the environmental and social characteristics of the region and is measured by its ability to anticipate, cope with, resist, and recover from drought.

Because drought is usually considered a regional hazard, it is not enhanced or analyzed by county-level mapping. All county areas are assumed to have the same risk level within Crawford County, but impacts will vary depending upon the source of potable water (private well or public water service). Mapping of the current drought status is published by the National Integrated Drought Information System (NIDIS): U.S. Drought Portal which can be found at [www.drought.gov](http://www.drought.gov).

The Pennsylvania Department of Environmental Protection also publishes up-to-date status information on drought and can be found online at: <https://www.dep.pa.gov/Business/Water/PlanningConservation/Drought/Pages/default.aspx>.

### *RANGE OF MAGNITUDE*

Drought is a normal part of virtually every climate on the planet, even rainy ones. It is the most complex of all-natural hazards, and it affects more people than any other hazard. Analysis shows that it can be as expensive as floods and hurricanes. The impacts of drought are greater than the impacts of any other natural hazard, except hurricanes. Since 1980, 26 droughts cost the U.S. at least \$249 billion, with an average cost of more than \$9.6 billion incurred during each event (NIDIS, 2020). Social and environmental impacts are also significant, although it is difficult to put a precise cost on these impacts (National Drought Mitigation Center, 2020).

According to the Pennsylvania 2019 State Hazard Mitigation Plan, the Commonwealth uses five indicators to assess drought conditions:

- *Precipitation Deficits*
- *Stream Flows*
- *Groundwater Levels*
- *Soil Moisture*
- *Reservoir Storage*

In Pennsylvania, PEMA has primary responsibility for managing droughts with direct support from the Department of Environmental Protection (DEP). According to *Drought Management in Pennsylvania* (2018), PEMA and DEP use the following three stages to describe and manage droughts. They are listed in order of increasing severity:

- ***Drought Watch***: *A period to alert government agencies, public water suppliers, water users and the public regarding the potential for future drought-related problems, Drought Watches are invoked when three or more drought indicators are present for a county or group of counties.*

*The focus is on increased monitoring, awareness and preparation for response if conditions worsen. A request for voluntary water conservation is made. The objective of voluntary water conservation measures during a drought watch is to reduce water uses by 5 percent in the affected areas. Due to varying conditions, individual water suppliers or municipalities may be asking for more stringent conservation actions.*

- **Drought Warning:** *This phase involves a coordinated response to imminent drought conditions and potential water supply shortages through concerted voluntary conservation measures to avoid or reduce shortages, relieve stressed sources, develop new sources, and if possible, forestall the need to impose mandatory water use restrictions. The objective of voluntary water conservation measures during a drought warning is to reduce overall water uses by 10-15 percent in the affected areas. Due to varying conditions, individual water suppliers or municipalities may be asking for more stringent conservation actions.*
- **Drought Emergency:** *This stage is a phase of concerted management operations to marshal all available resources to respond to actual emergency conditions, to avoid depletion of water sources, to assure at least minimum water supplies to protect public health and safety, to support essential and high priority water uses and to avoid unnecessary economic dislocations. It is possible during this phase to impose mandatory restrictions on non-essential water uses that are provided in the Pennsylvania Code (Chapter 119), if deemed necessary and if ordered by the Governor of Pennsylvania. The objective of water use restrictions (mandatory or voluntary) and other conservation measures during this phase is to reduce consumptive water use in the affected area by fifteen percent, and to reduce total use to the extent necessary to preserve public water system supplies, to avoid or mitigate local or area shortages and to assure equitable sharing of limited supplies.*

In addition, local water rationing is an option for communities:

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

The worst historical drought event in Pennsylvania occurred in 1963, when precipitation statewide averaged below normal for ten of twelve months. Drought emergency status led to widespread water use restrictions, and reservoirs dipped to record low levels. Corn, hay, and other agricultural products shriveled in parched field, causing economic losses. Governor William Scranton sought drought aid for Pennsylvania in the face of mounting agricultural losses, and the event became a presidentially declared disaster in September 1963 (Gelber, 2002).

While severe drought may not be an annual occurrence in Crawford County, the effects drought can have on the County can be dramatic due to the County's agricultural industry. In fact, the Pennsylvania Crop Insurance Education and Participation Program (a partnership of the US Department of Agriculture, the Pennsylvania Department of Agriculture, and Penn State University) estimated that drought was the top reason for crop failure in Pennsylvania from 1981-2009; roughly 59% of all crop failures were due to drought.

Environmental impacts of drought include:

- *Hydrologic effects – lower water levels in reservoirs, lakes and ponds; reduced stream flow; loss of wetlands; estuarine impacts; groundwater depletion and land subsidence; effects on water quality such as increases in salt concentration and water temperature; decrease in supply to fight fires*

- *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 through loss in plants and plant diversity*
- *Loss of water for navigation and recreation*
- *Increase in nitrate levels which can have health impacts on pregnant women and children.*

The worst-case scenario for Crawford County would be for an extreme drought to occur for an extended period of time across the entire county. Such a drought could cause high losses to the agricultural sector and threaten the ability of populations that rely on domestic well and septic systems to access water.

#### PAST OCCURRENCE

Between 1930 and 1994, the Commonwealth of Pennsylvania experienced five significant droughts: 1930-1934, 1939-1942, 1953-1955, 1961-1967, and 1991-1992. The most severe incidents of drought in Crawford County occurred from 1991-1992 and 1998-1999, per the DEP. The DEP maintains the most comprehensive data on drought occurrences across Pennsylvania. Declared drought status for Crawford County from 1980 to 2020 is shown in Table 5.3.2-1. Descriptions for drought status categories (i.e. watch, warning, and emergency) are included in Section 4.3.2.2.

**Crawford County**  
**Table 5.3.2-1 Past drought events in**

Date	Drought Status
July 7, 1988 to August 24, 1988	Watch
August 24, 1988 to December 12, 1988	Warning
June 28, 1991 to July 24, 1991	Watch
July 24, 1991 to August 16, 1991	Warning
August 16, 1991 to April 20, 1992	Emergency
April 20, 1992 to June 23, 1992	Warning
June 23, 1992 to September 11, 1992	Watch
September 1, 1995 to December 18, 1995	Watch
December 3, 1998 to December 16, 1998	Warning
December 16, 1998 to March 15, 1999	Emergency
March 15, 1999 to September 30, 1999	Watch

Date	Drought Status
September 30, 1999 to February 25, 2000	Warning
February 25, 2000 to May 5, 2000	Watch
August 24, 2001 to May 13, 2002	Watch
September 5, 2002 to June 18, 2003	Watch
April 11, 2006 to June 30, 2006	Watch
August 6, 2007 to September 5, 2007	Watch
November 7, 2008 to January 26, 2009	Watch
September 16, 2010 to December 17, 2010	Watch
August 5, 2011 to September 2, 2011	Watch
July 19, 2012 to August 31, 2012	Watch



As can be seen in the table above, Crawford County has not had a severe drought since 1999-2000. According to DEP’s Watershed Management Drought Information Center, the County has had 9 drought watches in the period since the last drought warning in the winter of 1999-2000. The USDA Risk Management Agency operates and manages the Federal Crop Insurance Corporation program. Since Crawford County farms are eligible for crop insurance, it is possible to determine agricultural losses due to drought in the county. Table 5.3-2.2 displays the crop loss insurance payments by year due to drought (including even mild drought occurrences) since 1981.

Crop Year	Indemnity Amount	Crop Year	Indemnity Amount	Crop Year	Indemnity Amount
1981	\$1,785.00	1994	\$6,894.00	2007	\$366,609.00
1982	\$7,365.00	1995	\$46,426.00	2008	\$75,531.00
1983	\$18,838.00	1996	\$0.00	2009	\$2,688.00
1984	\$0.00	1997	\$88,800.00	2010	\$219,424.70
1985	\$0.00	1998	\$152,859.00	2011	\$320,646.50
1986	\$0.00	1999	\$96,581.00	2012	\$427,230.50
1987	\$0.00	2000	\$4,001.00	2013	\$8,352.00
1988	\$0.00	2001	\$316,196.00	2014	\$0.00
1989	\$3,403.00	2002	\$415,852.00	2015	\$282,399.39
1990	\$0.00	2003	\$0.00	2016	\$193,692.75
1991	\$59,176.00	2004	\$4,369.00	2017	\$465,536.05
1992	\$597.00	2005	\$213,345.00	2018	\$40,199.50
1993	\$71,131.00	2006	\$82,247.00	2019	\$0.00
		<b>Total</b>	<b>\$3,992,174.39</b>		

**Table 5.3.2-2 Crop Loss Insurance Payments**

Of the crop losses summarized in Table 5.3-2.2, the individual crops that suffered the most substantial losses (as defined by indemnity amount) were soybeans and corn. Table 5.3-2.3 provides the total indemnity amount by crop type for crop years 1981 through 2019.

Crop	Indemnity Amount	Crop	Indemnity Amount
All other crops	\$1,984,488.00	Oats	\$11,844.35
Barley	\$5,773.00	Potatoes	\$131,257.00
Corn	\$699,445.80	Soybeans	\$1,110,455.24
Forage Production	\$14,647.00	Wheat	\$12,008.00
Forage Seeding	\$4,076.00	<b>Total</b>	<b>\$3,992,174.39</b>
Fresh Market Sweet Corn	\$18,180.00		

**Table 5.3.2-3 Substantial Loss**

One way to measure the magnitude of a drought is through the Palmer Drought Severity Index. This index is based on several meteorological and hydrological factors, including temperature and soil moisture levels, and is computed weekly by the National Weather Service's Climate Prediction Center. The index compares precipitation received against the average amount expected during that period. Droughts are expressed as negative numbers. Palmer values of -2.00 to -2.99 indicate a watch status; values of -3.00 to -3.99 indicate a warning; and values of -4.00 and less indicate an emergency.

According to the Palmer Drought Severity Index, Crawford County spent 5% to 9.9% of the time between 1895 and 1995 in a severe and extreme drought (i.e., Palmer values less than or equal to -3). Figure 4.3.2-1 displays these findings and Crawford County in relation to other areas in Pennsylvania.

### *FUTURE OCCURRENCE*

Because there is no single definition for drought, its onset and termination are difficult to determine. We can, however, identify various indicators of drought, and tracking these indicators provides us with a crucial means of monitoring drought. On the whole, though, the probability of future drought events can be considered possible according to the Risk Factor Methodology.

The National Oceanic and Atmospheric Administration Paleoclimatology Program studies drought by analyzing records from tree rings, lake and dune sediments, archaeological remains, historical documents, and other environmental indicators to obtain a broader picture of the frequency of droughts in the United States. According to their research, "...paleoclimatic data suggest that droughts as severe as the 1950's drought have occurred in central North America several times a century over the past 300-400 years, and thus we should expect (and plan for similar droughts in the future. The paleoclimatic record also indicates that droughts of a much greater duration than any in the 20th century have occurred in parts of North America as recently as 500 years ago." Based on this research, the 1950's drought situation could be expected approximately once every 50 years or 20% chance every ten years. An extreme drought, worse than the 1930's "Dust Bowl," has an approximate probability of occurring once every 500 years or a .2% chance of occurring each decade. (National Oceanic and Atmospheric Administration, 2003)

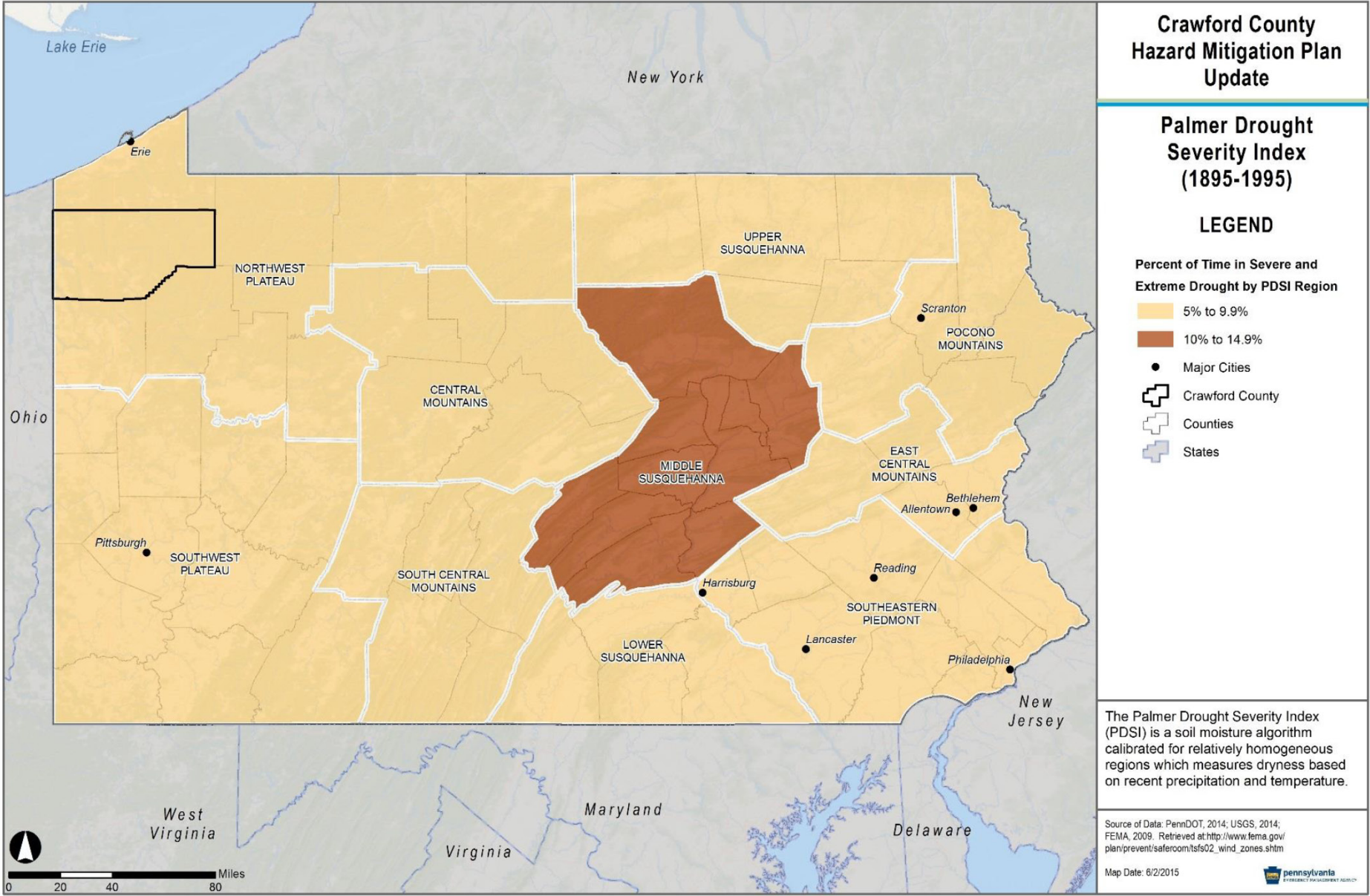
Understanding the historical frequency, duration, and spatial extent of drought assists in determining the likelihood and potential severity of future droughts. The characteristics of past droughts provide benchmarks for projecting similar conditions into the future. Based on historical record of 6 drought events since 1950, it can reasonably be assumed that this type of event has occurred once every 11.66667 years from 1950 through 2020.

Current Year (2020) subtracted by Historical Year (1950) = 70 Years on Record

Years on Record (70) divided by Number of Historical Events (6) = 11.66667

Furthermore, the historic frequency calculates that there is an 8.57% chance of this type of event occurring each year. On the whole, the probability of a drought event is considered possible as defined by the Risk Factor Methodology probability criteria.

Figure 5.3-2.1 Percent of time areas of Pennsylvania have PSDI values  $\leq -3$  (NDMC, 2009)



**VULNERABILITY ASSESSMENT**

Risk Factor (RF) Value: 1.8

According to the qualitative assessment performed using the RF tool, the drought hazard scored a RF value of 1.8 (from a scale of 0 to 4, with 4 being the highest risk level).

Hazard	Risk Assessment Category					Risk Factor
	Probability	Impact	Spatial Extent	Warning Time	Duration	
Drought	1	2	3	2	1	1.8

Drought typically does not have a direct impact on critical facilities or structures. However possible losses/impacts to critical facilities include the loss of critical function due to low water supplies. Severe droughts can negatively affect drinking water supplies. Should a public water system be affected, the losses could total into the millions of dollars if outside water is shipped in. Private springs/wells could also dry up. Possible losses to infrastructure include the loss of potable water.

Drought has serious implications for the agricultural sector of Crawford County’s economy. According to the 2017 USDA Census of Agriculture, Crawford County has 194,447 acres in 1,091 farms. The market value of all agricultural products sold exceeded \$107 million in 2017; some of this entire product is at risk during a drought event. Crawford County ranks 19th of the 67 counties in Pennsylvania in terms of the market value of agricultural products sold. Crawford County ranked 13th for crops and 23rd for Livestock, Poultry, and Products (USDA, 2017). Table 4.3.2-6 lists the livestock inventory items in Crawford County in 2017. With these agricultural assets, drought events can severely impair the local economy with prolonged drought negatively impacting the livelihood of residents within agricultural communities particularly.

**Table 5.3.2-4 Livestock Inventory Items in Crawford County**

Livestock	Count
Broilers and other meat-type chickens	1,826
Cattle and calves	32,216
Goats	1,091
Hogs and pigs	1,317
Horses and ponies	1,956
Layers	(D)
Pullets	(D)
Sheep and lambs	2,902
Turkeys	162
(D) Withheld to avoid disclosing data for individual operations.	

Wildfire is the most severe secondary effect associated with drought. Wildfires can devastate wooded and agricultural areas, threatening natural resources and farm production facilities. Prolonged drought conditions can cause major ecological changes, such as increases in scrub growth, flash flooding, and soil erosion.

Long-term water shortages can have a high impact on agribusinesses, hydropower-dependent utilities, and other industries reliant on water for production services; all critical infrastructure in Crawford County is vulnerable to the effects of a drought. Drought can cause municipalities to enforce water rationing and distribution. That strains the availability of consumable water for the community. It also increases Crawford County's vulnerability to other hazards such as severe weather, extreme heat, and public health emergencies. The special needs population of any county must also be considered during drought conditions.

Society's vulnerability to drought is affected by (among other things) population growth and shifts, urbanization, demographic characteristics, technology, water use trends, government policy, social behavior, and environmental awareness. These factors are continually changing, and society's vulnerability to drought may rise or fall in response to these changes. For example, increasing and shifting populations put increasing pressure on water and other natural resources—more people need more water. But a drought evolves slowly over time and the population typically has ample time to prepare for its effects. Should a drought affect the water available for public water systems or individual wells, the availability of clean drinking water could be compromised. This situation would require emergency actions and could possibly overwhelm the local government and financial resources.

Crawford County residents that use private domestic wells are more vulnerable to droughts. Table 4.3.2-7 shows the number of domestic wells per 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. There are at least 8,551 domestic wells in Crawford County. Municipalities with the highest number of domestic wells, and subsequently more vulnerable to droughts, are Vernon Township, West Mead Township, Summit Township, Hayfield Township, South Shenango Township, North Shenango Township, and Sadsbury Township.

Future development's greatest impact on the drought hazard would possibly be to ground water resources. New water and sewer systems or significant well and septic sites could use up more of the water available, particularly during periods of drought. Fortunately, public water systems are monitored, but individual wells and septic systems are not as strictly regulated. Therefore, future development could have an impact on the drought vulnerabilities.

**National Risk Index (NRI) ID: C42039 Crawford County, Pennsylvania**

Drought	
Number of Events	0
Annualized Frequency	0
Expo.- Agricultural Value (\$)	0
Expo.- Total (\$)	0
HLR- Agriculture	0
HLR- Overall Rating	No Rating
EAL- Agricultural Value (\$)	0
EAL- Total (\$)	0
EAL Score	0
EAL Rating	No Expected Annual Losses
Risk Score	0
Risk Rating	No Rating

Heat Wave	
Number of Events	2
Annualized Frequency	0.08
Expo.- Building Value (\$)	9,548,324,909
Expo.- Population	88,765
Expo.- Population Equiv. (\$)	656,860,987,977
Expo.- Total (\$)	666,409,312,886
HLR- Buildings	0
HLR – Population	0
HLR- Overall Rating	Very Low
EAL- Building Value (\$)	8
EAL – Population	0
EAL- Population Equiv. (\$)	24,309
EAL- Total (\$)	24,317
EAL Score	6.84
EAL Rating	Relatively Low
Risk Score	4.73
Risk Rating	Relatively Low

Municipality	Number of Reported Domestic Wells
Athens Township	52
Beaver Township	144
Bloomfield Township	201
Blooming Valley Borough	29
Cambridge Springs Borough	14
Cambridge Township	105
Centerville Borough	11
Cochranton Borough	13
Conneaut Lake Borough	12
Conneaut Township	289
Conneautville Borough	9
Cussewago Township	180
East Fairfield Township	96
East Fallowfield Township	234
East Mead Township	152
Fairfield Township	166
Greenwood Township	294
Hayfield Township	477
Hydetown Borough	37
Linesville Borough	15
Meadville City	105
North Shenango Township	430
Oil Creek Township	186
Pine Township	102
Randolph Township	164
Richmond Township	152

Municipality	Number of Reported Domestic Wells
Rockdale Township	68
Rome Township	93
Sadsbury Township	403
Saegertown Borough	24
South Shenango Township	453
Sparta Township	71
Spartansburg Borough	20
Spring Township	275
Springboro Borough	6
Steuben Township	64
Summerhill Township	233
Summit Township	478
Titusville City	30
Townville Borough	10
Troy Township	100
Union Township	238
Venango Borough	52
Venango Township	74
Vernon Township	751
Wayne Township	165
West Fallowfield Township	103
West Mead Township	591
West Shenango Township	83
Woodcock Borough	99
Woodcock Township	188
Unknown	210

**Table 5.3.2-5 Domestic Wells in Crawford County**

### *Crawford County Community Lifeline Integration*

Components and Essential Elements of information needed to stabilize and mitigate the incident within the Lifelines for this hazard within the lifeline(s) include:

- *Lifeline Planning Factors (Maximum anticipated or known impacts)*
- *Number of people seeking short-term public shelter*
- *Number of households' w/o potable water on H+1*
- *Percent of water systems with at least moderate damage*
- *Number of wastewater leaks/breaks*
- *Percent of grocery stores w/o power*

### *Lifeline Stabilization Target*

All survivors, their pets, and service animals have access to food, water, and sanitation. Sheltering, including cellular reception, capacity, accessibility, and wrap-around services, is supporting the displaced population. Sufficient resources are in place to sustain agricultural requirements.

### *County Assistance Lines of Efforts*

- *Sheltering Operations (In Progress)*
- *Emergency Repairs and Augmentations to Infrastructure [Water] (Anticipated)*
- *Temporary Housing [Repair, Rental Assistance, Direct Housing] (Anticipated)*

### *Mitigation Solutions Assess local vulnerability to drought.*

- *Monitor drought conditions.*
- *Monitor the water supply and its functions.*
- *Plan for future drought events.*
- *Require mandatory water conservation measures during drought emergencies.*
- *Prevent overgrazing.*
- *Improve water supply and delivery systems to save water.*
- *Encourage drought-tolerant landscape design.*
- *Educate and encourage citizens to take water-saving measures.*
- *Educate and encourage farmers to implement soil and water conservation practices.*
- *Encourage agricultural interests to obtain crop insurance.*





**Food, Water, Sheltering:** Food (Commercial Food Distribution, Commercial Food Supply Chain, Food Distribution Programs), Water (Drinking Water Utilities, Wastewater Systems, Commercial Water Supply Chain), Shelter, Agriculture (Animal and Agriculture)



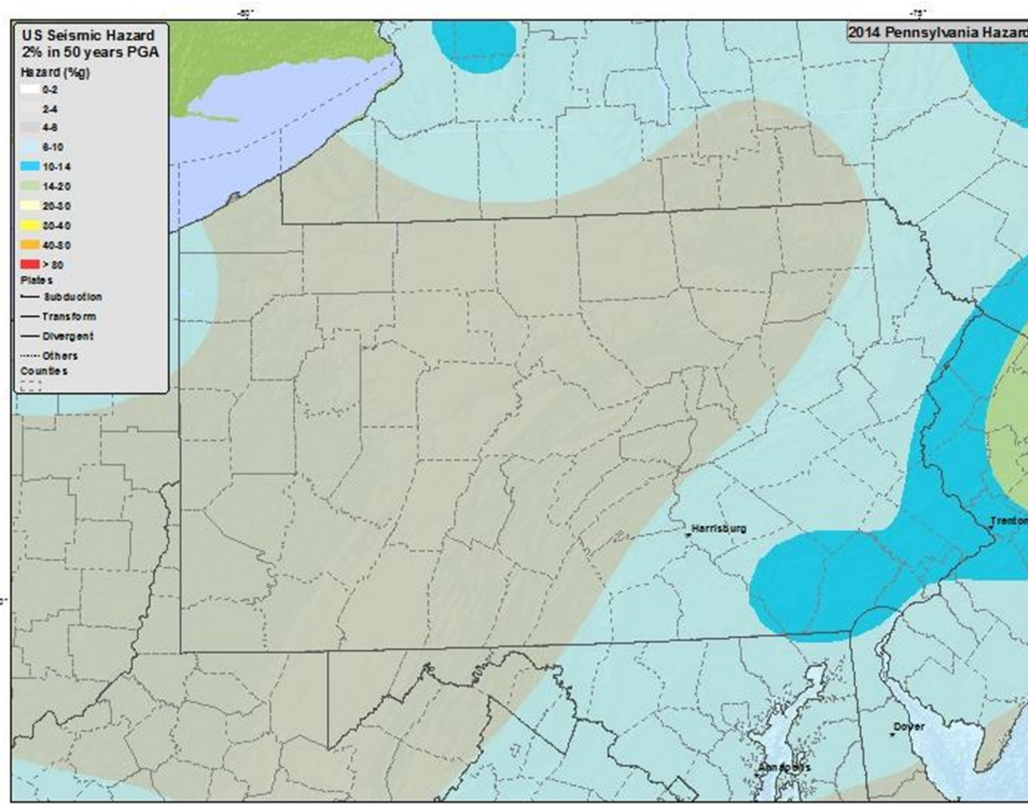
**Transportation:** Highway/Roadway (Roads, Bridges), Railway (Freight, Passenger), Aviation (Commercial (e.g. cargo/passenger, General, Military), Pipeline, Mass Transit (Bus, Rail, Ferry)

### 5.3-3 EARTHQUAKE

#### LOCATION AND EXTENT

Earthquakes are geological events that involve movement or shaking of the crust of the earth. Earthquakes are measured in terms of their magnitude and intensity (instrumental – Catastrophic). Earthquakes can cause devastating destruction to the manmade environment. Earthquake events in Pennsylvania typically do not impact areas greater than 100 km from the epicenter. Earthquakes are relatively infrequent and uncommon in Crawford County, but there is existing data to indicate that earthquake activity has occurred in Crawford County causing minimal damage, if any.

Figure 5.3.3-1 2014 Seismic Hazard Map



The area is generally not known for seismicity, and USGS downgraded the probabilistic seismic hazard for much of Pennsylvania in 2014. However, Northwestern Pennsylvania’s vulnerability to earthquakes decreases from west to east (see Figure 5.3.3-1).

#### 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 4.3.3-1 summarizes Richter Scale magnitudes as they relate to the spatial extent of impacted areas. Earthquake epicenters have occurred in Crawford County and range from 2.3 to 3.7 on the Richter Scale. Based on historical events, earthquakes with epicenters in Pennsylvania have not exceeded a magnitude of 6.0 (Pennsylvania 2019 State Hazard Mitigation Plan).

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. The impact an earthquake event has on an area is typically measured in terms of earthquake intensity. Intensity is most commonly

**Table 5.3.3-1  
Richter Scale**

Richter Magnitudes	Earthquake Effects
Less than 3.5	Generally, not felt, but recorded.
3.5 – 5.4	Often felt, but rarely causes damage.
Under 6.0	At most, slight damage to well-designed buildings; can cause major damage to poorly constructed buildings over small regions.
6.1 – 6.9	Can be destructive up to about 100 kilometers from epicenter.
7.0 – 7.9	Major earthquake; can cause serious damage over large areas.
8.0 or greater	Great earthquake; can cause serious damage in areas several hundred kilometers across.

measured using the Modified Mercalli Intensity (MMI) Scale based on direct and indirect measurements of seismic effects. A detailed description of the Modified Mercalli Intensity Scale is shown in Table 4.3.3-2. The earthquakes that occur in Pennsylvania originate deep with the Earth’s crust, and not on an active fault. Based on historical data of earthquakes with a recorded intensity, little damage is expected from 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 Crawford County or near the border in an adjacent county, causing mild damage in populated areas.

**Table 5.3.3-2 Modified Mercalli Intensity Scale**

Scale	Intensity	Description of Effects	Corresponding Richter Scale Magnitude
I	Instrumental	Usually detected only on seismographs.	<4.2
II	Feeble	Felt only by a few persons at rest, especially on upper floors of buildings.	
III	Slight	Felt quite noticeably indoors, especially on upper floors. Most people don’t recognize it as an earthquake (i.e. a truck rumbling).	
IV	Moderate	Can be felt by people walking; dishes, windows, and doors are disturbed.	
V	Slightly Strong	Sleepers are awoken; unstable objects are overturned.	<4.8
VI	Strong	Trees sway; suspended objects swing; objects fall off shelves; damage is slight.	<5.4
VII	Very Strong	Damage is negligible in buildings of good design and construction, slight to moderate in well-built ordinary structures, and considerable in poorly built or badly designed structures; some chimneys are broken.	<6.1
VIII	Destructive	Damage is slight in specially designed structures; considerable in ordinary, substantial buildings. Moving cars become uncontrollable; masonry fractures, poorly constructed buildings damaged.	<6.9
IX	Ruinous	Some houses collapse, ground cracks, pipes break open; damage is considerable in specially designed structures; buildings are shifted off foundations.	

Scale	Intensity	Description of Effects	Corresponding Richter Scale Magnitude
X	Disastrous	Some well-built wooden structures are destroyed; most masonry and frame structures are destroyed along with foundations. Ground cracks profusely; liquefaction and landslides widespread.	<7.3
XI	Very Disastrous	Most buildings and bridges collapse, roads, railways, pipes and cables destroyed.	<8.1
XII	Catastrophic	Total destruction; trees fall; lines of sight and level are distorted; ground rises and falls in waves; objects are thrown upward into the air.	>8.1

Crawford County is estimated to have a ‘slight’ earthquake hazard, which means that it has 2 percent exceedance levels (2 percent expectation of being exceeded in a period of 50 years) between 4 and 8 PGA. Roughly, ground acceleration must exceed 15 PGA for significant damage to occur, though soil conditions at local sites are extremely important in controlling how much damage will occur as a consequence of a given amount of ground acceleration.

Environmental impacts of earthquakes can be numerous, widespread, and devastating, particularly if indirect impacts are considered. The worst-case scenario, although highly unlikely, for Crawford County would be the occurrence of a Mercalli Scale XII earthquake with the following consequences:

Induced tsunamis and flooding or landslides and avalanches;

- *Poor water quality;*
- *Damage to vegetation; and*
- *Breakage in sewage or toxic material containments.*

### **PAST OCCURRENCE**

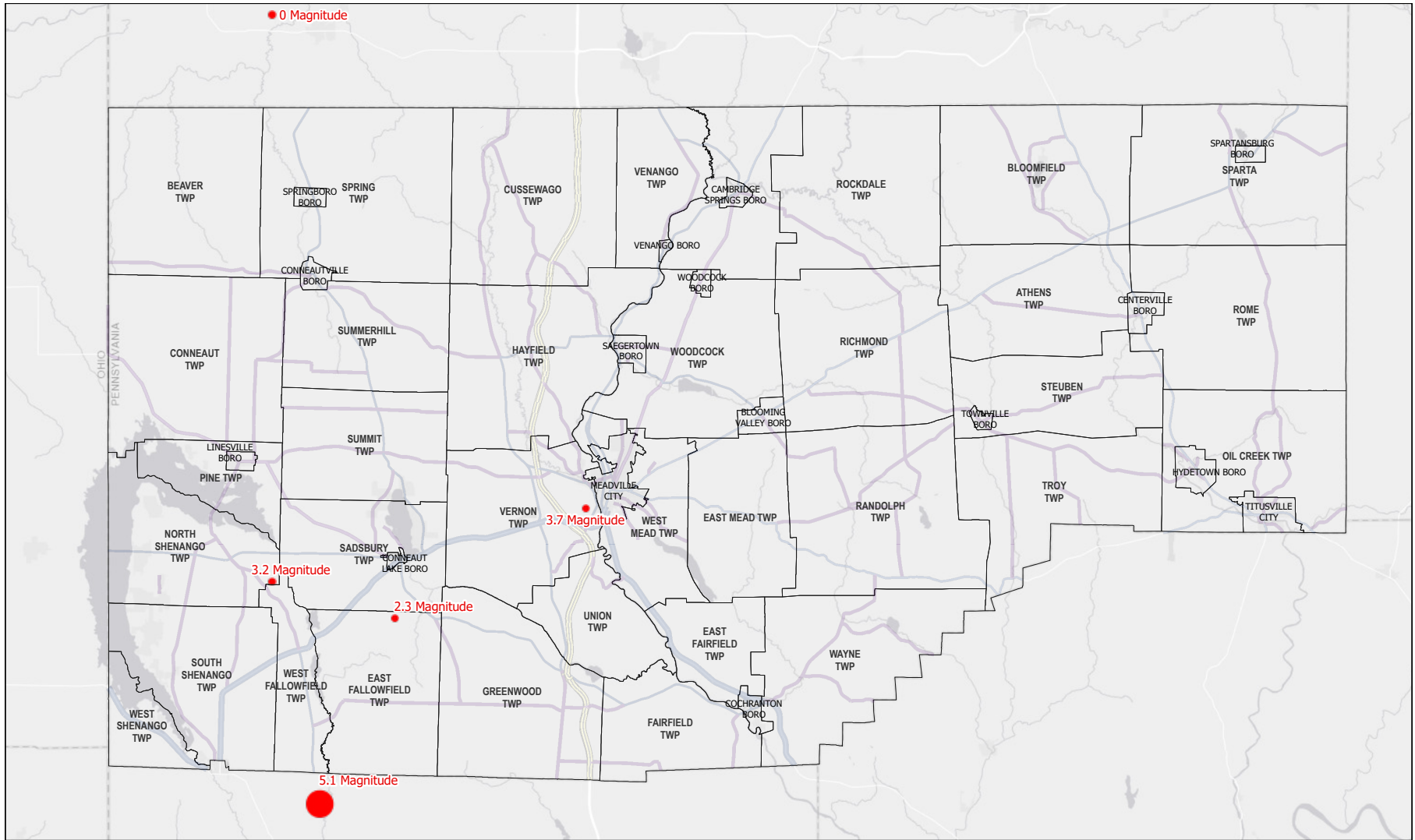
Seven earthquake epicenters have been measured in Crawford County. Figure 5.3.3-2 shows three recorded earthquake events in Crawford County between 1974 and 2003.

Four more earthquake events with epicenters in Crawford County have been recorded since 2003.

1. 2.1 on January 3rd, 2007 near the intersection of Broadford Road and Greer Road in Hayfield Township.
2. 2.0 on July 21st, 2008 near the intersection of Huckleberry Road and State Highway 18 in West Fallowfield Township.
3. 2.0 on December 10, 2010 near the intersection of Laird Road and Miller Drive in East Fallowfield Township.
4. 2.0 on August 25th, 2020 near the intersection of Ruheville Road and Shermansville Road in Summit Township.

No injuries or severe damages from earthquake events have been reported in Crawford County.

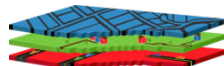
Figure 5.3.3-2 Earthquakes in Crawford County



**Earthquake History (1974-2003)**



Crawford County Government  
 Crawford County Courthouse  
 903 Diamond Park  
 Meadville PA 16335  
 GIS Manager: Phillip Baranyai  
 Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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 Data used for map creation is approximate and should not be used for site specific decision making.  
 Crawford County assumes no responsibility or liability to the accuracy or completion of these maps.

Source: Pennsylvania Department of



Conservation & Natural Resources  
 (PA DCNR)

**Earthquakes in Pennsylvania (1724–2003)**

**Magnitude**

- 0.0 - 3.9 Minor
- 4.0 - 4.9 Light
- 5.0 - 5.9 Moderate

**FUTURE OCCURRENCE**

Crawford County is located in a zone where minor earthquake damage is expected. On the whole, the probability of an earthquake event is considered unlikely as defined by the Risk Factor Methodology probability criteria (see Table 5.3.3-3).

**VULNERABILITY ASSESSMENT**

Risk Factor (RF) Value: 2

According to the qualitative assessment performed using the RF tool, the earthquake hazard scored a RF value of 2 (from a scale of 0 to 4, with 4 being the highest risk level).

Hazard	Risk Assessment Category					Risk Factor
	Probability	Impact	Spatial Extent	Warning Time	Duration	
Earthquake	1	2	2	4	1	2

The effects of earthquake (if the hazard exists) could potentially be anything from detected only on seismographs to ground water wells collapsing to total destruction, trees falling, ground rises and falls in waves. Continued enforcement of the unified construction code should mitigate this vulnerability.

**Crawford County Community Lifeline Integration**

Components and Essential Elements of information needed to stabilize and mitigate the incident within the Lifelines for this hazard within the lifeline(s) include;

**Lifeline Planning Factors (Maximum anticipated or known impacts)**

- Number of people seeking short-term public shelter
- Number of households’ w/o potable water on H+1
- Percent of water systems with at least moderate damage
- Number of wastewater leaks/breaks

Earthquake	
Number of Events Annualized Frequency	0
Expo.- Building Value (\$)	9,548,325,000
Expo.- Population	88,765
Expo.- Population Equiv. (\$)	656,861,000,000
Expo.- Total (\$)	666,409,325,000
HLR – Buildings	0.01
HLR- Population	0
HLR- Overall Rating	Relatively Moderate
EAL- Building Value (\$)	31,993
EAL- Population	0
EAL- Population Equiv. (\$)	1,137
EAL- Total (\$)	33,130
EAL Score	2.64
EAL Rating	Very Low
Risk Score	2.17
Risk Rating	Very Low

- *Percent of grocery stores w/o power*
- *Number of highway bridges with at least moderate damage*
- *Number of railway bridges with at least moderate damage*
- *Number of airport runways with at least moderate damage*
- *Number of port facilities with at least moderate damage*

#### **Lifeline Stabilization Target**

- *All survivors, their pets, and service animals have access to food, water, and sanitation. Sheltering, including cellular reception, capacity, accessibility, and wrap-around services, is supporting the displaced population. Sufficient resources are in place to sustain agricultural requirements.*
- *Multimodal routes (air, rail, road, port) are clear of debris and accessible by normal or alternate means.*

#### **County Assistance Lines of Efforts**

- *Adopt and enforce building codes.*
- *Incorporate earthquake mitigation into local planning.*
- *Map and assess community vulnerability to seismic hazards.*
- *Conduct building safety inspections.*
- *Protect critical facilities and infrastructure.*
- *Implement structural mitigation techniques.*
- *Increase earthquake risk awareness.*
- *Conduct outreach to builders, architects, engineers, and inspectors.*
- *Provide information on structural and non-structural retrofitting.*



**Transportation:** Highway/Roadway (Roads, Bridges), Railway (Freight, Passenger), Aviation (Commercial (e.g. cargo/passenger, General, Military), Pipeline, Mass Transit (Bus, Rail, Ferry)

### **5.3-4 LANDSLIDE**

#### *LOCATION AND EXTENT*

A landslide is the downward and outward movement of slope-forming soil, rock, and vegetation, which is driven by 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, volcanic eruptions, and changes in groundwater levels.

There are several types of landslides: rock falls, rock topple, slides, and flows. Rock falls are rapid movements of bedrock, which result in bouncing or rolling. A topple is a section or block of rock that rotates or tilts before falling to the slope below. Slides are movements of soil or rock along a distinct surface of rupture, which separates the slide material from the more stable underlying material. Mudflows, sometimes referred to as mudslides, mudflows, lahars or debris avalanches, are fast-moving rivers of rock, earth, and other debris saturated with water. They develop when water rapidly accumulates in the ground, such as heavy rainfall or rapid snowmelt, changing the soil into a flowing river of mud or "slurry." Slurry can flow rapidly down slopes or through channels, and can strike with little or no warning at avalanche speeds. Slurry can travel several miles from its source, growing in size as it picks up trees, cars, and other materials along the way. As the flows reach flatter ground, the mudflow spreads over a broad area where it can accumulate in thick deposits.

Landslides are typically associated with periods of heavy rainfall or rapid snow melt and tend to worsen the effects of flooding that often accompanies these events. In areas burned by forest and brush fires, a lower threshold of precipitation may initiate landslides. Some landslides move slowly and cause damage gradually, whereas others move so rapidly that they can destroy property and take lives suddenly and unexpectedly. Among the most destructive types of debris flows are those that accompany volcanic eruptions. A spectacular example in the United States was a massive debris flow resulting from the 1980 eruptions of Mount St. Helens, Washington. Areas near the bases of many volcanoes in the Cascade Mountain Range of California, Oregon and Washington are at risk from the same types of flows during future volcanic eruptions.

Areas that are generally prone to landslide hazards include previous landslide areas; the bases of steep slopes; the bases of drainage channels; and developed hillsides where leach-field septic systems are used. Areas that are typically considered safe from landslides include areas that have not moved in the past; relatively flat-lying areas away from sudden changes in slope; and areas at the top or along ridges, set back from the tops of slopes. In the United States, it is estimated that landslides cause up to \$2 billion in damages and from 25 to 50 deaths annually. Globally, landslides cause billions of dollars in damage and thousands of deaths and injuries each year.

Crawford County, located in Northwest Pennsylvania, has low susceptibility to the landslide hazard. However, southwestern Pennsylvania has by far the highest concentration of landslides throughout the commonwealth. Landslides occur primarily in colluvial (loose) soil and old landslide debris on steep slopes. Most major and minor highways have sections cut in rock or soil that can fail. Steep mountain slopes across the state have experienced debris avalanches associated with extreme rainfall or rain-on-snow events. Glacial and glacial-lake sediments underlie stream bank and lake bluff slumps and other failure areas across the much of the northern part of the state.

Urban and rural land development is increasing both the number of landslides and the economic effects of natural slides. Major highway construction with large excavations and fills located in mountainous areas creates potential for many landslides. According to the United States Geological Survey (USGS), less than 1.5% of Crawford County is involved in landslide (see Figure 5.3.4-1).

#### *RANGE OF MAGNITUDE*

Areas of the Commonwealth that have underlying mines are subject to subsidence and constitute a potential threat to people living in those areas. Isolated incidents throughout the coal regions over the years have been houses, garages, and trees swallowed up by subsidence holes. Lengths of local streets, highways, and countless building foundations have been damaged.

Landslides cause damage to transportation routes, utilities, and buildings, create travel delays and other side effects. Fortunately, deaths and injuries due to landslides are rare in Pennsylvania. Almost all of the known deaths due to landslides have occurred when boulders/rocks fall along highways and involve vehicles. Storm induced debris flows are the only other type of landslide likely to cause death and injury. Most landslides that do occur in Pennsylvania are moderate to slow moving and damage infrastructure rather than people.

The Pennsylvania Department of Transportation and large municipalities incur substantial costs due to landslide damage and to 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, 1999). Although no significant landslides have been recorded in Crawford County, the worst-case scenario would be a massive landslide resulting in fatalities, injuries, and disrupting the transportation network.

#### *PAST OCCURRENCE*

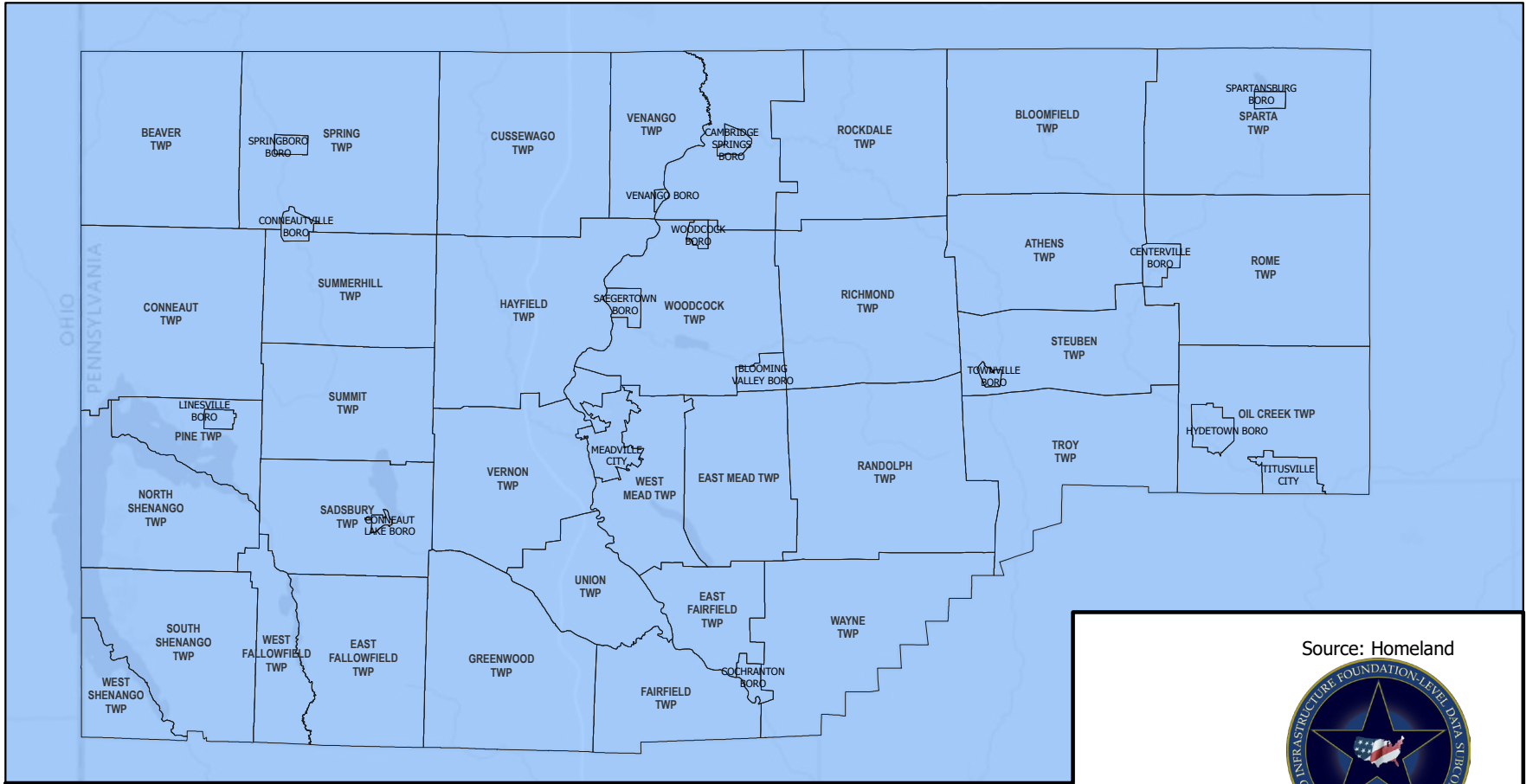
There have been several landslides in the Commonwealth, but only one significant event on record in Crawford County. On December 27th, 2015 a landslide due to rain resulted in a collapse of the roadway on U.S. Highway 322 in East Fairfield Township just north of Cochranon Borough. Landslide inventory maps were created in late 1970s and early 1980s by the U.S. Geological Survey as part of an Appalachians-wide study of landslides. These maps show landslides and related features that were identified mainly from aerial photographs; however, Crawford County was not included in this inventory (DCNR, 1999).

#### *FUTURE OCCURRENCE*

Landslides remain a possible occurrence in localized areas of Crawford County, but impacts from such an event would likely cause minimal localized damage and are unlikely. The USGS continues to devote fewer resources to landslide mapping (and no resources to landslide probability modeling) because landslides tend to have much more isolated impacts. On the whole, the probability of a landslide event is considered unlikely as defined by the Risk Factor Methodology probability criteria.



Figure 5.3.4-1 Landslide Susceptibility and Incidence



Source: Homeland

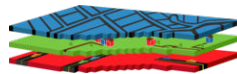


Foundation-Level Data (HIFLD)

### Landslide Susceptibility & Incidence



Crawford County Government  
 Crawford County Courthouse  
 903 Diamond Park  
 Meadville PA 16335  
 GIS Manager: Phillip Baranyai  
 Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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 Data used for map creation is approximate and should not be used for site specific decision making.  
 Crawford County assumes no responsibility or liability to the accuracy or completion of these maps.

### Landslide Regions - Susceptibility

- Low landslide incidence (less than 1.5% of the area is involved in landsliding)
- Moderate susceptibility to landsliding & low incidence
- Moderate landslide incidence (1.5 - 15% of the area is involved in landsliding)
- High landslide incidence (more than 15% of the area is involved in landsliding)
- High susceptibility to landsliding & low incidence
- High susceptibility to landsliding & moderate incidence
- No data available

**VULNERABILITY ASSESSMENT**

Risk Factor (RF) Value: 2

According to the qualitative assessment performed using the RF tool, the landslide hazard scored a RF value of 2 (from a scale of 0 to 4, with 4 being the highest risk level).

Hazard	Risk Assessment Category					Risk Factor
	Probability	Impact	Spatial Extent	Warning Time	Duration	
Landslide	1	1	2	4	2	2

Most communities in Crawford County are not vulnerable to landslides. Any events that do occur would take place in steeply sloped areas. In addition, places where landforms have been altered for purposes of highway construction or other development may be uniquely vulnerable to landslide hazards. This is especially true if development is located at the base or crest of cliffs or near large highway cut-outs. Although considered low, the susceptibility of landslide is greatest in the southeastern area of the county (Oil Creek Township, Troy Township, and Wayne Township). These areas should be considered vulnerable to landslides, particularly if mitigation measures have not been implemented.

Landslide	
Number of Events	0
Annualized Frequency	0.02
Expo.- Building Value (\$)	5,300,565,877
Expo.- Population	49,935
Expo.- Population Equiv. (\$)	369,522,273,453
Expo.- Total (\$)	374,822,839,330
HLR- Buildings	0
HLR- Population	0
HLR- Overall Rating	Very Low
EAL- Building Value (\$)	277,426
EAL- Population	0
EAL- Population Equiv. (\$)	83,217
EAL- Total (\$)	360,643
EAL Score	30.97
EAL Rating	Relatively Moderate
Risk Score	24.4
Risk Rating	Relatively Moderate

**National Risk Index (NRI) ID: C42039 Crawford County, Pennsylvania**

### *Crawford County Community Lifeline Integration*

Components and Essential Elements of information needed to stabilize and mitigate the incident within the Lifelines for this hazard within the lifeline(s) include;

#### **Lifeline Planning Factors (Maximum anticipated or known impacts)**

- *Number of highway bridges with at least moderate damage*
- *Number of railway bridges with at least moderate damage*
- *Number of airport runways with at least moderate damage*
- *Number of port facilities with at least moderate damage*

#### **Lifeline Stabilization Target**

- *Multimodal routes (air, rail, road, port) are clear of debris and accessible by normal or alternate means.*

#### **County Assistance Lines of Efforts**

- *Emergency Repairs and Augmentations to Infrastructure [Port] (Anticipated)*
- *Debris Management [Road, Port] (Anticipated)*

#### **Mitigation Solutions**

- *Map and assess vulnerability to landslides.*
- *Manage development in landslide hazard areas.*
- *Prevent impacts to roadways.*
- *Remove existing buildings and infrastructure from landslide hazard areas.*



## **HEALTH AND MEDICAL COMMUNITY LIFELINE:**

Medical Care (Hospitals, Dialysis, Pharmacies, Long-Term Care Facilities, VA Health System, Veterinary Services, Home Care),

Public Health (Epidemiological Surveillance, Laboratory, Clinical Guidance, Assessment/ Interventions/ Treatments, Human Services, Behavioral Health),

Medical Supply Chain (Blood/Blood Products, Manufacturing, Pharmaceutical, Device, Medical Gases, Distribution, Critical Clinical Research, Sterilization, Raw Materials),

Patient Movement (Emergency Medical Services),

Fatality Management (Mortuary and Post-Mortuary Services)

### **5.3-5 PANDEMIC AND INFECTIOUS DISEASE**

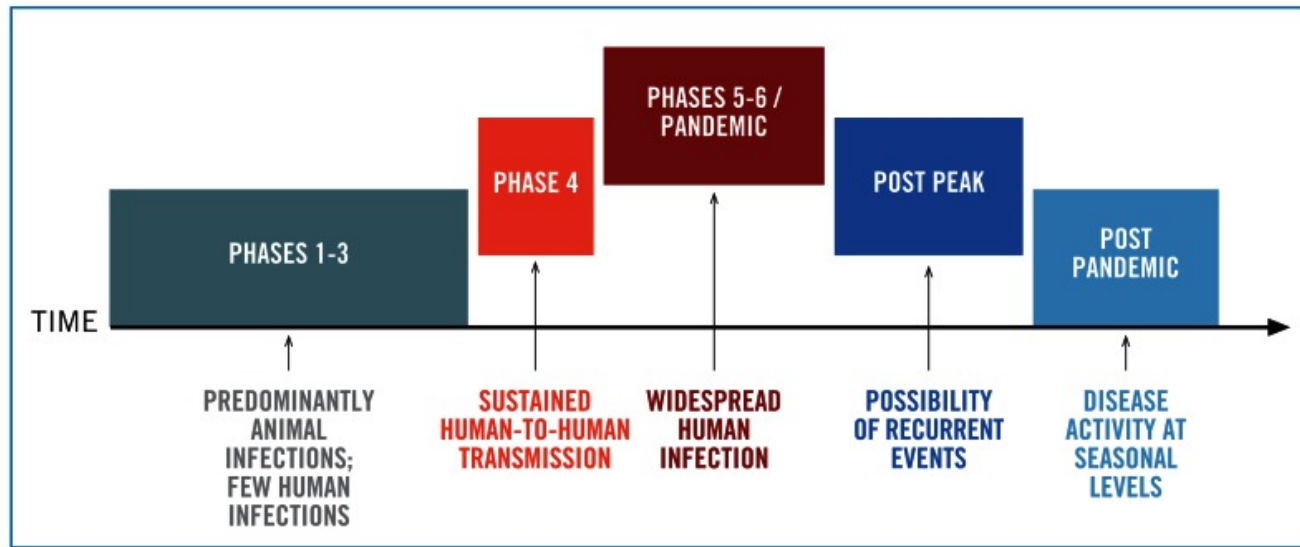
#### *LOCATION AND EXTENT*

A disease epidemic occurs when there are more cases of that disease than normal. A pandemic is a worldwide epidemic of a disease. An influenza pandemic may occur when a new influenza virus appears against which the human population has no immunity. With the increase in global transport, as well as urbanization and overcrowded conditions in some areas, epidemics due to a new influenza virus are likely to take hold around the world, and become a pandemic faster than before. Pandemics can be either mild or severe in the illness and death they cause, and the severity of a pandemic can change over the course of that pandemic. No one was prepared for such a magnitude, World Wide, which the COVID-19 Pandemic has caused. Crawford County has planned for years for a “Pandemic” hazard with Points of Distribution Plans but not to the extent affecting the entire World.

Pandemic events cover a wide geographical area and affect a large population as we currently see. The exact size and extent of an infected population is dependent upon how easily the illness is spread, mode of transmission, and the amount of contact between infected and uninfected individuals. Closing off air flights from other countries, closing schools, and keeping everyone home as much as possible had a direct correlation to the spread. Crawford County is primarily concerned with the reality of a pandemic flu outbreak that is occurring now. The previous pandemic, the H1N1 virus, colloquially known as swine flu was the last pandemic of concern before the COVID-19 occurred. This virus was first detected in people in the United States in April 2009. On June 11, 2009, the World Health Organization (WHO) signaled that a pandemic of 2009 H1N1 flu was underway (CDC, 2009).

#### *RANGE OF MAGNITUDE*

In the 2005 revision of the pandemic influenza phase descriptions, developed in 1999 and is still current, the World Health Organization has retained the use of a six-phased approach for easy incorporation of new recommendations and approaches into existing national preparedness and response plans. The grouping and description of pandemic phases have been revised to make them easier to understand, more precise, and based upon observable phenomena.



Phases 1–3 correlate with preparedness, including capacity development and response planning activities, while Phases 4–6 clearly signal the need for response and mitigation efforts. Furthermore, periods after the first pandemic wave are elaborated to facilitate post pandemic recovery activities.

In nature, influenza viruses circulate continuously among animals, especially birds. Even though such viruses might theoretically develop into pandemic viruses, in Phase 1, no viruses circulating among animals have been reported to cause infections in humans.

In Phase 2, an animal influenza virus circulating among domesticated or wild animals is known to have caused infection in humans, and is therefore considered a potential pandemic threat.

In Phase 3, an animal or human-animal influenza reassortant virus has caused sporadic cases or small clusters of disease in people, but has not resulted in human-to-human transmission sufficient to sustain community-level outbreaks. Limited human-to-human transmission may occur under some circumstances, for example, when there is close contact between an infected person and an unprotected caregiver. However, limited transmission under such restricted circumstances does not indicate that the virus has gained the level of transmissibility among humans necessary to cause a pandemic.

Phase 4 is characterized by verified human-to-human transmission of an animal or human-animal influenza reassortant virus able to cause “community-level outbreaks.” The ability to cause sustained disease outbreaks in a community marks a significant upwards shift in the risk for a pandemic. Any country that suspects or has verified such an event should urgently consult with WHO so that the situation can be jointly assessed and a decision made by the affected country if implementation of a rapid pandemic containment operation is warranted. Phase 4 indicates a significant increase in risk of a pandemic but does not necessarily mean that a pandemic is a foregone conclusion.

Phase 5 is characterized by human-to-human spread of the virus into at least two countries in one WHO region. While most countries will not be affected at this stage, the declaration of Phase 5 is a strong signal that a pandemic is imminent and that the time to finalize the organization, communication, and implementation of the planned mitigation measures is short.

## WHO PANDEMIC PHASE DESCRIPTIONS AND MAIN ACTIONS BY PHASE

PHASE	DESCRIPTION	MAIN ACTIONS				
		PLANNING AND COORDINATION	SITUATION MONITORING AND ASSESSMENT	COMMUNICATIONS	REDUCING THE SPREAD OF DISEASE	CONTINUITY OF HEALTH CARE PROVISION
PHASE 1	No animal influenza virus circulating among animals have been reported to cause infection in humans.	Develop, exercise, and periodically revise national influenza pandemic preparedness and response plans.	Develop robust national surveillance systems in collaboration with national animal health authorities, and other relevant sectors.	Complete communications planning and initiate communications activities to communicate real and potential risks.	Promote beneficial behaviours in individuals for self protection. Plan for use of pharmaceuticals and vaccines.	Prepare the health system to scale up.
PHASE 2	An animal influenza virus circulating in domesticated or wild animals is known to have caused infection in humans and is therefore considered a specific potential pandemic threat.					
PHASE 3	An animal or human-animal influenza reassortant virus has caused sporadic cases or small clusters of disease in people, but has not resulted in human-to-human transmission sufficient to sustain community-level outbreaks.					
PHASE 4	Human to human transmission of an animal or human-animal influenza reassortant virus able to sustain community-level outbreaks has been verified.	Direct and coordinate rapid pandemic containment activities in collaboration with WHO to limit or delay the spread of infection.	Increase surveillance. Monitor containment operations. Share findings with WHO and the international community.	Promote and communicate recommended interventions to prevent and reduce population and individual risk.	Implement rapid pandemic containment operations and other activities; collaborate with WHO and the international community as necessary.	Activate contingency plans.
PHASE 5	The same identified virus has caused sustained community level outbreaks in two or more countries in one WHO region.	Provide leadership and coordination to multisectoral resources to mitigate the societal and economic impacts.	Actively monitor and assess the evolving pandemic and its impacts and mitigation measures.	Continue providing updates to general public and all stakeholders on the state of pandemic and measures to mitigate risk.	Implement individual, societal, and pharmaceutical measures.	Implement contingency plans for health systems at all levels.
PHASE 6	In addition to the criteria defined in Phase 5, the same virus has caused sustained community level outbreaks in at least one other country in another WHO region.					
POST PEAK PERIOD	Levels of pandemic influenza in most countries with adequate surveillance have dropped below peak levels.	Plan and coordinate for additional resources and capacities during possible future waves.	Continue surveillance to detect subsequent waves.	Regularly update the public and other stakeholders on any changes to the status of the pandemic.	Evaluate the effectiveness of the measures used to update guidelines, protocols, and algorithms.	Rest, restock resources, revise plans, and rebuild essential services.
POST PANDEMIC PERIOD	Levels of influenza activity have returned to the levels seen for seasonal influenza in most countries with adequate surveillance.	Review lessons learned and share experiences with the international community. Replenish resources.	Evaluate the pandemic characteristics and situation monitoring and assessment tools for the next pandemic and other public health emergencies.	Publicly acknowledge contributions of all communities and sectors and communicate the lessons learned; incorporate lessons learned into communications activities and planning for the next major public health crisis.	Conduct a thorough evaluation of all interventions implemented.	Evaluate the response of the health system to the pandemic and share the lessons learned.



Phase 6, the pandemic phase, is characterized by community level outbreaks in at least one other country in a different WHO region in addition to the criteria defined in Phase 5. Designation of this phase will indicate that a global pandemic is under way.

During the post-peak period, pandemic disease levels in most countries with adequate surveillance will have dropped below peak observed levels. The post-peak period signifies that pandemic activity appears to be decreasing; however, it is uncertain if additional waves will occur and countries will need to be prepared for a second wave.

Previous pandemics have been characterized by waves of activity spread over months. Once the level of disease activity drops, a critical communications task will be to balance this information with the possibility of another wave. Pandemic waves can be separated by months and an immediate “at-ease” signal may be premature.

In the post-pandemic period, influenza disease activity will have returned to levels normally seen for seasonal influenza. It is expected that the pandemic virus will behave as a seasonal influenza “A” virus. At this stage, it is important to maintain surveillance and update pandemic preparedness and response plans accordingly. An intensive phase of recovery and evaluation may be required.

**PAST OCCURRENCE**

Events that have involved pandemic in Crawford County include H1N1 from September 28, 2014 to May 23, 2015 and March 2020 when the Corona Virus COVID-19 affected the World. However, throughout the past, influenza pandemics have resulted in increased death and disease and great social disruption.

According to the Pennsylvania Department of Health’s flu data for the 2019-2020 flu season, the total confirmed flu cases reported is 1,576 and total confirmed deaths reported is 2. As of August 28, Crawford County has seen total COVID-19 cases reported 203 (177 confirmed; 26 probable) and total confirmed COVID-19 deaths of 2. On December 1, 2020 Crawford County saw a substantial increase of 1,582 confirmed cases, 425 probable cases and 23 deaths (14 of which have been in a long-term care center) with 13,808 negative tests. There are now 35 patients hospitalized with COVID-19, 11 adults in the intensive care unit, and 1 patient on a ventilator. Epidemiology Research Associate – Informatics, Pennsylvania Department of Health Bureau of Epidemiology

In the 20th century until 2020, the most severe influenza pandemic occurred in 1918-1919 and caused an estimated 40 to 50 million deaths worldwide. A list of events worldwide is shown below.

Year/Time Frame	Known as:	Virus type	Geographic Origin
1889	Russian flu	H2N2 or H3N8	Russia
1918	Spanish flu	H1N1	German, Britain, France, United States
1957	Asian flu	H2N2	China
1968-1969	Hong Kong flu	H3N2	Hong Kong
1976	Swine flu	H1N1	Fort Dix “swine flu fiasco”
2006	H5N1	H5N1	India
2007	Australian equine	H3N8	Australia
2007	Bernard Matthews	H5N1	England – Bernard Matthews’ farms
2008	West Bengal	H5N1	West Bengal, India
2014-2015	Novel H1N1	H1N1	Mexico
2020-2021	Novel Corona Virus	COVID-19	China

Since Crawford County was impacted with the H1N1 virus during 2009, a comprehensive network has been developed across Pennsylvania which includes trapping mosquitoes, collecting dead birds and monitoring horses, people and in past years sentinel chickens.

Virus	Common Name
H1N1	Human, swine, bird
H2N2	bird
H5N1	“bird flu”
H3N8	Canine (dog flu), equine-2
H7N7	Equine-1 (horse flu)
H7N9	Avian (bird flu)

### **Smallpox**

The World Health Organization (WHO) certified the eradication of smallpox in 1979. This is due to the vaccination campaigns throughout the 19th and 20th centuries.

### **West Nile Virus**

PA Department of Environmental Protection is involved in West Nile Virus surveillance and control. The virus has not been found in mosquito populations in Crawford County in 2020. There also have been no human cases in the county. They are also conducting surveillance for Eastern Equine Encephalitis and have not detected any to date in the county. They are setting mosquito traps on a monthly basis in the county to test for this. (PA DEP August 2020)

### **Rabies**

From 2016 to 2019 Crawford County has reported and tested positive for rabies the following animals; 9 raccoons, 5 bats, 2 skunks, 1 cat, and 1 dog. The PA Department of Agriculture monitors and tests for rabies and other animal illnesses. (PA DAG August 2020)

### **African Swine Fever**

African swine fever (ASF) is a highly contagious hemorrhagic viral disease affecting domestic and wild swine. There is no treatment for or approved vaccine against ASF. African swine fever virus (ASFV) can be spread by live or dead pigs, domestic or wild, and raw and processed pork products. Transmission can also occur via contaminated feed, specific insect vectors (soft ticks), and fomites (non-living objects) such as shoes, clothes, vehicles, equipment etc., due to the high environmental resistance of ASFV. There are quarantine orders on African Swine Fever which has to do with exhibition requirements for fairs and shows in Pennsylvania. This is the newest disease that the PA Department of Agriculture are on the lookout for. It has been pretty devastating to the pig herd in Asia. Domestic Animal Health Inspector, PA Department of Agriculture, Bureau of Animal Health and Diagnostic Services (August 2020)



Selected causes of death by County from the PA Department of Health Web-site show the following causes of death: Motor Vehicle Accidents 64 Intentional Self-harm 85, Lung Cancer 297, Female Breast Cancer 65, Assault (Homicide) 11, Diseases of Heart 1,143, Stroke 265, and Cardiovascular Disease 1,488, All Deaths 5,048 (PA DOH 2019).

In January 2016 Crawford County Department of Public Safety helped write an Emergency Response Plan with the PA Department of Agriculture Northwestern Region Office to address the possibility of the Highly Pathogenic Avian Influenza in Crawford County. The purpose of this Response Plan is to describe procedures and establish responsibilities for public safety planning for and response to identified HPAI at known facilities in Crawford County. HPAI consists of H5N2, H5N8, H5N1 strains which peaks in April and ends in June. There are 126 registered poultry locations identified in Crawford County with three being the largest locations in PA Dept. of Agriculture Northwestern Region I. Pennsylvania is fourth in egg production and ninth in turkey production. This plan nor does PA Dept. of Agriculture planning does not address poultry in the wild. This is currently a non-human threat however it is a devastating economic impact to the amount nationally of 1.6-billion-dollar loss for the industry with 3.3 billion impacts for tertiary businesses. This vital link to preventing HPAI is the biosecurity of backyard flocks and the Amish community.

On May 31, 2019 a confirmed case of measles was recently identified in Crawford County. The individual with measles potentially exposed members of the public who: Used the entrance near the emergency department at Meadville Medical Center (751 Liberty St., Meadville, PA 16335) on Tuesday, May 28, 2019 between 10.30am-1.00pm. Meadville Medical Center is notifying and evaluating patients, visitors and staff who may have come in contact with the individual. People infected through these exposures may develop symptoms through June 18, 2019. Measles outbreaks are on-going in New York, New Jersey, Michigan, California, and many other countries in Europe, Asia, Africa, South America, and Oceania.

### *Coronavirus COVID-19 Information*

As of January 30, 2020, the World Health Organization (WHO) has declared the novel coronavirus pandemic a global health emergency. World Health Organization has officially named the 2019 novel coronavirus COVID-19. On March 13, 2020, President Trump declared a national emergency. On March 13, 2020, Governor Wolf ordered statewide school closings. Mass closings in Montgomery (starting March 13) and Delaware (starting March 16) counties including all schools, community centers, gyms, entertainment centers, and non-essential retail continues. All critical infrastructure will remain open. On March 17, 2020 the Crawford County Commissioners sign a Declaration of Disaster Emergency and the President Judge signed a Declaration of Judicial Emergency. On March 29, 2020, President Trump extended federal social distancing and mitigation guidelines until April 30, 2020. Also, on March 29, 2020, Governor Tom Wolf requested a major disaster declaration from the President through the Federal Emergency Management Agency to provide additional support for state, county, and municipal governments and certain nonprofits, as well as individuals who are struggling during the COVID-19 outbreak. On March 31, 2020, Governor Tom Wolf announced the approval of part of his request to the President for a major disaster declaration to support state, county and local response to the COVID-19 outbreak in Pennsylvania. Also, on March 31, 2020, Governor Wolf revised the “stay at home” orders to include Crawford County. On April 1, 2020, Governor Wolf revised the “stay at home” orders to include all 67 counties in Pennsylvania.

On April 9, 2020 Governor Wolf ordered the closure of all K-12 schools and programs, public and private, through the end of the 2019-2020 academic year. Pennsylvania Pre-K Counts, Head Start Supplemental Assistance Programs, and Preschool Early Intervention programs will also remain closed, and institutions of higher education are prohibited from offering in-person instruction.

On April 20th Governor Wolf and Health Secretary Levine extended their statewide stay-at-home orders to May 8, 2020.

On April 22nd Governor Wolf presented his detailed plan for reopening the commonwealth with a targeted May 8th start. The administration will categorize reopening into three phases: Red, yellow, and green. Phases will be assigned based on conditions in a county, counties, or region. Here's the link to the plan: <https://www.governor.pa.gov/process-to-reopen-pennsylvania/>. Governor Tom Wolf today announced that the Wolf Administration is lifting some restrictions on businesses related to certain outdoor activities. Starting Friday, May 1, golf courses, marinas, guided fishing trips and privately owned campgrounds may reopen statewide and are required to follow updated life-sustaining business guidance and FAQ to include specifics for how these outdoor recreational industries can resume activities while prioritizing public health and safety. Campgrounds in state parks will remain closed through Thursday, May 14 (04/28/20).

The Governor will announce on May 1st what regions will go to Yellow Phase on May 8th with additional information (04/28/20). The Governor announced the reopening of 24 counties in the northwest and north-central regions of the state, moving them from red to yellow beginning at 12:01 a.m. on Friday, May 8th, 2020 (05/01/20). Crawford County moved into the Green Phase today (05/29/20).

Crawford County Government established a COVID-19 Subcommittee that have met twice with numerous smaller meetings with Department Heads.

Crawford County Emergency Operations Center has been stood up and at Partial Activation Level with EMA Staff and EOC Volunteers during the weekday 0800 to 1600 daily.

The Crawford County Courthouse will be closed Monday, March 23rd, 2020 to Friday, March 27th, 2020. It's anticipated that the building will reopen on Monday, March 30th, 2020. On Thursday, March 26th, 2020, the Commissioners extended the current closure of the County government through April 3rd, 2020. That closure was then extended April 2nd, 2020 until further notice.

The Crawford County Department of Public Safety's 9-1-1 personnel are preparing to be housed in the building. The dispatchers would work 12 hours on and 12 hours off for 7 straight days. Two campers are located in the garage. They would be used for male and female sleeping quarters and for showers.

The Crawford County Judicial Center as well as all other court office buildings are generally closed to the public per order of the Supreme Court. The Courts remain open for essential functions as defined by Court orders and posted on doors and websites. As far as the Judicial Center is concerned, all offices within will be open for limited functions and staffed accordingly.

The Crawford County Commissioners signed a Travel Authorization Letter during a Declared State of Emergency. It will be given to all essential Crawford County personnel.

The Crawford County COVID-19 Information Facebook Group was established. It has over 9,000 members now. It features live videos from doctors and Crawford County Commissioner Eric Henry.

FEMA Administrator recommends the following, which Crawford County is meeting or exceeding; mitigation activities along with the "15 Days to Slow the Spread;" integrate all emergency management & public health operations; collect public, private, and government bed capacity data; actively plan to stand-up Alternate Care Sites; maintain situational awareness of ventilators; identify all sources to surge medical professionals; and finally manage personal protective equipment carefully.

On 04/03/20 the Crawford County Commissioners announced that approximately 100 county employees will be furloughed beginning on 04/13/20 due to a decrease in revenue caused by the COVID-19 pandemic.

On 04/06/20 The Crawford County Commissioners established a COVID-19 Informational phone line for those without internet or media access. That phone number is; 814-373-2504.

The Crawford County Commissioners continue to examine the financial status of the county's income versus expenses and make changes and decisions based on those numbers (04/09/20).

The Crawford County Commissioners are purchasing 55 gallons of hand sanitizer and 2,500 masks for county employees (04/16/20).

Following the Governor's Order, beginning 8 p.m. Sunday all patrons entering a county building must wear a mask or they will not be able to enter the building (04/17/20).

Crawford County Emergency Operations Center will go to Level 1 on Monday, April 20th at 08:00 with DPS/EMA Staff working from their offices to ensure social distancing. The EOC can be activated once again within minutes as needed (04/17/20).

Crawford County Election Board voted today to use all paper ballots and not machines for the June 2nd Primary Election. A couple polling locations will need to be either changed to another site or combined with another site (04/22/20).

Beginning on Monday, May 11th, 2020 at 8 a.m. Crawford County government buildings will be available to the general public by appointment only. Patrons must make appointments with the appropriate county departments prior to arriving. No member of the public will be granted access to a county building without having made an appointment. Patrons will be required to wear masks and will be asked COVID-19 screening questions at the time of making the appointment and before being allowed entry into a county government building. County offices will have sneeze shields and hand sanitizer and will regularly disinfect frequently touched areas. County government will continue to follow CDC and DOH guidance for social distancing and cleaning, and the PA Department of Health will monitor public health indicators and will adjust orders and restrictions as necessary (05/01/20).

On behalf of the Crawford County Commissioners, the Department of Public Safety would like to thank everyone who has been involved in the response to this pandemic. Our years of planning, training, and exercising together has made this incident go as well as it could with all of our combined support and effort. We still do not know what the Yellow Phase will bring to Crawford County nor the next emergency, the Murder Hornets, but together we will work together to provide the very best response and recovery efforts to the residents of Crawford County. Thank you and Stay Safe! Sincerely, Allen Clark (05/05/20)

Effective June 1st, 2020 the Crawford County Courthouse will no longer require appointments for the public to enter the building. However, the public will still be required to wear masks and go through the screening process at the front door upon entering the courthouse (05/26/20).

Governor Wolf announced that Secretary of Health Dr. Levine expanded the mask wearing requirement and Ordered that masks be worn whenever someone leaves their home. More specifically, the new Order also relates to the workplace. Therefore, effective today, all employees in any County building must wear masks when entering the buildings, working in or walking through common areas, when dealing with members of the public

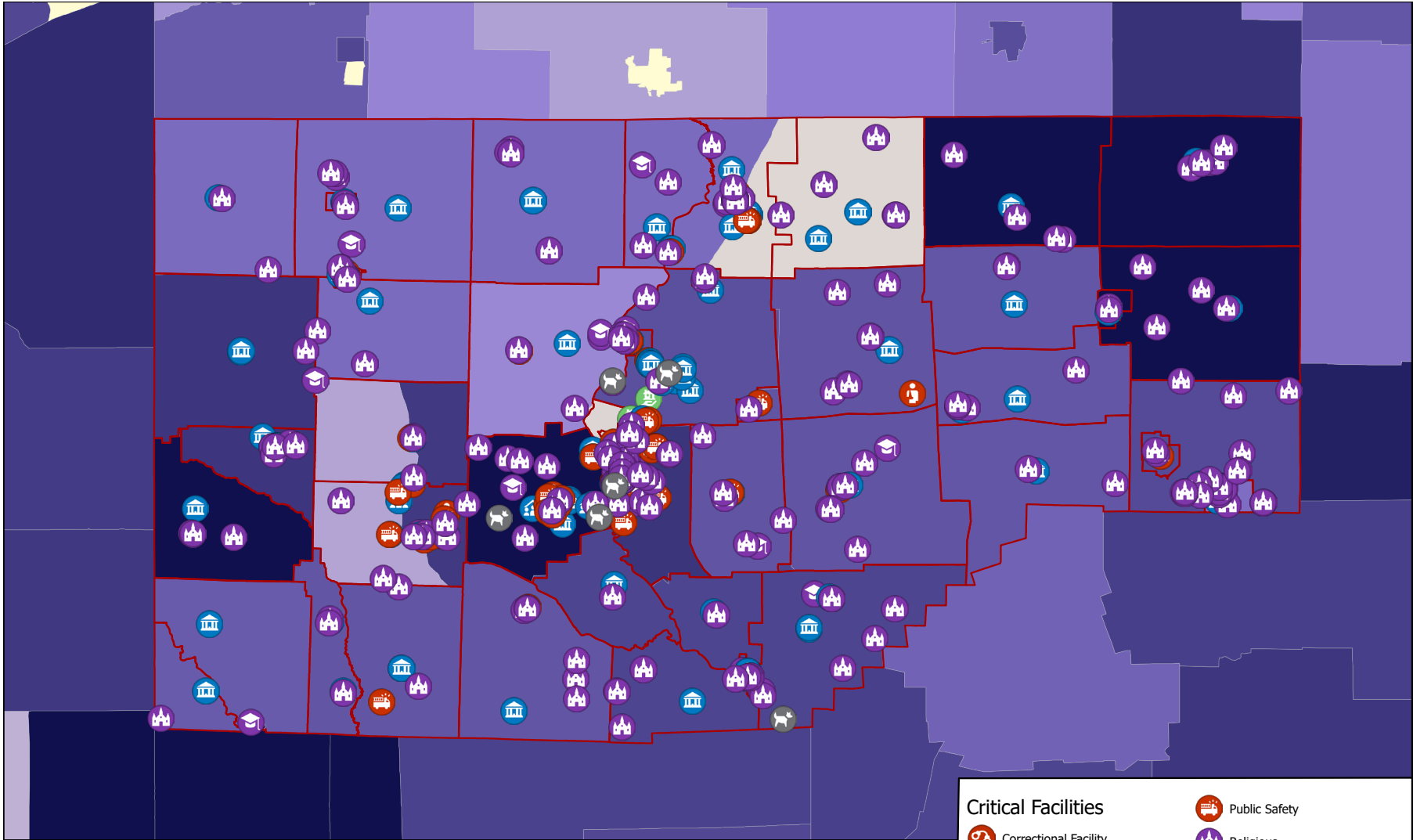
(who are also required to wear masks), etc. We interpret the Order to mean that you may remove your mask when in your own personal office space that is not accessible to the public (07/02/20).

- *July 3, 2020 – Phased Reopening for Round 7 of green counties. All PA counties operating within the green phase*
- *July 15, 2020 – Governor Wolf announced revised restrictions for Pennsylvania bars and restaurants*
- *July 16, 2020 – Secretary Levine announced updated guidance to safely reopen schools, and Governor*
- *Wolf announced the availability of \$50 million in grant funding for hazard pay to front-line employees in life-sustaining industries*
- *July 28, 2020 – 100% of all LTCFs completed the first round of baseline testing*
- *July 31, 2020 – Secretary Levine announced a contract with Insight Global to hire and train 1,000 contact tracing staff*
- *August 6, 2020 – Governor Wolf recommended all Pre-K-12 school and recreational youth sports be postponed until at least January 1, 2021*
- *December 10, 2020 – COVID-10 continues to increase in both residents testing positive and deaths. Most deaths have occurred in long term care centers but not all of them. The two hospitals are still able to treat non-COVID patients and well as COVID patients. All healthcare facilities are having difficulty in maintaining staffing levels due to staff resigning and staff being quarantined. The PA Army National Guard has assisted some of the long-term care centers. Four-day mass testing site is being planned for Crawford County in January. Much of the federal and state information changes on a daily basis which leaves the county and facilities to quickly implement new mitigation and planning measures without the luxury of having time to plan and prepare. As many county employees that can are working from home or on a hybrid work schedule. Access to County Government offices is by appointment only. Contract tracing is almost impossible due to the number of positive cases each day in the county and state. There are at least four companies working on vaccinations which could be given as early as before Christmas depending on availability and those willing to take it. Schools are either all on-line or a hybrid schedule limiting the number of students in school. The Thanksgiving holiday is causing a spike and many officials fear what Christmas holiday will bring in early January.*

#### **FUTURE OCCURRENCE**

Current epidemiological models project that a pandemic could result in 2 to 7.4 million deaths globally. Effective pandemic preparedness around the world is essential to mitigate the effects of a pandemic, particularly if it becomes severe which the COVID-19 has become. On the whole, the probability of a pandemic event is considered probable as defined by the Risk Factor Methodology probability criteria mostly due to the current Pandemic the world is experiencing currently and the projections moving into the normal flu season.

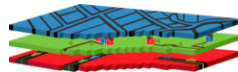
Figure 5.3.5-1 Vulnerable Populations & Facilities to Pandemics



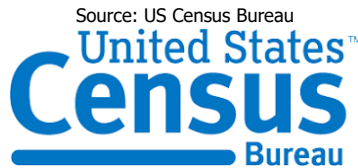
**Population and critical facilities vulnerable to pandemic**



Crawford County Government  
 Crawford County Courthouse  
 903 Diamond Park  
 Meadville PA 16335  
 GIS Manager: Phillip Baranyai  
 Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



This map is subject to change at any time after date of issuance.  
 Data used for map creation is approximate and should not be used for site specific decision making.  
 Crawford County assumes no responsibility or liability to the accuracy or completion of these maps.



**Critical Facilities**

- Correctional Facility
- Education
- Extended Care/Senior Living
- Government
- Hospital
- Hotel/Motel
- Medical - Clinic

- Public Safety
- Religious
- Veterinarian

**Dependent Population by Census Tract**  
 Percent of population in dependent age groups (under 18 & 65 +)

> 46  
 < 30

## VULNERABILITY ASSESSMENT

Risk Factor (RF) Value: 4

According to the qualitative assessment performed using the RF tool, the pandemic hazard scored a RF value of 4 (from a scale of 0 to 4, with 4 being the highest risk level).

Hazard	Risk Assessment Category					Risk Factor
	Probability	Impact	Spatial Extent	Warning Time	Duration	
Pandemic	4	4	4	4	4	4

Certain population groups are at higher risk of flu infection as we have seen with the current flu pandemic. This population group includes people 65 years and older, children younger than 5 years old, pregnant women, and people of any age with certain chronic medical conditions. Such conditions include but are not limited to diabetes, heart disease, asthma, and kidney disease (HHS, 2020). Schools, convalescent centers, and other institutions serving those younger than 5 years old and older than 65 years old are locations conducive to faster transmission of viruses since populations identified as being at high risk are concentrated at these facilities. The highest concentrations of these facilities are located in: City of Meadville, City of Titusville, Boroughs of Conneautville, Linesville, Conneaut Lake, Cambridge Springs, Saegertown, Cochranon, and the Townships of Summerhill, Randolph, Vernon, and West Mead.

The economic difficulties, both personal and business/government, is yet unknown. Crawford County Government has received 8.5 million dollars in CARES Act funding to date.

According to the World Health Organization and the Pennsylvania Department of Health, the influenza pandemic virus has spread rapidly due to the interconnected nature of the world and the high level of global travel. If the pandemic evolved to become severe and widespread over time, we could also expect and are currently experiencing;

- *Vaccines, antiviral agents and antibiotics to treat secondary infections to be in high demand, and potentially in short supply;*
- *Medical facilities to be strained with demands to care for both influenza and non-influenza patients;*
- *Potentially significant shortages of personnel to provide essential community services.*

### *Crawford County Community Lifeline Integration*

Components and Essential Elements of information needed to stabilize and mitigate the incident within the Lifelines for this hazard within the lifeline(s) include;

#### **Lifeline Planning Factors (Maximum anticipated or known impacts)**

- *Number of total injuries or fatalities*
- *Number and percent of total hospital beds function*
- *Number of medical facilities with at least moderate damage*

#### **Lifeline Stabilization Target**

- *All survivors, their pets, and service animals have access to required medical and veterinary care. Emergency medical systems are capable of managing patient movement requirement. Public health services are accessible to all survivors. Sufficient temporary fatality management support is in place to meet processing demand. Medical supply chain capable of adequately resupplying medical care providers.*

#### **County Assistance Lines of Efforts**

- *Personal protective equipment stockpiling*
- *Rapid testing capabilities*
- *Coordination of information among entities*
- *Vaccination Points of Distribution planning, training, and exercising*
- *Education on mitigation and preventive measures*



**FOOD, WATER, SHELTERING:** Food (Commercial Food Distribution, Commercial Food Supply Chain, Food Distribution Programs), Water (Drinking Water Utilities, Wastewater Systems, Commercial Water Supply Chain), Shelter, Agriculture (Animal and Agriculture)



**HEALTH AND MEDICAL:** Medical Care (Hospitals, Dialysis, Pharmacies, Long-Term Care Facilities, VA Health System, Veterinary Services, Home Care), Public Health (Epidemiological Surveillance, Laboratory, Clinical Guidance, Assessment/ Interventions/ Treatments, Human Services, Behavioral Health), Medical Supply Chain (Blood/Blood Products, Manufacturing, Pharmaceutical, Device, Medical Gases, Distribution, Critical Clinical Research, Sterilization, Raw Materials), Patient Movement (Emergency Medical Services), Fatality Management (Mortuary and Post-Mortuary Services)



**SAFETY AND SECURITY:** Law Enforcement/Security (Police Stations, Law Enforcement, Site Security, Correctional Facilities, Search and Rescue (Local Search and Rescue), Fire Services (Fire Stations, Firefighting Resources), Government Service, (Emergency Operation Centers, Essential Government Functions, Government Offices, Schools, Public Records, Historic/Cultural Resources), Community Safety, (Flood Control, Other Hazards, Protective Actions)

## 5.3-6 TORNADO, WIND STORM, LIGHTNING STRIKES

### LOCATION AND EXTENT

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 touchdown 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 1,200 tornadoes is reported nationwide, resulting in an average of 60-65 fatalities and 1,500 injuries (NOAA, 2020). 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).

Strong winds can also occur outside of tornadoes, severe thunderstorms, and winter storms. These winds typically develop with strong pressure gradients and gusty frontal passages. The closer and stronger two systems (one high pressure, one low pressure) are, the stronger the pressure gradient, and therefore, the stronger the winds are. Downburst winds, which can cause more widespread damage than a tornado, occur when air is carried into a storm's updraft, cools rapidly, and comes rushing to the ground. Cold air is denser than warm air, and therefore, wants to fall to the surface. On warm summer days, when the cold air can no longer be supported up by the storm's updraft, or an exceptional downdraft develops,



the air crashes to the ground in the form of strong winds. These winds are forced horizontally when they reach the ground and can cause significant damage. These types of strong winds can also be referred to as straight-line winds. Downbursts with a diameter of less than 2.5 miles are called microbursts and those with a diameter of 2.5 miles or greater are called macrobursts. A derecho, or bow echo, is a series of downbursts associated with a line of thunderstorms. This type of phenomenon can extend for hundreds of miles and contain wind speeds in excess of 100 mph.

Based on 60 years of tornado history and over 150 years of hurricane history, FEMA identifies western and central Pennsylvania as being more susceptible to higher winds than eastern Pennsylvania (FEMA, 2014).

Tornadoes and windstorms pose a potential threat to all of Crawford County and its municipalities as well as throughout the entire Commonwealth of Pennsylvania. Windstorms are usually associated with hurricanes, tropical storms, and tornadoes, but may also include thunderstorms and less violent storm systems. The destruction from these storms can be tremendous, destroying buildings, uprooting trees and injuring people.

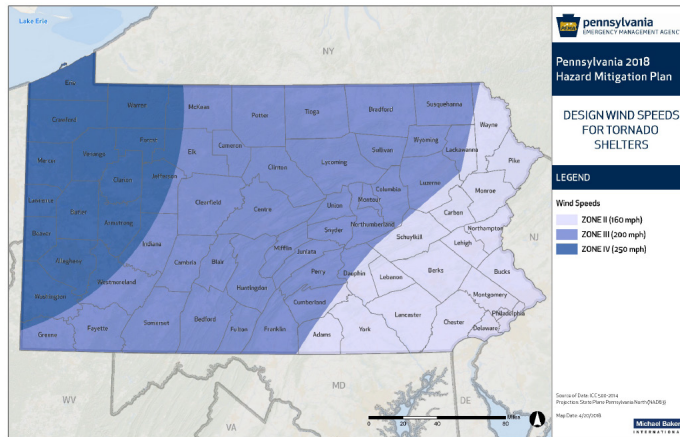
**RANGE OF MAGNITUDE**

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 residential homes (particularly mobile homes), and tend to remain localized in impact. 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 that was published in 1971. It classifies United States tornadoes into six intensity categories, as shown in Table 5.3.6-1, based upon the estimated maximum winds occurring within the wind vortex. The EF-Scale has become the definitive metric for estimating wind speeds

E-F 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 100m (300ft); steel reinforced concrete structure badly damaged; high-rise buildings have significant structural deformation.

**Table 5.3.6.1 Enhanced Fujita Scale Categories**

**Zones**  
**Figure 5.3-6.1 Wind Speed**



within tornadoes based upon the damage done to buildings and structures since it was implemented through the National Weather Service in 2007.

The map (Figure 5.3-6.1) from the PA State Hazard Mitigation Plan of October 2018 illustrates wind speed zones developed by the American Society of Civil Engineers based on information including 60 years of tornado history and over 150 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 (FEMA, 2014). Crawford County falls within Zone IV, meaning design wind speeds for shelters and critical facilities should be able to withstand a 3-second gust of up to 250 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 EF5 tornado.

The worst-case scenario for tornadoes in Crawford County would be for a high magnitude storm (EF 4 or 5) to occur within a densely populated portion of the county resulting in a high number of fatalities, injuries, and property damages. As described in greater detail below, this occurred on May 31st, 1985 when an F4 tornado swept through the county and resulted in multiple deaths and significant property damage.

#### PAST OCCURRENCE

Historical evidence shows that Crawford County has experienced 37 tornadoes between 1950 and 2020. As a result of these violent events, 85 injuries and 11 deaths have been recorded. The most powerful tornado to strike Crawford County, an F4, occurred on May 31st, 1985 and was responsible for 8 deaths, 75 injuries, and \$25 million in property damages. The following Table summarizes these past occurrences.

**Table 5.3-6.2 Crawford County Tornadoes and High Winds**

#	Location	Date	Magnitude	Death	Injury	Property Damage
1	CRAWFORD COUNTY	7/24/1950	F0	0	0	\$3,000
2	CRAWFORD COUNTY	1/17/1952	F2	0	0	\$250,000
3	CRAWFORD COUNTY	7/1/1955	F2	0	0	\$25,000
4	CRAWFORD COUNTY	7/24/1968	F1	0	0	\$250,000
5	CRAWFORD COUNTY	5/2/1972	F3	0	0	\$25,000
6	CRAWFORD COUNTY	4/2/1979	F1	0	0	\$25,000
7	CRAWFORD COUNTY	6/15/1980	F0	0	0	\$3,000
8	CRAWFORD COUNTY	7/21/1980	F1	0	1	\$250,000
9	CRAWFORD COUNTY	7/28/1981	F2	0	4	\$250,000
10	CRAWFORD COUNTY	9/1/1981	F1	0	0	\$25,000
11	CRAWFORD COUNTY	5/2/1983	F0	0	0	\$25,000
12	CRAWFORD COUNTY	5/31/1985	F2	1	0	\$0

#	Location	Date	Magnitude	Death	Injury	Property Damage
13	CRAWFORD COUNTY	5/31/1985	F3	2	0	\$0
14	CRAWFORD COUNTY	5/31/1985	F4	8	75	\$25,000,000
15	CRAWFORD COUNTY	5/31/1985	F2	0	0	\$0
16	CRAWFORD COUNTY	5/31/1985	F3	0	0	\$2,500,000
17	CRAWFORD COUNTY	6/22/1985	F2	0	0	\$250,000
18	CRAWFORD COUNTY	6/22/1985	F1	0	0	\$25,000
19	CRAWFORD COUNTY	6/22/1985	F1	0	0	\$25,000
20	CRAWFORD COUNTY	9/30/1986	F2	0	1	\$2,500,000
21	TITUSVILLE	9/2/1993	F0	0	0	\$5,000
22	BLOOMING VALLEY	6/11/1994	F1	0	1	\$500,000
23	SAEGERTOWN	5/24/1995	F0	0	0	\$50,000
24	LINESVILLE	7/20/1998	F1	0	0	\$75,000
25	CUSTARDS	6/1/2001	F0	0	0	\$100,000
26	LINESVILLE	6/5/2002	F1	0	0	\$50,000
27	CROSSINGSVILLE	7/27/2002	F0	0	0	\$50,000
28	COCHRANTON	11/10/2002	F1	0	0	\$325,000
29	GUYS MILLS	5/20/2004	F0	0	0	\$50,000
30	CUSTARDS	5/25/2004	F2	0	0	\$3,500,000
31	MEADVILLE	5/1/2007	F1	0	0	\$500,000
32	CONNEAUTVILLE	6/2/2010	EF0	0	0	\$125,000.00
33	ROMETOWN	6/6/2010	EF0	0	0	\$30,000.00
34	BEAVER CENTER	5/26/2011	EF1	0	0	\$150,000.00
35	SUMMERHILL	10/2/2018	EF2	0	0	
36	RICHMOND	10/2/2018	EF1	0	0	
37	STEUBEN	10/2/2018	EF1	0	0	
38	SPRINGBORO	4/14/2019	EF0	0	1	\$850,000
<b>TOTAL</b>				<b>11</b>	<b>86</b>	<b>\$286.69 Million</b>

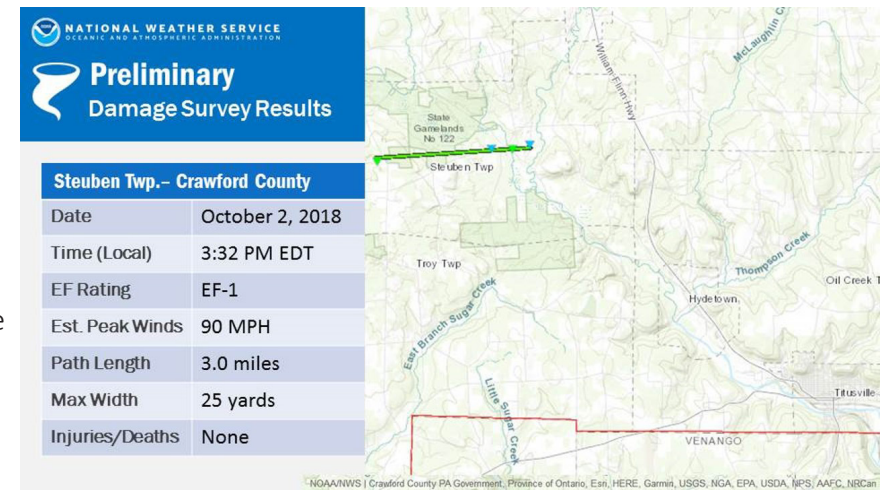
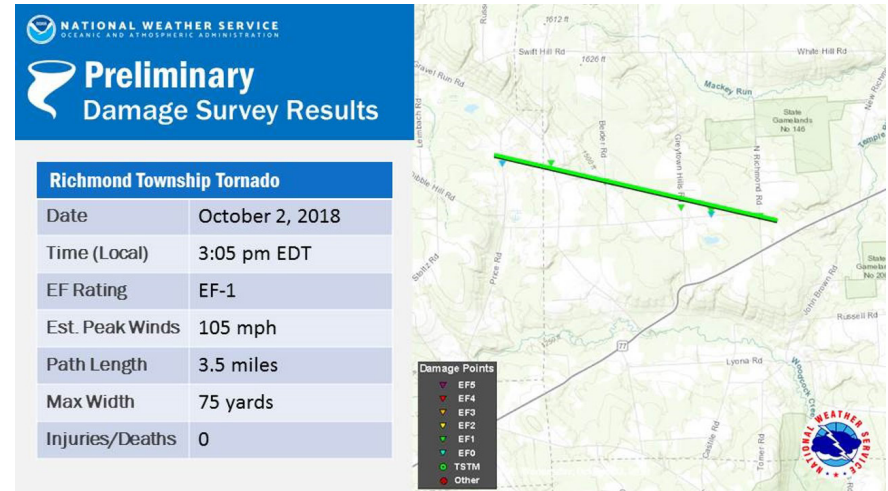
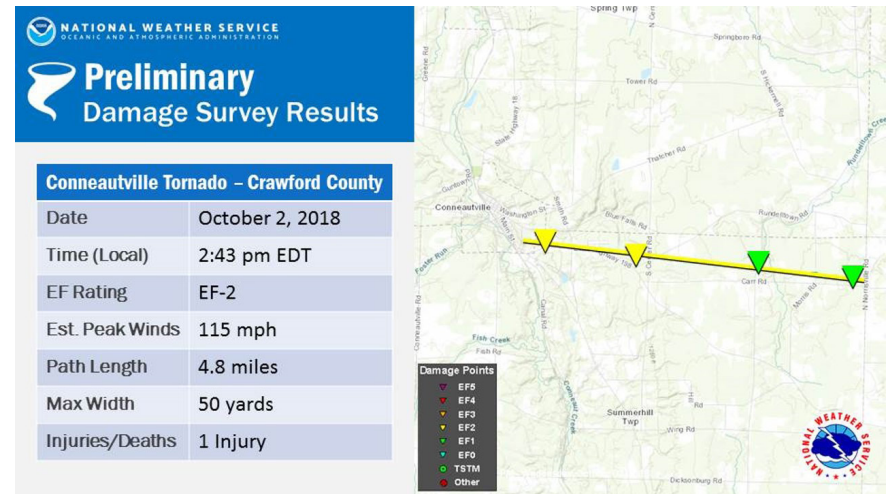


Summerhill Township, Rolling Fields Elder Care villa that was destroyed by tornado 2018

Most Recent Tornado Events in Crawford County:

10/02/2018 Tornado Outbreak in Crawford County caused minor damage to Rolling Fields Elder Care main building (162 residents) and destroyed a villa house adjacent to it in Summerhill Township. Tornado touchdowns were reported in Richmond and Steuben Townships causing numerous downed trees and wires, and some structural damage. No injuries were reported. Category: EF 2 & two (2) EF 1 tornadoes confirmed by the National Weather Service. [https://www.weather.gov/cle/event\\_20181002\\_tornadoes](https://www.weather.gov/cle/event_20181002_tornadoes)

11/5-6/2017 Severe thunderstorms raced across Crawford County causing over 109 reports of trees down, three cars with individuals inside them had trees fall on them, two pole fires, and two flooded roads were reported to Crawford County 9-1-1. There were no injuries reported to Crawford County DPS. A severe thunderstorm watch was issued by the National Weather Service in Cleveland at 5:30 pm and is in effect until 10:00 pm this evening. Power was disrupted to over 10,000 residents with restoration times from tonight to tomorrow. Fire Departments and public works worked throughout the night



clearing trees from the roadways and assisting the power companies when it was safe to do so. There were three homes that had trees fall onto them but were still inhabitable. The Harmonsburg Road near Porter Road is closed until Noon tomorrow until PennDOT can clear the road of trees and debris. Category: EF 1. November 5, 2017 Tornado Outbreak

*Time Description*

2:28 Torando Warning issued for Crawford County until 3:00

2:41 911 takes call from Adam at Rolling Fields, tornado on ground, building damaged, active gas leak

2:51 911 takes report of tornado on the ground 18939 N Norrisville Rd

2:53 Tornado Watch until 11:00pm

3:01 Torando Warning issued for Crawford County until 3:45

3:03 Rolling Fields report 1 minor injury. Substantial damage to building. Evacuating Residents

3:15 911 takes call of funnel cloud Gravel Run Blooming Valley

3:19 911 takes report of funnel cloud SH 86 and Amy Rd

3:33 Torando touchdown in Steuben Township damage to agriculture buildings

3:35 Flood Warning for Crawford County until 9:30pm

3:36 911 takes call of tornado activity new SH 77 in Bloomfield Twp

3:39 Tornado Warning for Crawford County until 4:15

3:41 911 takes call of tornado on the ground Old SR 8 Oil Creek Township

3:43 Torando Warning for Crawford County until 4:30

3:50 911 takes call of cloud rotation over Blooming Valley

3:54 911 takes call of funnel cloud near SH 8 Hydetown Borough

3:58 911 takes report of funnell cloud near Limber & Water Tower West Mead

4:07 911 takes report of flooding Gospel Hill Road

4:21 911 takes report of flooding Plank Road

4:49 911 takes report of flooding SH 408

5:14 911 takes report of flooding East Main Street Titusville

5:45 911 takes a call about numerous trees down Oregon Corners Road Richmond Twp Red Cross notified for two residents

2:11 All Residents were located to 15 different long term care centers

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
<b>Totals:</b>								0	2	478.00K	0.00K
<a href="#">LINESVILLE</a>	CRAWFORD CO.	PA	06/05/2016	14:54	EST-5	Thunderstorm Wind	50 kts. EG	0	0	1.00K	0.00K
<a href="#">TOWNVILLE</a>	CRAWFORD CO.	PA	06/05/2016	15:18	EST-5	Thunderstorm Wind	50 kts. EG	0	0	1.00K	0.00K
<a href="#">SPARTANSBURG</a>	CRAWFORD CO.	PA	06/05/2016	15:24	EST-5	Thunderstorm Wind	50 kts. EG	0	0	1.00K	0.00K
<a href="#">HYDETOWN</a>	CRAWFORD CO.	PA	06/05/2016	15:40	EST-5	Thunderstorm Wind	50 kts. EG	0	0	1.00K	0.00K
<a href="#">CONNEAUT LAKE</a>	CRAWFORD CO.	PA	06/06/2016	21:35	EST-5	Thunderstorm Wind	50 kts. EG	0	0	10.00K	0.00K
<a href="#">CAMBRIDGE SPGS</a>	CRAWFORD CO.	PA	07/13/2016	23:00	EST-5	Thunderstorm Wind	52 kts. MG	0	0	0.00K	0.00K
<a href="#">SAEGERTOWN</a>	CRAWFORD CO.	PA	08/11/2016	17:55	EST-5	Thunderstorm Wind	50 kts. EG	0	0	10.00K	0.00K
<a href="#">MEADVILLE</a>	CRAWFORD CO.	PA	09/08/2016	15:22	EST-5	Thunderstorm Wind	50 kts. EG	0	0	8.00K	0.00K
<a href="#">MEADVILLE</a>	CRAWFORD CO.	PA	09/10/2016	18:10	EST-5	Thunderstorm Wind	50 kts. EG	0	0	25.00K	0.00K
<a href="#">BLOOMING VLY</a>	CRAWFORD CO.	PA	09/10/2016	18:24	EST-5	Thunderstorm Wind	50 kts. EG	0	0	1.00K	0.00K
<a href="#">MEADVILLE</a>	CRAWFORD CO.	PA	09/10/2016	19:23	EST-5	Thunderstorm Wind	50 kts. EG	0	0	30.00K	0.00K
<a href="#">MEADVILLE</a>	CRAWFORD CO.	PA	09/17/2016	15:45	EST-5	Thunderstorm Wind	50 kts. EG	0	0	5.00K	0.00K
<a href="#">MEADVILLE</a>	CRAWFORD CO.	PA	03/01/2017	06:15	EST-5	Thunderstorm Wind	50 kts. EG	0	0	50.00K	0.00K
<a href="#">SAEGERTOWN</a>	CRAWFORD CO.	PA	04/27/2017	18:26	EST-5	Thunderstorm Wind	50 kts. EG	0	0	1.00K	0.00K
<a href="#">MEADVILLE</a>	CRAWFORD CO.	PA	04/30/2017	15:43	EST-5	Thunderstorm Wind	50 kts. EG	0	0	2.00K	0.00K
<a href="#">CONNEAUTVILLE</a>	CRAWFORD CO.	PA	05/01/2017	13:05	EST-5	Thunderstorm Wind	50 kts. EG	0	0	15.00K	0.00K
<a href="#">SAEGERTOWN</a>	CRAWFORD CO.	PA	05/01/2017	13:22	EST-5	Thunderstorm Wind	50 kts. EG	0	0	1.00K	0.00K
<a href="#">MEADVILLE</a>	CRAWFORD CO.	PA	05/01/2017	13:22	EST-5	Thunderstorm Wind	50 kts. EG	0	0	15.00K	0.00K
<a href="#">CAMBRIDGE SPGS</a>	CRAWFORD CO.	PA	05/01/2017	13:26	EST-5	Thunderstorm Wind	50 kts. EG	0	0	1.00K	0.00K
<a href="#">HARMONSBURG</a>	CRAWFORD CO.	PA	05/18/2017	19:50	EST-5	Thunderstorm Wind	61 kts. EG	0	0	30.00K	0.00K
<a href="#">HARMONSBURG</a>	CRAWFORD CO.	PA	06/18/2017	13:14	EST-5	Thunderstorm Wind	50 kts. EG	0	0	1.00K	0.00K
<a href="#">SAEGERTOWN</a>	CRAWFORD CO.	PA	06/18/2017	13:14	EST-5	Thunderstorm Wind	50 kts. EG	0	0	1.00K	0.00K
<a href="#">GUYS MILLS</a>	CRAWFORD CO.	PA	06/18/2017	13:55	EST-5	Thunderstorm Wind	50 kts. EG	0	0	12.00K	0.00K
<a href="#">HARMONSBURG</a>	CRAWFORD CO.	PA	06/18/2017	17:51	EST-5	Thunderstorm Wind	50 kts. EG	0	0	15.00K	0.00K
<a href="#">SAEGERTOWN</a>	CRAWFORD CO.	PA	06/18/2017	18:05	EST-5	Thunderstorm Wind	50 kts. EG	0	0	1.00K	0.00K
<a href="#">MEADVILLE</a>	CRAWFORD CO.	PA	06/18/2017	18:10	EST-5	Thunderstorm Wind	50 kts. EG	0	0	1.00K	0.00K
<a href="#">MEADVILLE</a>	CRAWFORD CO.	PA	06/19/2017	18:33	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
<a href="#">SPRINGBORO</a>	CRAWFORD CO.	PA	08/04/2017	11:20	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K

<a href="#">CONNEAUT LAKE</a>	CRAWFORD CO.	PA	08/04/2017	11:57	EST-5	Thunderstorm Wind	50 kts. EG	0	0	10.00K	0.00K
<a href="#">SAEGERTOWN</a>	CRAWFORD CO.	PA	08/04/2017	12:41	EST-5	Thunderstorm Wind	50 kts. EG	0	0	10.00K	0.00K
<a href="#">TOWNVILLE</a>	CRAWFORD CO.	PA	08/04/2017	12:58	EST-5	Thunderstorm Wind	50 kts. EG	0	0	10.00K	0.00K
<a href="#">COCHRANTON</a>	CRAWFORD CO.	PA	08/04/2017	14:20	EST-5	Thunderstorm Wind	50 kts. EG	0	0	10.00K	0.00K
<a href="#">SPARTANSBURG</a>	CRAWFORD CO.	PA	09/04/2017	23:13	EST-5	Thunderstorm Wind	50 kts. EG	0	0	1.00K	0.00K
<a href="#">BLACK ASH CORNERS</a>	CRAWFORD CO.	PA	09/04/2017	23:23	EST-5	Thunderstorm Wind	50 kts. EG	0	0	3.00K	0.00K
<a href="#">LINESVILLE</a>	CRAWFORD CO.	PA	11/05/2017	19:00	EST-5	Thunderstorm Wind	50 kts. EG	0	0	15.00K	0.00K
<a href="#">MEADVILLE</a>	CRAWFORD CO.	PA	07/16/2018	17:47	EST-5	Thunderstorm Wind	50 kts. EG	0	0	10.00K	0.00K
<a href="#">SHADELAND</a>	CRAWFORD CO.	PA	07/26/2018	17:55	EST-5	Thunderstorm Wind	50 kts. EG	0	0	1.00K	0.00K
<a href="#">SAEGERTOWN</a>	CRAWFORD CO.	PA	10/02/2018	13:53	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<a href="#">COCHRANTON</a>	CRAWFORD CO.	PA	10/06/2018	16:50	EST-5	Thunderstorm Wind	52 kts. EG	0	0	2.00K	0.00K
<a href="#">CONNEAUTVILLE</a>	CRAWFORD CO.	PA	04/14/2019	17:49	EST-5	Thunderstorm Wind	52 kts. EG	0	0	10.00K	0.00K
<a href="#">LINESVILLE</a>	CRAWFORD CO.	PA	04/14/2019	17:58	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<a href="#">HARTSTOWN</a>	CRAWFORD CO.	PA	05/25/2019	17:10	EST-5	Thunderstorm Wind	56 kts. EG	0	0	5.00K	0.00K
<a href="#">FREDERICKSBURG</a>	CRAWFORD CO.	PA	05/25/2019	17:14	EST-5	Thunderstorm Wind	52 kts. EG	0	0	5.00K	0.00K
<a href="#">CAMBRIDGE SPGS</a>	CRAWFORD CO.	PA	06/01/2019	17:00	EST-5	Thunderstorm Wind	61 kts. EG	0	0	15.00K	0.00K
<a href="#">HOOTVILLE</a>	CRAWFORD CO.	PA	06/01/2019	17:18	EST-5	Thunderstorm Wind	61 kts. EG	0	0	0.00K	0.00K
<a href="#">LINESVILLE</a>	CRAWFORD CO.	PA	06/29/2019	01:15	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<a href="#">COON CORNERS</a>	CRAWFORD CO.	PA	06/29/2019	01:42	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<a href="#">MEADVILLE</a>	CRAWFORD CO.	PA	06/29/2019	01:48	EST-5	Thunderstorm Wind	52 kts. EG	0	0	5.00K	0.00K
<a href="#">LINESVILLE</a>	CRAWFORD CO.	PA	07/11/2019	14:05	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<a href="#">HYDETOWN</a>	CRAWFORD CO.	PA	07/19/2019	17:57	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<a href="#">HYDETOWN</a>	CRAWFORD CO.	PA	07/19/2019	18:05	EST-5	Thunderstorm Wind	65 kts. EG	0	0	0.00K	0.00K
<a href="#">FAUNCETOWN</a>	CRAWFORD CO.	PA	07/19/2019	18:40	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<a href="#">COCHRANTON</a>	CRAWFORD CO.	PA	08/15/2019	18:10	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<a href="#">SHAWS</a>	CRAWFORD CO.	PA	08/15/2019	18:10	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<a href="#">COCHRANTON</a>	CRAWFORD CO.	PA	08/15/2019	18:11	EST-5	Thunderstorm Wind	70 kts. MG	0	0	0.00K	0.00K
<a href="#">COCHRANTON</a>	CRAWFORD CO.	PA	08/15/2019	18:12	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<a href="#">COCHRANTON</a>	CRAWFORD CO.	PA	08/15/2019	18:15	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<a href="#">MT HOPE</a>	CRAWFORD CO.	PA	08/15/2019	18:26	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<a href="#">FRENCHTOWN</a>	CRAWFORD CO.	PA	08/15/2019	18:27	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K

<a href="#">FREDERICKSBURG</a>	CRAWFORD CO.	PA	08/15/2019	19:00	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<a href="#">MEADVILLE ARPT</a>	CRAWFORD CO.	PA	08/15/2019	19:12	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<a href="#">ATLANTIC</a>	CRAWFORD CO.	PA	08/18/2019	16:15	EST-5	Thunderstorm Wind	52 kts. EG	0	2	20.00K	0.00K
<a href="#">FREDERICKSBURG</a>	CRAWFORD CO.	PA	08/18/2019	16:15	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<a href="#">MEADVILLE</a>	CRAWFORD CO.	PA	08/18/2019	16:15	EST-5	Thunderstorm Wind	52 kts. EG	0	0	100.00K	0.00K
<a href="#">MEADVILLE</a>	CRAWFORD CO.	PA	08/18/2019	16:50	EST-5	Thunderstorm Wind	52 kts. EG	0	0	5.00K	0.00K
<a href="#">FREDERICKSBURG</a>	CRAWFORD CO.	PA	08/18/2019	16:50	EST-5	Thunderstorm Wind	60 kts. EG	0	0	0.00K	0.00K
<a href="#">CUSTARDS</a>	CRAWFORD CO.	PA	08/18/2019	16:50	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<a href="#">CAMBRIDGE SPGS</a>	CRAWFORD CO.	PA	08/18/2019	20:02	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<a href="#">GUYS MILLS</a>	CRAWFORD CO.	PA	09/11/2019	15:52	EST-5	Thunderstorm Wind	52 kts. EG	0	0	2.00K	0.00K
<a href="#">PETTIS</a>	CRAWFORD CO.	PA	05/29/2020	11:20	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
<a href="#">TITUSVILLE</a>	CRAWFORD CO.	PA	05/29/2020	11:45	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
<a href="#">BUETTS CORNERS</a>	CRAWFORD CO.	PA	05/29/2020	11:48	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
<b>Totals:</b>								0	2	478.00K	0.00K



LOCATION	DATE	DETAILS	PROPERTY DAMAGE
County Wide	1/12/2020	High Wind 50kts	\$175,000
Saegertown, Woodcock, Hayfield Townships	2/24/2019	High Winds 54kts	\$100,000
Sadsbury Township	4/14/2019	Funnel Cloud spotted by a trained spotter	NA
County Wide	1/1/2019	Strong Winds 44kts	\$15,000
County Wide	1/10/2017	High Winds 50kts	\$75,000

Table 5.3-6.4 shows the number of Weather Alerts for this hazard over the past four years.

Weather Alert	2020	2019	2018	2017	Total
Severe Thunderstorm Warning	8	21	1	22	52
Tornado Warning	0	2	5	0	7
Severe Thunderstorm Watch	5	0	1	0	6
Wind Advisory	0	0	1	3	4
Tornado Watch	0	1	0	1	2
Thunderstorm Warning	0	0	0	1	1

**Table 5.3-6.4**  
**Weather Alerts**

Crawford County experienced power failures in limited areas, minor loss of communication networks and sustained significant loss during the 1985 tornado outbreak that affected 10 counties (including Crawford). Figure 5.3-6.2 depicts the spatial distribution of tornado events in the county.

### *FUTURE OCCURRENCE*

The probability of the county and its municipalities experiencing severe winds is difficult to quantify. The highest probability of a tornado or high wind event exists during the months of May, June, and July, although a moderate quantity of tornadoes have occurred in Crawford County during the month of September. Crawford County is located in a high wind zone area that can produce high winds and tornadoes capable of 250 MPH or greater. The probability of a tornado striking is difficult to determine, but based on historical record of 38 high wind/tornado events since 1950, it can reasonably be assumed that this type of event has occurred once every 1.9 years from 1950 through 2020.

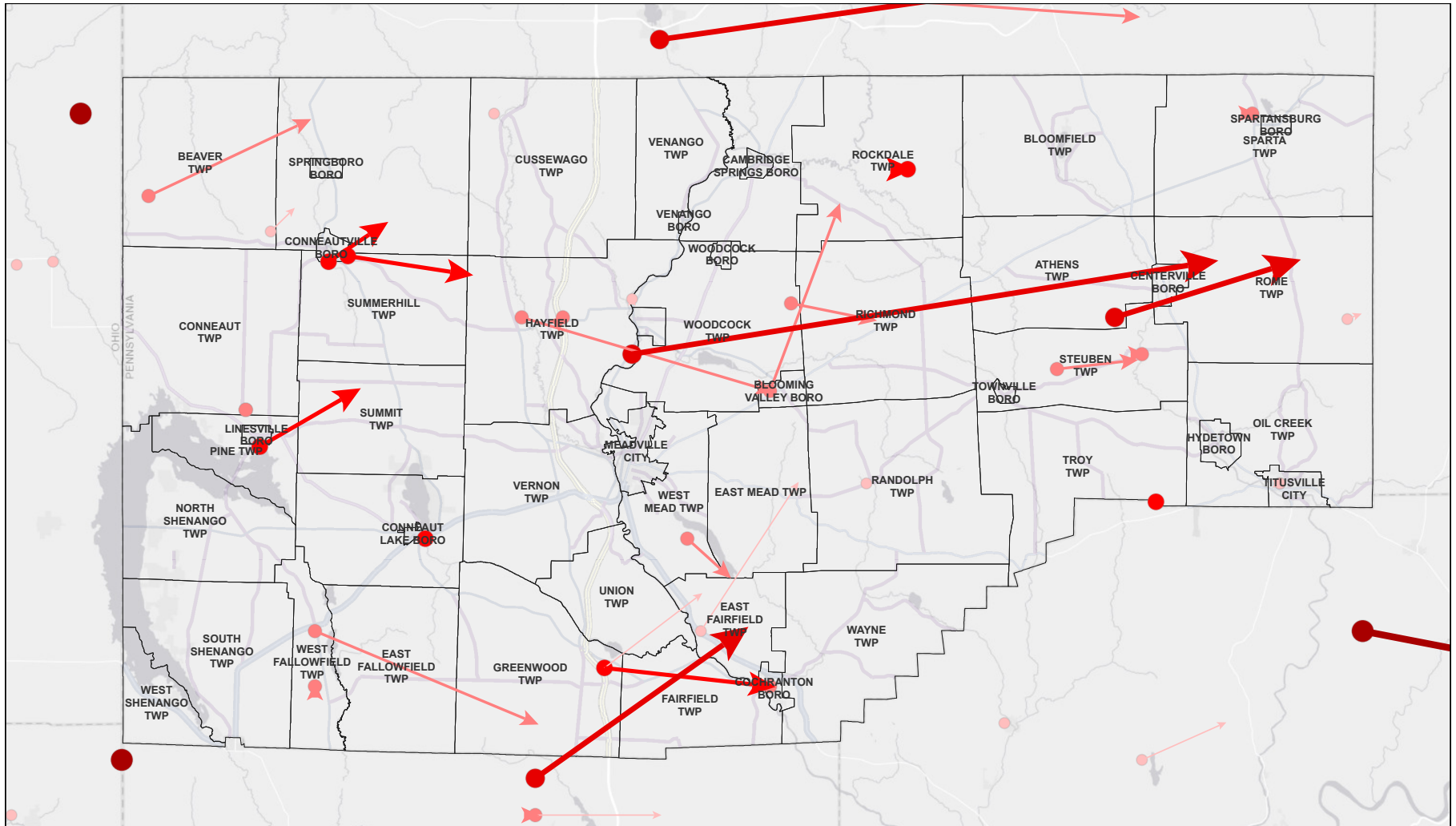
Current Year (2020) subtracted by Historical Year (1950) = 70 Years on Record

Years on Record (70) divided by Number of Historical Events (38) = 1.968

Furthermore, the historic frequency calculates that there is a 52.86% chance of this type of event occurring in a given year.

Most of Pennsylvania is susceptible to tornadoes of a magnitude of at most an EF3. However, historical record (05/31/1985) clearly dictates that these weather phenomena can exceed the norm. On the whole, the probability of a tornado or high wind storm event is considered likely as defined by the Risk Factor Methodology probability criteria.

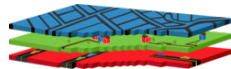
Figure 5.3.6-5 Tornado History in Crawford County



### Tornado History (1950-2018)



Crawford County Government  
 Crawford County Courthouse  
 903 Diamond Park  
 Meadville PA 16335  
 GIS Manager: Phillip Baranyai  
 Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



This map is subject to change at any time after date of issuance.  
 Data used for map creation is approximate and should not be used for site specific decision making.  
 Crawford County assumes no responsibility or liability to the accuracy or completion of these maps.

Source: National Oceanic &



Atmospheric Administration (NOAA)

#### Tornado Paths

- F0
- F1
- F2
- F3
- F4
- F5

#### Tornado Initial Touchdown Locations

- F0 (3 second gusts: 65-85 MPH)
- F1 (3 second gusts: 86-110 MPH)
- F2 (3 second gusts: 136-165 MPH)
- F3 (3 second gusts: 136-165 MPH)
- F4 (3 second gusts: 166-200 MPH)
- F5 (3 second gusts: Over 200 MPH)

## VULNERABILITY ASSESSMENT

RISK FACTOR (RF) Value: 2.6

According to the qualitative assessment performed using the RF tool, the tornado/high wind storm hazard scored a RF value of 2.6 (from a scale of 0

Hazard	Risk Assessment Category					Risk Factor
	Probability	Impact	Spatial Extent	Warning Time	Duration	
Pandemic	4	4	4	4	4	4

to 4, with 4 being the highest risk level). Summarizes the risk levels assigned to each RF category.

The potential for tornadoes always exists. The topography in Crawford County offers little protection due to it being relatively flat and the National Weather Service cannot accurately predict smaller funnels, so there is difficulty in alerting the populace in a timely manner. While the frequency of these severe weather events has been moderately high based on historical record, the damage that results from a tornado can be devastating. A tornado with an “EF4” designation (which occurred on 05/31/1985) can carry a wind velocity of 200 MPH resulting in a force of more than 100 pounds per square foot of surface area, a “wind load” that exceeds the design limits of most buildings within Crawford County.

The Storm Prediction Center has developed damage indicators to be used with the Enhanced Fujita Scale for different types of buildings. Some of the indicators for different building types are shown in Tables 4.3.7-5, 4.3.7-6, and 4.3.7-7.

Since the probability of a tornado is relatively the same across Crawford County, the vulnerabilities to structures depend on the building types and their susceptibility to sustain damages in a severe weather event. Even if a structure performs well in the high winds, flying debris and falling trees may result in damages to a building.

Possible losses to critical facilities include:

- *Structural losses*
- *Contents losses*
- *Critical functional losses*
- *Critical data losses*

DAMAGE DESCRIPTION	WIND SPEED RANGE (Expected in Parentheses)
Threshold of visible damage	59-88 MPH (72 MPH)
Loss of roof covering (<20%)	72-109 MPH (86 MPH)
Damage to penthouse roof & walls, loss of rooftop HVAC equipment	75-111 MPH (92 MPH)
Broken glass in windows or doors	78-115 MPH (95 MPH)
Uplift of lightweight roof deck & insulation, significant loss of roofing material (>20%)	95-136 MPH (114 MPH)
Façade components torn from structure	97-140 MPH (118 MPH)
Damage to curtain walls or other wall cladding	110-152 MPH (131 MPH)
Uplift of pre-cast concrete roof slabs	119-163 MPH (142 MPH)
Uplift of metal deck with concrete fill slab	118-170 MPH (146 MPH)
Collapse of some top building envelope	127-172 MPH (148 MPH)
Significant damage to building envelope	178-268H (210 MPH)

DAMAGE DESCRIPTION	WIND SPEED RANGE (Expected in Parentheses)
Threshold of visible damage	55-83 MPH (68 MPH)
Loss of roof covering (<20%)	66-99 MPH (79 MPH)
Broken windows	71-106 MPH (87 MPH)
Exterior door failures	83-121 MPH (101 MPH)
Uplift of metal roof decking; significant loss of roofing material (>20%); loss of rooftop HVAC	85-119 MPH (101 MPH)
Damage to or loss of wall cladding	92-127 MPH (108 MPH)
Collapse of tall masonry walls at gym, cafeteria, or auditorium	94-136 MPH (114 MPH)
Uplift or collapse of light steel roof structure	108-148 MPH (125 MPH)
Collapse of exterior walls in top floor	121-153 MPH (139 MPH)
Most interior walls of top floor collapsed	133-186 MPH (158 MPH)
Total destruction of a large section of building envelope	163-224H (192 MPH)

DAMAGE DESCRIPTION	WIND SPEED RANGE (Expected in Parentheses)
Threshold of visible damage	54-83 MPH (67 MPH)
Inward or outward collapsed of overhead doors	75-108 MPH (89 MPH)
Metal roof or wall panels pulled from the building	78-120 MPH (95 MPH)
Column anchorage failed	96-135 MPH (117 MPH)
Buckling of roof purlins	95-138 MPH (118 MPH)
Failure of X-braces in the lateral load resisting system	118-158 MPH (138 MPH)
Progressive collapse of rigid frames	120-168 MPH (143 MPH)
Total destruction of building	132-178 MPH (155 MPH)

The most difficult network to maintain is the road infrastructure. Debris may block roadways making transportation and commerce difficult if not impossible. Above ground infrastructure, namely overhead power lines, communications towers and lines, and structures, are very susceptible to severe weather. High winds and falling trees can damage this type of infrastructure and disrupt services. Table 5.3-6.3 shows the Enhanced Fujita Scale Damage Indicators for electric transmission lines.

**Table 5.3-6.6 Enhanced Fujita Scale Damage Indicators for Electric Transmission Lines**

MUNICIPALITY	TOTAL STRUCTURES	NUMBER OF MOBILE HOME STRUCTURES	PERCENT MOBILE HOMES
Athens Township	717	32	4.5%
Beaver Township	766	42	5.5%
Bloomfield Township	2,564	135	5.3%
Blooming Valley Borough	217	5	2.3%
Cambridge Springs Borough	800	8	1.0%
Cambridge Township	1,145	64	5.6%
Centerville Borough	189	13	6.9%
Cochranton Borough	637	6	0.9%
Conneaut Lake Borough	429	10	2.3%
Conneaut Township	1,435	85	5.9%
Conneautville Borough	549	12	2.2%
Cussewago Township	1,084	59	5.4%
East Fairfield Township	756	32	4.2%
East Fallowfield Township	832	45	5.4%
East Mead Township	825	37	4.5%
Fairfield Township	951	50	5.3%
Greenwood Township	1,135	89	7.8%
Hayfield Township	1,842	116	6.3%
Hydetown Borough	335	17	5.1%
Linesville Borough	593	12	2.0%
Meadville, City of	5,309	3	0.1%
North Shenango Township	3,334	254	7.6%
Oil Creek Township	1,438	72	5.0%
Pine Township	713	50	7.0%
Randolph Township	1,273	76	6.0%
Richmond Township	1,102	65	5.9%

MUNICIPALITY	TOTAL STRUCTURES	NUMBER OF MOBILE HOME STRUCTURES	PERCENT MOBILE HOMES
Rockdale Township	998	92	9.2%
Rome Township	1,102	59	5.4%
Sadsbury Township	3,410	71	2.1%
Saegertown Borough	468	1	0.2%
South Shenango Township	3,253	260	8.0%
Sparta Township	1,003	62	6.2%
Spartansburg Borough	234	9	3.8%
Spring Township	1,150	55	4.8%
Springboro Borough	264	21	8.0%
Steuben Township	700	41	5.9%
Summerhill Township	805	60	7.5%
Summit Township	2,050	126	6.1%
Titusville, City of	2,935	2	0.1%
Townville Borough	188	5	2.7%
Troy Township	1,022	68	6.7%
Union Township	595	48	8.1%
Venango Borough	140	5	3.6%
Venango Township	724	48	6.6%
Vernon Township	3,396	77	2.3%
Wayne Township	1,281	67	5.2%
West Fallowfield Township	490	42	8.6%
West Mead Township	3,197	52	1.6%
West Shenango Township	836	44	5.3%
Woodcock Borough	74	4	5.4%
Woodcock Township	1,563	88	5.6%
TOTAL	62,848	2,796	4.4%

Populations residing in manufactured homes have an increased vulnerability to high-wind events and tornadoes. Mobile homes and commercial trailers may be at higher risk during tornadoes and windstorms because of their lightweight, unanchored design. Table 4.3.7-9 shows the number of mobile homes and commercial trailers per municipality in Crawford County. Rockdale, West Fallowfield, Union, and South Shenango Townships have the highest proportion of mobile homes and commercial trailers, ranging between 8-9% of all structures.

**National Risk Index (NRI) ID: C42039 Crawford County,  
Pennsylvania**

Lightning	
Number of Events	1,152
Annualized Frequency	52.39
Expo. – Building Value (\$)	9,548,325,000
Expo. – Population	88,765
Expo. – Population Equiv. (\$)	656,861,000,000
Expo. – Total (\$)	666,409,325,000
HLR – Buildings	0
HLR – Population	0
HLR – Overall Rating	Relatively Low
EAL – Building Value (\$)	1,249
EAL – Population	0
EAL – Population Equiv. (\$)	496,772
EAL – Total (\$)	498,021
EAL Score	38.5
EAL Rating	Relatively High
Risk Score	25.38
Risk Rating	Relatively High

Strong Wind	
Number of Events	194
Annualized Frequency	6.08
Expo.- Building Value (\$)	9,548,325,000
Expo.- Population	88,765
Expo.- Population Equiv. (\$)	656,861,000,000
Expo.- Agricultural Value (\$)	107,270,000
Expo.- Total (\$)	666,516,595,000
HLR- Buildings	0
HLR- Population	0
HLR- Agriculture	0
HLR- Overall Rating	Very Low
EAL- Building Value (\$)	617,655
EAL- Population	0
EAL- Population Equiv. (\$)	370,608
EAL- Agricultural Value (\$)	322
EAL- Total (\$)	988,585
EAL Score	23.96
EAL Rating	Relatively Moderate
Risk Score	15.55
Risk Rating	Relatively Moderate

Tornado	
Number of Events	11
Annualized Frequency	4.19
Expo. – Building Value (\$)	7,106,656
Expo. – Population	66
Expo. – Population Equiv. (\$)	488,890,463
Expo. – Total (\$)	495,997,119
HLR – Buildings	0.01
HLR – Population	0
HLR – Overall Rating	Relatively Low
EAL – Building Value (\$)	296,229
EAL – Population	0
EAL – Population Equiv. (\$)	60,823
EAL – Total (\$)	357,052
EAL Score	11.58
EAL Rating	Relatively Low
Risk Score	6.6
Risk Rating	Relatively Low

Tsunami	
Risk Rating	Not Applicable

Hail	
Number of Events	397
Annualized Frequency	12.42
Expo.- Building Value (\$)	9,548,325,000
Expo.- Population	88,765
Expo.- Population Equiv. (\$)	656,861,000,000
Expo.- Agricultural Value (\$)	107,270,000
Expo.- Total (\$)	666,516,595,000
HLR – Buildings	0
HLR- Population	0
HLR- Agriculture	0
HLR- Overall Rating	Very Low
EAL- Building Value (\$)	362,015
EAL- Population	0
EAL- Population Equiv. (\$)	44,454
EAL- Agricultural Value (\$)	4,496
EAL- Total (\$)	410,965
EAL Score	12.82
EAL Rating	Relatively Low
Risk Score	11.24
Risk Rating	Relatively Low

## *Crawford County Community Lifeline Integration*

Components and Essential Elements of information needed to stabilize and mitigate the incident within the Lifelines for this hazard within the lifeline(s) include:

### **Lifeline Planning Factors (Maximum anticipated or known impacts)**

- *Number of buildings with at least extensive damage*
- *Number of fire station facilities with at least moderate damage*
- *Number of police station facilities with at least moderate damage*
- *Number of government offices with at least moderate damage*
- *Number of dams/levees at risk of failure and/or at least moderate damage*
- *Number of isolated communities*
- *Number of facilities requiring federal security support*
- *Number of survivors requiring SAR assistance*
- *Number of total injuries or fatalities*
- *Number and percent of total hospital beds function*
- *Number of medical facilities with at least moderate damage*
- *Number of people seeking short-term public shelter*
- *Number of households' w/o potable water on H+1*
- *Percent of water systems with at least moderate damage*
- *Number of wastewater leaks/breaks*
- *Percent of grocery stores w/o power*

### **Lifeline Stabilization Target**

- *Threats to life-safety are no longer a concern for all response personnel and impacted communities. Government essential functions, including executive leadership, are operational. Sufficient search and rescue assets are on-scene to assist all survivors. Sufficient fire resources are available to support fire suppression efforts.*
- *All survivors, their pets, and service animals have access to required medical and veterinary care. Emergency medical systems are capable of managing patient movement requirement. Public health services are accessible to all survivors. Sufficient temporary fatality management support is in place to meet processing demand. Medical supply chain capable of adequately resupplying medical care providers.*
- *All survivors, their pets, and service animals have access to food, water, and sanitation. Sheltering, including cellular reception, capacity, accessibility, and wrap-around services, is supporting the displaced population. Sufficient resources are in place to sustain agricultural requirements.*

### **County Assistance Lines of Efforts**

- *Damage Assessment*
- *Search and Rescue*
- *Restoration of Public Infrastructure*
- *Temporary Emergency Power*



- *Healthcare Systems Support*
- *Sheltering Operations and Temporary Housing*
- *Emergency Repairs and Augmentations to Infrastructure*
- *Coordinate Recovery Efforts with VOAD Agencies*
- *Conduct Tornado Awareness Activities and Outreach*
- *Encourage Construction of Safe Rooms*
- *Require Wind-Resistant Building Techniques*
- *Conduct Tornado Awareness Activities*



**Transportation:** Highway/Roadway (Roads, Bridges), Railway (Freight, Passenger), Aviation (Commercial (e.g. cargo/passenger, General, Military), Pipeline, Mass Transit (Bus, Rail, Ferry)



**Health and Medical:** Medical Care (Hospitals, Dialysis, Pharmacies, Long-Term Care Facilities, VA Health System, Veterinary Services, Home Care), Public Health (Epidemiological Surveillance, Laboratory, Clinical Guidance, Assessment/ Interventions/ Treatments, Human Services, Behavioral Health), Medical Supply Chain (Blood/Blood Products, Manufacturing, Pharmaceutical, Device, Medical Gases, Distribution, Critical Clinical Research, Sterilization, Raw Materials), Patient Movement (Emergency Medical Services), Fatality Management (Mortuary and Post-Mortuary Services)

## 5.3-7 WINTER STORM

### LOCATION AND EXTENT

Crawford County was impacted by varying degrees of winter weather over the last century; however; the occurrence of severe winter weather in the county is relatively common during winter months. Severe winter weather can cause hazardous driving conditions, communications and electrical power failures, community isolation, and can adversely affect business continuity. This type of severe weather may include one or more of the following winter factors:

**Blizzards**, as defined by the National Weather Service, are a combination of sustained winds or frequent gusts of 35 mph or greater and visibilities of less than a quarter mile from falling or blowing snow for 3 hours or more. A blizzard, by definition, does not indicate heavy amounts of snow, although they can happen together. The falling or blowing snow usually creates large drifts from the strong winds. The reduced visibilities make travel, even on foot, particularly treacherous. The strong winds may also support dangerous wind chills. Ground blizzards can develop when strong winds lift snow off the ground and severely reduce visibilities.

**Heavy snow**, in large quantities, may fall during winter storms. Six inches or more in 12 hours or eight inches or more in 24 hours constitutes conditions that may significantly hamper travel or create hazardous conditions. The National Weather Service issues warnings for such events. Smaller amounts can also make travel hazardous, but in most cases, only result in minor inconveniences. Heavy wet snow before the leaves fall from the trees in the fall or after the trees have leafed out in the spring may cause problems with broken tree branches and power outages.

**Ice storms** develop when a layer of warm (above freezing), moist air aloft coincides with a shallow cold (below freezing) pool of air at the surface. As snow falls into the warm layer of air, it melts to rain, and then freezes on contact when hitting the frozen ground or cold objects at the surface, creating a smooth layer of ice. This phenomenon is called freezing rain. Similarly, sleet occurs when the rain in the warm layer subsequently freezes into pellets while falling through a cold layer of air at or near the Earth's surface. Extended periods of freezing rain can lead to accumulations of ice on roadways, walkways, power lines, trees, and buildings. Almost any accumulation can make driving and walking hazardous. Thick accumulations can bring down trees and power lines.

**Extreme Cold**, in extended periods, frequently occurs throughout the winter months in Crawford County. Heating systems compensate for the cold outside. Most people limit their time outside during extreme cold conditions, but common complaints usually include pipes freezing and cars

refusing to start. When cold temperatures and wind combine, dangerous wind chills can develop.

**Wind chill** is how cold it “feels” and is based on the rate of heat loss on exposed skin from wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature, and eventually, internal body temperature. Therefore, the wind makes it feel much colder than the actual temperature. For example, if the temperature is 0°F and the wind is blowing at 15 mph, the wind chill is -19°F. At this wind chill, exposed skin can freeze in 30 minutes. Wind chill does not affect inanimate objects. (National Weather Service)

To protect people and property, the National Weather Service issues informational products alerting the public to varying degrees of hazardous weather. The following products can be issued during hazardous winter weather:

- **Winter Storm Watch:** Issued when conditions are favorable for significant winter storm events (heavy sleet, heavy snow, ice storm, heavy snow and blowing snow or a combination of events).
- **Winter Storm Warning:** Issued for significant winter weather events including snow, ice, sleet, blowing snow, or a combination of these hazards. Travel will become difficult or impossible in some situations.
- **Winter Weather Advisory:** Issued when snow, blowing snow, ice, sleet, or a combination of these wintry elements is expected, but conditions should not be hazardous enough to meet warning criteria.
- **Blizzard Watch:** Issued when there is a potential for falling and/or blowing snow with strong winds and extremely poor visibilities. This can lead to whiteout conditions and make travel very dangerous.
- **Blizzard Warning:** Issued for frequent gusts greater than or equal to 35 mph accompanied by falling and/or blowing snow, frequently reducing visibility to less than 1/4 mile for three hours or more. A Blizzard Warning means severe winter weather conditions are expected or occurring. Falling and blowing snow with strong winds and poor visibilities are likely, leading to whiteout conditions making travel extremely difficult.
- **Ice Storm Warning:** Issued for ice accumulation of around 1/4 inch or more. This amount of ice accumulation will make travel dangerous or impossible and likely lead to snapped power lines and falling tree branches.
- **Freezing Rain Advisory:** Issued when light ice accumulation (freezing rain and/or freezing drizzle) is expected but will not reach warning criteria. Expect a glaze on roads resulting in hazardous travel.
- **Lake Effect Snow Watch:** Issued when conditions are favorable for lake effect snow events. A potential exists for heavy accumulation of lake effect snow. Travel and commerce may be significantly affected.
- **Lake Effect Snow Warning:** Issued when widespread or localized lake induced snow squalls or heavy showers are expected to produce significant snowfall accumulation. Lake effect snow usually develops in narrow bands and impacts a limited area. These bands can produce very heavy snow with sudden restrictions in visibility. Driving conditions may become hazardous at times.
- **Lake Effect Snow Advisory:** Issued for widespread or localized lake effect snowfall accumulation (and blowing snow) remaining below warning criteria. Expect lake effect snow showers and assume travel will be difficult in some areas. Some localized snow bands will be intense enough to produce several inches in a few areas with sudden restrictions in visibility.

- **Wind Chill Watch:** Issued when there is the potential for a combination of extremely cold air and strong winds to create dangerously low wind chill values.
- **Wind Chill Warning:** Issued for a combination of very cold air and strong winds that will create dangerously low wind chill values. This level of wind chill will result in frostbite and lead to hypothermia if precautions are not taken.
- **Wind Chill Advisory:** Issued when low wind chill temperatures are expected, but will not reach local warning criteria. Extremely cold air and strong winds will combine to generate low wind chill readings.

The science of meteorology and records of severe weather are not quite sophisticated enough to identify what areas of the county are at greater risk for damages. Therefore, all areas of the county are assumed to have the same severe weather risk countywide.

#### *RANGE OF MAGNITUDE*

Severe winter weather can result in the closing of primary and secondary roads, particularly in rural locations, loss of utility services, and depletion of oil heating supplies. Environmental impacts often include damage to shrubbery and trees due to heavy snow loading, ice build-up, and/or high winds which can break limbs or even bring down large trees. 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. The worst winter storm to affect Crawford County occurred in December 2004. This storm caused approximately \$1.2 million in damages and resulted in scattered power outages in Crawford County.

#### *PAST OCCURRENCE*

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

The first of these devastating winter storms occurred in early January with record snowfall depths in excess of 33 inches in the southwest and south-central portions 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, affecting the southeastern portion of the Commonwealth, which 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.

More specifically, winter weather is a common occurrence in Crawford County throughout the late fall, winter, and early spring months. According to the National Centers for Environmental Information, there were 161 winter weather events in Crawford County between 01/01/1996 and 05/31/2020. Data indicates that one death occurred as a result of winter weather activity during that timeframe.

The weather alerts listed in Table 5.3-7.1 were issued by the National Weather Service in Cleveland for Crawford County from 2017 to 2020.

Weather Alert	2020	2019	2018	2017	Total
Winter Weather Advisory	5	20	9	8	42
Winter Storm Warnings	0	4	4	5	13
Winter Storm Watch	0	2	2	5	9
Wind Chill Advisory	0	2	3	0	5
Freeze Advisory	2	0	0	0	2
Wind Chill Watch	0	1	0	0	1
Wind Chill Warning	0	1	0	0	1

**Table 5.3-7.1  
Weather Alerts  
(2017-2020)**

Date	Type	Deaths	Injuries	Property Damage
1/2/1996	Heavy Snow	1	0	\$100,000
1/9/1996	Heavy Snow	0	0	\$4,000
2/2/1996	Cold/Wind Chill	0	0	\$100,000
3/2/1996	Heavy Snow	0	0	\$2,000
11/9/1996	Heavy Snow	0	0	\$1,000,000
11/26/1996	Heavy Snow	0	0	\$0
12/24/1996	Heavy Snow	0	0	\$0
1/6/1997	Heavy Snow	0	0	\$0
1/10/1997	Cold/Wind Chill	0	0	\$5,000
1/16/1997	Heavy Snow	0	0	\$0
1/26/1997	Heavy Snow	0	0	\$0
2/13/1997	Heavy Snow	0	0	\$0
3/6/1997	Heavy Snow	0	0	\$0
3/6/1997	Heavy Snow	0	0	\$0
10/22/1997	Heavy Snow	0	0	\$25,000
11/14/1997	Ice Storm	0	0	\$0
11/15/1997	Heavy Snow	0	0	\$0
12/5/1997	Heavy Snow	0	0	\$75,000
12/30/1997	Heavy Snow	0	0	\$0
1/13/1998	Winter Weather	0	13	\$0
3/10/1998	Heavy Snow	0	0	\$0

Date	Type	Deaths	Injuries	Property Damage
3/14/1998	Heavy Snow	0	0	\$0
12/16/1998	Heavy Snow	0	0	\$0
12/21/1998	Heavy Snow	0	0	\$0
12/30/1998	Heavy Snow	0	0	\$0
1/2/1999	Winter Storm	0	5	\$30,000
1/8/1999	Winter Storm	0	0	\$0
1/13/1999	Winter Storm	0	0	\$5,000
1/14/1999	Heavy Snow	0	0	\$0
1/16/1999	Heavy Snow	0	0	\$50,000
2/12/1999	Heavy Snow	0	0	\$0
3/3/1999	Heavy Snow	0	0	\$0
3/5/1999	Heavy Snow	0	0	\$20,000
12/23/1999	Heavy Snow	0	0	\$150,000
12/27/1999	Heavy Snow	0	0	\$0
1/21/2000	Heavy Snow	0	0	\$20,000
11/20/2000	Heavy Snow	0	0	\$200,000
11/21/2000	Heavy Snow	0	0	\$250,000
12/5/2000	Heavy Snow	0	0	\$15,000
12/6/2000	Heavy Snow	0	0	\$40,000
12/12/2000	Heavy Snow	0	0	\$100,000
12/13/2000	Winter Storm	0	0	\$150,000

**Table 5.3-7.1 Weather Events (1996-2020)**

Date	Type	Deaths	Injuries	Property Damage
12/24/2000	Heavy Snow	0	0	\$30,000
12/27/2000	Heavy Snow	0	0	\$30,000
1/5/2001	Heavy Snow	0	0	\$40,000
1/27/2001	Heavy Snow	0	0	\$20,000
2/2/2001	Heavy Snow	0	0	\$15,000
3/5/2001	Heavy Snow	0	0	\$75,000
3/26/2001	Heavy Snow	0	0	\$40,000
12/20/2001	Heavy Snow	0	0	\$0
12/28/2001	Heavy Snow	0	0	\$100,000
2/4/2002	Heavy Snow	0	0	\$0
2/27/2002	Heavy Snow	0	0	\$50,000
3/3/2002	Heavy Snow	0	0	\$25,000
3/22/2002	Heavy Snow	0	0	\$75,000
3/24/2002	Winter Storm	0	0	\$50,000
11/30/2002	Heavy Snow	0	0	\$100,000
12/1/2002	Heavy Snow	0	0	\$75,000
12/24/2002	Heavy Snow	0	0	\$100,000
1/10/2003	Heavy Snow	0	0	\$35,000
12/5/2003	Winter Storm	0	0	\$150,000
12/17/2003	Heavy Snow	0	0	\$250,000
1/6/2004	Heavy Snow	0	0	\$250,000
1/14/2004	Winter Storm	0	0	\$250,000
1/19/2004	Heavy Snow	0	0	\$250,000
1/27/2004	Winter Storm	0	0	\$200,000
3/12/2004	Heavy Snow	0	0	\$50,000
3/16/2004	Heavy Snow	0	0	\$250,000
4/4/2004	Heavy Snow	0	0	\$125,000
12/13/2004	Heavy Snow	0	0	\$250,000
12/22/2004	Winter Storm	0	0	\$1,200,000
1/5/2005	Winter Storm	0	0	\$800,000

Date	Type	Deaths	Injuries	Property Damage
1/22/2005	Winter Storm	0	0	\$150,000
2/20/2005	Heavy Snow	0	0	\$15,000
3/1/2005	Winter Storm	0	0	\$200,000
4/2/2005	Winter Storm	0	0	\$300,000
11/24/2005	Winter Storm	0	0	\$150,000
12/1/2005	Heavy Snow	0	0	\$100,000
1/24/2006	Heavy Snow	0	0	\$150,000
2/5/2006	Winter Storm	0	0	\$75,000
11/2/2006	Lake-Effect Snow	0	0	\$50,000
12/3/2006	Lake-Effect Snow	0	0	\$20,000
12/4/2006	Lake-Effect Snow	0	0	\$15,000
12/7/2006	Lake-Effect Snow	0	0	\$25,000
1/19/2007	Lake-Effect Snow	0	0	\$20,000
1/24/2007	Lake-Effect Snow	0	0	\$75,000
1/30/2007	Lake-Effect Snow	0	0	\$75,000
2/13/2007	Winter Storm	0	0	\$30,000
2/22/2007	Lake-Effect Snow	0	0	\$25,000
3/16/2007	Heavy Snow	0	0	\$50,000
12/3/2007	Lake-Effect Snow	0	0	\$50,000
12/15/2007	Winter Storm	0	0	\$300,000
1/1/2008	Winter Storm	0	0	\$50,000
2/12/2008	Winter Storm	0	0	\$50,000
2/26/2008	Winter Storm	0	0	\$150,000
3/4/2008	Winter Storm	0	0	\$500,000
3/7/2008	Winter Storm	0	0	\$600,000
10/28/2008	Lake-Effect Snow	0	0	\$75,000
11/20/2008	Lake-Effect Snow	0	0	\$250,000
12/6/2008	Lake-Effect Snow	0	0	\$250,000
12/19/2008	Winter Storm	0	0	\$30,000
1/15/2009	Extreme Cold/ Wind Chill	0	0	\$0

Date	Type	Deaths	Injuries	Property Damage
1/27/2009	Winter Storm	0	0	\$300,000
2/19/2009	Lake-Effect Snow	0	0	\$250,000
12/27/2009	Lake-Effect Snow	0	0	\$200,000
1/1/2010	Lake-Effect Snow	0	0	\$500,000
2/9/2010	Winter Storm	0	0	\$250,000
2/25/2010	Winter Storm	0	0	\$200,000
12/4/2010	Lake-Effect Snow	0	0	\$400,000
12/12/2010	Lake-Effect Snow	0	0	\$250,000
1/7/2011	Lake-Effect Snow	0	0	\$150,000
2/1/2011	Winter Storm	0	0	\$300,000
2/20/2011	Winter Storm	0	0	\$200,000
3/10/2011	Winter Storm	0	0	\$150,000
1/1/2012	Lake-Effect Snow	0	0	\$100,000
1/12/2012	Lake-Effect Snow	0	0	\$150,000
2/10/2012	Lake-Effect Snow	0	0	\$75,000
2/25/2012	Lake-Effect Snow	0	0	\$50,000
3/27/2012	Cold/Wind Chill	0	0	\$0
4/29/2012	Extreme Cold/ Wind Chill	0	0	\$200,000
12/21/2012	Winter Storm	0	0	\$100,000
12/26/2012	Winter Storm	0	0	\$100,000
2/1/2013	Winter Storm	0	0	\$75,000
3/18/2013	Winter Storm	0	0	\$75,000
3/20/2013	Lake-Effect Snow	0	0	\$50,000
10/23/2013	Lake-Effect Snow	0	0	\$180,000
11/11/2013	Lake-Effect Snow	0	0	\$50,000
11/26/2013	Winter Storm	0	0	\$150,000
1/2/2014	Heavy Snow	0	0	\$100,000
1/6/2014	Extreme Cold/ Wind Chill	0	0	\$0

Date	Type	Deaths	Injuries	Property Damage
1/28/2014	Extreme Cold/ Wind Chill	0	0	\$0
2/4/2014	Winter Storm	0	0	\$100,000
3/12/2014	Winter Storm	0	0	\$150,000
12/11/2014	Winter Storm	0	0	\$0
1/6/2015	Lake-Effect Snow	0	0	\$150,000
2/1/2015	Winter Storm	0	0	\$200,000
2/15/2015	Extreme Cold/ Wind Chill	0	0	\$0
2/20/2015	Extreme Cold/ Wind Chill	0	0	\$0
12/18/2015	Lake-Effect Snow	0	0	\$50,000
1/11/2016	Lake-Effect Snow	0	0	\$200,000
1/17/2016	Lake-Effect Snow	0	0	\$200,000
2/9/2016	Lake-Effect Snow	0	0	\$150,000
2/15/2016	Heavy Snow	0	0	\$200,000
4/8/2016	Winter Storm	0	0	\$150,000
11/19/2016	Lake-Effect Snow	0	0	\$150,000
12/8/2016	Lake-Effect Snow	0	0	\$150,000
12/14/2016	Lake-Effect Snow	0	0	\$100,000
12/29/2016	Lake-Effect Snow	0	0	\$150,000
3/13/2017	Winter Storm	0	0	\$150,000
1/3/2018	Lake-Effect Snow	0	0	\$100,000
1/12/2018	Winter Storm	0	0	\$175,000
3/1/2018	Winter Storm	0	0	\$150,000
3/8/2018	Lake-Effect Snow	0	0	\$100,000
3/14/2018	Lake-Effect Snow	0	0	\$150,000
1/19/2019	Winter Storm	0	0	\$150,000
1/30/2019	Extreme Cold/ Wind Chill	0	0	\$0

Date	Type	Deaths	Injuries	Property Damage
1/18/2020	Lake-Effect Snow	0	0	\$10,000
2/7/2020	Lake-Effect Snow	0	0	\$0
2/26/2020	Lake-Effect Snow	0	0	\$5,000
<b>Totals</b>		<b>1</b>	<b>18</b>	<b>\$18,901,000</b>

### FUTURE OCCURRENCE

Reported severe winter weather events over the past 24 years provide an acceptable framework for determining the future occurrence in terms of frequency for such events. The probability of the county and its municipalities experiencing severe winter weather, although frequent, can be difficult to quantify, but based on historical record of 161 winter weather events since 1996, it can reasonably be assumed that this type of event has occurred once every 0.149 years from 1996 through 2020.

Current Year (2020) subtracted by Historical Year (1996) = 24 Years on Record

Years on Record (24) divided by Number of Historical Events (161) = 0.149

Furthermore, the historic frequency calculates that there is a 670.83% chance of this type of event occurring each year. On the whole, the probability of a winter storm event is considered highly likely as defined by the Risk Factor Methodology probability criteria.

### VULNERABILITY ASSESSMENT

Risk Factor (RF) Value: 2.2

According to the qualitative assessment performed using the RF tool, the winter storm hazard scored a RF value of 2.2 (from a scale of 0 to 4, with 4 being the highest risk level).

Hazard	Risk Assessment Category					Risk Factor
	Probability	Impact	Spatial Extent	Warning Time	Duration	
Winter Storm	3	2	3	1	2	2.2

Similar to the vulnerability assessment discussion for tornadoes and severe wind, vulnerability to the effects of winter storms on buildings is dependent on the age of the building type, construction material used, and condition of the structure. Heavy snow loads on roofs, particularly large span roofs, can cause roofs to leak or even collapse depending on their construction. Extremely cold temperatures may cause pipes to freeze and subsequently burst, causing water damage.

Probably the greatest issue for critical facilities during significant winter weather is the inaccessibility of such facilities due to poor roadways, utility



outages, or dangerous wind chills. During periods of heavy snow, ice, or blizzards, roads can quickly become impassable, stranding motorists and isolating communities. Long-term road closures during an extended cold period may diminish and threaten propane and fuel supplies. Possible losses to critical infrastructure include:

- *Electric power disruption*
- *Communication disruption*
- *Water and fuel shortages*
- *Road closures*
- *Damaged infrastructure components, such as sewer lift stations and treatment plants*

Debris may also block roadways making transportation and commerce difficult if not impossible. Those facilities with back-up generators are better equipped to handle a severe weather situation should the power go out.

An extended power outage during winter may make many homes and offices unbearably cold. Additionally, during extended winter-time power outages, people often make the mistake of bringing portable generators inside or not venting them properly, leading to carbon monoxide poisoning. With poor road conditions, sheltering residents may present significant logistical challenges with getting people to heated facilities, feeding, and providing medical care. These situations, accompanied by stranded motorists that need to be rescued, represent significant threats to the population.

Additional information on construction type and building codes enforced at time of construction would allow a more thorough assessment of the vulnerability of structures to winter storm impacts such as severe wind and heavy snow loading. Based on the information available, all communities in Crawford County are essentially equally vulnerable to the direct impacts of winter storms.

All future structures built in Crawford County will likely be exposed to severe winter weather damage. Since the previous statement is assumed to be uniform countywide, the location of development does not increase or reduce the risk necessarily. Crawford County and its jurisdictions need to adhere to building codes, and therefore, new development can be built to current standards to account for heavy snow loads. Additionally, as homes go up

in more remote parts of the county, accessing those rural residents may become impossible should sheltering or emergency services be needed in an extreme event.

**Pennsylvania**  
**National Risk Index (NRI) ID: C42039 Crawford County,**

Winter Weather	
Number of Events	403
Annualized Frequency	15
Expo. – Building Value (\$)	9,548,324,909
Expo. – Population	88,765
Expo. – Population Equiv. (\$)	656,860,987,977
Expo. – Total (\$)	666,409,312,886
HLR – Buildings	0
HLR – Population	0
HLR – Overall Rating	Very Low
EAL – Building Value (\$)	415,453
EAL – Population	0
EAL – Population Equiv. (\$)	240,178
EAL – Total (\$)	655,631
EAL Score	36.11
EAL Rating	Relatively High
Risk Score	29.41
Risk Rating	Relatively High

Cold Wave	
Number of Events	11
Annualized Frequency	1
Expo.- Building Value (\$)	9,548,324,909
Expo.- Population	88,765
Expo.- Population Equiv. (\$)	656,860,987,977
Expo.- Agricultural Value (\$)	107,270,000
Expo.- Total (\$)	666,516,582,886
HLR- Buildings	0
HLR- Population	0
HLR- Agriculture	0
HLR- Overall Rating	Very Low
EAL- Building Value (\$)	7,292
EAL- Population	0
EAL- Population Equiv. (\$)	47,083
EAL- Agricultural Value (\$)	34,451
EAL- Total (\$)	88,826
EAL Score	23
EAL Rating	Relatively Moderate
Risk Score	19
Risk Rating	Relatively Moderate

### *Crawford County Community Lifeline Integration*

Components and Essential Elements of information needed to stabilize and mitigate the incident within the Lifelines for this hazard within the lifeline(s) include;

#### **Lifeline Planning Factors (Maximum anticipated or known impacts)**

- *Number of highway bridges with at least moderate damage*
- *Number of railway bridges with at least moderate damage*
- *Number of airport runways with at least moderate damage*
- *Number of port facilities with at least moderate damage*
- *Number of total injuries or fatalities*
- *Number and percent of total hospital beds function*
- *Number of medical facilities with at least moderate damage*

#### **Lifeline Stabilization Target**

- *Multimodal routes (air, rail, road, port) are clear of debris and accessible by normal or alternate means.*
- *All survivors, their pets, and service animals have access to required medical and veterinary care. Emergency medical systems are capable of managing patient movement requirements. Public health services are accessible to all survivors. Sufficient temporary fatality management support is in place to meet processing demand. Medical supply chain capable of adequately resupplying medical care providers.*

#### **County Assistance Lines of Efforts**

- *Adopt and enforce building codes.*
- *Protect buildings and infrastructure.*
- *Protect power lines.*
- *Reduce impacts to roadways.*
- *Conduct winter weather risk awareness activities.*
- *Assist vulnerable populations.*
- *Mitigation Solutions*
- *Adopt and enforce building codes.*
- *Protect buildings and infrastructure.*
- *Protect power lines.*
- *Reduce impacts to roadways.*
- *Conduct winter weather risk awareness activities.*
- *Assist vulnerable populations.*



**HEALTH AND MEDICAL COMMUNITY LIFELINE:** Medical Care (Hospitals, Dialysis, Pharmacies, Long-Term Care Facilities, VA Health System, Veterinary Services, Home Care), Public Health (Epidemiological Surveillance, Laboratory, Clinical Guidance, Assessment/ Interventions/ Treatments, Human Services, Behavioral Health), Medical Supply Chain (Blood/Blood Products, Manufacturing, Pharmaceutical, Device, Medical Gases, Distribution, Critical Clinical Research, Sterilization, Raw Materials), Patient Movement (Emergency Medical Services), Fatality Management (Mortuary and Post-Mortuary Services)



**HAZARDOUS MATERIALS COMMUNITY LIFELINE:** Facilities (Oil/HAZMAT Facilities (e.g. chemical, nuclear) Oil/HAZMAT/Toxic Incidents from Facilities); Hazardous Debris, Pollutants, Contaminants (Oil/HAZMAT/Toxic Incidents from Non-Fixed Facilities, Radiological or Nuclear Incidents)

## 5.3-8 INVASIVE SPECIES

### LOCATION AND EXTENT

Invasive Species are defined as NON-NATIVE SPECIES that can cause ECOLOGIC, ECONOMIC, OR HUMAN HEALTH related impacts. Invasive species are a high-risk biological contaminant. They are the only pollutant/contaminant that actually reproduce once released into the environment. The phenomena of invasive species is largely attributed to human activity and alteration of native ecosystems. Human society is increasingly globalized, and people have the capability to traverse the globe at unparalleled rates. Either intentionally or unintentionally, species of plants or animals may accompany people when they travel, introducing the species to a novel ecosystem. Once introduced a new species has an unfair advantage over native species. There are likely no diseases or predators/herbivores to keep the introduced species in check. Under these conditions introduced species may thrive, potentially restructuring the ecosystem and threatening its health.

Common pathways for invasive species introduction to Pennsylvania include (PA DOA, 2010):

- *Contamination of internationally traded products*
- *Hull fouling*
- *Movement of Recreational Watercraft*
- *Ship ballast water release*
- *Discarded live fish bait*
- *Intentional release*
- *Escape from cultivation*
- *Movement of soil, compost, wood, vehicles or other materials and equipment*
- *Unregulated sale of organisms*
- *Smuggling activities*
- *Hobby trading or specimen trading*
- *Ornamental Trade*

Invasive species threats are typically divided into two main subsets:

***Aquatic Invasive Species (AIS)*** are nonnative, invertebrates, fishes, aquatic plants, and microbes that threaten the diversity or abundance of native species, the ecological stability of the infested waters, human health and safety, or commercial, agriculture, or recreational activities dependent on such waters.

***Terrestrial Invasive Species (TIS)*** are nonnative plants, vertebrates, arthropods, or pathogens that complete their lifecycle on land whose introduction does or is likely to cause economic or environmental harm or harm to human health. The location and extent of invasive threats is dependent on the preferred habitat of the species, as well as the species' ease of movement and establishment. Table 22 – Crawford Invasive Species lists invasive species that are currently known to be in Crawford County.

### *Range of Magnitude*

Invasive Species are defined as non-native species that can cause ecologic, economic, or human health related impacts. Some non-native species like Ringneck Pheasants and Brown Trout are not considered pests and are actually important to the economy. Other non-native species become invasive and can have many negative impacts and cause significant changes in the composition of ecosystems. For example, an ongoing Hydrilla infestation in Pymatuning Reservoir poses a strong risk of severely compromising the ecology and economic value of the reservoir, as well as other surrounding water bodies including the Great Lakes. The reservoir's shallow depths (reported average depth = 15 feet) make a large fraction of the lake subject to risk of Hydrilla invasion. A preliminary conservative analysis examining typical littoral areas up to 10 feet in depth across the entire lake indicates that over 6,500 acres of the lake's total 17,088 acres is at strong risk of Hydrilla invasion. It should be recognized that a lake-wide infestation of Hydrilla would represent a major challenge to the uses and ecology of the lake and require an exponential increase in cost of possible management. An initial cost project for a single annual cycle of managing an infestation up 6,500 acres in size is between \$2.2 - \$2.9 million. With hydrilla's tuber reproductive strategy, such management would need to occur for 2 – 3 consecutive years to reach improved maintenance control conditions and as much as 8-10 years to push towards full eradication. Currently ~700 ac of Hydrilla is being managed by a collaborative effort between Pa DCNR State Parks, Ohio Department of Natural Resources, Crawford County Conservation District, and US Army Corps of Engineers Buffalo District. On a statewide and federal scale, the Pymatuning monoecious Hydrilla infestation is a perfect springboard for spread to Pennsylvania lakes as well as neighboring states and the Great Lakes themselves. With over 3.1 million visitors per year, the potential for Hydrilla to spread exponentially is a very real threat. Hydrilla in Pymatuning Reservoir has the potential for severe economic impact to Crawford County, Pennsylvania as well as Ashtabula County, Ohio. A Penn State Economic Impact Study found the following: Pymatuning State Park, both local and non-local visitors spent an estimated \$83,608,000 on their trips to this park in 2010. This spending resulted in \$78,352,000 in sales, 1,178 Jobs, \$27,343,000 in labor income and \$43,566,000 in value added. With the visitation listed and with the Spillway attracting over 400,000 visitors a year, one can easily say Pymatuning State Park is the #1 tourist destination in Crawford County. As part of the regional effort to contain Hydrilla in Pymatuning Reservoir, Pymatuning State Park implemented a pilot launch steward program at their boat launches. Started in 2016, the effort has prevented a number of introductions of invasive species to Pymatuning Reservoir, including Cabomba and Zebra Mussels (neither of which are currently in the Reservoir). The program also surveys boaters on where they came from and where they plan to go next in an effort to gain an idea of how far Pymatuning Reservoir could spread Hydrilla to new waters. An excerpt from the 2017 report states "Boaters gave 60 locations when asked where they might be using their boat next. (2017: 55) Top 3 after Pymatuning: Lake Arthur, Shenango Lake, and Lake Erie (same as 2016). They responded with 66 locations of where they last used their boat. Top 3 responses after Pymatuning: Lake Arthur, Shenango, and Lake Erie. (2016: 82, Arthur, Erie, Wilhelm). Inspected boats were registered to: Florida, Iowa, Kentucky, Louisiana, Michigan, Maryland, North Carolina, New York, Ohio, Pennsylvania, and West Virginia. The only difference between 2016 and 2017 was Iowa vs. Indiana."

## Past Occurrence

Invasive species have been entering Pennsylvania since the arrival of European settlers. Crawford Invasive Species lists currently known invasive species that are established in Crawford County that pose a threat. The list should not be considered comprehensive, as it is always evolving. Some invasive species such as the Emerald Ash Borer, Japanese Beetle, and Garlic Mustard are also widespread in the region surrounding Crawford County. While Crawford County can work towards mitigating the negative impacts of such widespread species, controlling the spread of established species can be difficult. In contrast, Infestations of species such as Japanese Stilt grass, the Common Reed, European Frog-Bit, or European Water Chestnut are just outside of Crawford County's borders. In these cases, Early Detection/Rapid Response (EDRR) is critical in the protection of Crawford County resources (Table 23 – High Risk Species). While all species listed here are not native to Crawford County, those species highlighted in yellow pose a larger ecological threat than others (see Vulnerability Assessment for additional discussion).

Note: updates are from the Pennsylvania Natural Heritage Program list of Invasive Species. As of Friday 8-21-2020.

Known Invasive Species In Crawford County	
Scientific Name	Common Name(s)
<b>Aquatic Animals</b>	
<i>Alsea pseudoharengus</i>	Alewife
<i>Carassius auratus</i>	Goldfish
<i>Cipangopaludina chinensis</i> ; <i>Bellamya chinensis</i>	Chinese Mystery Snail
<i>Cipangopaludina japonica</i> ; <i>Bellamya japonica</i>	Japanese mysterysnail
<i>Corbicula fluminea</i>	Asian Clam
<i>Ctenopharyngodon stelleri</i>	Grass Carp
<i>Cyprinus carpio</i>	Common Carp
<i>Dreissena polymorpha</i>	Zebra Mussel
<i>Neogobius melanostomus</i>	Round Goby
<i>Orconectes rusticus</i>	Rusty Crayfish
<i>Petromyzon marinus</i>	Sea Lamprey
<i>Procambarus acutus</i>	White River Crayfish
<b>Aquatic Plants</b>	
<i>Cabomba carolinia</i>	Carolina Fanwort
<i>Hydrilla verticillata</i>	Hydrilla - PA Class A Noxious Weed, Federally Listed Noxious Weed
<i>Iris pseudacorus</i>	Yellow Iris
<i>Lithium salicaria</i>	Purple Loosestrife - PA Class B Noxious Weed
<i>Myriophyllum spicatum</i>	Eurasian Watermilfoil
<i>Najas minor</i>	Brittle Naiad
<i>Nelumbo lutea</i>	American Lotus
<i>Nymphaoides peltata</i>	Yellow Floating Heart - PA Class A Noxious Weed
<i>Persicaria hydropiper</i>	Marsh Pepper Knotweed, Smartweed
<i>Phragmites australis</i>	Common Reed
<i>Potamogeton crispus</i>	Curly Leaf Pondweed
<i>Typha angustifolia</i>	Narrowleaf Cattail
<b>Diseases</b>	
<i>Cryptococcus fagisuga</i> & <i>Neonectria</i>	Beech Bark Disease Complex
<i>Sirococcus clavigenis</i> ; <i>Juglandacearum</i> ( <i>Hypocreales: Nectraceae</i> )	Butternut Canker
Diaporthales: <i>Cyphonectriaceae</i>	Chestnut Blight
<i>Cronartium ribicola</i>	White Pine Blister Rust
<i>Neonectria faiginata</i>	Neonectria canker
<b>Insects</b>	
Coleoptera: <i>Cuculionidae</i>	Pine Shot Beetle
Hymenoptera: <i>Cynipidae</i>	Chestnut Gall Wasp
Coleoptera: <i>Buprestidae</i>	Emerald Ash Borer
Lepidoptera: <i>Lymantriidae</i> <i>Lymantria dispar</i>	Gypsy Moth
Coleoptera: <i>Scarabaeidae</i>	Japanese Beetle
Hymenoptera: <i>Tenthredinidae</i>	Pear Sawfly
Coleoptera: <i>Curculionidae</i>	Strawberry Root Weevil
<i>Halyomorpha halys</i>	Brown Marmorated Stink Bug
<i>Colledium rufipenne</i>	Japanese Cedar Longhorn Beetle
<i>Choristoneura conflictana</i>	Large Aspen Tortrix
<b>Terrestrial Plants</b>	
<i>Abutilon theophrasti</i>	Velvetleaf
<i>Acer platanoides</i>	Norway Maple
<i>Acer platanoides</i>	Norway Maple
<i>Achillea millefolium</i>	Common Yarrow
<i>Acorus calamus</i>	Sweetflag Calamus
<i>Agrostis gigantea</i>	Giant Bentgrass
<i>Agrostis gigantea</i>	Reedtop
<i>Agrostis stolonifera</i>	Creeping Bentgrass
<i>Agrostis stolonifera</i>	Tree of Heaven
<i>Allianthus altissima</i>	Creeping Bentgrass
<i>Alliaria petiolata</i>	Garlic Mustard
<i>Ailnus glutinosus</i>	European Alder
<i>Anthoxanthum odoratum</i>	Sweet Vernal Grass
<i>Berberis thunbergii</i>	Japanese Barberry
<i>Brassica nigra</i>	Black Mustard
<i>Bromus inermis</i>	Smooth Brome
<i>Bromus tectorum</i>	Cheatgrass
<i>Cabomba carolinia</i>	Carolina Fanwort
<i>Celastrus orbiculatus</i>	Oriental Bittersweet
<i>Centauria jacea</i>	Brown Knapweed
<i>Centauria stoebe</i> ssp. <i>Micranthos</i>	Spotted Knopweed
<i>Cerastium fontanum</i> ssp. <i>Vulgare</i>	Big Chickweed
<i>Chelidonium majus</i>	Greater celandine
<i>Chelidonium majus</i>	Greater Celandine
<i>Cirsium arvense</i>	Canada Thistle
<i>Cirsium arvense</i>	Canada Thistle - PA Class B Noxious Weed
<i>Cimicifuga vulgaris</i>	Wild Basil
<i>Conium maculatum</i>	Poison-hemlock
<i>Conium maculatum</i>	Poison Hemlock - PA Class B Noxious Weed

<i>Dactylis glomerata</i>	Orchard Grass
<i>Echinochloa crus-galli</i>	Barnyardgrass
<i>Elaeagnus umbellata</i>	Autumn Olive
<i>Epilobium hirsutum</i>	Great Hairy Willowherb
<i>Epilobium parviflorum</i>	Small Hairy Willowherb
<i>Fallopia species unknown</i>	Knotweed (species unknown)
<i>Frangula alnus</i>	Glossy False Buckthorn
<i>Frangula alnus</i>	Glossy Buckthorn
<i>Glechoma hederacea</i>	Ground Ivy
<i>Hemerocallis fulva</i>	Tawny Daylily
<i>Heracleum mantegazzianum</i>	Giant Hogweed - PA Class A Noxious Weed
<i>Hesperis matronalis</i>	Dame's Rocket
<i>Heracium aurantiacum</i>	Orange Hawkweed
<i>Heracium pilosella</i>	Mouse-ear Hawkweed
<i>Holcus lanatus</i>	Common Velvetgrass
<i>Holcus lanatus</i>	Common Velvetgrass
<i>Hypericum perforatum</i>	Common St. John's-wort
<i>Iris pseudacorus</i>	Yellow Iris
<i>Lolium perenne</i>	Perennial ryegrass
<i>Lolium perenne</i>	Perennial ryegrass
<i>Lonicera japonica</i>	Japanese Honeysuckle
<i>Lonicera morrowii</i>	Morrow's Honeysuckle
<i>Lonicera spp</i> (species unknown)	Honeysuckle (species unknown)
<i>Lonicera spp.</i>	Bush Honeysuckles (exotic)
<i>Lotus corniculatus</i>	Garden Bird's-foot-trefoil
<i>Lotus corniculatus</i>	Birdsfoot Trefoil
<i>Lysimachia nummularia</i>	Creeping Jenny, Creeping Yellow Loosestrife
<i>Lysimachia salicaria</i>	Purple Loosestrife - PA Class B Noxious Weed
<i>Lysimachia vulgaris</i>	Garden Loosestrife
<i>Lythrum salicaria</i>	Purple Loosestrife - PA Class B Noxious Weed
<i>Medicago lupulina</i>	Black Medic
<i>Mentha spicata</i>	Spearmint
<i>Myosotis scorpioides</i>	True Forget-me-not
<i>Myosoton aquaticum</i>	Giant Chickweed
<i>Pastinaca sativa</i>	Wild Parsnip
<i>Persicaria maritima</i>	Ladyshrub
<i>Phalaris arundinacea</i>	Reed Canary Grass
<i>Phleum pratense</i>	Meadow Timothy
<i>Phragmites australis</i>	European Common Reed
<i>Phragmites australis spp</i>	Common Reed
<i>Plantago lanceolata</i>	English Plantain
<i>Poa compressa</i>	Canada Bluegrass
<i>Poa trivialis</i>	Scribner's Bluegrass
<i>Poa trivialis</i>	Roughstalk Bluegrass
<i>Polygonum persicaria</i>	Lady's Thumb
<i>Pyrus calleryana</i>	Callery Pear
<i>Ranunculus repens</i>	Creeping Buttercup
<i>Reynoutria japonica</i>	Japanese Knotweed
<i>Rosa multiflora</i>	Multiflora Rose - PA Class B Noxious Weed
<i>Rumex acetosella</i>	Sheep Sorrel
<i>Rumex crispus</i>	Curly Dock
<i>Rumex obtusifolius</i>	Bitter Dock
<i>Salix alba</i>	White Willow
<i>Salix fragilis</i>	Crack Willow
<i>Saponaria officinalis</i>	Bouncing Bet
<i>Schedonorus pratensis</i>	Meadow Fescue
<i>Sedum acre</i>	Gold-moss
<i>Solanum dulcamara</i>	Climbing Nightshade
<i>Solanum dulcamara var. dulcamara</i>	Climbing Nightshade
<i>Sonchus oleraceus</i>	Field Sowthistle
<i>Sonchus dulcamara</i>	Bittersweet Nightshade
<i>Stellaria media</i>	Common Chickweed
<i>Tragopogon dubius</i>	Meadow Goats-beard
<i>Trifolium hybridum</i>	Alsike Clover
<i>Trifolium repens</i>	White Clover
<i>Tussilago farfara</i>	Colts Foot
<i>Veronica officinalis</i>	Common Speedwell
<i>Vinca minor</i>	Lesser Periwinkle
<i>Vinca spp.</i>	Periwinkle
<i>Virburnum opulus</i>	European Cranberrybush

## Future Occurrence

According to PISC (the Pennsylvania Invasive Species Council), the probability of future occurrence for invasive species threats is growing due to the increasing volume of transported goods, increasing efficiency and speed of transportation, and expanding international trade agreements. Expanded global trade has created opportunities for many organisms to be transported to and establish themselves in new counties and regions. Climate change is contributing to the introduction of new invasive species. As maximum and minimum seasonal temperatures change, pests are able to establish themselves in previously inhospitable climates. This also gives introduced species an earlier start and increases the magnitude of their growth, possibly shifting the dominance of ecosystems in the favor of nonnative species.

In order to combat the increase in future occurrences, the PISC (a collaboration of state agencies, public organizations and federal agencies) released the first Invasive Species Management Plan in April of 2010, and a revised plan in 2016. The plan outlines the Commonwealth's goals for managing the spread of nonnative invasive species and creates a framework for responding to threats through research, action, and public outreach and communication. More information can be found at [https://www.agriculture.pa.gov/Plants\\_Land\\_Water/PlantIndustry/GISC/Pages/default.aspx](https://www.agriculture.pa.gov/Plants_Land_Water/PlantIndustry/GISC/Pages/default.aspx).

There are several invasive species that are found in close proximity to Crawford County but have not yet been detected inside the county (see Table 23 – High Risk Species). In cases like this Early Detection/Rapid Response (EDRR) becomes critical to mitigate irreversible harm to Crawford County Resources. Early control efforts, heightened awareness, and public outreach and education can help prevent an invasive species from becoming established. Once a species is established, it is much more difficult and expensive to eradicate it from an ecosystem. Prevention is the most cost-effective option and should be the goal. For a more inclusive list of invasive plants found in Pennsylvania and a list of invasive plants on the Pennsylvania watch list, see the referenced PA DCNR publication “DCNR Invasive Plants” (PA DCNR, 2016). (See 4.3.5.5. Vulnerability Assessment for additional discussion).

High Risk Species in close proximity to Crawford County on the Watch List are (highlighted in yellow are the highest priority).

Watch List Invasive Species at Risk of Invading In Crawford County	
Scientific Name	Common Name(s)
<b>Aquatic Animals</b>	
<i>Channa argus</i>	Northern Snakehead
<i>Dreissena rostriformis bugensis</i>	Quaga Mussel
<i>Hypophthalmichthys molitrix</i>	Silver Carp
<i>Hypophthalmichthys nobilis</i>	Bighead Carp
<i>Mylopharyngodon piceus</i>	Black Carp
<i>Neogobius melanostomus</i>	Round Goby
<b>Aquatic Plants</b>	
<i>Butomus umbellatus</i>	Flowering Rush
<i>Hydrocharis morsus-ranae</i>	European Frogbit - PA Class A Noxious Weed
<i>Myriophyllum aquaticum</i>	Parrot Feather - PA Class B Noxious Weed
<i>Myriophyllum heterophyllum</i>	Broadleaf Water-milfoil
<i>Nitellopsis obtusa</i>	Starry Stonewort
<i>Trapa natans</i>	European Water Chestnut - Pa Class A Noxious Weed
<i>Veronica anagallis-aquatica</i>	Water Speedwell
<b>Diseases</b>	
<i>Discula destructiva</i>	Dogwood Antracnose
<i>Geosmithia morbida</i> & <i>Pityophthorus juglandis</i>	Thousand Cankers Disease
Hemiptera: Diaspididae	Elongate Hemlock Scale
Prion Disease	Chronic Wasting Disease
<i>Ophiostoma ulmi</i> & <i>Ophiostoma novo-ulmi</i>	Dutch Elm Disease
<b>Insects</b>	
<i>Lycorma delicatula</i>	Spotted Lantern Fly
<i>Anoplophora glabripennis</i>	Asian Long-Horned Beetle
Coleoptera: Chrysomelidae	Imported Willow Leaf Beetle
Coleoptera: Curculionidae	European Bark Beetle
<i>Fenusa pusilla</i>	Birch Leafminer
Hemiptera: Adelgidae	Hemlock Wolly Adelgid
Hemiptera: Diaspididae	Oystershell Scale
Hymenoptera: Cynipidae	Chestnut Gall Wasp
Hymenoptera: Tenthredinidae	Pear Sawfly
<i>Otiarhynchus sulcatus</i>	Black Vine Weevil
<i>Pinus Sylvestris</i> , <i>P. nigra</i> , <i>p. pinaster</i>	Sirex Woodwasp
Thysanoptera: Thripidae	Pear Thrips
<b>Plants</b>	
<i>Aegopodium podagraria</i>	Bishop's Goutweed
<i>Ajuga reptans</i>	Carpet-Bugle
<i>Allium vineale</i>	Field Garlic
<i>Alnus glutinosa</i>	European Alder
<i>Cardamine impatiens</i>	Touch-me-not Bittercress
<i>Dipsacus fullonum</i>	Fuller's Teasel
<i>Galium mullugo</i>	Great Hedge Bedstraw
<i>Ipomoea purpurea</i>	Common Morning-glory
<i>Lathyrus latifolius</i>	Perennial Pea
<i>Leucanthemum vulgare</i>	Oxeye Daisy
<i>Linaria vulgaris</i>	Butter-and-eggs
<i>Microstegium vimineum</i>	Japanese Stiltgrass, Nepalese Browntop
<i>Myriophyllum heterophyllum</i>	

## Vulnerability Assessment

Risk Factor (RF) Value: 1.8

According to the qualitative assessment performed using the RF tool, the utility interruption hazard scored a RF value of 1.8 (from a scale of 0 to 4, with 4 being the highest risk level). Table below summarizes the risk levels assigned to each RF category.

Hazard	Risk Assessment Category					Risk Factor
	Probability	Impact	Spatial Extent	Warning Time	Duration	
Invasive Species	4	2	1	1	1	1.8

Crawford County’s vulnerability to invasion depends on the species in question. However, in general risk of new invasions should be considered high and an expected occurrence. Invasive species are a high-risk biological contaminant. They are the only pollutant/contaminant that actually reproduce once released into the environment. Human activity and mobility are ever increasing, and combined with the prospects of climate change, invasive species are becoming increasingly threatening. Invasive species can have severe adverse economic effects by impacting agriculture, recreation, and logging activities. Natural ecosystems provide clean water, recreational opportunities, habitat for native wildlife, and places to enjoy the tranquility and transcendence of nature. A case in point, Crawford County ranks as a high-risk county in Pennsylvania for tick borne diseases such as Lyme Disease. Dense stands of invasive species such as Japanese Barberry, Bush Honeysuckle, and Oriental Bittersweet are known to harbor much higher tick densities than a healthy ecosystem, thus increasing the likelihood of transmission of tick-borne disease within the county.

There are several invasive species that are found in close proximity to Crawford County but have not yet been detected inside the county (see Table 23 – High Risk Species). In cases like this Early Detection/Rapid Response (EDRR) becomes critical to mitigate irreversible harm to Crawford County Resources. Early control efforts, heightened awareness, and public outreach and education can help prevent an invasive species from becoming established. Once a species is established, it is much more difficult and expensive to eradicate it from an ecosystem. Prevention is the most cost-effective option and should be the goal. For a more inclusive list of invasive plants found in Pennsylvania and a list of invasive plants on the Pennsylvania watch list, see the referenced PA DCNR publication “DCNR Invasive Plants” (PA DCNR, 2016).

## Prevention and Response Options

### Early Detection/Rapid Response:

Invasive species are easiest and most cost effective to control before they become widespread and established in an area. For that reason, Early Detection/Rapid Response should prioritize management of new or novel introductions. Especially species that are listed as priorities in Table 23-High Risk Species, as well as species listed on the PA Noxious Weed List. New aquatic invasive species infestations should utilize the Pennsylvania Aquatic Invasive Species Rapid Response Plan to help guide response activities [https://seagrant.psu.edu/sites/default/files/PA%20Rapid%20Response%20Plan%203\\_11\\_19\\_0.pdf](https://seagrant.psu.edu/sites/default/files/PA%20Rapid%20Response%20Plan%203_11_19_0.pdf).



## **Recording and Reporting:**

Any suspected new infestation should be immediately reported to the PA at Invasive Species Hotline at 1-866-253-7189 or [Badbug@pa.gov](mailto:Badbug@pa.gov). Detailed locations should be recorded for invasive plants so sites can be easily relocated, treated and monitored. The use of PA iMapInvasives <https://www.paimapinvasives.org/> to track and record invasive species is recommended.

## **Prioritize:**

Public use areas such as state and municipal parks and forests, as well as healthy ecosystems identified in the Crawford County Natural Heritage Inventory [http://www.naturalheritage.state.pa.us/CNAI\\_PDFs/Crawford%20County%20NHI%202008-WEB.pdf](http://www.naturalheritage.state.pa.us/CNAI_PDFs/Crawford%20County%20NHI%202008-WEB.pdf) should be prioritized over developed and private areas. Locations with lower densities of invasive plants are often easier to control and should be prioritized over compromised habitats. Locations where humans are disturbing the landscape opens up niche space, and often times the aggressive invasive species move in faster than native species. Such locations include: road work, ditch/ culvert work, logging activities, stream improvement/stabilization and bridge work. Education and outreach for those conducting these activities should be conducted to minimize the likelihood of invasive species becoming established.

Some invasive species pose a higher risk than others. Priority species for management in Crawford County have been identified. Those priority species are highlighted in yellow in Table – Crawford Invasive Species and Table – High Risk Species.

## **Control:**

Methods of control depend on the specific infestation, but the most common approaches are mechanical (cutting and hand-pulling), Biological (release of a disease or herbivore) and chemical (herbicide treatments). For the most up to date options contact Penn State Cooperative Extension or visit <https://plantscience.psu.edu/research/projects/wildland-weed-management/publications/invasive-species-quicksheets>

## **Prevention:**

The most successful method of addressing the threat of invasive species is preventing them from establishing in the first place. It is the least labor intensive and most economical alternative. Education and Outreach have been proven to be an effective method of preventing or recognizing infestation of invasive species. The utilization of established outreach material should be conducted on an annual basis. Sources include Crawford County Extension, Pennsylvania Sea Grant, Pa Department of Conservation and Natural Resources, and Crawford county Conservation District.

Pymatuning State Park implemented a pilot launch steward program at their boat launches. Started in 2016, the effort has prevented a number of introductions of invasive species to Pymatuning Reservoir, including Cabomba and Zebra Mussels (neither of which are currently in the Reservoir). The program also surveys boaters on where they came from and where they plan to go next in an effort to gain an idea of how far Pymatuning Reservoir could spread Hydrilla to new waters. An excerpt from the 2017 report states “Boaters gave 60 locations when asked where they might be using their boat next. (2017: 55) Top 3 after Pymatuning: Lake Arthur, Shenango Lake, and Lake Erie (same as 2016). They responded with 66 locations of where they last used their boat. Top 3 responses after Pymatuning: Lake Arthur, Shenango, and Lake Erie. (2016: 82, Arthur, Erie, Wilhelm). Inspected boats were registered to: Florida, Iowa, Kentucky, Louisiana, Michigan, Maryland, North Carolina, New York, Ohio, Pennsylvania, and West Virginia. The only difference between 2016 and 2017 was Iowa vs. Indiana.” The expansion of this program to other waterways in Crawford County should be considered if feasible.

### *County Resources/ Point of Contact:*

- *Crawford County Conservation District (814)763-5269*
- *DCNR Bureau of Forestry (814) 763-1585*
- *Crawford County Extension Office at (814) 333-7460.*

### *Crawford County Community Lifeline Integration*

Components and Essential Elements of information needed to stabilize and mitigate the incident within the Lifelines for this hazard within the lifeline(s) include;

#### **Lifeline Planning Factors (Maximum anticipated or known impacts)**

- *Number of total debris (tons)*

#### **Lifeline Stabilization Target**

- *All survivors, their pets, and service animals have access to required medical and veterinary care. Emergency medical systems are capable of managing patient movement requirement. Public health services are accessible to all survivors. Sufficient temporary fatality management support is in place to meet processing demand. Medical supply chain capable of adequately resupplying medical care providers.*
- *All contaminated areas are identified and secure.*

#### **County Assistance Lines of Efforts**

- *Coordination among environmental entities*
- *Educate residents on how to prevent the spread of species*
- *Invasive species are eliminated*

# HUMAN-MADE HAZARDS

FEMA defines human-caused hazards as technological hazards and terrorism. These hazards are distinct from natural hazards in that they are induced by human activity. While risks presented by natural hazards may be increased or decreased as a result of human activity, they are not inherently human induced. The term technological hazard refers to incidents that can arise from human activities such as the manufacturing, transportation, storage, and use of hazardous materials. Technological hazards are assumed to be accidental and their consequences unintended.

This section addresses three types of technological hazards:

- *Dam/Levee Failure*
- *Environmental Hazards*
- *Terrorism*
- *Utility Interruption*



**FOOD, WATER, SHELTERING:** Food (Commercial Food Distribution, Commercial Food Supply Chain, Food Distribution Programs), Water (Drinking Water Utilities, Wastewater Systems, Commercial Water Supply Chain), Shelter, Agriculture (Animal and Agriculture)



**TRANSPORTATION COMMUNITY LIFELINE:** Highway/Roadway (Roads, Bridges), Railway (Freight, Passenger), Aviation (Commercial (e.g. cargo/passenger, General, Military), Pipeline, Mass Transit (Bus, Rail, Ferry)

## 5.3-9 Dam Failure

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



**Hazardous Materials:** Facilities (Oil/HAZMAT Facilities (e.g. chemical, nuclear) Oil/HAZMAT/Toxic Incidents from Facilities)  
Hazardous Debris, Pollutants, Contaminants (Oil/HAZMAT/Toxic Incidents from Non-Fixed Facilities, Radiological or Nuclear Incidents)



**Transportation:** Highway/Roadway (Roads, Bridges), Railway (Freight, Passenger), Aviation (Commercial (e.g. cargo/passenger, General, Military), Pipeline, Mass Transit (Bus, Rail, Ferry)

## 5.3-10 HAZARDOUS MATERIALS AND ENVIRONMENTAL HAZARDS

### LOCATION AND EXTENT

#### Hazardous Materials

Hazardous materials include flammable liquids, solids, and gases, combustible liquids, explosives, blasting agents, radioactive materials, oxidizing materials, corrosive materials, poisons, refrigerated liquids, hazardous waste/substances, and other regulated material.

A hazardous material release is the contamination of the environment (i.e. air, water, soil) by any material that because of its quantity, concentration, physical characteristics, or chemical characteristics threatens human, animal, or plant health, the environment, or property. Hazardous material spills are usually accidental events that arise from human activities such as the manufacture, transportation, storage, and use of hazardous materials. The consequences of such spills are usually unintended. An accidental or intentional release of materials could produce a health hazard to those in the area, downwind, and/or downstream with immediate, prolonged, and/or delayed effects. The spread of the material may additionally be defined by weather conditions and topography of the area. A hazardous material release can come from a fixed facility, via its transportation, or intentionally in the case of terrorism.

Fixed facilities housing hazardous substances in Crawford County include the usual facilities within communities such as water and waste water treatment plants, gas stations, and supply stores containing substances such as fuel, farm chemicals, propane, fuel oil, paint, and chlorine.

As stated previously, a hazardous material release may also occur due to a transportation accident. The most likely locations for a transportation-related hazardous material release are along the interstate, highways, and the railroad. Gas, propane, and other hazardous materials are delivered throughout the county year-round, creating a potential disaster every time one of the delivery trucks goes on the road. The need for gas, propane, fertilizers, and other toxic materials is very high in agricultural communities.

Facilities that use, manufacture, or store hazardous materials in Pennsylvania must comply with Title III of the federal Superfund Amendments and Reauthorization Act (SARA), also known as the Emergency Planning and Community Right-to-Know Act (EPCRA), and the Commonwealth's reporting requirements under the Hazardous Materials Emergency Planning and Response Act (1990-165), as amended. The community right-to-know reporting requirements keep communities abreast of the presence and release of chemicals at individual facilities. Key information about the chemicals handled by manufacturing or processing facilities is contained in the US Environmental Protection Agency's (USEPA's) Toxic Release Inventory (TRI) database.

Facilities which employ ten or more full-time employees and which manufacture or process 25,000 pounds or more, or otherwise use 10,000 pounds or more, of any SARA Section 313-listed toxic chemical in the course of a calendar year are required to report TRI information to the USEPA, the federal enforcement agency for SARA Title III, and PEMA. Also, transportation carriers must have response plans in place to address accidents. Otherwise the local emergency response team will step in to secure and restore the area. For example, in May 1998, a truck carrying hazardous waste spilled its load, prompting the Pennsylvania North-Central Region Emergency Response Team of the PA DEP to respond. The cyanide-containing waste was quickly cleaned up with no injuries, property damage or environmental damage reported.

Fourteen facilities in Crawford County are classified as EPA TRI facilities. The locations of these sites are shown in Table 5.3-10.1. (EPA, TRI 2020)

Facility Name	Municipality
Advanced Cast Products, Inc.	Vernon Township
Homer Wood Hardwood Flooring	Titusville City
Meadville Forging Company	Cambridge Springs Borough
Meadville Forging Company	West Mead Township
Molded Fiber Glass Tray Company	Pine Township
Oil Creek Plastics	Oil Creek Township
Parker LORD	Saegertown Borough
Roser Technologies, Inc.	Titusville City
Suit-Kote Corporation	West Mead Township
The J.M. Smucker Company	Vernon Township
Universal Stainless & Alloy Products	Titusville City
US Bronze Foundry & Machine, Inc.	Woodcock Township
Viking Tool & Gage	Sadsbury Township
Vitro Flat Glass, LLC	Greenwood Township

**Table 5.3-10.1 EPA TRI Facilities**

According to annual Tier II reports for calendar year 2019, there were 408 facilities in the county that “used, stored, or manufactured significant amounts of hazardous materials” with the majority of sites attributed to gas wells. A total of 610 chemicals were on site at those facilities. A total of 28 of the facilities were exempt from Tier II Fees while a total of 40 chemicals were at the exempt facilities. Thirty eight of the facilities were classified as extremely hazardous substance (EHS) facilities which had 172 chemicals were at the EHS facilities. There were no facilities in adjacent counties or states which represented a threat to Crawford County.

**Table 5.3-10.2 LOCATION OF 408 TIER II FACILITIES IN CRAWFORD COUNTY**

Facility Name	Municipality
AC-School Services, Inc.	Summit Township
ADVANCED CAST PRODUCTS INC	Vernon Township
AIR PRODUCTS AND CHEMICALS INC	Greenwood Township
ALLEGHENY COLLEGE	Meadville City
AYM LLC- CORBETT CORPORATION BULK PLANT	Titusville City
BAILLIE LUMBER CO.	Oil Creek Township
Bloomfield Twp Sewage Authority	Bloomfield Township
BUCKEYE ALUMINUM FOUNDRY, INC.	Conneaut Township
CAMBRIDGE SPRINGS WATER PLANT	Cambridge Springs Borough
CAMPBELL STUDIOS, INC.	Cambridge Springs Borough
Centerra Co-op	Cambridge Springs Borough
CHANNELLOCK INC PLANT 1	Meadville City
ChoiceWood Titusville Distribution Center	Oil Creek Township
CJ Industries	Meadville City
CLEAR LAKE LUMBER INC	Spartansburg Borough
CONNEAUT LAKE JOINT MUN AUTH	Sadsbury Township
CROWN CASTLE-805303- PA 024 Vernon Township	Vernon Township
CROWN CASTLE-805460 Union Township	Union Township
CROWN CASTLE-868131 Summerhill Township	Summerhill Township
Cygnus Home Service SCHWAN'S HOME SERVICE – 105300	Titusville City
Diversified- Alexander 2	Vernon Township
Diversified- Anthony Unit 3	Hayfield Township
Diversified- Ballut Unit 1	Sadsbury Township
Diversified- Bradley 3	Vernon Township

Facility Name	Municipality
Diversified- Byler 91	Greenwood Township
Diversified- Coulter 6, Williams 16	East Fallowfield Township
Diversified- Dillaman 1	Hayfield Township
Diversified- Dillaman 2	Hayfield Township
Diversified- Dygert 3	East Fallowfield Township
Diversified- Ernst Farms 1, 2, 3	Vernon Township
Diversified- Ferguson 3	Vernon Township
Diversified- Garrity Unit 1	Hayfield Township
Diversified- Gaut 1, 2, 3	Hayfield Township
Diversified- Godby 1	Greenwood Township
Diversified- Hebert 5	East Fallowfield Township
Diversified- Helbig 2	East Fallowfield Township
Diversified- Helgert 1	East Mead Township
Diversified- Horne 11,12	East Fallowfield Township
Diversified- Johnston 17	East Mead Township
Diversified- Johnston 8	Sadsbury Township
Diversified- Johnston Unit 14	Hayfield Township
Diversified- Kelly 4	East Fallowfield Township
Diversified- Kightlinger 1	Vernon Township
Diversified- Kingston Unit 1	Hayfield Township
Diversified- Krider 2, 3	Vernon Township
Diversified- Lance 1	Hayfield Township
Diversified- McArdle Unit 3	Greenwood Township
Diversified- McIntyre 3	Vernon Township
Diversified- Myers 3	Greenwood Township
Diversified- O'Conner Unit 3	Woodcock Township
Diversified- Oliver 1	Greenwood Township
Diversified- Pallack 11	Greenwood Township
Diversified- Pallack 6	Greenwood Township
Diversified- Quinn 1	Vernon Township

Facility Name	Municipality
Diversified- Rawson 1	Sadsbury Township
Diversified- Rawson 2	Sadsbury Township
Diversified- Roth 1	Vernon Township
Diversified- Satterlee 1	Vernon Township
Diversified- Shearer 2	East Fallowfield Township
Diversified- Smith Unit 10	Hayfield Township
Diversified- Taylor 3	Greenwood Township
Diversified- Williams 12	Greenwood Township
Diversified- Williams 15	Greenwood Township
Diversified- Williams 29	Hayfield Township
Diversified- Wotherspoon 2	Greenwood Township
Diversified- Yeager 5	Hayfield Township
Diversified- Yoder Unit 10	Greenwood Township
Diversified- Yost 3	Sadsbury Township
DJR Wells Foulk #2	East Fallowfield Township
Doren Inc. Cambridge Plant	Cambridge Springs Borough
ENERGY RESOURCES G LUCAS	West Shenango Township
ENERGY RESOURCES GLOTH KASZYNSKI UNIT	Randolph Township
Energy Resources of America Miller	Randolph Township
Enervest- Urbanick #2	Conneaut Township
FERRELLGAS- Conneaut Lake	Sadsbury Township
Giant Eagle, Inc.- GetGo # 3288	Titusville City
Grand Valley MFG Titusville Buildings 52 & 82	Titusville City
GREENLEAF CORPORATION	Hayfield Township
HARNED OIL PRODUCTS INC	Sadsbury Township
HOMER WOOD HARDWOOD FLOORING	Titusville City
INTERNATIONAL WAXES INC	Titusville City
ITU AbsorbTech, Inc.	Titusville City

Facility Name	Municipality
KASTLE- Askey Unit #2	Spring Township
KASTLE- Askey, T.D. #1	Spring Township
Kastle- Austin #1	Beaver Township
KASTLE- Bailey, D. #1	Summerhill Township
KASTLE- Bailey, W.C. #1	Summerhill Township
KASTLE- Baker-McGee	Summerhill Township
KASTLE- Barron #1	Spring Township
KASTLE- Barron Unit #1	Spring Township
Kastle- Bobula Unit #1	Spring Township
KASTLE- Boyles #1	Spring Township
KASTLE- Boyles #2	Spring Township
KASTLE- Boyles #3	Spring Township
KASTLE- Bunting, M. #5	Spring Township
Kastle- Burgess #1	Beaver Township
KASTLE- Clements, CZ #2	Spring Township
KASTLE- Clements, CZ #3	Spring Township
KASTLE- Conneaut Hardwood #1	Summerhill Township
KASTLE- Cooper #4	Spring Township
KASTLE- Cooper, Luther #1	Spring Township
KASTLE- Cooper, Luther #3	Spring Township
KASTLE- Cousins, R.W. #1	Summerhill Township
Kastle- Davis #1	Spring Township
KASTLE- Ertman, E3	Spring Township
KASTLE- Fehr-Silata	Cussewago Township
KASTLE- Ferry #2	Spring Township
KASTLE- Ford #1	Hayfield Township
KASTLE- Ford, Alice #1	Summerhill Township
KASTLE- Frawley #2	Spring Township
Kastle- Greene, G #1	Spring Township
KASTLE- Greenlee-Ingols #5	Spring Township

Facility Name	Municipality
KASTLE- Gribus-Martin #1	Spring Township
KASTLE- Haemer, M. H.#4	Summerhill Township
KASTLE- Haemer, M., Jr.#1	Summerhill Township
KASTLE- Hepak-Freleigh #1	Spring Township
KASTLE- Hite-Bean	Spring Township
KASTLE- Hoover, HM #1	Spring Township
KASTLE- Jamison, M.E. #1	Summerhill Township
Kastle- Johnson Unit #3	Beaver Township
KASTLE- Keene-Webb	Summerhill Township
Kastle- Kosiorek unit #1	Beaver Township
KASTLE- Lenhardt #2	Spring Township
KASTLE- Main, C.L. #1	Summerhill Township
KASTLE- Maringo, Joseph #1	Spring Township
KASTLE- Marks, S.L. #1	Spring Township
KASTLE- Marks, S.L. #2	Spring Township
KASTLE- Mathews, J.D. #1	Summerhill Township
KASTLE- McBride, J.W. #1	Spring Township
KASTLE- McBride, J.W. #2	Summerhill Township
KASTLE- McGinnis #1	Spring Township
KASTLE- McGinnis #2	Spring Township
Kastle- Methanol Tank	Spring Township
Kastle- Miller, Earl #2	Hayfield Township
Kastle- Miller, F. #3	Beaver Township
Kastle- Miller-Payne #1	Spring Township
KASTLE- Nelson Unit #2	Spring Township
KASTLE- NNR 1, NNR 3	Spring Township
KASTLE- Orthodox #15	Spring Township
KASTLE- Orthodox #19	Spring Township
Kastle- Orthodox #21	Spring Township
KASTLE- Orthodox #25	Spring Township

Facility Name	Municipality
KASTLE- Panko-Jamison	Summerhill Township
KASTLE- Percy, EL #1	Summerhill Township
Kastle- Pierpont Compressor Station	Spring Township
KASTLE- Raber Unit #1	Summerhill Township
KASTLE- RAK-Smith	Spring Township
KASTLE- Robson Unit #1	Spring Township
Kastle- Schrock Unit	Beaver Township
KASTLE- Schweller-Bean	Spring Township
KASTLE- Shidemantle 1	Spring Township
KASTLE- Shidemantle 5	Spring Township
KASTLE- Shidemantle 6	Spring Township
KASTLE- Smith, SF#2	Summerhill Township
KASTLE- SNL Unit #1	Spring Township
Kastle- Solvent Tank	Spring Township
KASTLE- Surrarrer, A. #2	Summerhill Township
KASTLE- Troyer #1	Spring Township
KASTLE- Webb, Helen #2	Summerhill Township
KASTLE- Webb, Helen #3	Summerhill Township
KASTLE- Weisz, GG #1	Spring Township
KASTLE- Wise, G #1	Summerhill Township
KASTLE- Wise-Matthews	Summerhill Township
KASTLE- Youngs#1	Summerhill Township
KLASEN MCQUISTON ENERGY CORPORATION	Wayne Township
L&B ENERGY LLP- Goodenow, D.E. #1	Beaver Township
L&B ENERGY LLP- Starcheski, J.O. #3	Conneaut Township
L&B ENERGY LLP- ADAMS #1	Beaver Township
L&B Energy LLP- Atrozskin, L.J. #3	Beaver Township
L&B ENERGY LLP- Ausmundson #1	Conneaut Township
L&B ENERGY LLP- Ball, K. #1	Spring Township



Facility Name	Municipality
L&B Energy LLP- Bernat #2	Conneaut Township
L&B ENERGY LLP- Bish, David #1	Beaver Township
L&B ENERGY LLP- Boban, AT, STD#2	Beaver Township
L&B ENERGY LLP- Bubna Proper	Spring Township
L&B ENERGY LLP- Clements, J.R. #2	Spring Township
L&B Energy LLP- Conneaut School, Baumgart #1	Conneaut Township
L&B ENERGY LLP- Devrnja, D. #3	Spring Township
L&B Energy LLP- Eells #1F	Cussewago Township
L&B ENERGY LLP- Ertman, Edwin A #2	Spring Township
L&B ENERGY LLP- Ertman, R. #2	Spring Township
L&B ENERGY LLP- Ewig, R #1	Beaver Township
L&B ENERGY LLP- FEHR #2	Spring Township
L&B ENERGY LLP- FIRTH #1	Summerhill Township
L&B ENERGY LLP- Fladie, Floyd #1	Hayfield Township
L&B ENERGY LLP- FORD, D #1	Hayfield Township
L&B ENERGY LLP- GILLETTE #1	Conneaut Township
L&B Energy LLP- Greenawalt, C #1/ #2	Conneaut Township
L&B Energy LLP- Greenawalt, J #2 & #3	Conneaut Township
L&B ENERGY LLP- Greenlee Ingols #3	Spring Township
L&B Energy LLP- Gribus, Joe	Spring Township
L&B ENERGY LLP- Halko, J #2	Cussewago Township
L&B ENERGY LLP- HEIM #1 & #2	Spring Township
L&B ENERGY LLP- HOUCK, CW #1	Hayfield Township
L&B ENERGY LLP- Hyde Sr.-STD#5	Beaver Township
L&B ENERGY LLP- HYDE, WJ SR STD CO 3	Beaver Township
L&B Energy LLP- JOHNSON, GLADE #1	Beaver Township
L&B ENERGY LLP- Kelyman #1F	Cussewago Township
L&B Energy LLP- Kliber #2	Cussewago Township
L&B ENERGY LLP- KLIBER, THOMAS C ET UX #1	Cussewago Township

Facility Name	Municipality
L&B ENERGY LLP- Koss, Michael #1	Conneaut Township
L&B ENERGY LLP- Kuhn, C. #1	Beaver Township
L&B Energy LLP- Laskodi #1	Conneaut Township
L&B Energy LLP- Laskodi #2	Conneaut Township
L&B ENERGY LLP- LENHARDT NICOLLS UNIT #1	Summerhill Township
L&B ENERGY LLP- Loucks, W.L. #1	Conneaut Township
L&B ENERGY LLP- MCFADDEN #1N	Spring Township
L&B ENERGY LLP- Michalek, M.E.#1	Beaver Township
L&B ENERGY LLP- MILLER, EARL #2	Hayfield Township
L&B ENERGY LLP- MILLER, F #1/ #2	Beaver Township
L&B ENERGY LLP- MILLER, WILLIAM #1	Spring Township
L&B ENERGY LLP- NICKLAS #1- BAUMGART #2	Conneaut Township
L&B Energy LLP- Overmoyer #1 & #2	Conneaut Township
L&B ENERGY LLP- OVERMOYER, DANIEL M #4	Conneaut Township
L&B ENERGY LLP- QUICK, JOHN W#1	Beaver Township
L&B Energy LLP- Rahn #1 & #2	Conneaut Township
L&B Energy LLP- Recland 3&4	Conneaut Township
L&B Energy LLP- Reiser # 1	Conneaut Township
L&B ENERGY LLP- RITTER #2	Conneaut Township
L&B ENERGY LLP- Schmidt, J & H #5	Cussewago Township
L&B ENERGY LLP- Schwartz, J #1	Beaver Township
L&B Energy LLP- Shidemantle 4	Cussewago Township
L&B ENERGY LLP- SHIDEMANTLE, RICHARD #7	Cussewago Township
L&B ENERGY LLP- SHIDEMANTLE, RICHARD A #3	Cussewago Township
L&B ENERGY LLP- SNOW #1	Summerhill Township
L&B ENERGY LLP- STARCHESKI, JO #2	Conneaut Township

Facility Name	Municipality
L&B ENERGY LLP- Tyler, D. #3, #5	Beaver Township
L&B ENERGY LLP- UNDERWOOD #1	Beaver Township
L&B Energy LLP- Van Buren 1	Hayfield Township
L&B Energy LLP- Varee #1	Spring Township
L&B ENERGY LLP- VORISEK SHEFFIELD	Conneaut Township
L&B ENERGY LLP- WHITE, KENNETH #3	Cussewago Township
L&B ENERGY LLP- WOODARD #1/#2	Beaver Township
L&B ENERGY LLP- Worden, W.S. #2	Beaver Township
L&B Energy LLP- Elliott, E1, Elliott, G2	Cussewago Township
L&B ENERGY LLP- Ertman, R. #1	Spring Township
L&B ENERGY LLP Ferry #1	Spring Township
L&B ENERGY LLP- Shidemantle 2	Cussewago Township
Laurel Mountain Midstream/Townville Compressor Sta	Randolph Township
Lindy Paving Inc- Conneaut Lake	Sadsbury Township
Linesville Borough Municipal Authority	Linesville Borough
Linesville Pine Joint Municipal Authority	Pine Township
LORD CORPORATION- Cambridge Springs	Cambridge Springs Borough
LORD CORPORATION SAEGERTOWN	Saegertown Borough
MacLean Saegertown, LLC.	Saegertown Borough
Meadville Area Water Authority	Vernon Township
MEADVILLE FORGING COMPANY- Cambridge Springs	Cambridge Springs Borough
MEADVILLE FORGING COMPANY- West Mead	West Mead Township
Meadville Medical Center – Grove	Meadville City
Meadville Medical Center – Liberty	Meadville City
MEADVILLE REDI MIX CONCRETE INC.	West Mead Township
MOLDED FIBER GLASS TRAY CO	Pine Township

Facility Name	Municipality
Municipal Authority of Conneaut Lake Borough	Conneaut Lake Borough
NCW- AT&T Mobility- Chapmanville- USID96017	Wayne Township
Northwest Crawford County Sewer Authority	Springboro Borough
NORTHWEST HARDWOODS INC- TITUSVILLE YARD	Oil Creek Township
OIL CREEK PLASTICS, INC	Oil Creek Township
PA Army National Guard Readiness Center – CS	Cambridge Township
PA F&BC LINESVILLE STATE FISH HATCHERY	Pine Township
PENELEC/MEADVILLE OFFICE	West Mead Township
PENNDOT 0110-01 Crawford County	Vernon Township
Peters’ Heat Treating, Inc. – Meadville	Meadville City
Peters’ Heat Treating, Inc.- West Mead	West Mead Township
Progress For Industry, Inc.	Saegertown Borough
Range Resources- 11 Agnew # 1	Summit Township
Range Resources- 11 Roncaglione, J. # 1	Conneaut Township
Range Resources- 11-1 Ferm 1,2,3,5,7; Foster 1,3;	Summerhill Township
Range Resources- 11-10 Dearborn 1	Summerhill Township
Range Resources- 11-11 Benisch 1	Summerhill Township
Range Resources- 11-12 Brown 2,4; Handleman 3	Summerhill Township
Range Resources- 11-13 Loper 1, Luchansky 1, Phil	Summerhill Township
Range Resources- 11-14 Luchansky 2	Summerhill Township
Range Resources- 11-15 Hollenbeck 1, O’Donnell 1	Summerhill Township
Range Resources- 11-16 Blood 2, Campbell 1	Conneaut Township

Facility Name	Municipality
Range Resources- 11-17 Heald 1,2	Conneaut Township
Range Resources- 11-18 Handleman 1, Ulz 1,2	Summit Township
Range Resources- 11-19 Drda 1,3, Reynolds 2, Rich	Summerhill Township
Range Resources- 11-2 Sokolosky 1	Summerhill Township
Range Resources- 11-20 Mills 1,3, Richmond 3	Summit Township
Range Resources- 11-21 Gallaher 3, Smith 1	Summerhill Township
Range Resources- 11-22 Gallaher 1, Gallaher AB 1,	Summerhill Township
Range Resources- 11-23 Batyko 1,2, Gallaher 2	Summerhill Township
Range Resources- 11-24 Marley-Garczek 1, Sabol 1	Summerhill Township
Range Resources- 11-25 Urbanick 1	Conneaut Township
Range Resources- 11-26 Snyder 1	Conneaut Township
Range Resources- 11-27 Chapin 1, Higgins 1	Conneaut Township
Range Resources- 11-28 Castor 1	Summit Township
Range Resources- 11-29 Farley 1,2, Plyer 1, Reyno	Summit Township
Range Resources- 11-3 Shidemantle 1	Summerhill Township
Range Resources- 11-30 Funtal 1	Summit Township
Range Resources- 11-31 Hindman 1, Roberts 1	Summit Township
Range Resources- 11-32 Ballo 1	Conneaut Township
Range Resources- 11-33 Ballo 2, McElhinney 1	Conneaut Township
Range Resources- 11-34 Foust 1, Fry 1, Kalla 1	Summit Township

Facility Name	Municipality
Range Resources- 11-35 Nickerson 1, Shellito 3	Summit Township
Range Resources- 11-36 Bunnell 1,3	Summit Township
Range Resources- 11-37 Hindman 2, Zarembinski 1	Summit Township
Range Resources- 11-38 Agnew 1, Staley 1	Summit Township
Range Resources- 11-39 Blood & Brown 1,2, Shellito	Summit Township
Range Resources- 11-4 Arendash 1, Keene R. 1, Kee	Summerhill Township
Range Resources- 11-40 Shellito 2	Summit Township
Range Resources- 11-41 Bartges 1	Sadsbury Township
Range Resources- 11-42 Davis 1	Summit Township
Range Resources- 11-43 Carlson 1, Thompson 1	Summit Township
Range Resources- 11-44 Sousa 1	Sadsbury Township
Range Resources- 11-45 McElhinney 2	Pine Township
Range Resources- 11-6 Getsinger 1, Moertel 1	Summerhill Township
Range Resources- 11-7 Evans 1, Foster 4, Paris 1,	Conneaut Township
Range Resources- 11-8 Bauer 1, Emanuel 1, Jacobs	Summerhill Township
Range Resources- 11-9 Brown 1, Hartley 1	Summerhill Township
Range Resources- 12-1 Shaw 1	Summerhill Township
Range Resources- 15-1 Rendulic, J. 1	Sadsbury Township
Range Resources- 17-1 Allen Trust 1	Sadsbury Township
Range Resources- 20-1 Westfall 1-67	Spring Township
Range Resources- 2-1 Luchansky 1	Cussewago Township
Range Resources- 2-10 Hritzay2	Cussewago Township

Facility Name	Municipality
Range Resources- 2-11 Coon 1	Cussewago Township
Range Resources- 2-12 Mook, J. 1	Cussewago Township
Range Resources- 2-13 Gajdowski 1, Huya 1, Stoll	Cussewago Township
Range Resources- 2-14 Baer 2,	Cussewago Township
Range Resources- 2-15 Huya #2, Stoll #1,#3, Worley	Cussewago Township
Range Resources- 2-16 Schlosser 4, Worley 3	Cussewago Township
Range Resources- 2-17 Maynard 1	Cussewago Township
Range Resources- 2-18 Miller, R. 2	Cussewago Township
Range Resources- 2-19 Hoegerl 1, Schlosser 2	Hayfield Township
Range Resources- 2-2 Biernacki 1,2	Cussewago Township
Range Resources- 2-20 Brown 1	Hayfield Township
Range Resources- 2-21 Acker 1, Acker 2, Himes 1	Cussewago Township
Range Resources- 2-22 Williams 1	Hayfield Township
Range Resources- 2-3 Hecker 2	Cussewago Township
Range Resources- 2-6 Shearer, C. 1	Cussewago Township
Range Resources- 2-7 Mitchell, A. 1	Cussewago Township
Range Resources- 2-8 Luce 1	Cussewago Township
Range Resources- 2-9 Hritzay 1, 3, Worley 1	Cussewago Township
Range Resources- 4-1 Coy 2	Beaver Township
Range Resources- 4-2 Austin 1	Beaver Township
Range Resources- 4-3 Marsidell 1	Beaver Township
Range Resources- 4-4 Fryrear 1, Gresh 1, Papaioan	Spring Township
Range Resources- 51-10 Kebert 8	Greenwood Township

Facility Name	Municipality
Range Resources- 51-11 Schwartzbauer 1	Greenwood Township
Range Resources- 51-12 Kebert Dev. 11,17,18,23	Greenwood Township
Range Resources- 51-13 Sari 1,2; Marlyn Shetler 1	Greenwood Township
Range Resources- 51-14 Bitenc 1,2,3,8,10,14	Greenwood Township
Range Resources- 51-15 Rombold 2	Greenwood Township
Range Resources- 51-16 Kebert Dev. 12	Greenwood Township
Range Resources- 51-17 Stritzinger 2	Greenwood Township
Range Resources- 51-18 Stritzinger 1	Greenwood Township
Range Resources- 51-19 Schandelmeier 1,2,3,5,7	Greenwood Township
Range Resources- 51-2 Kebert A3,4,10,	Greenwood Township
Range Resources- 51-20 Bitenc 5,7-2,9,12; Nader 3	Greenwood Township
Range Resources- 51-21 Rombold 1	Greenwood Township
Range Resources- 51-22 Nader 1,4; Schandelmeier 6	Greenwood Township
Range Resources- 51-23 Nader 2	Greenwood Township
Range Resources- 51-3 Kebert 2,6	Greenwood Township
Range Resources- 51-4 Dunn Kebert 1, Kebert 4A, A	Greenwood Township
Range Resources- 51-5 Kebert 2-N, Kebert Dev. 5	Greenwood Township
Range Resources- 51-6 Kebert Dev. 16	Greenwood Township
Range Resources- 51-7 Kebert Dev. 13,14	Greenwood Township
Range Resources- 9-1 Gessner 2	Spring Township
Range Resources- Allen Yard	Sadsbury Township

Facility Name	Municipality
Range Resources- C. Coldren Unit #1, C. Coldren U	Fairfield Township
Range Resources- D. Clark #1	Greenwood Township
Range Resources- Deiss Unit #3	Fairfield Township
Range Resources- Garbart #1	Summit Township
Range Resources- L. Swogger #1	Fairfield Township
Range Resources- Lippert Compressor Station, Eliz	East Fairfield Township
Range Resources- Park Golf Course Unit #1	Summit Township
Range Resources- PPG Direct Sales Meter	Greenwood Township
Range Resources-Fred Miller Unit #1	Oil Creek Township
Rex Energy Ohio-George Law 2	Beaver Township
Rex Energy Ohio-George Law 4	Beaver Township
Rex Energy Ohio-R.F. Bayles1	Beaver Township
Rex Energy Ohio-R.F.Bayles 2	Beaver Township
Roser Technologies, Inc.	Titusville City
SAEGERTOWN AREA SEWER AUTHORITY	Saegertown Borough
Saegertown Borough- WELL 1	Saegertown Borough
Saegertown Borough- WELL 2	Saegertown Borough
Saegertown Borough- WELL 3	Saegertown Borough
Saegertown Borough- WELL 4	Saegertown Borough
Saegertown Borough- WELL 5	Saegertown Borough
Saegertown Borough- WELL 6,7	Saegertown Borough
Sheetz #159	Conneaut Lake Borough
Sheetz #502	Titusville City
SOUTHALL GAS LLC – North	Centerville Borough
SOUTHALL GAS LLC – South	Centerville Borough
Sperry Farms Inc	East Fallowfield Township

Facility Name	Municipality
SUBURBAN ENERGY SERVICES	Hayfield Township
Suit-Kote Meadville	West Mead Township
The Home Depot Store #4169	Vernon Township
The J.M. Smucker Company – Meadville	Vernon Township
TITUSVILLE AREA HOSPITAL	Titusville City
TITUSVILLE DAIRY PRODUCTS CO	Titusville City
Titusville Wastewater Plant	Titusville City
Titusville Water Works	Oil Creek Township
U.S. Army Reserve ECS 103/ AMSA 103	Greenwood Township
UNIVERSAL STAINLESS & ALLOY PRODUCTS	Titusville City
US BRONZE FOUNDRY & MACHINE	Woodcock Township
VERIZON CAMBRIDGE SPRINGS CO(PA1210007)	Cambridge Springs Borough
VERIZON LINCOLNVILLE CO (PA1710002)	Bloomfield Township
Verizon TITUSVILLE CO (PA5830007)	Titusville City
VIKING TOOL & GAGE INC	Sadsbury Township
Vitro Flat Glass, LLC Works 8	Greenwood Township
VTSA- Fredericksburg STP	Vernon Township
VTSA- South Watson Run STP	Vernon Township
Windstream Conneaut Lake Central Office	Conneaut Lake Borough
Windstream Meadville Central Office (41C)	Meadville City
Windstream Meadville Central Office Garage	Meadville City

When a hazardous material incident occurs in Crawford County, there is a chance it will not only involve soil or surface material, but will also involve flowing water in ditches, rivers, or small streams. Other potential concerns for spills/leaks are icy road conditions during winter months, sabotage, and terrorism.

**Table 5.3-10.3 EHS Chemicals by Municipalities**

Municipality	Official Name	Average Daily Amount	Days On Site
Bloomfield Township	CHLORINE	100 to 499	183
Bloomfield Township	Lead Acid Batteries	5,000 to 9,999	365
Cambridge Springs Borough	CHLORINE	100 to 499	365
Cambridge Springs Borough	Gramoxone	0 to 99	365
Cambridge Springs Borough	Hydrofluoric acid – MIX	100 to 499	365
Cambridge Springs Borough	Lead Acid Batteries	5,000 to 9,999	365
Cambridge Springs Borough	Lead-Acid Battery	10,000 to 24,999	365
Cambridge Springs Borough	NITRIC ACID – MIX	1,000 to 4,999	365
Cambridge Springs Borough	SULFURIC ACID – MIX	1,000 to 4,999	365
Cambridge Springs Borough	THIODAN3E/THIONEX 3EC	0 to 99	365
Conneaut Lake Borough	Chlorine	100 to 499	365
Conneaut Lake Borough	SULFURIC ACID	500 to 999	365
East Fallowfield Township	FORMALDEHYDE (SOLUTION)	100 to 499	365
Greenwood Township	CHLORINE	0 to 99	365
Greenwood Township	LEAD ACID BATTERIES	100,000 to 499,999	365
Greenwood Township	SULFUR DIOXIDE	10,000 to 24,999	365
Greenwood Township	SULFURIC ACID	1,000 to 4,999	365
Greenwood Township	SULFURIC ACID	500 to 999	365
Greenwood Township	SULFURIC ACID	10,000 to 24,999	365
Hayfield Township	TITANIUM TETRACHLORIDE	100 to 499	365
Linesville Borough	CHLORINE	0 to 99	365
Meadville City	AMMONIA, ANHYDROUS	0 to 99	365
Meadville City	LEAD ACID BATTERY	10,000 to 24,999	365
Meadville City	SULFURIC ACID	500 to 999	365
Meadville City	SULFURIC ACID	1,000 to 4,999	365
Oil Creek Township	CHLORINE	500 to 999	365
Pine Township	Batteries	5,000 to 9,999	365
Pine Township	CHLORINE	500 to 999	365

Municipality	Official Name	Average Daily Amount	Days On Site
Pine Township	FORMALIN	1,000 to 4,999	365
Pine Township	SULFUR DIOXIDE	500 to 999	365
Sadsbury Township	CHLORINE	100 to 499	365
Sadsbury Township	Marathon Petroleum Asphalt	100,000 to 499,999	365
Sadsbury Township	SULFURIC ACID	500 to 999	365
Saegertown Borough	2,6-DIISOCYANATOTOLUENE	1,000 to 4,999	365
Saegertown Borough	Bromine	10,000 to 24,999	320
Saegertown Borough	CHLORINE	100 to 499	85
Saegertown Borough	CHLORINE	100 to 499	365
Saegertown Borough	CHLORINE	100 to 499	365
Saegertown Borough	CHLORINE	100 to 499	365
Saegertown Borough	CHLORINE	100 to 499	365
Saegertown Borough	CHLORINE	100 to 499	365
Saegertown Borough	CHLORINE	100 to 499	365
Saegertown Borough	FORMALDEHYDE	1,000 to 4,999	365
Saegertown Borough	HEXACHLOROCYCLOPENTADIENE	1,000 to 4,999	365
Saegertown Borough	Hydrochloric Acid (36%)	25,000 to 49,999	365
Saegertown Borough	Hydrogen peroxide (Conc.< 52%)	1,000 to 4,999	55
Saegertown Borough	Isophorone diisocyanate	5,000 to 9,999	365
Saegertown Borough	NITRIC ACID	1,000 to 4,999	365
Saegertown Borough	PHENOL	75,000 to 99,999	365
Saegertown Borough	SULFURIC ACID	10,000 to 24,999	365
Saegertown Borough	SULFURIC ACID	1,000 to 4,999	365
Saegertown Borough	TOLUENE DIISOCYANATE	10,000 to 24,999	365
Springboro Borough	CHLORINE	500 to 999	365
Springboro Borough	CHLORINE	100 to 499	365
Summerhill Township	SULFURIC ACID	500 to 999	365
Titusville City	CHLORINE	1,000 to 4,999	365
Titusville City	Lead Acid Batteries	10,000 to 24,999	365
Titusville City	NITROGEN HYDRIDE	1,000 to 4,999	365

Municipality	Official Name	Average Daily Amount	Days On Site
Titusville City	SULFURIC ACID	1,000 to 4,999	365
Titusville City	SULFURIC ACID	5,000 to 9,999	365
Union Township	SULFURIC ACID	500 to 999	365
Vernon Township	CHLORINE	100 to 499	365
Vernon Township	CHLORINE	100 to 499	365
Vernon Township	LEAD-ACID BATTERY	10,000 to 24,999	365
Vernon Township	SULFURIC ACID	500 to 999	365
Vernon Township	SULFURIC ACID	100 to 499	365
Vernon Township	Sulfuric acid	500 to 999	365
Wayne Township	Sulfuric Acid	500 to 999	365
West Mead Township	AMMONIA	1,000 to 4,999	365
West Mead Township	Lead-Acid Battery	10,000 to 24,999	365

### Pipelines

Pipelines are identified by company and product. During a pipeline emergency, first responders should contact the company to find out which product is being transported if there is more than one product listed.

Company	Product
Dominion	Natural Gas, UN# 1971
	Propane, UN# 1075
Emkey Gathering	Natural Gas, UN# 1971
Peoples Natural Gas/ Peoples TWP	Natural Gas, UN# 1971
National Fuel Gas Supply	Natural Gas, UN# 1971
Kinder Morgan	Natural Gas, UN# 1971



## *Railways*

Four freight trains travel in and through Crawford County along the following rail lines:

Canadian National Railway through subsidiary of Bessemer and Lake Erie Railroad operates a class II railroad in northwestern Pennsylvania and northeastern Ohio.

Norfolk Southern Railway – operates as a class I railroad in the United States. The railroad is a major transporter of domestic and export coal, sourced in Pennsylvania along with West Virginia, Virginia, Kentucky and Tennessee.

Western New York & Pennsylvania Railroad, LLC – is a limited liability company, controlled by Livonia, Avon & Lakeville RR Corp. of Lakeville, NY. WNYR began independent operations in 2001, following a long-term lease with Norfolk Southern.

Oil Creek and Titusville Railroad – operating as tourism for Pennsylvania Oil Country and freight connection for Titusville industry from 1986 to present. Several Titusville industries rely on the Oil Creek and Titusville Lines to move their raw material and products to or from locations throughout the US, Canada and Mexico. Locomotive #75 and standby Locomotive #85 each have a 1,000-horsepower turbo-charged diesel engine.

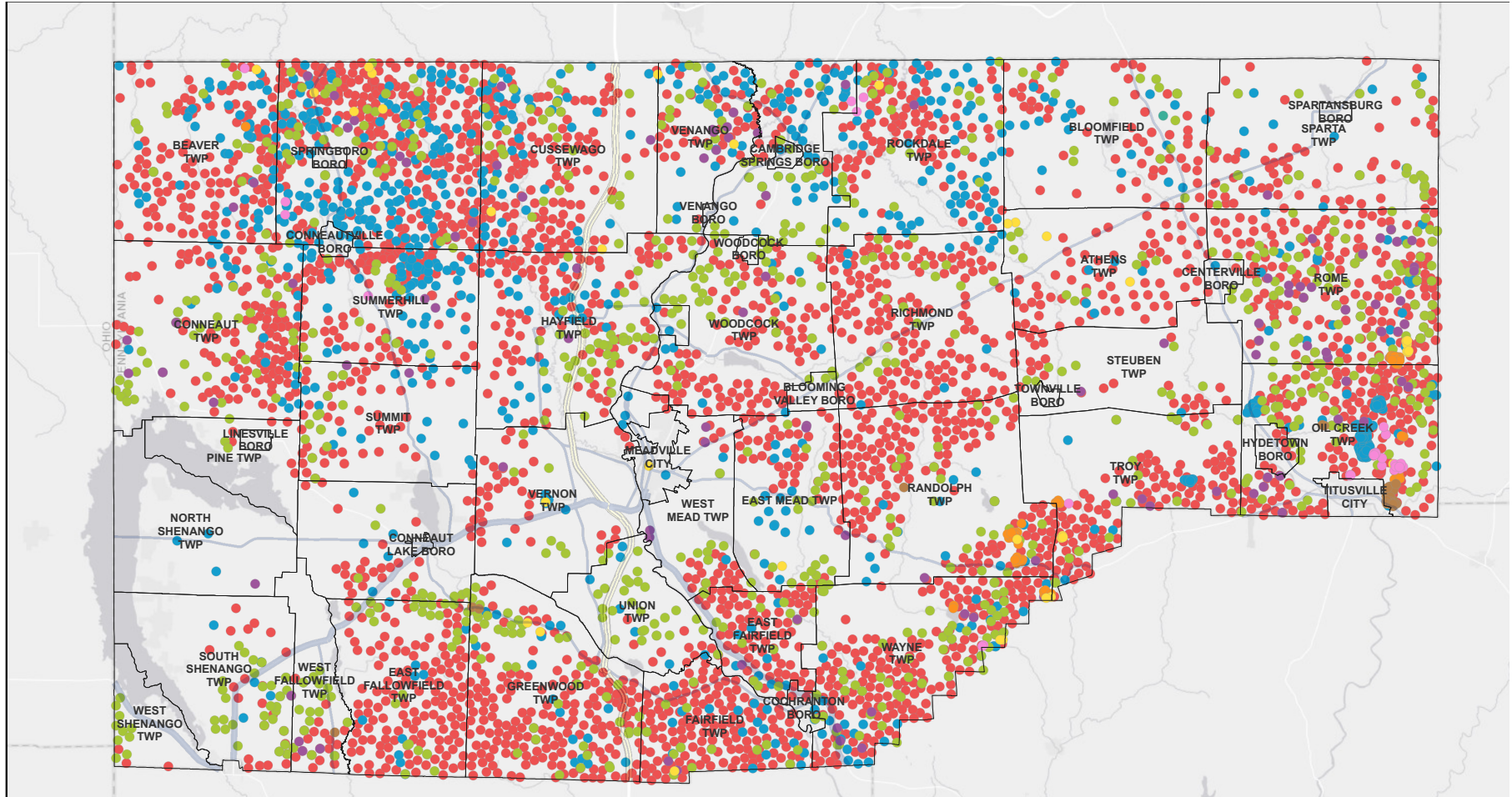
## *Oil and Gas Extraction*

In addition to TRI facilities, Crawford County is home to numerous conventional and unconventional oil and gas wells spread throughout the county. Conventional wells are traditional vertical wells, while unconventional wells are typically horizontally drilled wells commonly associated with the Marcellus Shale. Both types pose similar risks in the case of an incident and impacts on the surrounding infrastructure, however unconventional drilling can have more wide-spread impacts on the environment. So far unconventional drilling has stopped and production was not as prosperous as once thought.

8 owners/operators submitted annual Tier II reports for calendar year 2019 for 317 active conventional oil and gas wells in Crawford County. The county also has 3 active unconventional wells that have been drilled, but no production has come from these wells so far.

There was one drill and operate permit applied for in 2016 and one in 2017 both on the Byler Farm in East Fallowfield Township which were unconventional/horizontal wells but no activity has taken place as of this date per DEP and Township Officials in September 2020.

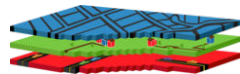
Figure 5.3. 10-1 Conventional Oil & Gas Well Locations in Crawford County



### Locations of Conventional Oil & Gas Wells



Crawford County Government  
 Crawford County Courthouse  
 903 Diamond Park  
 Meadville PA 16335  
 GIS Manager: Phillip Baranyai  
 Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



This map is subject to change at any time after date of issuance.  
 Data used for map creation is approximate and should not be used for site specific decision making.  
 Crawford County assumes no responsibility or liability to the accuracy or completion of these maps.

Source: Pennsylvania Department of

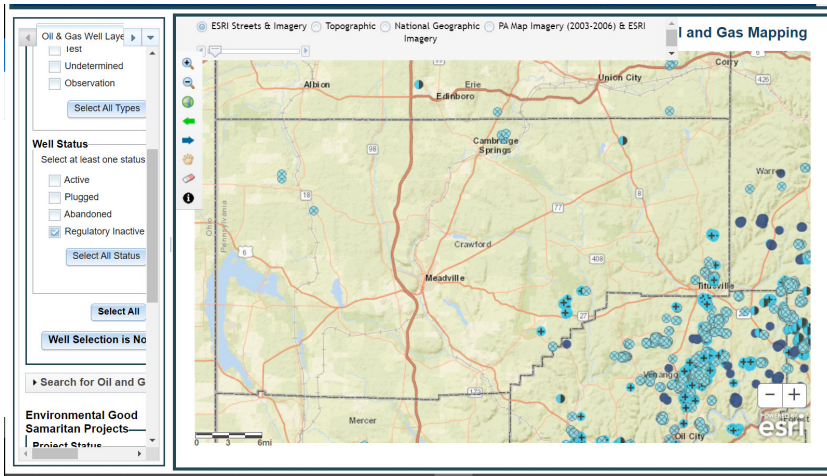


Conservation & Natural Resources (PA DCNR)

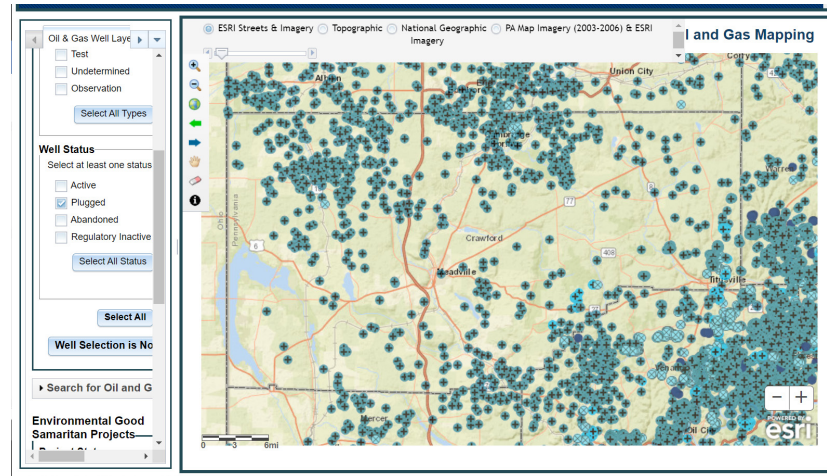
### Conventional Wells

- Active
- Plugged OG Well
- Operator Reported Not Drilled
- Proposed But Never Materialized
- DEP Plugged
- Abandoned
- DEP Abandoned List
- DEP Orphan List
- Regulatory Inactive Status

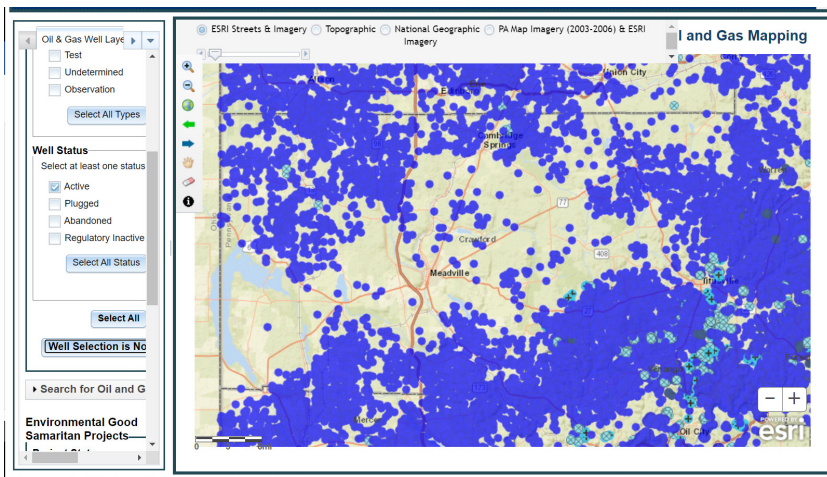
### Oil and Gas Conventional Wells Regulatory Inactive



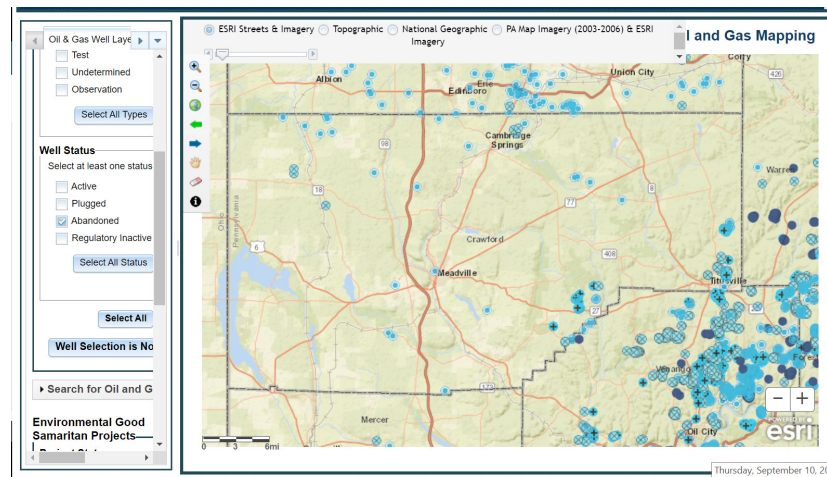
### Oil and Gas Conventional Wells Plugged



### Oil and Gas Conventional Wells Active



### Oil and Gas Conventional Wells Abandoned



### RANGE OF MAGNITUDE

Hazardous material releases can contaminate air, water, and soils and result in deaths and 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 traditional, conventional wells, water supplies, both groundwater and surface are at risk of contamination from brine and other pollutants including methane which can also pose a fire hazard. This can happen at any time during the extraction (and production) process or transport, but also if an abandoned well is not properly plugged. Marcellus Shale play drilling has introduced a new set of hazards to the oil and gas industry in addition to the normal risks associated with the industry. The Marcellus Shale formation exists at a depth normally between 5,000 and 8,000 feet and holds trillions of cubic feet of natural gas. Extraction from this depth was previously not feasible, but as drilling technology has improved over the years, recovering natural gas from Marcellus Shale is now possible (PA DEP-BOGM, 2010a).

Surface waters and soil are sometimes polluted by brine, a salty wastewater product of gas well drilling, and from spills occurring at the drilling site or from a pipeline breach. This can spoil public drinking water supplies and be particularly detrimental to vegetation and aquatic animals.

Natural gas well fires occur when natural gas is ignited at the well site. Often, these fires erupt during drilling when a spark from machinery or equipment ignites the gas. The initial explosion and resulting flames have the potential to seriously injure or kill individuals in the immediate area. These fires are often difficult to extinguish due to the intensity of the flame and the abundant fuel source.

In addition to the traditional hazards associated with oil and gas well drilling, potential impacts from Marcellus Shale gas well drilling include the following:

- *Surface water depletion from high consumptive use with low return rates affecting drinking water supplies and aquatic ecosystems and organisms;*
- *Contaminated surface and groundwater resulting from hydraulic fracturing and the recovery of contaminated hydraulic fracturing fluid;*
- *Mishandling of solid toxic waste*
- *With a hazardous material or natural gas release, whether accidental or intentional, there are potentially exacerbating or mitigating circumstances that will affect its severity or impact. Mitigating conditions, on the other hand, are characteristics of the target and its physical environment that can reduce the effects of a hazard. 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 are characteristics that can enhance or magnify the effects of a hazard and include:*
- *Weather conditions: affects how the hazard occurs and develops*
- *Micro-meteorological effects of buildings and terrain: alters dispersion of hazardous materials*
- *Non-compliance with applicable codes (e.g. building or fire codes) and maintenance failures (e.g. fire protection and containment features): can substantially increase the damage to the facility itself and to surrounding buildings*

The severity of the incident is dependent not only on the circumstances described above, but also with the type of material released and the distance and related response time for emergency response teams. 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.

Impacts of incidents at natural gas drilling sites can vary from relatively minor to catastrophic. If a large volume of natural gas escapes from a well at the surface, it will expand and spread over a large area. The potential for a major explosion of the gas exists; this explosion could kill hundreds of people, destroy property, spark wild land and urban fires, overwhelm the local EMS services and hospitals with the influx of casualties, force evacuations, close roads, cause utility outages (if a power or telephone transmission line is damaged), etc.

The worst-case scenario for an oil or gas well incident would be if there was a discharge of pollutant material like frac fluid into the waterways of Crawford County including French Creek that flows south, Conneaut Creek that flows north to Lake Erie, and Oil Creek that flows south. This is particularly an issue in the central and western portions of the county, where residents rely on domestic water wells for their potable water supply. The only Municipality that obtains water from one of our streams is Cambridge Springs Borough which services a population of 2,608 residents and 883 employees. (2017 Data USA)

The worst possible hazardous materials incident would be the release of a large quantity of hazardous material from a fixed facility near the County's most densely populated municipality, the City of Meadville. While little physical property damage is likely from this type of event, the potential to cause injury and death to residents and visitors is significant.

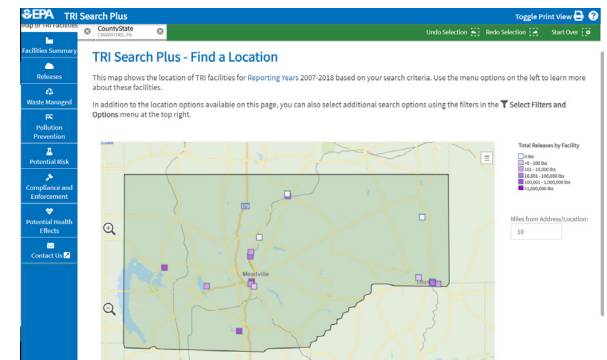
### PAST OCCURRENCE

Since the passage of SARA, Title III, facilities which produce, use, or store hazardous chemicals must notify the public through the county emergency dispatch center and PEMA if an accidental release of a hazardous substance meets or exceeds a designated reportable quantity, and affects or has the potential to affect persons and/or the environment outside the plant. SARA, Title III and Pennsylvania Act 165 also require a written follow-up report to PEMA and the County. These written follow-up reports include any known or anticipated health risks associated with the release, and actions to be taken to mitigate potential future incidents. In addition, Section 204(a)(10) of Act 165 requires PEMA to staff and operate a 24-hour State Emergency Operations Center (SEOC) to provide effective emergency response coordination.

The USEPA Toxic Release Inventory reports that as of 2018, 95,447 pounds of chemicals were released from facilities located in Crawford County (EPA, 2018). The vast majority of these releases were attributed to on-site air emissions (84,182 pounds), with the chemical industry sector accounting for roughly half of these emissions (41,340 pounds). The Toxics Release Inventory is a publicly available EPA database that contains information on toxic chemicals releases and waste management activities reported annually by certain industries as well as federal facilities.

Crawford County Department of Public Safety 9-1-1 Center dispatched public safety agencies between January 1, 2016 and December 31, 2019 to the following hazardous materials incidents; 306 CO Investigations, 185 Odor Investigations, 26 Fuel Spills, 24 Utility Emergencies, 21 Explosions, 10 Aircraft Accidents, and 3 Hazardous Materials.

Knowledge Center and WebEOC Incidents sent to PEMA under this hazard for calendar years 2014 to 2020 are; 42 Hazardous Materials and 42 Transportation Incidents.



Significant Hazardous Materials that occurred in Crawford County from January 1, 2016 to August 31, 2020 are as follows;

**02/24/2016 14:16** Oil Spill from oil and gas well (Conneaut Township) 15151 S Townline Rd, Linesville PA 16424 Oil was spilling from an oil well near 15151 South Townline Road on the Conneaut Township/Summit Township line. Summit Township VFD personnel are on scene. They stopped the flow of oil & they are in the process of containing the spill. Dustin Wyant from PA DEP NWRO was notified of the incident. EMA 2 is responding to the scene with 900-34. Ben Zimmer from PA DEP NWRO was on scene. He will coordinate the cleanup. Don Bovard reported the incident to the National Response Center via phone. He spoke to Keith Weatherly.

**08/02/2016 19:27** Vernon Township- Fuel Spill Hazardous Materials/Flammable Liquid & Solids, 16332 Conneaut Lake Road, Meadville PA the fuel tank on an SUV became dislodged as it was traveling on Conneaut Lake Road. The driver pulled into the parking lot of Meadville Medical Center Express Care at Vernon. Gasoline leaking from the tank ran down the parking lot & into a storm drain. A total of approximately 20 gallons was spilled. Most of it went down the storm drain. PA DEP NWRO was notified of the incident. Chief 23 spoke to Jack Crow over the phone. Jack Crow advised Chief 23 to flush the storm drain with water. Chief 23 reported that 1,000 gallons of water was dumped into two storm drains from which gasoline fumes were present.

**09/23/2016 08:53** Smell of gas in Titusville High School Natural gas release at 302 East Walnut Street, Titusville PA 16354 The Titusville High School Principal (Titusville School District) smelled gas and evacuated all students and staff out of the building. The School District Administration is also in that building. Everyone was evacuated to Carter Field which is two blocks from the building. Titusville, Fire, EMS, and Police are on scene and National Fuel Gas notified. Parents were notified. National Fuel Gas arrived on scene and investigated and could not find any leaks. Students and staff were allowed to return to the building at 09:00 today. Closing KC Incident now. [Sent to HIMS, PEMA]

**10/23/2016 17:14** Aircraft Accident Titusville Airport at 2572 Meadville Rd, Titusville PA 16354 Aircraft 836 Bonanza Aircraft / Tail # N1099A with 6 Souls on board. Flight originated at MCD APN (MICH) inbound to 6G1 Titusville power loss to aircraft and went off the end of the runway. No injuries occurred and no fire on scene. There was damage to the aircraft. Titusville Police and Fire Departments are on scene. Crawford EMA notified, Venango County 911 notifies, FAA notified, and conference call is in process at this time making all notifications. Emergency resources cleared the scene late last night and the Civil Air Patrol is on site protecting the scene until scene cleanup can begin today. Representatives from the FAA took over control of the scene and personnel from the Civil Air Patrol cleared.

**11/01/2016 08:50** Motor Vehicle Accident with HazMat Spill A motor vehicle accident involving a dump truck & a Ford Escape occurred at the intersection of Hickory Street (State Highway 77) & Washington Street (State Highway 27). The driver of the Ford Escape was injured & entrapped. The accident resulted in the spill of automotive fluids from the dump truck.

**11/02/2016 09:31** Hazardous Material Release Caller is reporting that Pittsburgh Glass Works located at 5123 Victory Boulevard Cochranton, PA 16314 is releasing an unknown material to the air that is causing their eyes to burn. Turns out it was Combined Systems testing tear gas at nearby location. Tim Buck is the contact person at Combined Systems, his number is 724-932-2177 ext.130

**03/28/17** Approximately 280 gallons of home heating fuel spilled at a summer residence in South Shenango Township spreading through four properties. Deputy Director for EMA assisted Jamestown Vol. Fire Dept. along with PA DEP Emergency Response to deploy absorbent socks, pads, and booms to contain the spill.

**04/26/17** A semi-tractor trailer crashed into a building in the City of Titusville causing 50 gallons of diesel fuel leak from the saddle tanks. Titusville Fire Department contained the spill and EAP from Titusville cleaned it up. Deputy Director for EMA coordinated with Assistant Fire Chief and DEP Emergency Response via phone.

**12/15/17** Canadian National Railroad reported that its train has become entangled in NW REC power lines and is blocking two roads in Summerhill Township SR Dicksonburg and Twp. Wing Road. No injuries. No unmet needs. Conneautville Fire Dept. on scene to detour traffic. No backlogs and no cues.

**12/18/17** Hazardous Materials: Chemical spill. Lord Corporation, 601 South Street, Saegertown Pa 16433. A pump seal failed, which pushed oil into a small batch and foamed over, as a result approximately 10 to 15 gallons of a DNB intermediate chemical (PH above 2 vented out of a line at the Lord Corporation at 601 South Street in Saegertown Borough, Crawford County. Sorbents were deployed and cleanup is underway and the release was secured. No injuries or evacuations.

**01/22/18** A storage tank rusted through and leaked twenty gallons of number 2 fuel oil into a site storm water system at Pittsburgh Glass Works in Greenwood Township on January 22 at 10:00am. The National Response Center was notified by PGW. A private cleanup contractor was called in to clean up the spill.

**02/05/18** A 55-gallon drum fell off a fork lift, rupturing and spill 35 gallons of Xylene onto the concrete floor of a warehouse at the Lord Corporation at 601 South Street in Saegertown Borough, Crawford County. The material has been contained and cleanup operations are underway.

**03/09/18** Semi-truck rolled over on State Highway 77 between State Highway 8 and Dorn Rd in Sparta Township, Crawford Co. Vehicle is leaking a substance from the holding area that has not be identified, possibly transmission fluid. Crawford Co EMA is en route to the scene Corry PA State police and Spartansburg volunteer fire dep't is on scene.

**12/05/18** A release of 500 pounds of propylene oxide into the air at Lord Corporation in Saegertown. Release is reported to be secured and an investigation is being conducted by the facility. Incident occurred at 1400 hrs. today.

**01/08/19** Oil Well Fire, Spring Township

**02/08/19** Hydrochloric Acid Spill, Lord Corporation, Saegertown Borough

**03/05/19** Sodium Hypochlorite Spill, YMCA, City of Meadville

**05/01/19** Oil spill from pipeline, Summerhill Township

**06/11/19** Herbicide Leak, Ernst Farms, Vernon Township

**07/20/19** Raw sewage discharge at 19678 Bockman Hall Road, Saegertown. Reported stated it's been going on for years

**08/23/19** This morning a maintenance worker at the Titusville YMCA was overcome by the fumes from a cleaning solution that was prepared yesterday. EmeryCare transported the victim to Titusville Area Hospital. Titusville FD is on scene ventilating the facility.

**10/21/19** Meadville Central Fire Dep't and Crawford County EMA were dispatched at 09:02 to the Meadville YMCA at 356 Chestnut St for a reported chlorine leak in the basement. The building was evacuated. The children from the day care facility were re-located across the street to the First Baptist Church. MCFD and building maintenance determined the problem was a partially spilled 5-gallon bucket of muriatic acid which was contained and the room containing the acid was secured. The building was checked and there were no dangerous levels. A private contractor is being called to clean up the spilled chemical. The YMCA will remain closed until the cleanup is completed. There are no unmet needs and Fire and EMA have cleared the scene.

**12/20/19** Semi tanker hauling isobutane at the 147-mile marker north bound I 79 caught fire. Driver detached the tanker and moved the semi on fire away from the tanker. Fire is out now. I 79 north bound both lanes are being closed and a detour in progress. Vernon Central Fire Dept., Cochranon Fire Dept., Hayfield Fire Dept., Greenwood Fire Dept. assisting with tankers and traffic control. PA State Police Meadville en route. PA DEP NW Office notified. No unmet needs at this time.

Pennsylvania has a long history of oil and gas well drilling and though infrequent, many accidents and incidents have occurred related to the extraction of these natural resources. While no comprehensive list of oil and gas related incidents exists for the area, the PA DEP has made oil and gas well compliance information available to the public. Since January 1, 2009, there have been 7 environmental health and safety violations at oil and gas wells in Crawford County. Of these violations, seven occurred at an unconventional well. The most common infractions were:

- *4 O & G Act 223 General. Used only when a specific O& G Act code cannot be used*
- *1 Failure to install, in a permanent manner, the permit number on a complete Well*
- *1 Failure to post permit number, operator name, address, telephone number in a conspicuous manner at the site during drilling*
- *1 Stream discharge of IW, includes drill cuttings, oil, brine, and/or silt*

There were eight water supply investigation resolved complaints between 2016 and 2020.

#### **FUTURE OCCURRENCE**

While many hazardous material release incidents have occurred in Crawford County in the past, they are generally considered difficult to predict. An occurrence is largely dependent upon the accidental or intentional actions of a person or group.

The likelihood of a conventional well drilling incident or an emergency at a natural gas drilling site in Crawford County cannot be determined at this time, as there is little historical data to analyze. However, the likelihood of an incident within the County is expected to increase with the increase in the number of well sites. Future emergencies will occur at well sites as well as along the natural gas transportation network.

Careful consideration of which roads are actually suitable for heavy, industrial use and improved safety measures (including more traffic signals and officers, or a planned trucking schedule) could help reduce traffic accidents and infrastructure degradation (Cassidy, 2014). Additionally, the industry



could take responsibility for improving maintenance of the infrastructure and scheduling of their traffic so as to keep heavy truck flow to certain hours and thereby minimize accidents.

Impervious surfaces can increase the risk of flooding (as rain or run-off can no longer readily seep into the ground) and can prove exceedingly detrimental to maintaining a balanced ecosystem. Estimates vary slightly (based on location, technology, etc.), but the average footprint of a well pad is 1.3 hectares and the associated infrastructure is 10.3 hectares (Evans and Kiesecker, 2014; Environment America, 2013). If the indirect impacts are considered as well, this then the total land disturbance, and impact on the permeability of the ground, is 20.2 hectares, or about 50 acres (Evans and Kiesecker, 2014). If this unit is applied to the number of new well permits issued between 2006 and 2014 in Crawford County (1,257), then about 25,391 hectares (~98 square miles), roughly 9.68% of the total land area of the County, was disturbed by or converted to oil and gas extraction.

From the 2016 Crawford County Commodity Flow Study Conclusion;

- *Based on physical observations, the largest flow of hazardous materials in Crawford County occurred along Interstate 79 (north and south bound) with 71 placards identified, or approximately 12% of the commercial transportation vehicles on the roadway during the study period.*
- *Hazard Class 3, flammable liquids, made up the majority of hazard classes identified, with Class 2 flammable gases coming in second. Class 8 corrosive substances and Class 9 miscellaneous hazardous materials represented approximately 1 to 2% of the transportation vehicles identified each respectfully during the study period.*
- *SARA Title III facilities in Crawford County have identified sulfuric acid (corrosive) as the most utilized chemical, with chlorine (gases – toxic and/or corrosive) and lead acid batteries (corrosive) falling into place behind respectfully.*

Crawford County should utilize preventative practices and planning purposes for emergency response to hazardous materials incidents. Emergency responders should plan and prepare for all hazardous materials but specifically training and hazardous material resources should be focused on class 3 flammable liquids and class 2 flammable gasses. These classes of chemicals represent the most frequently transported throughout Crawford County during the traffic studies. First responders should continue to conduct hazardous material operations level courses at a minimum within their departments. Response resources should also be purchased and maintained for response to these classes of chemicals. The Crawford County Emergency Management Agency and the Crawford County LEPC stand ready to assist with any needs that first responders may have.

If continued investment and development in the natural gas industry is inevitable, then the County should take measures to plan for future development to help mitigate the impacts of well drilling on transportation infrastructure and impervious surfaces. One major component of this is the regulation of new well pads siting locations. The design and process of a shale, horizontal well, is such that the placement of the well pad is much more flexible (as there are multiple lateral wells that extend to a greater area), and the siting has the ability to take impacts to natural habitats into account. In determining more ecologically appropriate locations that reduce potential runoff, the County could require a setback from streams and wetlands, as well as avoidance of development on areas with a steep slope. Additionally, greater care and oversight could be taken to balance future well development with watershed needs and conservation goals.

## VULNERABILITY ASSESSMENT

Risk Factor (RF) Value: 2.6

According to the qualitative assessment performed using the RF tool, the hazardous materials hazard scored a RF value of 2.6 (from a scale of 0 to 4, with 4 being the highest risk level).

Hazard	Probability	Impact	Risk Assessment			Risk Factor
			Spatial Extent	Warning Time	Duration	
HazMat	3	3	1	4	2	2.6

Transportation accidents/incidents remain a major concern and vulnerability for Crawford County. The continued increase in the number of shipments also brings the potential increase in frequency of accidents/incidents. The county has approximately, 2,353 miles of roadway, of which 54 miles are interstate highway, 1,016 are state and federal highway, and 1,310 are secondary and municipal roadway. The major routes used for the transportation of hazardous materials are Interstate 79, route(s) 6, 18, 19, 102, 285, 322, and 408. Crawford County is also served by an extensive rail system (see rail map on page 95) which includes the Bessemer/Lake Erie, Norfolk Southern, and Western New York (Meadville to Corry).

Most hazardous material releases do not usually have an effect on infrastructure, particularly underground infrastructure. Some critical infrastructure uses hazardous materials to operate such as chlorine for water treatment and PCB's for electric transformers. Similarly, the contamination of the water supply may be treated like a hazardous material release. Propane, oil, and natural gas, necessary fuels for heating, can also be hazardous if released during their delivery due to their explosive potential. Transportation may be limited if a key roadway or railway is blocked by an incident.

Possible losses to critical facilities include:

- *Critical functional losses*
- *Contamination*
- *Structural and content losses, if an explosion is present*

Possible losses to structures include;

- *Inaccessibility*
- *Contamination*
- *Structural and contents losses, if an explosion is present*

In 2016 the Crawford County Emergency Management Agency contracted MCM Consulting Group, Inc. to conduct a commodity flow study within the county. MCM Consulting Group, Inc. and Crawford County conducted the traffic counts and then developed the final report. The study included the monitoring of designated motor traffic routes traversing the county during several dates and times.

The traffic that was counted identified typical flows of hazardous materials through the various transportation corridors reviewed. The information gathered is listed as hazard class and/or by placard numbers. This information is listed in the hazardous commodities identified section of this report.

This commodity flow study identifies the chemicals that at any given time could be transported throughout Crawford County. The Crawford County Commodity Flow Study 2016 also identifies the chemicals that are stored at the SARA Title III facilities within Crawford County.

Summary of hazardous materials during traffic counts at twenty-four locations on state highways entering Crawford County:

<b>Class #</b>	<b>Totals</b>
Class 1: Explosives	0
Class 2: Gases	57
Class 3: Flammable liquids	77
Class 4: Flammable solids	2
Class 5: Oxidizing substances and Organic peroxides	3
Class 6: Toxic substances and Infectious substances	7
Class 7: Radioactive materials	0
Class 8: Corrosive substances	15
Class 9: Miscellaneous hazardous materials	11
<b>TOTALS</b>	<b>172</b>

With 1,366 total transportation vehicles identified, the number that were placarded represents approximately 12.5% of the vehicles. In some instances, the UN# was identified during the traffic counts. The table below identifies the placarded vehicles by class, UN#, and chemical name. (\* Please note: all chemical names for the UN# is listed as the actual chemical cannot be identified at this level of survey).

The population impacts are often greater than the structural impacts during a hazardous material release. Depending on the material, the health impacts to humans can be long and short term. A release in Crawford County could threaten the population. Greater population concentrations may be found in communities, special needs facilities, and businesses. Generally, an incident will affect only a subset of the total population at risk. In a hazardous material release, those in the immediate isolation area would have little to no warning, whereas, the population further away in the dispersion path may have some time to evacuate, depending on the weather conditions, material released, and public notification.

Possible economic losses include:

- *Business closure and associated business disruption losses*

Possible ecologic losses include;

- *Loss of wildlife*
- *Habitat damage*

Possible social losses include:

- *Cancelled activities*
- *Emotional impacts of significant population losses and illnesses*

Vulnerability to environmental hazards focuses on the people in the hazard area, as opposed to other hazards which focus on the property damage. Table 4.3.10-6 presents a breakdown of the population within the 1.5 miles of an EPA TRI fixed hazardous materials facility, within 0.25 miles of a major highway, or within 0.25 miles of a railroad on which hazardous materials are transported. All communities have populations within 0.25 miles of major roads, while roughly half have populations within 0.25 miles of a rail line. The communities with the highest percentage of their population within 0.25 miles of a rail line are Conneautville and Springboro Borough, with approximately 68% and 63% of the population, respectively. Crawford County as a whole has roughly 10% of its population within 0.25 miles of rail lines.

Vulnerability to oil and gas well incidents is defined as being located within 1,000 yards of an unconventional oil or gas well. This buffer is what DEP uses as its “zone of culpability” for oil and gas well incidents. While explosions or other catastrophic incidents at an oil or gas well could cause

property damage, of primary concern is the population living near these wells. Table 4.3.10-7 enumerates the populations living within 1,000 yards of a conventional oil and gas well, while Table 4.3.10-8 enumerates the populations living within 1,000 yards of an unconventional oil and gas well. These were calculated by intersecting the 2010 Census Block centroids with the zone of culpability as defined by DEP. This analysis indicates approximately 73% of the County’s population is vulnerable (within 1,000 yards) to impacts of a conventional oil or gas well incident (including 27 municipalities with 90% or more of their population living in the zone of culpability). As seen in Table 4.3.10-8, a smaller portion of the County’s population is vulnerable to unconventional oil and gas wells, with only 0.3% of the County’s population living in close proximity to these types of wells.

Critical infrastructure within each hazard area is listed in Table 4.3.10-9; these facilities may be required to evacuate due to a hazardous material release, thereby disrupting vital services. As mentioned previously, hazardous materials pose a risk not only at the point of production or extraction, but also in transport. Communities living in close proximity to transportation networks used to facilitate the movement of hazardous materials are more vulnerable to a hazardous material release. The US Department of Transportation recommends an evacuation zone of a half-mile in the event of an accident involving hazardous materials. FracTracker has estimated the population within this evacuation zone along freight lines in Crawford County. As illustrated in the map, communities with the highest number of persons at risk to an oil train derailment are located in the most populous municipalities in the County and include: Meadville City; Titusville City; and West Mead Township.

Crawford County and the surrounding areas are rich in natural resources and the continued development of industries related to these natural resources is a distinct possibility. New development may increase the number of people and facilities exposed to hazardous material releases.

Railway	Report			
Canadian National Railway	No hazardous materials transported along this rail line. (Email correspondence from Greg Palmer, Canadian National)			
Norfolk Southern Railway (Summary of all commodities for latest 12 months ending April 30, 2016)	Total # of shipments	UN ID#	Class #	Chemical Name
	3,010	1077	2	Propylene
	1,871	3295	3	Hydrocarbons, liquid
	1,852	1075	2	Petroleum gases
	536	1075	2	Butane
	386	1075	2	Butane
	216	1267	3	Petroleum crude oil
	198	1040	2	Ethylene oxide
	192	1075	2	Propylene
	137	1075	2	Liquefied petroleum gas
	105	2448	9	Sulfur, molten
	63	1075	2	Propane
	58	1075	2	Liquefied petroleum gas
	48	1294	3	Toluene
	30	1978	2	Propane
	27	3082	9	Environmentally hazardous
	17	1052	8	Hydrogen fluoride
	16	1203	3	Gasoline
	7	1262	3	Octanes
6	3082	9	Environmentally hazardous	
	4	1114	3	Benzene
	2	1075	2	Isobutane
	2	2055	3	Styrene monomer
Western New York & Pennsylvania Rail Road	<ul style="list-style-type: none"> <li>• Isobutylene, Hazard Class 2.1</li> <li>• Xylene, Hazard Class 3</li> <li>• Cresols, Hazard Class 6.1</li> </ul>			
Oil Creek & Titusville Lines, Inc.	Hazard Class 9 is transported along this rail line at approximately 12 cars/year. This rail line operates at low speeds.			

From 2016 Crawford County Commodity Flow Study:

Locomotives would have diesel, lube oil, coolant fluids, and battery acid (50 gallons total) that could pose a threat if the locomotive was to be involved in a derailment. There have been past incidents with hazardous materials being released from railcars in Crawford County, between January 2010 and February 2016. These are listed below:

January 4, 2013 – On the Western NY & PA railroad at the Mercer-Crawford County line, Wayne Township, there was a train derailment. Four cars with non-hazardous plastic parts and one with Isobutylene UN 1055, Guide 115, leaking.

April 29, 2015 – Xylene leaked from a rail card that was stationary in the railroad yard in West Mead Township.

### *Crawford County Community Lifeline Integration*

Components and Essential Elements of information needed to stabilize and mitigate the incident within the Lifelines for this hazard within the lifeline(s) include;

Lifeline Planning Factors (Maximum anticipated or known impacts)

- *Number of # of oil systems facilities with at least moderate damage*
- *Number of highway bridges with at least moderate damage*
- *Number of total debris (tons)*
- *Number of railway bridges with at least moderate damage*
- *Number of hazardous materials facilities damaged*
- *Number of airport runways with at least moderate damage*

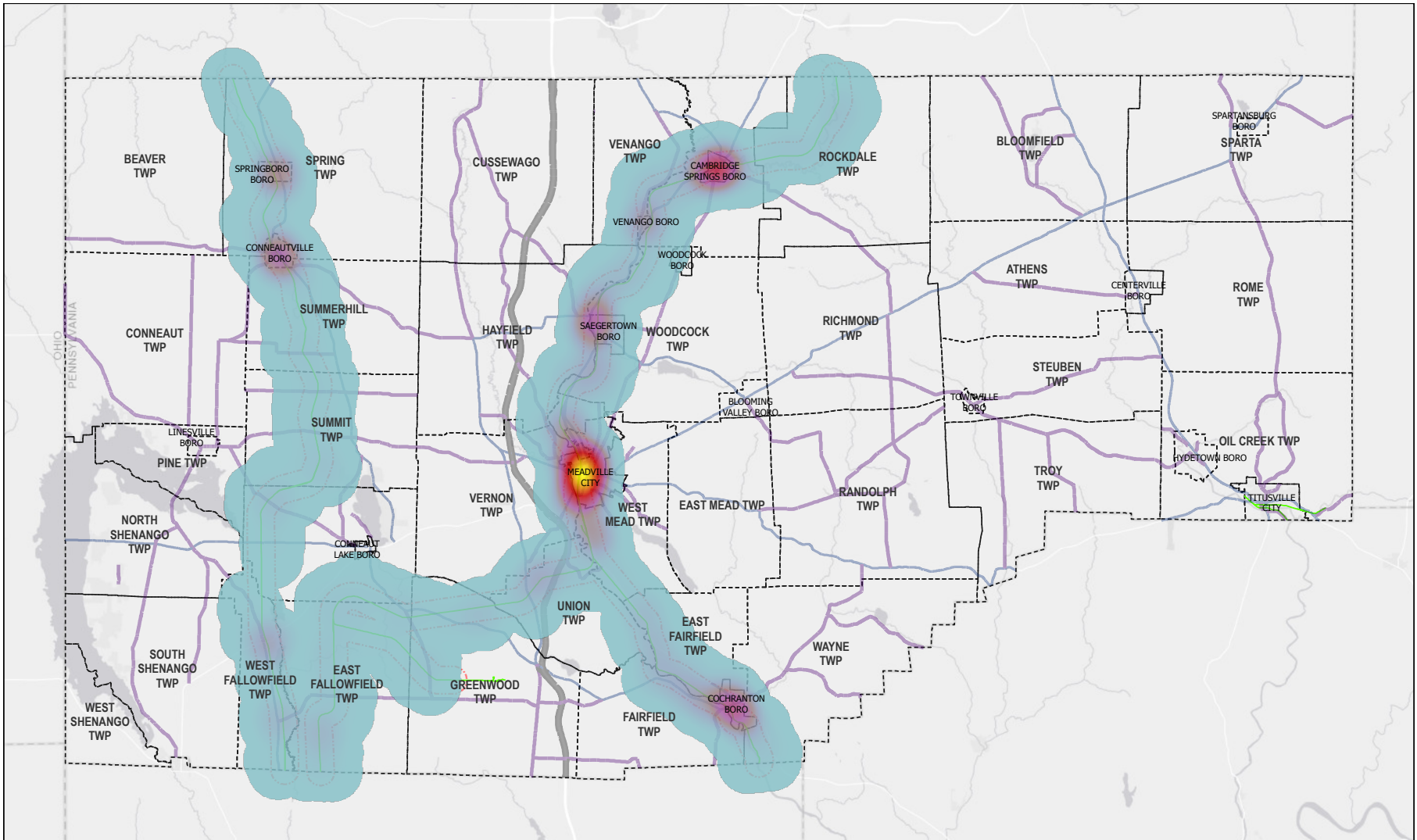
Lifeline Stabilization Target

- *All contaminated areas are identified and secure*
- *Multimodal routes (air, rail, road, pipeline) are clear of debris and accessible by normal or alternate means.*

County Assistance Lines of Efforts

- *Emergency Repairs and Augmentations to Infrastructure*
- *Provide Hazardous Materials Training and Exercises to Public Safety Agencies*
- *Maintain relationships with Tier II facilities*
- *Assess and Map Community Risks*
- *Maintain absorbent material stockpiles, resources, and equipment for Public Safety Agencies*
- *Prevent Development and Limit Density in Hazard Areas*

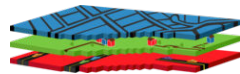
Figure 5.3.10-2 Population Vulnerable to Oil Train Derailment



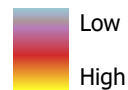
**Population vulnerable to oil train derailment**



Crawford County Government  
 Crawford County Courthouse  
 903 Diamond Park  
 Meadville PA 16335  
 GIS Manager: Phillip Baranyai  
 Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



**Train derailment evacuation zone structures - generalized**



**Train derailment evacuation zones (1/2 mile)**

Train derailment evacuation zones (1/2 mile)

This map is subject to change at any time after date of issuance.  
 Data used for map creation is approximate and should not be used for site specific decision making.  
 Crawford County assumes no responsibility or liability to the accuracy or completion of these maps.



### ***SAFETY AND SECURITY LIFELINE:***

Law Enforcement/Security (Police Stations, Law Enforcement, Site Security, Correctional Facilities, Search and Rescue (Local Search and Rescue), Fire Services (Fire Stations, Firefighting Resources), Government Service, (Emergency Operation Centers, Essential Government Functions, Government Offices, Schools, Public Records, Historic/Cultural Resources), Community Safety, (Flood Control, Other Hazards, Protective Actions)

## **5.3-11 TERRORISM**

### *LOCATION AND EXTENT*

Acts of terrorism are human-caused hazard that are intentional and often planned. Terrorism, both domestic and international, is a violent act done to try and influence government or the population of some political or social objective. Terrorist acts can come in many recognized forms or may be more subtle using untraditional methods. The primary recognized forms of terrorism are chemical, explosive, biological, radiological, and cyber; however, terrorism's only limitation is the human imagination.

Chemical terrorism is the use of chemical agents to poison, kill, or incapacitate the population or animals, destroy crops or natural resources, or deny access to certain areas. Chemical agents can be broken into five different categories: nerve agents, vesicants, cyanide, pulmonary agents, and incapacitating agents.

Terrorism using explosive and incendiary devices includes bombs and any other technique that creates an explosive, destructive effect. Bombs can take many forms from a car bomb to a mail bomb. They can be remotely detonated using a variety of devices or directly detonated in the case of a suicide bomb.

Bioterrorism is the use of biological agents, such as Anthrax, Ricin, and Smallpox, to infect the population, plants, or animals with disease or illness.

Radiological terrorism involves the use of radiological dispersal devices or nuclear facilities to attack the population. Exposure to radiation can cause radiation sickness, long-term illness, and even death. Terrorism experts fear the use of explosive and radiological devices in the form of a "dirty bomb" to attack the population. A "dirty bomb" is a low-tech, easily assembled and transported device made up of simple explosives combined with a suitable radioactive agent.

Cyber terrorism is the attack or hijack of the information technology infrastructure that is critical to the US economy through financial networks, government systems, mass media, or other systems. Any cyber-attack that creates national unrest or instability would be considered cyber terrorism.

Most times, terrorist acts, both domestic and international, are driven by a terrorist group or hate organization. Occasionally, individuals, as was the case in the Oklahoma City bombing, perform independent acts. Usually, the perpetrators have an underlying belief that drives the act.

When notified by a government official, the National Weather Service has the ability to send alert messages through the Emergency Alert System and over NOAA Weather Radio. Examples include the following:

- *Local Area Emergency Message: This message defines an event that by itself does not pose a significant threat to public safety and/or property, but the event could escalate, contribute to other more serious events, or disrupt critical public safety services. Instructions, other than public*



*protective actions, may be provided by authorized officials. Examples of when this message may be used include: utility disruptions, road closures, or a potential terrorist threat where the public is asked to remain alert.*

- *Civil Emergency Message: This message outlines a significant threat or threats to public safety and/or property that is imminent or in progress. The hazard is usually less specific or severe than those requiring a Civil Danger Warning.*
- *Law Enforcement Warning: This warning is issued for a bomb explosion, riot, or other criminal event. An authorized law enforcement agency may block roads, waterways, or facilities, evacuate or deny access to affected areas, and arrest violators or suspicious persons.*
- *Radiological Hazard Warning: This warning warns of the loss, discovery, or release of a radiological hazard such as the theft of a radiological isotope used for medical, seismic, or other purposes, discovery of radioactive materials, or a transportation accident involving nuclear weapons, nuclear fuel, or radioactive wastes. Authorized officials may recommend protective actions be taken if a radioactive hazard is discovered.*
- *Civil Danger Warning: This warning is issued when an event presents a danger to a significant civilian population. The message usually warns of a specific hazard and outlines specific protective actions such as evacuation or shelter in place.*
- *Shelter in Place Warning: This warning is issued when the public is recommended to shelter in place (go inside, close doors and windows, turn off air conditioning or heating systems, and turn on the radio or TV for more information). Examples include hazardous material releases or radioactive fallout.*

The probability of terrorism occurring cannot be quantified with as great a level of accuracy as that of many natural hazards. Furthermore, these incidents generally occur at a specific location, such as a government building, rather than encompassing an area such as a floodplain. Thus, planning should be asset-specific, identifying potentially at-risk critical facilities and systems in the community. Once a comprehensive list of critical assets has been developed, it should be prioritized so that efforts can be directed to protect the most important assets first. Then, beginning with the highest-priority assets, the vulnerabilities of each facility or system to each type of hazard should be assessed.

For the purpose of developing a realistic prioritization of terrorism hazard mitigation projects, three elements should be considered:

- *Relative importance of the various facilities and systems in the asset inventory*
- *Vulnerabilities of those facilities*
- *Threats that are known to exist.*

This plan update identifies critical facilities located in Crawford County and the hazards to which these facilities are susceptible. A critical facility is defined as a facility in either the public or private sector that provides essential products and services to the general public, is otherwise necessary to preserve the welfare and quality of life in the county, or fulfills important public safety, emergency response, and/or disaster recovery functions.

Critical facilities identified in the county are shelters; gas, electric and communication utilities; hospitals and other health care facilities; water and wastewater treatment plants, hazardous waste sites; and schools. In addition to critical facilities, the county contains at risk populations that should be factored into a vulnerability assessment. Critical assets and infrastructure are systems whose incapacity or destruction would have a devastating effect on the county; this includes:

- *Government services*
- *Emergency services*
- *Water supply systems*
- *Transportation networks*
- *Telecommunications infrastructure*
- *Electrical power systems*
- *Gas and oil facilities*

### *RANGE OF MAGNITUDE*

Terrorism refers to the use of WMD, including biological, chemical, nuclear, and radiological weapons; arson, incendiary, explosive, and armed attacks; industrial sabotage and intentional hazardous materials releases; and “cyber-terrorism”. Within these general categories, however, there are many variations. Particularly in the area of biological and chemical weapons, there are a wide variety of agents and ways for them to be disseminated.

Terrorist methods can take many forms, including:

- *Agri-terrorism*
- *Arson/incendiary attack*
- *Armed attack*
- *Biological agent*
- *Chemical agent*
- *Cyber terrorism*
- *Conventional bomb or bomb threat*
- *Hazardous material release (intentional)*
- *Nuclear/Dirty bomb*
- *Radiological agent*

Two types of terrorist activity could have potential relevance to Crawford County: agri-terrorism and intentional hazardous material releases. Agri-terrorism is direct, intentional, generally covert contamination of food supplies or introduction of pests and/or disease agents to crops and livestock. Crawford County is semirural, with much of its land area dedicated to agriculture. The County also has a number of SARA Title III and EPA Toxic Release facilities and major transportation routes that traverse the County, making intentional hazardous material release a potential threat to citizens and the environment.

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

agent used and the duration of exposure.

Biological agents are organisms or toxins that have illness-producing effects on people, livestock, and crops. Because some biological agents cannot be easily detected and may take time to develop, it is difficult to know that a biological attack has occurred until victims display symptoms. In other cases, the effects are immediate. Those affected by a biological agent require the immediate attention of professional medical personnel. Some agents are contagious, and victims may need to be quarantined.

A worst-case scenario for a terrorist attack in Crawford County would be the intentional release of hazardous materials in either of the County's two most populous municipalities – the cities of Meadville and Titusville. Not only would a release in these areas have the potential to injure the greatest number of people, but could also harm the County's ability to respond to such an event. Out of the 91 critical facilities in the county in close proximity to hazmat facilities (1.5 miles), roughly one-third are located in the cities of Meadville and Titusville.

### *PAST OCCURRENCE*

Like just about every other county in the nation, Crawford County has had its share of domestic terrorism incidents. The table below indicates the number of previous occurrences of terrorism, criminal activity, and potential civil disorder from the 9-1-1 Center Computer Aided Dispatch system from January 1, 2016 to 2020.

Suspicious Person	1,391
Suspicious Activity	1,336
Suspicious Vehicle	1,228
Ordinance Violation	127
Weapons Offense	20
Explosion	4

**03/28/16 16:00** Supported Titusville Police with a suspicious package.

**05/17/2016 13:45** Bomb Threat Terrorist Activity: Bomb threat at 16086 Conneaut Lake Road, Meadville PA 16335 At approximately 13:45 on

**05/17/16** the Vernon Township Police Department was advised that an employee of Walmart found a note in the store warning of the possibility of a bomb in the store. It was the second such event in two days. VTPD personnel responded and it was determined the situation warranted a temporary evacuation. In conjunction with management the store was evacuated first of customers and then of employees. The building was searched for suspicious activities or parcels. None were located. The likelihood of an explosive device in the building having been greatly reduced, the employees returned to the building at approximately 15:45. Customers were allowed to enter at approximately 16:00. The incident remains under investigation by the VTPD.

**12/15/18** A pipe bomb was found by a resident at Lord Mason Park in the Borough of Conneautville. State Police and Erie City Police Department Bomb Squad responded. The device was not explosive.

**04/24/19** Bomb Threat

**01/2020** Cyber Threat Meadville Medical Center is dealing with a data security incident involving its employee payroll system. The incident was discovered last week and involves only employee information at this point, according Don Rhoten, the hospital's vice president of consumer engagement. The security problem "may have resulted in unauthorized access to the personal information of some employees and their dependents," Rhoten confirmed in an email to the Tribune on Wednesday. "Based on our investigation thus far, we have no evidence that this incident involves any patient information," Rhoten said. Once the incident became known, Rhoten said the hospital secured its employee payroll computer portal, notified the FBI and launched an investigation into the incident. Catherine Policicchio, spokeswoman for the FBI's field office in Pittsburgh, said Wednesday the law enforcement agency wouldn't comment on whether there was an investigation. As a precautionary measure, Meadville Medical Center notified its employees of the incident on Jan. 23, Rhoten said. "We are working with a professional security firm to address this incident and determine what personal information may have been involved," Rhoten said. "We appreciate our employees' patience as we investigate this incident." Two years ago, 830 Meadville Medical Center patients were among 45,000 nationwide who had medical reports illegally accessed by an employee of Nuance Communications Inc. between Nov. 20, 2017, and Dec. 9, 2017. The hospital had a contract with Nuance, a computer software technology corporation, to provide transcription services for notes made to medical records by physicians. What was accessed in 2018 were transcribed reports from a patient's visit to a physician, not a patient's entire medical history nor the patient's Social Security number. (Meadville Tribune January 30, 2020)

On January 30, 2020, the Meadville Tribune reported that Meadville Medical Center was investigating what appeared to be an attack on the employee payroll system. No patient data was believed to have been impacted. On March 26, however, and only days after furloughing hundreds of employees due to the decreased volume of patients coming to the hospital because of the pandemic, the center was hit with what appeared to be an malware attack that impacted the electronic health record system and email. The center optimistically reported that they would have the EHR system restored by that weekend. It didn't work out quite that quickly, though. According to an AP report yesterday, the EHR system was brought back online starting 5 days after the attack, but other systems remain down even now, three weeks later. Now the hospital is saying it expects "the vast majority of core systems to be restored and functional this week." The hospital also informed AP that there was no indication of "any unauthorized access to or taking of patient information." Except that the hospital couldn't access the EHR and that they had to resort to other systems while they couldn't restore the EHR? There has been no report that the furlough was in any way related to the attack, and the medical center has not reported receiving any ransom demand associated with the attack. DataBreaches.net has reached out to the center to seek more details about the malware and any ransom demand, and will update this post if a response is received. (April 16, 2020)

**02/24/2020** Ransom Ware Threat On February 24, 2020 at around 7:00am, the PENNCREST School District detected unusual network activity and identified associated pop-up messages stating that files were encrypted. Upon discovering this, PENNCREST contacted the Carnegie Mellon University Cyber Terrorism Division (CERT) to provide immediate emergency response support and to help secure our environment. This response included disabling a likely compromised account and disabling remote access at the firewall. The encrypted file characteristics, including file extensions and distributions, were consistent with the Dharma ransom ware variant. The initial internal investigation revealed a suspicious connection from an IP address that resolved to Russia. We immediately reported the incident to our cyber insurance policy carrier, AXIS. Axis engaged Lewis Brisbois Bisgaard & Smith LLP for incident response counsel, and Arete Advisors, for a digital forensic investigation. Upon receipt of the forensic data, Arete conducted a review and confirmed that Client's systems had been impacted with a ransom ware variant capable of spreading throughout the network. Arete's analysis of the systems revealed characteristics that followed a pattern consistent with the Dharma variant of ransom ware. Dharma is typically disseminated through exploited RDP connections and uses a mutex of the RSA algorithm2, which is implemented

just prior to the encryption process. This variant does not avoid User Account Control (UAC); rather, it uses this to begin deploying a second copy of itself upon download, elevating privileges. The ransom ware does not generally contain functionality for self-propagation, nor does it contain the ability to access or exfiltrate data automatically from the environment. Deployment of the ransom ware is accomplished using network shares and scripted automation. Arete's forensic analysis of our devices and logging data found no evidence of unauthorized access to sensitive data nor any evidence of data exfiltration. In addition, Arete did not observe the execution of any programs, applications, or threat actor behavior indicative of data exfiltration, including staging of data. The threat actor activity was consistent with an automated intrusion causing the ransom ware and its tools to be downloaded, installed, and executed. There was no indication of any interactive activity by the threat actor other than pushing out this automated intrusion for the purpose of launching the ransom ware. On March 7, 2020, PENNCREST filed a complaint with the FBI Internet Crime Complaint Center. Upon discovering the incident, we took immediate steps to further secure our environment. We worked with cyber security experts

**05/31/20** There was a peaceful protest in the City of Meadville after the George Floyd incident. Approximately 150 people walked from First District Elementary School to Diamond Park where they laid down for eight minutes then walked to Second District Elementary School.

From 2016 to the present, Troop E, Meadville has not responded to or received any calls related to terrorism. The only incidents that may come close are that PSP Meadville members assisted Troop D, Mercer with protestors last week (August 2020) at Combined Tactical near Jamestown, Mercer County

In 2017, PSP Meadville assisted the FBI, Secret Service, and the Washington D.C. Metro Police Dept. with taking a Crawford County resident into custody who traveled to Washington D.C. with firearms and ammunition claiming he wanted to meet with the President. The individual was taken into custody in D.C. Meadville's contribution was mostly notification to the law enforcement agencies in D.C. (PA State Police Meadville Barracks August 2020)

From the Center for Rural Pennsylvania dated 2019, Cybercrimes cost U.S. victims lost \$3.5 Billion dollars due to Cybercrimes. 47% of cybercrime victims in the U.S. are 50 years old and older. There were 10,914 Pennsylvania cybercrime victims with an average loss of \$8,639 for a total loss of \$94.3 million. \$1.78 Billion losses in 2019 due to business e-mail compromises in the U.S. 24% of phishing crimes in the U.S. contributing to \$57.8 million in losses. 86% of Pennsylvania households with one or more computers and 89% of U.S. households with one or more computers.

It is common no win 2020 to receive e-mails and friend requests from people we know but unfortunately, they were hacked and they personal did not send the e-mail or friend request. Cybercriminals combine poisonous links, attachments, and enticements in various ways to develop malicious email campaigns that are, unfortunately, very effective. While it's impossible to enumerate all email-based threats, here's a list of some of the most significant and dangerous types.

**Ransomware:** Most commonly delivered via email, ransomware encrypts the victim's data and demands a fee to restore it. According to CNBC, ransomware spiked 6,000% in 2016, and most ransomware victims, in an attempt to recover their data, paid the ransom.

**Phishing:** Phishing uses psychological manipulation to bait victims into divulging logon data or other sensitive information that criminals sell or use for malicious purposes. A phishing attack usually consists of an authentic-looking sender and a socially engineered message. Many email recipients believe the message is from a trusted individual and will open infected attachments or click on malicious links.

**Spear phishing:** A more targeted form of phishing, spear phishing consists of a highly customized attack, focused on a specific individual or organization. Cybercriminals will often perform extensive research to make their emails appear legitimate. For example, criminals will pose as, or mention legitimate colleagues, departments, business partners, or even superiors.

**Spoofing:** Because email protocols lack effective mechanisms for authenticating email addresses, hackers are able to use addresses and domains that are very similar to legitimate ones, deceiving victims into believing that fraudulent emails are from a trusted individual. Criminals may spoof an individual mailbox (“johndoe@123abccompany.com” vs. “johnnydoe@123abccompany.com”), or the company’s domain (“johndoe@123abccompany” vs “johndoe@123abcompany”).

**Man-in-the-Middle Attacks:** In these attacks, cybercriminals insert themselves between the user and the application, website, or service the victim is using. This enables the attacker to impersonate the victim, read and manipulate their emails, steal valuable personal information, and even modify or conduct transactions, all without the victim’s knowledge. Like most malicious emails, man-in-the-middle attacks are not new. However, in recent years, hackers have found numerous ways to revive this classic attack. To make matters worse, a variety of inexpensive hacking tools are readily available that help criminals perform man-in-the-middle attacks.

**Whaling / Business Email Compromise:** Business Email Compromise (BEC), also known as “whaling” target’s an organization’s biggest fish. This is a type of social engineering scam where an attacker sends an email to someone in the organization that has the ability to execute a financial transaction. The email looks like it’s from the CEO (or another empowered individual), and requests an immediate financial transaction such as a vendor payment, direct deposit, or wire transfer.

**Spam:** Despite a number of ways to filter out unwanted email, spam remains a significant challenge for organizations. While ordinary spam is simply considered a nuisance, spam is also frequently used to deliver malware. Ransomware, for example, is most commonly delivered via spam, and it behooves all organizations to carefully evaluate spam for dangerous intent.

**Key Loggers:** In the most damaging data breaches, the criminals behind the attacks nearly always utilize stolen user credentials. One effective method criminals’ use to obtain IDs and passwords is a keylogger, often delivered by email when victims inadvertently click on a malicious attachment or link.

**Zero-Day Exploits:** A zero-day vulnerability refers to a security weakness that is unknown to the software developer. The security hole is exploited by hackers before the vendor has created a fix. Zero-day attacks are frequently delivered via malicious emails, and hackers use them to gain unauthorized access and steal sensitive information.

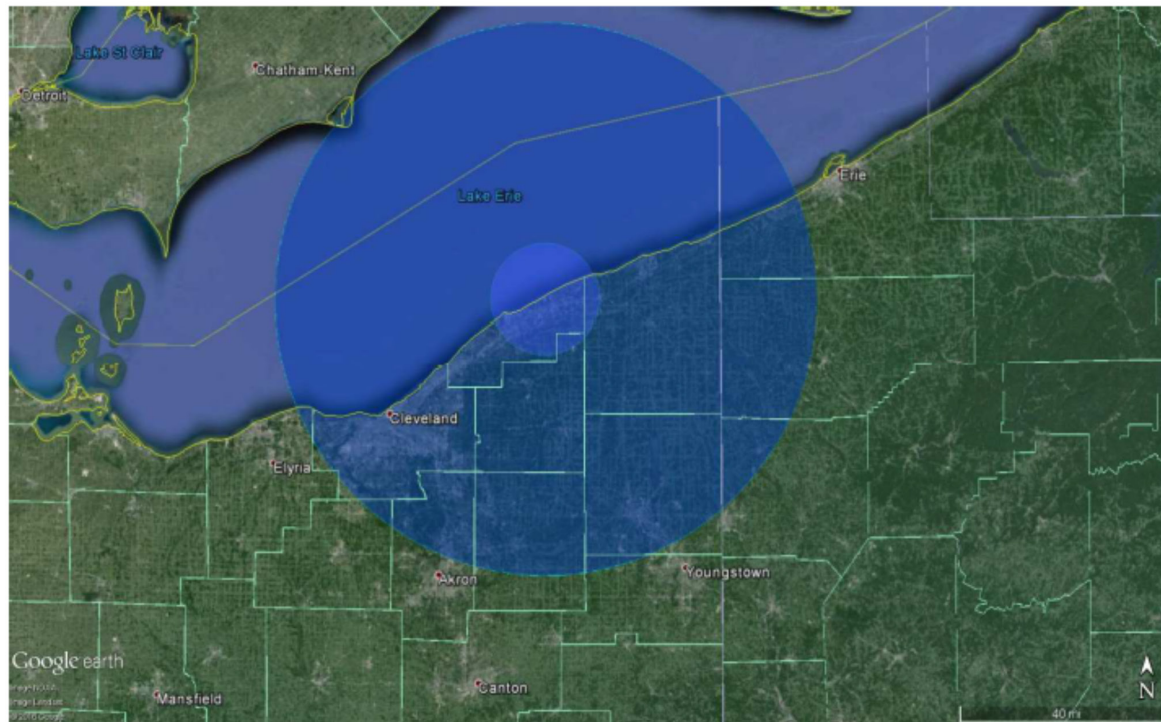
**Social Engineering:** Cybercriminals use social engineering to build trust before stealing user logon credentials or confidential data. In a social engineering attack, a computer criminal poses as a trusted individual (IT support, human resource, outside contractor, etc.) and engages in a conversation to gain access to a company’s network. The attacker deceives the victim into divulging IDs, passwords, and sensitive information, or dupes them into performing a fraudulent transaction.

The Pennsylvania Criminal Intelligence Center reported that in May of 2020, animal rights activists launched, Project CounterGlow, intended to share information related to animal industry and activist investigations. The website contains two main features, a map and a paper trail. The

map provides the name, address, and geographic coordinates of more than 27,500 farms and animal agriculture facilities (meat), dairy cows, chickens (meat), layer hens (eggs), pigs, slaughterhouses, fur, and medical testing. The interactive map allows users to add new facility locations and contribute information to existing data points. The paper trail function of the website features discussion board and tutorials encouraging the investigation and documentation of facilities. Postings on the site encourage individuals to identify unmarked farms/facilities, and share information on specific farms/facilities where activists have investigated. <https://www.counerglow.org/> . For Crawford County they list 1 meat, 12 dairy, 1 slaughter house, and 1 egg facility.

### *FUTURE OCCURRENCE*

Crawford County's risk of terrorism continues to escalate, especially in the Cyber-crimes. There are a number of critical facilities within the county, as well as Perry Nuclear Plant in northwest in Lake County, Ohio (approx. 32 to 66 miles) that could affect Crawford County in the event of a terrorist attack or mechanical failure. Because of the close proximity to the risk area, western half of Crawford County is within the ingestion pathway zone vulnerable to levels of radioactive fallout. Population of 42,874 are within this zone including Pymatuning Lake and Conneaut Lake and Interstate 79 north and south. Next page is the zone map of Perry Nuclear Plant in Ohio.



Development should have little to no impact on the terrorism hazard; except for the increase in population and the associated increase in potential for life, property, and economic losses should an event occur.

Although the probability of Crawford County being the target of a direct domestic terrorist attack is greater than being the direct target of an international terrorist attack, it should be equally prepared for both. It is hard to determine at this point what the actual probability of a terrorist attack occurring within the county is. However, it is safe to assume that it is much greater than it was before September 11, 2001. On the whole, the probability of a terrorism event is considered unlikely as defined by the Risk Factor Methodology probability criteria.

### *VULNERABILITY ASSESSMENT*

The severity of terrorist incidents depends upon the type of method used, the proximity of the device to people, animals, or other assets and the duration of exposure to the incident or device.

Risk Factor (RF) Value: 3 According to the qualitative assessment performed using the RF tool, the terrorism hazard scored a RF value of 3 (from a scale of 0 to 4, with 4 being the highest risk level).

It is critical that the local law enforcement and government officials ask the following the questions regarding vulnerability to terrorism:

#### **Inherent vulnerability**

- *Visibility: How aware is the public of the existence of the facility?*
- *Utility: How valuable might the place be in meeting the objectives of a potential terrorist?*
- *Accessibility: How accessible is the place to the public?*
- *Asset mobility: Is the asset's location fixed or mobile?*
- *Presence of hazardous materials: Flammable, explosive, biological, chemical, and/or radiological? Present on site? If so, are they well secured?*
- *Potential for collateral damage: What are the potential consequences for the surrounding area if the asset is attacked or damaged?*
- *Occupancy: What is the potential for mass casualties based on the maximum number of individuals on site at a given time?*

#### **Tactical vulnerability**

- *Site perimeter*  
*Site planning and landscape design: Is the facility designed with security in mind (both site-specific and with regard to adjacent land uses)?*  
*Parking security: Are vehicle access and parking managed in a way that separates vehicles and structures?*
- *Building envelope*  
*Structural engineering: Is the building's envelope designed to blast-resistant? Does it provide collective protection against chemical, biological, and radiological contaminants?*



- *Facility interior*

*Architectural and interior space planning: Does security screening cover all public and private areas?*

*Mechanical engineering: Are utilities and HVAC systems protected and/or backed up with redundant systems?*

*Electrical engineering: Are emergency power and telecommunications available? Are alarm systems operational? Is lighting sufficient?*

*Fire protection engineering: Are the buildings water supply and fire suppression systems adequate, code-complaint, and protected? Are on-site personnel trained appropriately? Are local first responders aware of the nature of the operations at the facility?*

*Electronic and organized security: Are systems and personnel in place to monitor and protect the facility?*

Critical facilities play prominent roles in Crawford County. Often, terrorists target facilities that are highly important for government services and community stability. Threat data is not specific enough to identify what facilities are most vulnerable, therefore, all critical facilities are considered to have the same risk countywide. Given the rural nature of the region, a major terrorist attack making a direct impact in Crawford County is not expected. Perhaps the greatest threat to the communities is a disgruntled student, employee, or resident threatening others with violence. The extreme example of a bomb, depending on its size, could cause structural losses to a critical facility.

Possible losses to critical facilities include:

- *Structural losses*
- *Contents losses*
- *Critical functional losses*
- *Critical data losses*

Terrorism officials emphasize that potential targets include our nation's delicate infrastructure. Should an attack occur, Crawford County could locally lose electricity, telephone, or internet services. More localized incidents could disrupt water or sewer services. Other attacks could limit fuel or propane supplies and affect transportation and heating capabilities.

Possible losses to critical infrastructure include:

- *Electric power disruption*
- *Telephone service disruption*
- *Fuel shortages*

Structure losses are possible from terrorism and civil unrest but are not likely. Looting, however, can be associated with these types of events. Therefore, this hazard places both the population and property at risk. Communities and places of public gathering are generally going to be the areas of greatest risk.

Possible losses to structures include:

- *Structural losses*
- *Contents losses*
- *Vehicle losses*
- *Displacement losses*

The effects of terrorism are usually felt by the population. During times of unrest, the greatest risk is to human lives. Terrorists typically try to make a dramatic statement that will generate media interest. Attacking the population through a large loss of life is a common tactic. Depending on the type of attack, casualties could be light or involve much of the Crawford County population.

Possible economic losses include:

- *General national economic slowdowns*
- *Livestock losses through intentional disease spread*
- *Tourism losses during terrorism fears*
- *Possible ecologic losses include:*
- *Environmental contamination*
- *Possible social losses include:*
- *Cancelled activities*
- *Emotional impacts of significant population losses*
- *Loss of sense of security*

### *Crawford County Community Lifeline Integration*

Components and Essential Elements of information needed to stabilize and mitigate the incident within the Lifelines for this hazard within the lifeline(s) include;

**Lifeline Planning Factors (Maximum anticipated or known impacts)**

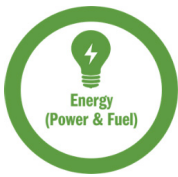
- *Number of buildings with at least extensive damage*
- *Number of fire station facilities with at least moderate damage*
- *Number of police station facilities with at least moderate damage*
- *Number of government offices with at least moderate damage*
- *Number of dams/levees at risk of failure and/or at least moderate damage*
- *Number of isolated communities*
- *Number of facilities requiring federal security support*
- *Number of survivors requiring SAR assistance*

## Lifeline Stabilization Target

- *Threats to life-safety are no longer a concern for all response personnel and impacted communities. Government essential functions, including executive leadership, are operational. Sufficient search and rescue assets are on-scene to assist all survivors. Sufficient fire resources are available to support fire suppression efforts.*

## County Assistance Lines of Efforts

- *Search and Rescue Training, Exercises, and Equipment for Public Safety Agencies*
- *Restoration of Public Infrastructure*
- *Cyber Security Training, Education, and Exercise for Businesses and Critical Facilities*
- *Write a Nuclear Power Plant Ingestion Zone Emergency Action Plan*
- *Assess and Map Community Risks*
- *Integrate Mitigation into Planning*



**ENERGY COMMUNITY LIFELINE:** Power Grid (Generation Systems, Transmission Systems, Distribution Systems), Fuel (Refineries/Fuel Processing, Fuel Storage, Pipelines, Fuel Distribution, Off-shore Oil Platforms)



**COMMUNICATIONS COMMUNITY LIFELINE:** Infrastructure (Wireless, Cable Systems and Wireline, Broadcast, Satellite, Data Center/Internet) Alerts, Warnings, Messages (Local Alert/Warning Ability, Access to IPAWS), 911 and Dispatch (Public Safety Answering Points, Dispatch), Responder Communications (LMR Networks), Finance (Banking Services, Electronic Payment Processing)



**FOOD, WATER, SHELTERING COMMUNITY LIFELINE:** Food (Commercial Food Distribution, Commercial Food Supply Chain, Food Distribution Programs), Water (Drinking Water Utilities, Wastewater Systems, Commercial Water Supply Chain), Shelter, Agriculture (Animal and Agriculture)

## 5.3-12 UTILITY INTERRUPTION

### LOCATION AND EXTENT

Utility interruption hazards are hazards that impair the functioning of important utilities in the energy, telecommunications, public works, and information network sectors. The focus of utility interruptions as a hazard lies in fuel, energy, or utility failure; this hazard is often secondary to other natural hazard event, particularly transportation accidents, lightning strikes, extreme heat or cold events, and coastal and winter storms. Severe thunderstorms, tornados, 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. Additional utility interruptions may be caused by traffic accidents. Utility interruptions have the potential to take place throughout the County.

### 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 count 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. The worst-case scenario for a utility interruption in Crawford County would be a long-term outage that also coincided with a winter storm event. While this kind of event would probably not cause structural damages, it could seriously endanger human health.

## *PAST OCCURRENCE*

The nationwide oil embargo of 1973- 1974, the severe winter of 1976- 1977, and the national gasoline shortage of 1979 emphasized the vulnerability of all residents in Crawford County to energy emergencies. Minor utility interruptions occur annually, most often in conjunction with winter storms, wind storms, and traffic accidents with a few that cause significant disruptions. Now in 2020, the reliance on the internet and wireless capabilities have increased exponentially. Now gasoline pumps, automatic transaction machines, and almost every grocery and retail store rely on the internet to make transactions of a purchase and payment.

The list below is of significant incidents occurring in Crawford County from 2016 to 2020 and their impact on residents and critical facilities;

**01/29/16 10:04**      **County Courthouse to Close Early, Water Shortage /Outage** Around 8:45 am Crawford County Commissioners were notified that a 6" water line has begun to leak near the construction location on John Holt Way adjacent to the Crawford County Courthouse. Meadville Area Water Authority was notified and responded immediately and determined that it will take most of the day to repair including shutting off the water. This water shut off will affect the Crawford County Courthouse, Adult Probation Annex, First Presbyterian Church who are sending their day car children home, and some apartments located on John Holt Way who have all been notified by the Water Authority. No other residents or facilities are impacted. Crawford County Commissioners met with their Emergency Action Team and the Water Authority and decided to close the Courthouse at 10:30am and all employees will be allowed to leave at that time. All other County Offices and Operations not affected by the water shut off will remain open and operational as normal. Information will be sent out when the repairs have been completed and the Courthouse Operations will return to normal by Monday morning. The 9-1-1Center located in the

**03/14/16 09:17**      **Boil Water Advisory** - GUYS MILLS VILLAGE Water supply contamination Guys Mills Village, Randolph Township DEP Safe Drinking Water staff received notification on March 13, 2016 that Guys Mills Mutual Water Association has issued a Boil Water Advisory to a portion of their distribution system. There are approximately 35 customers affected in the Village of Guys Mills, there are not eating/drinking or critical care facilities affected. The Boil Water Advisory was necessary due insufficient chlorine contact time.

**03/18/16**            **Resource Request Water Buffalo to Rolling Field Nursing Home** Conneautville Borough is cleaning the inside of their water tower which means the entire water supply will be drained. Rolling Fields Nursing Home has a direct line from the tower to its facility. Water will be maintained in the system by running two water pumps. Facility wanted the water buffalo in the event water supply was disrupted. Unknown when the cleaning will start or end.

**07/17/2016 17:50**      **Water Main Rupture** At approximately 2:45 pm a water main located at Mead Avenue Bridge and Cussewago Road in Vernon Township ruptured. Meadville Area Water Authority is on scene accessing the rupture. The anticipate water service to be restored by 8:00am tomorrow. All emergency procedures and emergency notifications have been made according to water authority. Unknown at this time the number of residents and businesses affected but water authority is working on that number. They have no unmet needs at this time as they have resources acquired from neighboring water and waste water authorities. Cussewago Road and Mead Avenue Bridge traffic will be affected but there are enough roads around that area. No EOC activation. EMA Director monitoring and will update. A 12" pipe secondary feeder line ruptured for unknown reason at 2:45pm Sunday. The break was isolated by 7:00pm. Pressure loss was experienced in the Kerrtown Area of Vernon Township. The pipe was 60 years old. There was still positive pressure in the lines so clean water is pushing out through the system not allowing any bacteria to get into it. There will be extra water testing after repairs are made. There were two 2.5-million-gallon water tanks supplying water. They estimate they lost 2 million gallons of water. Update on repair status will be entered this AM. Their first repair attempt was unsuccessful. They're bringing in a

contractor with a bigger machine and hope to have the repair completed by early afternoon. He reports that they still have positive pressure in the main and that a boil water advisory has not been necessary per Andy Walker, City Manager.

**07/08/2016 09:31** **Power Outage** There is a widespread power outage in Central Crawford County. The Crawford County Courthouse & Meadville Medical Center's Liberty Street facility is on generator power. Crawford County 9-1-1's tower on Reynolds Road is on generator power.

**07/11/2016 21:52** **Uncontrolled Gas Well Release** Spartansburg Fire Department is out with an abandoned gas well releasing Methane Liquid that is freezing at the top of the well. There are 3 residences in the area, one of which being within 100 yards of the well site. One landowner requested an ambulance but refused treatment. EMA and DEP are aware of the situation. Per DEP Emergency Response on scene the well has depressurized and is not giving off any readings on the multi-gas meters. The responsible party has been located and is on site with DEP ER. The well was being repaired. No evacuation, no unmet needs.

**07/07/2016 15:28** **Power Outage Utility** Emergency at 1199 Morgan Street, Meadville PA 16335. There is a widespread power outage in central Crawford County. According to Dan Heher at Penelec, the problem originated at the substation at 1199 Morgan Street in West Mead Township. Penelec crews were dispatched to the substation.

**08/24/2016 11:33** **Natural Gas Leak** Natural gas release at 11466 State Highway 618, Conneaut Lake PA 16316- There is a significant natural gas leak on State Highway 618 in Sadsbury Township. The incident is in front of Ferrellgas. National Fuel Gas is on scene. Departments 5 & 7 are also on scene. State Highway 618 is closed in both directions.

**09/14/2016 10:34** **Boil Water Advisory/West Mead Township** A Boil Water Advisory has been issued for New Beginnings Church of God located at 13226 Leslie Road, in West Mead Township, Crawford County. The boil water advisory was necessary due to E-coli being detected in their source water.

**11/05/2016 11:00** **Natural Gas Leak** Riverside Inn 1 Fountain Ave, Cambridge Springs Boro PA 16403 A 3 story multiple occupancy commercial hotel structure with a smell of natural gas outside. 30 residents evacuated with 1 being evaluated by EMS. Cambridge Springs Fire Dep't and EMS on the scene as well as National Fuel and HVAC.

**11/21/2016 12:14** **Power Outage** Vernon Township/Conneaut Lake Road, Meadville PA 16335 Penelec First Energy reports Customers Affected: 101-500 Cause: Equipment Damage Crew Status: Arrived Estimated Restoration: We expect to restore power to the majority of affected customers by Today at 10:00 PM. Fire Departments are being dispatched to staff intersections where the traffic lights are out. Most reports of outages are the Conneaut Lake Road from Smock Bridge City of Meadville to SR 98 in Vernon Township. Normal EMA Staff monitoring. No EOC activation. No unmet needs at this time. Call EMA Office if you need more information 814-724-8110.

**12/20/2016 15:40** **Trailer Park Water Disruption** Crawford County EMA was notified of a water outage to the Asbury Manor East Trailer Park in the City of Meadville. EMA Director contacted the City of Meadville EMA Coordinator for a sitrep. A water main to the trailer park broke sometime Sunday night or Monday morning on the trailer park owners' side of the curb box. There are 25 habited trailers. Cases of water were given to each trailer and the County's 450-gallon water buffalo deployed for flushing of toilets. Repairs should be completed by noon tomorrow. No other unmet needs. County EMA will follow up with City EMA tomorrow.

**01/30/17** **State Correctional Institution in Cambridge Springs Borough** Notified Crawford DPS that they had some equipment failure in their water system and to fix the problem they needed to shut the water off leaving the fire suppression system without any pressure. Those repairs were completed during the night and they will need to shut the system down one more time February 1st at 11:00pm for four hours to make final repairs with parts they could not obtain earlier. DPS EMA notified Cambridge Springs Public Safety Agencies. (Allen)

**02/06/17** **Conneautville Borough** reported a valve froze on their water tower tank yesterday at 6:00pm which required repairs to be made today. During the night one pump did not turn on automatically causing low pressure in the system. Maintenance manually turned the pump on and the system operated as normal. County's water buffalo to be taken out this morning to Rolling Fields Elder Care Facility for toilet flushing just in case water is disrupted during repairs. No unmet needs. No EOC Activation.

**02/21/17** **Hydetown Borough Boil Water Advisory** DEP Safe Drinking Water staff received notification that Hydetown Court East, a mobile home park in Hydetown Borough, Crawford County, issued a Boil Water Advisory (BWA) on February 21, 2017. There are approximately 30-40 customers that are impacted by this BWA. The BWA was necessary due to them not being able to meet the chlorine residual requirements. Closed March 2, 2017 at 3:00pm.

**03/02/17** **INCIDENT CLOSED DEP Safe Drinking Water** staff received notification that Hydetown Court East, a mobile home park in Hydetown Borough, Crawford County, issued a Boil Water Advisory (BWA) on February 21, 2017. There are approximately 30-40 customers that are impacted by this BWA. The BWA was necessary due to them not being able to meet the chlorine residual requirements.

**03/08/17** **2314 -Per FEMA REGION III** report, AT&T has reported that the issued affecting 911 wireless calls has been resolved. 2200- AT&T cellular users in your county may be affected by this incident due to a sporadic national outage that is impacting AT&T. AT&T Mobility is experiencing a service outage that is impacting the ability to deliver AT&T Mobility wireless 911 calls in your area. AT&T teams are engaged and are working to resolve the issue. Due to this service outage, you may experience interruptions or degradations to wireless 911 calls and wireless Phase I and Phase II location information. No other details concerning this outage are currently available. AT&T will notify when the issue has been resolved.

**06/30/17** **East Mead Vol. Fire Dept.** is requesting information as to the use of the County's Water Buffalo. The fire station has been without water since 6/26/2017 and there is no clarity as to what timeframe we are looking at to have well service water restored by East Mead Township. Since East Mead VFC is designated as an emergency shelter, would we be able to use the water buffalo and, is or would the water be potable? We hope to have water restored by the middle of next week at the earliest, but that has not been confirmed by the time of this Email.

**07/19/17** **DEP Safe Drinking Water** staff received notification that a Boil Water Advisory has been issued to all Vernon Township customers West of I-79. The entire Vernon Township Water system serves approximately 1,400 customers. Since most of their distribution system is west of I-79, it is estimated that 75 to 80 percent of their customers will be affected by this Boil Water Advisory. The Boil Water Advisory was necessary due to a water main break along Route 322. The break has not been repaired. The area of the advisory would then include several restaurants and other eating/drinking facilities Wal-Mart, Tim Horton's, Kings, Burger King, McDonalds, Sheetz on 19, medical facilities (the new Vernon Place, the oncology institute, Express care, other businesses, and residential connections Hunters Ridge, Forest Hills, two mobile home parks near the township building, and some individual home.

**07/27/17** **A boil water advisory** has been issued for Hydetown Mobile Home Park East in Hydetown Borough, Crawford County. The mobile

home park serves approximately 20 people. The boil water advisory was necessary due to their chlorine feed pump failing, resulting in low chlorine. A new pump has been installed. The boil water advisory will remain in effect until they satisfy the required bacteriological sampling.

**08/30/17** **Springboro Area Water Authority** just updated status to the entire system needs to go on a BWA. The system serves approximately 1,100 people including 2 schools (an elementary and middle school) as well as 2 restaurants. No critical care facilities. Sampling to begin Thursday

**09/16/17** **A boil water advisory** has been issued to Sunset View Motel located at 12210 PA-618, Sadsbury Township. The boil water advisory was issued due to E. coli present in its source water.

**11/01/17** **DEP Safe Drinking Water** staff received notification that a Boil Water Advisory has been issued at Hydetown Court West located at 13433 Park E in Hydetown Borough, Crawford County. This mobile home park serves approximately 23 people. The Boil Water Advisory was necessary due to their failing to maintain the required chlorine residual. They will need to have 4-log treatment back in place before they can conduct the required sampling to lift the BWA.

**01/12/18** **Linesville Borough Water Supervisor** notified Crawford DPS that there is a leak somewhere in their system and they lost 400,000 gallons of water from their water tower over night. Trying to locate leak. Working with DEP and have issued a boil water advisory.

**04/10/18** **Meadville Medical Center Phone Outage**

**07/27/18** **Phone interruption Meadville Medical Center**, City of Meadville

**08/01/18** **Meadville Medical Center Phone Outage**, City of Meadville. Meadville Medical Center is currently experiencing an internal and external phone outage. Technicians are working to fix the problem. Command Center is manned.

**08/03/18** **Crawford County 911 Line Outage**, County-wide The 911 system in Erie County and Crawford County suffered trunk failures which created 911 outages in both counties. Verizon has rerouted 911 landline and mobile calls to the 10-digit lines in both counties. Both counties report they are receiving calls on 10-digit lines with no issues. There is no estimated restoration time or outage cause reported at this time.

**08/14/18** **Meadville City Water Main Break**, City of Meadville. A Water leak occurred in the City of Meadville that affects Meadville Medical Center (MMC) Grove Street Surgical Unit and the Crawford County Public Safety Building. Meadville Water Authority is trying to isolate and reroute the water to those facilities. MMC working with the City of back up water and contacting a water hauler.

**10/12/18** **Meadville Area and Meadville Medical Center Power Outage**

**11/02/18** **DEP Safe Drinking Water** staff received notification that Vernon Township Water Authority located in Crawford County has issued a Boil Water Advisory to a portion of their distribution system. The Boil Water Advisory was necessary due to a water line break that occurred on North Dawn Drive the evening of 11/1/18. The break has been repaired and water was restored to their customers around 2:30 AM on 11/2/18. In addition to 108 residents in Forest Hills Condominiums and 117 residents in Hunters Ridge Apartments the only business affected is the Hampton Inn.



**11/14/18** **Water Buffalo** taken to Rolling Fields Elder Care for Planned Sprinkler System Valve Replacement

**12/12/18** **Phone lines** were intermittent at Meadville Medical Center

**12/12/18** **DEP Safe Drinking Water** staff received notification that Hardwood Estates, a mobile home park located in Summit Township, Crawford County, has issued a Boil Water Advisory. The Boil Water Advisory was necessary due to loss of positive pressure throughout their distribution system. They discovered that their well pump was not functioning properly and are in the process of replacing it. This affects 20 residential connections; approximately 50 people.

**05/24/19** **2230 - A caller from Lord Corporation** in Saegertown Borough reported someone hit a power pole and caused a power loss at their plant, which caused a coolant failure and release of approximately 1500 pounds of Dinitrobenzene. Absorbents were applied, and the material was contained.

**05/08/19** **Boil Water Emergency, Linesville Borough**

**08/25/19** **There is a widespread power outage** in the City of Titusville. Per Chuck Evanoff, Penelec, it appears to be a problem at one of the substations. Titusville Area Hospital was on back-up generator until repairs could be made and power restored from 13:06 to 17:35.

**08/23/19** **DEP Safe Drinking Water** staff received notification that Guys Mills Water Association located in Randolph Township, Crawford County issued a boil water advisory. The boil water Advisory was necessary due to a line break, which resulted in a breakdown in their 4-log treatment. The Association serves a residential population of approximately 100 persons. There are no restaurants, schools or critical care facilities served by this water system. This water system has a special condition in their permit requiring the blending of their sources due to high Nitrate levels at their spring source. Due to this line break, their well cannot keep up with demand so they will not be able to operate as permitted. Therefore, the Public Notice delivered to their customers will provide information for those homes with young children that they may want to use bottled water

**11/26/19** **Crawford County Care Center** Waterline Work, Saegertown Borough. 20881 State Highway 198, Saegertown PA 16433. There will be two separate water meters and valves replaced at the Crawford County Care Center (157 bed skilled nursing facility) located in Saegertown Borough starting on December 26 at 8:00pm and anticipated finish time 2:00am. This utility work has been coordinated with the Contractor, Saegertown Water Department, Saegertown Fire Department, Saegertown EMA, Crawford County Care Center, Correctional Facility, Maintenance, and Dept. of Public Safety.

**01/16/20** **Rolling Fields Elder Care** (181 beds) in Summerhill Township is on backup generator due to a Penelec power outage in the area affecting up to 2,000 customers. A situation at the substation on Fisher Road caused the outage in the Conneautville Area with estimated restoration around 2:30pm today. Facility is on backup generator and able to maintain operations without any disruptions. Penelec Government Liaison investigating and will provide updated information. Power restored at 3:10pm.

**06/03/20** **Hydepark Park East** located in Crawford County, Hydetown Boro had to issue a Boil Water Advisory to the entire park due to a pump failure that has already been replaced and the water has been restored to the park. There are 16 connections in the park with a total of 29 people that are on the system. They are already in the process of collecting confirmatory samples in order to lift the Boil Water Advisory.

09/01/20 **City of Meadville** had 1,000 water customers affected by a drop in water pressure at 2:30pm due to a water main break on North Main Street. All residents had some water and was safe to drink.

**Table 5.3-12.1 Municipal Water Source**

MUNICIPALITY	WATER SOURCE
Athens Township	Private Wells
Beaver Township	Private Wells
Bloomfield Township	Private Wells
Blooming Valley Borough	Private Wells
Cambridge Township	French Creek and Residential Private Wells
Cambridge Spring Borough	French Creek
Centerville Borough	Private Wells
Cochranton Borough	Ground Water from Two Wells
Conneaut Lake Borough	Ground Water from Two Wells by Conneaut Lake
Conneaut Township	Private Wells
Conneautville Borough	Ground Water from Two Wells
Cussewago Township	Private Wells
East Fairfield Township	Private Wells
East Fallowfield Township	Private Wells
East Mead Township	Private Wells
Fairfield Township	Private Wells
Greenwood Township	Private Wells
Hayfield Township	Private Wells
Hydetown Borough	Private Wells
Linesville Borough	Ground Water from Wells
Meadville – City	Ground Water from Wells
North Shenango Township	Private Wells
Oil Creek Township	Purchase water from City of Titusville and Private Wells
Pine Township	Private Wells
Randolph Township	Private Wells
Richmond Township	Private Wells

MUNICIPALITY	WATER SOURCE
Rockdale Township	Private Wells
Rome Township	Private Wells
Sadsbury Township	Private Wells
Saegertown Borough	Grounds Water from Seven Wells
South Shenango Township	Private Wells
Spartansburg Borough	Private Wells
Sparta Township	Private Wells
Spring Township	Private Wells
Springboro Borough	Ground Water from Wells
Steuben Township	Private Wells
Summerhill Township	Private Wells
Summit Township	Private Wells
Titusville – City	Grounds Water from Wells
Townville Borough	Private Wells
Troy Township	Private Wells
Union Township	Private Wells
Venango Borough	Private Wells
Venango Township	Private Wells
Vernon Township	Some Municipal and some from Wells
Wayne Township	Private Wells
West Fallowfield Township	Private Wells
West Mead Township	Water Authority, three private water companies (Autumn Hills, Woodland Heights, and Raymond Drive, along with private wells)
West Shenango Township	Private Wells
Woodcock Borough	Private Wells
Woodcock Township	Private Wells

## FUTURE OCCURRENCE

It is not anticipated that the County will face any localized energy emergencies and will remain susceptible to national emergencies. 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.

## VULNERABILITY ASSESSMENT

Risk Factor (RF) Value: 3

According to the qualitative assessment performed using the RF tool, the utility interruption hazard scored a RF value of 3 (from a scale of 0 to 4, with 4 being the highest risk level). Table 4.3.12-1 summarizes the risk levels assigned to each RF category.

Hazard	Risk Assessment Category					Risk Factor
	Probability	Impact	Spatial Extent	Warning Time	Duration	
Utility Interruption	3	3	3	4	2	3

Hospitals and emergency medical facilities as well as retirement homes and senior centers are particularly vulnerable to power outages. While back-up power generators are often used at these facilities, loss of electricity may result in hot or cold temperatures for which elderly populations are particularly vulnerable.

From January 1, 2016 to January 31, 2019 Crawford County Public Safety Agencies responded to 1,947 trees and wires down incidents, 117 natural gas incidents, and 24 utility incidents.

### *Crawford County Community Lifeline Integration*

Components and Essential Elements of information needed to stabilize and mitigate the incident within the Lifelines for this hazard within the lifeline(s) include;

#### Lifeline Planning Factors (Maximum anticipated or known impacts)

- *Number of households' w/o power on H+1*
- *Number of natural gas pipelines leaks/breaks*
- *Number of /% of gas stations w/o power or out of fuel*
- *Number of critical facilities w/o power*
- *Number of fuel (gallons) needed for generators through H+7*
- *Number of facilities with at least moderate damage*
- *Number of banks/ATMs inoperable*
- *Number of people seeking short-term public shelter*

- *Number of households' w/o potable water on H+1*
- *Number of wastewater leaks/breaks % of grocery stores w/o power*
- *Number/% of water systems with at least moderate damage*

#### **Lifeline Stabilization Target**

- *Generators are providing temporary emergency power at critical facilities necessary to stabilize other lifelines. Fuel distribution is available for responders. Sufficient fuel distribution is available for survivors, including to support individual's dependent on power for life sustaining medical care.*
- *Survivors have access to commercial communications infrastructure to contact or be contacted by emergency services. Land mobile radio communications network is operational. Public safety answering points are available to the public. Survivors have access to financial services.*
- *All survivors, their pets, and service animals have access to food, water, and sanitation. Sheltering, including cellular reception, capacity, accessibility, and wrap-around services, is supporting the displaced population. Sufficient resources are in place to sustain agricultural requirements.*

#### **County Assistance Lines of Efforts**

- *Temporary Emergency Power for Critical Facilities*
- *Municipalities Make Emergency Repairs and Augmentations to Infrastructure*
- *Remove all trees that could fall on utility lines*
- *Educating the Public on how to be Prepared when Utilizes are Disrupted*
- *Identify and Establish Back-up Systems to Primary Systems*

## **6. HAZARD VULNERABILITY SUMMARY**

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A vulnerability assessment applies the information collected through hazard profiling to Crawford County's assets, potentially at-risk populations and development trends to summarize the impacts from hazards on the community and its vulnerable structures. These impacts are represented by measures such as population at risk, percent damages, and dollar loss estimation. The purpose of this analysis is to identify weaknesses or vulnerabilities prior to an event so that mitigation action plans may prevent or reduce the predicted impact of disasters. The primary objective of the vulnerability assessment is to prioritize hazards of concern to provide a framework for the mitigation strategy and policy development.

To complete the vulnerability assessment, best available data was collected from a variety of sources, including local, state, and federal agencies, and multiple analyses were applied through qualitative and quantitative means. Additional work will be done on an ongoing basis to enhance, expand, and further improve the accuracy of baseline results, and it is expected that this vulnerability assessment will continue to be refined through future plan updates as new data and loss estimation methods available.

## 6.1 METHODOLOGY

A strong analysis includes both quantitative and qualitative methodologies. For instance, geographic information systems (GIS)-based analysis and local knowledge are both important inputs to identifying vulnerabilities. As part of this hazard vulnerability analysis, the Crawford County Mitigation Planning Committee conducted the following steps:

- *Inventory and summarize vulnerable assets*
- *Characterize repetitive flood loss properties*
- *Estimate loss*
- *Develop risk factor for each profiled hazard*
- *Describe asset vulnerability to future development*

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 twelve hazards profiled in the 2020 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 6.1-1. 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:

$$\text{Risk Factor Value} = [(Probability \times .30) + (Impact \times .30) + (Spatial \text{ Extent} \times .20) + (Warning \text{ Time} \times .10) + (Duration \times .10)]$$

Table 6.1-1 summarizes each of the five categories used for calculating a RF for each hazard. According to the weighting scheme applied, the highest possible RF value is 4.0.

Risk Assessment Category	Degree of Risk			Weight Value
	Level	Criteria	Index	
<b>Probability</b>	Unlikely	Less than 1% Annual Probability (AP)	1	30%
What is the likelihood of a hazard event occurring in a given year?	Possible	Between 1% and 49.9% AP	2	
	Likely	Between 50% and 90% AP	3	
	Highly Likely	Greater than 90% AP	4	

**Table 6.1-1 Risk Factor Summary**

Risk Assessment Category	Degree of Risk			Weight Value
	Level	Criteria	Index	
<p><b>Impact</b></p> <p>In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?</p>	Minor	Very few injuries, if any. Only minor property damage & minimal disruption on quality of life. Temporary shutdown of critical facilities.	1	30%
	Limited	Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one day.	2	
	Critical	Multiple deaths/ injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one week.	3	
	Catastrophic	High number of deaths/ injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.	4	
<p><b>Spatial Extent</b></p> <p>How large of an area could be impacted by a hazard event? Are impacts localized or regional?</p>	Negigible	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	

Risk Assessment Category	Degree of Risk			Index	Weight Value
	Level	Criteria			
<b>Warning Time</b> Is there usually some lead time associated with the hazard event? Have warning measures been implemented	More than 24 Hrs	Self-Defined		1	10%
	12 to 24 Hrs	Self-Defined		2	
	6 to 12 Hrs	Self-Defined		3	
	Less than 6 Hrs	Self-Defined		4	
<b>Duration</b> 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	

## 6.2 RANKING RESULTS

Using the methodology described in Section 6.1, Table 6.2-1 lists the Risk Factor calculated for each of the seventeen potential hazards identified in the 2020 HMP. Hazards identified as high risk have risk factors greater than 2.5. Risk Factors ranging from 2.0 to 2.4 were deemed moderate risk hazards. Hazards with Risk Factors 1.9 and less are considered low risk.

Hazard Risk	Hazard	Risk Assessment Category					Risk Factor
		Probability	Impact	Spatial Extent	Warning Time	Duration	
High	Pandemic	4	4	4	4	4	4
	Utility Interruption	3	3	3	4	2	3
	Terrorism	3	3	2	4	3	3
	Flooding	4	2	3	3	3	3
	Dam Failure	1	3	3	4	3	2.8
	HazMat	3	3	1	4	2	2.6
	Tornado	3	2	3	4	1	2.6
Moderate	Winter Storm	3	2	3	1	2	2.2
Low	Land Slide	1	1	2	4	2	2
	Earthquake	1	2	2	4	1	2
	Drought	1	2	3	2	1	1.8
	Invasive Species	4	2	1	1	1	1.8

Table 6.2-1 Hazard Ranking Summary

Based on the RF analysis, the natural hazard with the highest risk potential is flooding. The technological or human-made hazard with the highest risk potential was found to be terrorism. The top three risks identified through the vulnerability assessment in the 2020 Crawford County Hazard Mitigation Plan were (1) Pandemic, (2) Utility Interruption, and (3) Terrorism. The qualitative calculations produced by the RF tool in this plan update generally reflect the findings of the 2020 plan and the Crawford County MPC.

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 6.2-2 shows the different municipalities in Crawford County and what their greatest risks were to them.

**Table 6.2-2 Municipal Hazard Risks**

<b>MUNICIPALITY/ORGANIZATION</b>	<b>TOP HAZARDS</b>
Athens Township	Downed trees, wind damage, flooding, snow drifting, truck roll over, earthquake
Beaver Township	Flooding
Bloomfield Township	LPG Tanks, fuel and oil tanker leaks. Canadohta Lake
Blooming Valley Borough	High winds, storm water
Cambridge Township	Flooding and downed trees
Cambridge Spring Borough	Flooding and downed trees
Centerville Borough	Propane storage tanks
Cochranon Borough	High water, water drainage issues
Conneaut Lake Borough	Flooding, loss of power, access to dry hydrant
Conneaut Township	Icy roads
Conneautville Borough	Flash Flooding, Dam Failure, Thunderstorms, Blight
Cussewago Township	Flooding and downed trees
East Fairfield Township	Flash flood, poor visibility at intersections
East Fallowfield Township	Flooding and downed trees
East Mead Township	Flooding and downed trees
Fairfield Township	Flooding and downed trees
Greenwood Township	Vitro Flat Glass facility, Weather
Hayfield Township	Severe Weather
Hydetown Borough	Flooding
Linesville Borough	Power outage, wind, ice storms, heavy snow, flooding, loss of water
Meadville – City	Flooding, Hazardous Materials, Dam Failure, Fires, Tornado
North Shenango Township	Flooding, semi accidents
Oil Creek Township	Flooding and downed trees
Pine Township	Flooding and downed trees



MUNICIPALITY/ORGANIZATION	TOP HAZARDS
Randolph Township	Tornado, flood, power outage
Richmond Township	Flooding and downed trees
Rockdale Township	Downed trees, road washouts
Rome Township	Flooding and downed trees
Sadsbury Township	Blizzard, severe thunderstorm/tornado, sewer disruption, flooding, electrical disruption, wireless communication disruption
Saegertown Borough	Hazardous Materials, Utility Interruption, Flooding, Tornado, Severe Weather
South Shenango Township	Downed trees, clogged culverts, flooding, ice storm
Spartansburg Borough	Flooding, high hazard dam
Sparta Township	Flooding and downed trees
Spring Township	Flooding and downed trees
Springboro Borough	Flooding, drugs, blighted homes, chemicals
Steuben Township	Flooding and downed trees
Summerhill Township	No known hazards
Summit Township	Fuel tank leak into waterway
Titusville – City	Flooding, tornado, pandemic
Townville Borough	Storms, flooding
Troy Township	Flooding and downed trees
Union Township	Flooding, fallen trees
Venango Borough	Flooding and downed trees
Venango Township	Storms, Trees Down
Vernon Township	Industrial Sites, Interstate 79, Sewer Treatment Plants
Wayne Township	Weather-related incidents
West Fallowfield Township	Fire, Tornado, Motor Vehicle Accidents, Power Outages
West Mead Township	Winter Storms, Flooding, Domestic Violence Incidents
West Shenango Township	Flooding and downed trees
Woodcock Borough	Flooding, notification of residents
Woodcock Township	Flooding, Trees Down

## 6.3 POTENTIAL LOSS ESTIMATES

Potential loss estimates for hazard events help a community understand the monetary value of what might be at stake during a hazard event. Estimates are considered potential in that they generally represent losses that could occur in a countywide hazard scenario. In events that are localized, losses may be lower, while regional events could yield higher losses.

Potential loss estimates have four basic components, including:

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

Loss estimates provided in this section fall into three broad categories: historical losses, current-condition losses, and predictive losses. Historical loss estimates come from three primary sources: the NCDC storm events database, the NFIP, and the USDA's Risk Management Agency annual crop indemnities dating from 1980-2013. Current condition losses come from geospatial analysis of the value of buildings identified as vulnerable in the Vulnerability Assessment section of hazard profiles for floods, subsidence, wildfires, and transportation accidents. Finally, predictive losses were generated using HAZUS-MH, version 2.1. Historical losses do not take into account any of the aforementioned components, but they do provide insight into what future losses might be. The current-condition losses take into account replacement value only. HAZUS modeling takes into account all four components and provides the most comprehensive description of potential losses.

### *Historical Losses*

Historical losses were able to be determined for drought, flooding, hailstorms, tornado and windstorms, and winter storms from NCDC, USDA RMA, and the NFIP.

NCDC reports include property and crop damage estimates with their incident reports. As noted in many of the hazard profiles, though, many of the events have no damages reported. This does not mean that there was no damage; rather, it indicates that no damages were reported to NCDC. As a result, these should be considered low-end estimates of losses. For example, the flood and flash flood events reported in NCDC list over \$71 million in property damage and one fatality over the history of flooding in the county. Hailstorm losses reported to the NCDC totaled \$1.96 million from 1970- 2014. Property damage estimates for tornado were reported at over \$286 million, with 11 deaths, 85 injuries, and a range of property damage from \$2,500 to \$250 million. Historical losses for winter storms, including ice storms, sleet, and heavy snow, include one fatality, five injuries, and over \$12 million in property damage.

Agriculture is an integral part of Crawford County's economy, and agricultural production is highly vulnerable to natural hazard events. As previously mentioned, losses are available from the USDA RMA. The RMA operates and manages the Federal Crop Insurance Corporation, which provides crop insurance to American farmers. While not all crops are insured through RMA, their records provide strong insight into agricultural losses nationwide and in Crawford County. Table 4.4-4 illustrates the total amount of indemnities paid through RMA since 1980 in Crawford County by type of crop

failure. Only crop failures related to the hazards discussed in this plan are listed. By far the most historical crop losses have been due to excessive precipitation, followed by drought conditions, and cold wet weather.

Reason for Loss	Indemnity Amount
Cold Wet Weather	\$773,343.00
Cold Winter	\$63,711.10
Drought	\$3,992,174.39
Excess Moisture/Precipitation/Rain	\$13,401,948.32
Fire	\$2,404.00
Flood	\$6,444.00
Freeze	\$87,655.00
Frost	\$84,811.50
Hail	\$81,373.20
Heat	\$76,998.80
Hurricane/Tropical Depression	\$68,060.00
Wind/Excess Wind	\$17,878.00
<b>Grand Total</b>	<b>\$18,656,801.31</b>

**Table 6.3-1 Historic Loss Claims**

The final set of historic losses relates solely to prior flood losses and comes from the NFIP’s records of claims paid. Table 6.3-1 shows the total amount of claims paid in each municipality according to CIS on November 16, 2020. The City of Titusville and Conneautville Borough have had the most claims paid, and there are 11 communities that have never had a claim paid despite having policies in force in the community.

**CURRENT-CONDITION LOSSES**

As discussed previously, current-condition losses look at the total value of structures in each community in Crawford County along with the value of buildings identified as vulnerable in the 4.3.1 section of hazard profiles for floods. However, because data detailing the value of structures in Crawford County was not available, these losses could not be estimated at the time of this plan update.

**Federal Emergency Management Agency  
NFIP Policy and Claims Report  
PENNSYLVANIA**

<b>CID</b>	<b>Community</b>	<b>Number Policies</b>	<b>Total Coverage</b>	<b>Total Premium</b>	<b>Total Claims Since 1978</b>	<b>Total Paid Since 1978</b>
<b>** CRAWFORD COUNTY **</b>						
420346	CAMBRIDGE SPRINGS, BOROUGH OF	19	\$ 5,100,400	\$ 44,525	6	\$ 6,278
420347	CENTERVILLE, BOROUGH OF	0	\$ 0	\$ 0	4	\$ 7,547
420348	COCHRANTON, BOROUGH OF	26	\$ 2,380,100	\$ 18,220	14	\$ 28,953
420349	CONNEAUTVILLE, BOROUGH OF	8	\$ 910,600	\$ 4,434	12	\$ 262,076
420350	HYDETOWN, BOROUGH OF	5	\$ 1,059,700	\$ 3,113	2	\$ 52,026
420351	MEADVILLE, CITY OF	86	\$ 20,610,700	\$ 152,687	68	\$ 125,265
420352	SAEGERTOWN, BOROUGH OF	11	\$ 1,392,600	\$ 8,321	3	\$ 2,554
420353	SPRINGBORO, BOROUGH OF	6	\$ 419,900	\$ 2,813	2	\$ 5,029
420354	TITUSVILLE, CITY OF	49	\$ 6,125,900	\$ 43,347	82	\$ 335,486
420355	VENANGO, BOROUGH OF	4	\$ 300,700	\$ 6,636	0	\$ 0
420356	WEST MEAD, TOWNSHIP OF	11	\$ 3,425,500	\$ 15,765	0	\$ 0
421227	HAYFIELD, TOWNSHIP OF	6	\$ 665,600	\$ 6,257	5	\$ 4,335
421560	LINESVILLE, BOROUGH OF	6	\$ 642,800	\$ 5,047	2	\$ 11,065
421562	ATHENS, TOWNSHIP OF	0	\$ 0	\$ 0	1	\$ 7,259
421563	BLOOMFIELD, TOWNSHIP OF	24	\$ 2,150,800	\$ 24,677	1	\$ 0
421564	CAMBRIDGE, TOWNSHIP OF	5	\$ 852,300	\$ 4,989	4	\$ 2,054
421565	EAST FAIRFIELD, TOWNSHIP OF	2	\$ 210,000	\$ 997	11	\$ 37,195
421566	EAST MEAD, TOWNSHIP OF	1	\$ 210,000	\$ 336	1	\$ 25,000
421567	FAIRFIELD, TOWNSHIP OF	10	\$ 2,030,800	\$ 7,189	25	\$ 65,554
421568	OIL CREEK, TOWNSHIP OF	10	\$ 2,341,300	\$ 13,756	26	\$ 38,363
421570	SPRING, TOWNSHIP OF	2	\$ 500,000	\$ 1,318	0	\$ 0
421571	STEUBEN, TOWNSHIP OF	3	\$ 647,200	\$ 2,734	32	\$ 106,002
421572	TROY, TOWNSHIP OF	6	\$ 795,800	\$ 4,969	18	\$ 40,822
421573	UNION, TOWNSHIP OF	0	\$ 0	\$ 0	1	\$ 4,562
421574	VENANGO, TOWNSHIP OF	7	\$ 754,700	\$ 8,671	5	\$ 11,154
421575	VERNON, TOWNSHIP OF	31	\$ 7,782,700	\$ 127,701	19	\$ 98,153
421576	WAYNE, TOWNSHIP OF	2	\$ 241,000	\$ 1,078	1	\$ 10,227
421578	WOODCOCK, TOWNSHIP OF	7	\$ 1,004,800	\$ 9,223	8	\$ 12,913
422385	BEAVER, TOWNSHIP OF	2	\$ 560,000	\$ 1,026	0	\$ 0
422386	CONNEAUT LAKE, BOROUGH OF	5	\$ 663,400	\$ 6,748	8	\$ 6,810
422387	CONNEAUT, TOWNSHIP OF	1	\$ 350,000	\$ 682	0	\$ 0
422388	CUSSEWAGO, TOWNSHIP OF	2	\$ 175,000	\$ 549	0	\$ 0
422390	GREENWOOD, TOWNSHIP OF	0	\$ 0	\$ 0	1	\$ 46,547
422394	ROCKDALE, TOWNSHIP OF	1	\$ 84,000	\$ 853	4	\$ 0
422396	SADSBURY, TOWNSHIP OF	52	\$ 9,969,700	\$ 21,766	17	\$ 33,439
422397	SOUTH SHENANGO, TOWNSHIP OF	13	\$ 1,738,200	\$ 8,103	7	\$ 115,630
422399	SUMMERHILL, TOWNSHIP OF	1	\$ 42,000	\$ 189	0	\$ 0

**Federal Emergency Management Agency  
NFIP Policy and Claims Report  
PENNSYLVANIA**

<b>CID</b>	<b>Community</b>	<b>Number Policies</b>	<b>Total Coverage</b>	<b>Total Premium</b>	<b>Total Claims Since 1978</b>	<b>Total Paid Since 1978</b>
422400	SUMMIT, TOWNSHIP OF	19	\$ 5,060,700	\$ 11,959	30	\$ 199,886
422651	WEST FALLOWFIELD, TOWNSHIP OF	0	\$ 0	\$ 0	1	\$ 31,997
423636	NORTH SHENANGO, TOWNSHIP OF	4	\$ 980,000	\$ 1,428	1	\$ 966
<b>County Total :</b>		<b>447</b>	<b>\$ 82,178,900</b>	<b>\$ 572,106</b>	<b>422</b>	<b>\$ 1,735,147</b>
<b>State Total :</b>		<b>447</b>	<b>\$ 82,178,900</b>	<b>\$ 572,106</b>	<b>422</b>	<b>\$ 1,735,147</b>

*MODELED LOSSES (VIA HAZUS)*

FEMA HAZUS Case Study: HAZUS is a regional multi-hazard loss estimation model that was developed by FEMA and the National Institute for Building Sciences (NIBS). The primary purpose of HAZUS is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates are used by local, state, and regional officials to plan and simulate efforts to reduce risks from multi-hazards and prepare for emergency response and recovery.

This plan employed an enhanced HAZUS analysis for floods. As opposed to basic analysis using only default data, enhanced analysis incorporates some kind of more recent, up-to-date, or specific data for inclusion in the hazard models. The enhanced data incorporated into this HMP update include:

- *Updated demographic data from the 2010 Census,*
- *Updated essential facilities data from the County and other sources, and*
- *A user-delineated 100-year depth grid derived for Cumberland County from the effective DFIRM data and the 3.2 ft. statewide LiDAR dataset from DCNR.*

For more details on the HAZUS methodology used and additional results reports, see Appendix F.

A case study was recently completed on May 29, 2020 and June 7, 2020 for Crawford County of a 1% annual chance flood event using FEMA's HAZUS- MH risk analysis software. The base study looked at streams with a drainage area of at least 10 square miles. The study computed damages in dollars for total economic loss, building and content damage, and other economic impacts.

Debris Generation: HAZUS estimates the amount of debris that will be generated by the flood. The model breaks debris into three categories: (1) Finishes (dry wall, insulation, etc.), (2) Structural (wood, brick, etc.), (3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris. The model estimates that a total of 32,764 tons of debris will be generated. Of the total amount, finishes comprise 36% of the total, structural comprises of 34% of the total. If the debris tonnage is

converted into an estimated number of truckloads, it will require 1,311 truckloads (25 tons per truck) to remove the debris generated by the flood.

Shelter Requirements: HAZUS estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. HAZUS also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 4,806 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 2,437 people (out of a total population of 88,765) will seek temporary shelter in public shelters.

Economic Loss: The total economic loss estimated for the flood is 388.5 million dollars, which represents 44% of the total replacement value of the scenario buildings.

Building-Related Losses: The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the

losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood. The total building-related losses were 387.2 million dollars. Less than 1% of the estimated losses were related to the business interruption of the region.

Figure 6.3-1 displays the results of the HAZUS analysis for Crawford County. As seen in the map, the highest damage estimates from a 1%-annual-chance-flood event are projected to occur along French Creek and US Route 6 near Saegertown Borough and Hayfield and Woodcock Townships.

Crawford County, along with all 51 municipalities, participates in the National Flood Insurance Program (NFIP) and has ordinances regulating development in floodplain areas. 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. New development in unmapped areas could potentially occur in areas prone to flooding and increase vulnerabilities and potential losses; however, most of the current land use regulations require the consideration of flood hazards during the development review process. Further information regarding the Crawford County and the NFIP can be found in the Capability Assessment section of this plan.

## **6.4 FUTURE DEVELOPMENT AND VULNERABILITY**

Population change is perhaps the most significant indicator of changes in vulnerability and risk in the future. A rise or decrease in population not only impacts the level of risk (as to how many individuals could be affected), but also foreshadows development and land use changes for the County and its municipalities. Crawford 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. Much of this is dependent on future population and land use and development patterns.

The projections demonstrate a small increase in population at the County level of 2.9% between 2010 and 2040. Several municipalities are expected to exceed this rate of growth. Rockdale Township and Cambridge Springs are expected to increase population by almost half, at 43.6% and 41% during this period, respectively. 24 out of the 51 municipalities in the County are expected to decrease in population, with the largest decreases found in Hydetown, Spartansburg, and Venango Boroughs.

Municipality	Baseline Population	Population Projections			Percent Change
	2010 US Census	2020	2030	2040	2010-2040
Athens Township	734	760	748	757	3.1%
Beaver Township	902	943	960	990	9.8%
Bloomfield Township	1,919	1,984	1,936	1,952	1.7%
Blooming Valley Borough	337	312	284	258	-23.4%
Cambridge Springs Borough	2,595	2,995	3,299	3,658	41.0%
Cambridge Township	1,563	1,590	1,646	1,685	7.8%
Centerville Borough	218	204	186	170	-22.0%
Cochranon Borough	1,136	1,116	1,101	1,083	-4.7%
Conneaut Lake Borough	653	635	595	568	-13.0%
Conneaut Township	1,476	1,531	1,512	1,535	4.0%
Conneautville Borough	774	757	708	677	-12.5%
Cussewago Township	1,559	1,650	1,667	1,727	10.8%
East Fairfield Township	922	930	975	999	8.4%
East Fallowfield Township	1,620	1,788	1,966	2,138	32.0%
East Mead Township	1,493	1,522	1,538	1,562	4.6%
Fairfield Township	1,023	1,049	1,014	1,015	-0.8%
Greenwood Township	1,454	1,512	1,518	1,553	6.8%
Hayfield Township	2,940	2,963	2,887	2,867	-2.5%
Hydetown Borough	526	479	436	390	-25.9%
Linesville Borough	1,040	984	896	826	-20.6%
Meadville City	13,388	12,899	12,520	12,078	-9.8%
North Shenango Township	1,410	1,659	1,779	1,972	39.9%
Oil Creek Township	1,877	1,767	1,718	1,635	-12.9%
Pine Township	462	476	442	436	-5.6%
Randolph Township	1,782	1,859	1,860	1,905	6.9%
Richmond Township	1,475	1,521	1,596	1,654	12.1%
Rockdale Township	1,506	1,746	1,942	2,163	43.6%
Rome Township	1,840	2,026	2,160	2,323	26.3%

Municipality	Baseline Population		Population Projections			Percent Change 2010-2040
	2010 US Census	2020	2030	2040		
Sadsbury Township	2,933	3,139	3,222	3,376	15.1%	
Saegertown Borough	997	968	913	874	-12.3%	
South Shenango Township	2,037	2,311	2,423	2,627	29.0%	
Sparta Township	1,832	1,978	2,093	2,225	21.5%	
Spartansburg Borough	305	278	253	226	-25.9%	
Spring Township	1,548	1,544	1,529	1,520	-1.8%	
Springboro Borough	477	482	477	477	0.0%	
Steuben Township	804	810	753	732	-9.0%	
Summerhill Township	1,236	1,236	1,171	1,144	-7.4%	
Summit Township	2,027	2,126	2,086	2,125	4.8%	
Titusville City	5,601	5,203	4,735	4,306	-23.1%	
Townville Borough	323	301	301	288	-10.8%	
Troy Township	1,235	1,250	1,197	1,183	-4.2%	
Union Township	1,010	1,081	1,090	1,134	12.3%	
Venango Borough	239	217	198	177	-25.9%	
Venango Township	997	1,144	1,231	1,352	35.6%	
Vernon Township	5,630	5,626	5,699	5,727	1.7%	
Wayne Township	1,539	1,621	1,645	1,702	10.6%	
West Fallowfield Township	605	562	512	466	-23.0%	
West Mead Township	5,249	5,159	5,133	5,070	-3.4%	
West Shenango Township	504	514	497	495	-1.8%	
Woodcock Borough	157	161	168	174	10.8%	
Woodcock Township	2,856	3,127	3,174	3,350	17.3%	
<b>Total</b>	<b>88,765</b>	<b>90,493</b>	<b>90,385</b>	<b>91,326</b>	<b>2.9%</b>	

Making use of the analysis of Crawford County’s current population and demographics along with future population trends, it is important to explore how these projected changes may influence the County’s future vulnerability to the profiled hazards. Hazard vulnerability and loss potential will be higher in the places of higher density throughout the County, so as areas continue to grow and densify, these communities might become more vulnerable to hazards. For example, population growth and its associated development is likely to create increases in loss potential, as more people may be living in areas prone to hazards, especially flooding, winter storms, and droughts.

The Crawford County Planning collects information regarding the number of subdivision and development reviews conducted by the county. This



information provides an idea of where development is most likely ongoing and where loss potential might be increasing in the county. Table 6.2-2 displays the location and total number of subdivision and development reviews that occurred in 2020. A total of 42 subdivisions and 9 development proposals were reviewed. Bloomfield, Cussewago, and Hayfield Townships experience the most submittals for subdivisions reviews, while Vernon Township saw the largest number of development reviews.

Development can often change the hazard threat level of an area by placing additional critical facilities, businesses, transportation networks, and populations within vulnerable areas. Any development along transportation routes can increase the vulnerability to transportation incidents and hazardous material spills. Most often, development occurs along these transportation networks because of access and increased demand for travel and access to services. Therefore, the impact of these hazards can increase along with their frequency. While it can be difficult to curb development, it is to the municipality's advantage to be aware of development trends in order to successfully mitigate future hazards as risks increase.

## 7. CAPABILITY ASSESSMENT

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### 7.1 UPDATE PROCESS SUMMARY

Crawford County has a number of resources it can access to implement hazard mitigation initiatives including emergency response measures, local planning and regulatory tools, administrative assistance and technical expertise, fiscal capabilities, and participation in local, regional, state, and federal programs. The presence of these resources enables community resiliency through actions taken before, during, and after a hazard event.

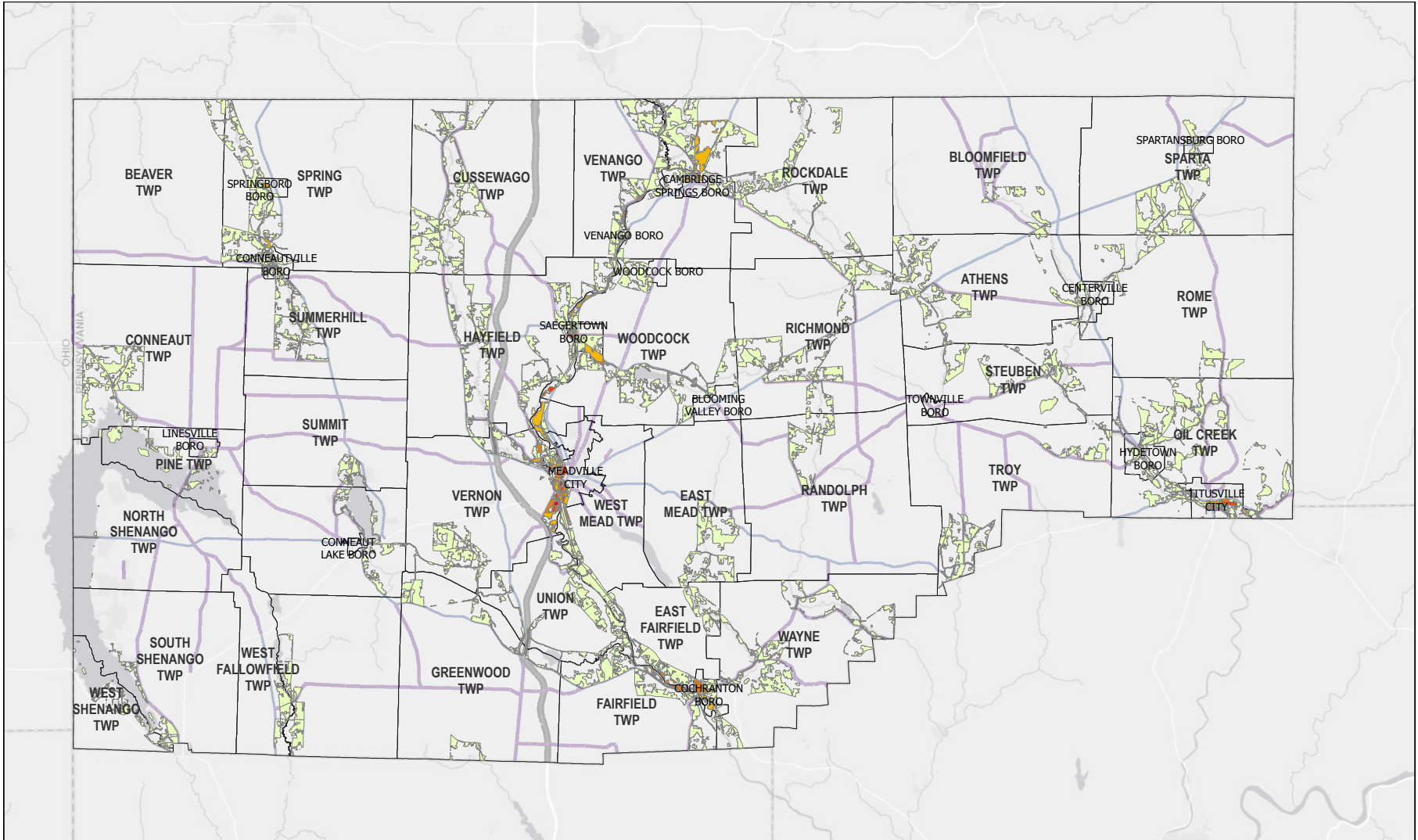
The 2020 HMP identified the presence of local plans, ordinances, and codes in each jurisdiction. It also specified local, state, and federal resources available for mitigation efforts. Through responses to the Capability Assessment Survey distributed to all municipalities and input from the Mitigation Planning Committee, the 2020 Hazard Mitigation Plan Update provides an updated inventory of the most critical local planning tools available within each participating jurisdiction and a summary of the fiscal and technical capabilities available through programs and organizations outside of the County. It also identifies emergency management capabilities and the processes used for implementation of the National Flood Insurance Program.

While the capability assessment serves as a good instrument for identifying local capabilities for, it also provides a means for recognizing gaps and weaknesses that can be resolved through future mitigation actions. The results of this assessment lend critical information for developing an effective mitigation strategy.

The purpose of conducting a capability assessment is to determine the ability of a local jurisdiction to implement a comprehensive mitigation strategy, and to identify potential opportunities for establishing or enhancing specific mitigation policies, programs or projects. As in any planning process, it is important to try to establish which goals and actions are feasible, based on an understanding of the organizational capacity of those agencies or departments tasked with their implementation.

A capability assessment helps to determine which mitigation actions are practical and likely to be implemented over time given a local government's planning and regulatory framework, level of administrative and technical support, amount of fiscal resources, and current political climate. A capability assessment has two primary components: an inventory of a local jurisdiction's relevant plans, ordinances or programs already in place

Figure 7.1.1-1 Total Economic Loss Estimates

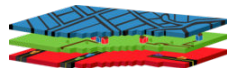


**Total economic loss estimates - FEMA | HAZUS analysis**

Source: Federal Emergency Management Agency (FEMA)



Crawford County Government  
 Crawford County Courthouse  
 903 Diamond Park  
 Meadville PA 16335  
 GIS Manager: Phillip Baranyai  
 Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



This map is subject to change at any time after date of issuance.  
 Data used for map creation is approximate and should not be used for site specific decision making.  
 Crawford County assumes no responsibility or liability to the accuracy or completion of these maps.



**FEMA**

FEMA - HAZUS: Total Economic Loss  
 Total loss estimates (In dollars)

- 0 - 2073
- 2074 - 7378
- 7379 - 17319
- 17320 - 28162
- 28163 - 68626

and an analysis of its capacity to carry them out. A careful examination of local capabilities will detect any existing gaps, shortfalls or weaknesses associated with ongoing government activities that could hinder proposed mitigation activities and possibly exacerbate hazard vulnerability. A capability assessment also highlights the positive mitigation measures already in place or being implemented at the local government level, which should continue to be supported and enhanced if possible, through future mitigation efforts.

The capability assessment serves as a critical part of the planning process, including the development of an effective multi-jurisdictional hazard mitigation strategy. Coupled with the Risk Assessment, the Capability Assessment section helps identify and target meaningful mitigation actions for incorporation into the Mitigation Strategy. It not only helps establish the goals for Crawford County to pursue under this Plan, but also ensures that those goals and the mitigation actions that follow are realistically achievable given local conditions.

## **7.2 CAPABILITY ASSESSMENT FINDINGS**

The findings of the capability assessment are summarized in this Plan in order to provide insight into the abilities of participating jurisdictions to implement a feasible hazard mitigation strategy. All information is based upon the input provided by local government officials through the Crawford County Planning Department and during meetings of the Mitigation Planning Committee.

## **7.3 PLANNING AND REGULATORY CAPABILITY**

Planning and regulatory capability is based on the implementation of plans, ordinances and programs that demonstrate a local jurisdiction's commitment to guiding and managing growth, including reconstruction following a disaster. Examples include emergency response, mitigation and recovery planning, comprehensive land use planning, transportation planning and capital improvements planning. Additional examples include the enforcement of zoning or subdivision ordinances and building codes that regulate how land is developed and structures are built. These planning initiatives present significant opportunities to integrate hazard mitigation principles and practices into the local decision-making process.

This assessment is designed to provide a general overview of the key planning and regulatory tools in place or under development for jurisdictions in Crawford County, along with their potential effect on hazard loss reduction. This information will help identify opportunities to address existing gaps, weaknesses or conflicts with other initiatives in addition to integrating the implementation of this Plan with existing planning mechanisms, where appropriate. Please note that no assumptions were made in the results of the Capability Assessment Survey. All answers are from the participant or supplemented by the County.

Table 7.3-1 provides a summary of the relevant local plans, ordinances and programs already in place or under development for Crawford County's participating local governments. An "X" indicates that the item is currently in place and being implemented and integrated by the local jurisdiction (or in some cases by the County on behalf of that jurisdiction), or that is currently under development.

A more detailed discussion of each jurisdiction's planning and regulatory capability follows.

### *Emergency Management*

Hazard mitigation is widely recognized as one of the four primary phases of emergency management. The three other phases include preparedness, response and recovery. In reality, each phase is interconnected with hazard mitigation as diagram to the right suggests. Opportunities to reduce potential losses through mitigation practices are ideally implemented before a disaster strike. Examples include the acquisition or elevation of flood-prone structures or the enforcement of regulatory policies that prevent construction in known hazard areas. In reality, the post-disaster environment

provides another important “window of opportunity” to implement hazard mitigation projects and policies. During this time period, federal disaster assistance, including the Hazard Mitigation Grant Program (HMGP), may be available. In addition, elected officials and disaster victims may be more willing to implement mitigation measures in order to avoid similar events occurring in the future.

Planning for each phase is a critical part of a comprehensive emergency management program and a key to the successful implementation of hazard mitigation actions. As a result, the Capability Assessment Survey asked several questions across a range of emergency management plans in order to assess each jurisdiction’s willingness to plan and their level of technical planning proficiency.

**Hazard Mitigation Plan:** A hazard mitigation plan represents a community’s blueprint for how it intends to reduce the impact of natural and human- caused hazards on people and the built environment. The essential elements of a hazard mitigation plan include a risk assessment, capability assessment and mitigation strategy.

Crawford County, along with fifty-one (51) municipalities, adopted the county-wide Hazard Mitigation Plan. This HMPU will build on the work already completed to include an assessment of natural and technological hazards and the identification of specific measures intended to reduce their impact.

**Emergency Operations Plan:** An emergency operation plan outlines responsibility and the means by which resources are deployed during and following an emergency or disaster.

The Emergency Management Services Code (PA Title 35) requires that all municipalities in the Commonwealth have a Local Emergency Operations Plan (EOP) which is updated every two years. All jurisdictions in Crawford County have or are in the process of updating their local EOP. A countywide EOP also exists. Jurisdictions are not required to sign on to the County EOP because county staff prefers to keep municipal emergency management coordinators actively engaged at a more local level.

### *General Planning*

The implementation of hazard mitigation activities involves departments and individuals beyond the emergency management profession. Stakeholders may include local planners, public works officials, economic development specialists and others. In many instances, concurrent local planning efforts may complement hazard mitigation goals even though they are not designed as such. Therefore, the Capability Assessment Survey also asked questions regarding each jurisdiction’s general planning capabilities and the degree to which hazard mitigation is integrated into other planning efforts.

**Comprehensive Plan:** A Comprehensive Plan establishes the overall vision for what a community wants to be and a guide to future governmental decision making. Typically, a comprehensive plan is comprised of demographic conditions, land use patterns, transportation elements and proposed community facilities. Given the broad nature of the plan and its regulatory standing in many communities, the integration of hazard mitigation measures into the comprehensive plan can serve as a far reaching, long-term risk reduction tool.

Crawford County recently completed a county-wide Comprehensive Plan in late 2014, and thirty eight (38) jurisdictions possess a comprehensive plan. All participating jurisdictions that returned a completed survey specified that their land use plans had a positive impact or are helping facilitate hazard loss reduction. Crawford County indicated that the plans are periodically updated.

**Historic Preservation Plan:** A historic preservation plan is intended to preserve historic structures or districts within a community. An often-overlooked aspect of the historic preservation plan is the assessment of buildings and sites located in areas subject to natural hazards to include the identification of the most effective way to reduce future damages. This may involve retrofitting or relocation techniques that account for the need to protect buildings that do not meet current building standards, or are within a historic district that cannot easily be relocated out of harm's way.

Survey results indicate that no jurisdictions have completed or are developing a stand-alone historic preservation plan. However, the Crawford County Planning Commission passed a resolution in August 2013 to endorse Pennsylvania's Statewide Historic Preservation Plan 2012-2017. The Commission's endorsement outlines specific actions that the County will take to support goals and objectives of the statewide plan.

**Subdivision and Land Development Ordinances:** A Subdivision and Land Development Ordinance (SALDO) is intended to regulate the development of housing, commercial, industrial or other uses, including associated public infrastructure, as land is subdivided into buildable lots for sale or future development. Subdivision design that accounts for natural hazards can dramatically reduce the exposure of future development. Twenty-nine (29) jurisdictions report adopting a SALDO. There is no County-wide SALDO to cover the jurisdictions that do not have such an ordinance.

**Zoning Ordinances:** Zoning represents the primary means by which land use is controlled by local governments. As part of a community's police power, zoning is used to protect the public health, safety and welfare of those in a given area. A zoning ordinance is the mechanism through which zoning is typically implemented. Since zoning regulations enable municipal governments to limit the type and density of development, it can serve as a powerful tool when applied in identified hazard areas. Twenty-seven (27) jurisdictions have zoning ordinances in place. There are no County-wide Zoning Regulations to cover the jurisdictions that do not have an ordinance.

**Floodplain Management:** Flooding represents the greatest natural hazard facing the nation. At the same time, the tools available to reduce the impacts associated with flooding are among the most developed when compared to other hazard-specific mitigation techniques. In addition to approaches that cut across hazards, such as education, outreach, and the training of local officials, the National Flood Insurance Program (NFIP) contains specific regulatory measures that enable government officials to determine where and how growth occurs relative to flood hazards. Participation in the NFIP is voluntary, but is promoted by FEMA as a crucial means to implement and sustain an effective hazard mitigation program.

In order for a county or municipality to join the NFIP, they must adopt a local flood damage prevention ordinance that requires jurisdictions to follow established minimum building standards in the floodplain. These standards require that all new buildings and substantial improvements to existing buildings will be protected from damage by the 1% annual chance flood, and that new floodplain development will not aggravate existing flood problems or increase damage to other properties.

In addition, NFIP 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 municipalities adopt more comprehensive flood mitigation measures.

Another key service provided by the NFIP is the mapping of identified flood hazard areas. Once prepared, the Flood Insurance Rate Maps (FIRMs) are used to assess flood hazard risk, regulate construction practices and set flood insurance rates. FIRMs are an important source of information to educate residents, government officials and the private sector about the likelihood of flooding in their community. As stated previously, all 51 municipalities in Crawford County participate in the NFIP. [Table 4.3.1-3 in Section 4.3.1](#) summarizes NFIP participation for each of Crawford County's local jurisdictions along with general NFIP policy data. The program is managed by local municipalities participating in the program through

ordinance adoption and floodplain regulation while the Crawford County Planning Commission provides an oversight and coordination role.

***Floodplain Management Plan:*** A floodplain management plan (or a flood mitigation plan) provides framework for the identification and implementation of corrective and preventative measures designed to reduce flood-related impacts.

Survey results indicate that twenty-seven (27) jurisdictions in Crawford County have prepared a floodplain management plan that supports flood loss reduction efforts. The jurisdictions also cited flood damage prevention ordinances, policies and codes that are in place or under development as part of other community planning and regulatory programs.

FEMA Region III makes available to communities, an ordinance review checklist which lists required provisions for floodplain management ordinances. This checklist helps communities develop an effective floodplain management ordinance that meets federal requirements for participation in the NFIP. The Pennsylvania Department of Community and Economic Development (DCED) provides communities, based on their 44 CFR 60.3 level of regulations, with a suggested ordinance document to assist municipalities in meeting the minimum requirements of the NFIP and the Pennsylvania Flood Plain Management Act (Act 166). Act 166 mandates municipal participation in and compliance with the NFIP. It also establishes higher regulatory standards for hazardous materials and high-risk land uses. As new Digital Flood Insurance Rate Maps (DFIRMs) are published, the Pennsylvania State NFIP Coordinator at DCED works with communities to ensure the timely and successful adoption of an updated floodplain management ordinance by reviewing and providing feedback on existing and draft ordinances. In addition, DCED provides guidance and technical support through Community Assistance Contacts (CAC) and Community Assistance Visits (CAV).

***Open Space Management Plan:*** An open space management an open space management plan is designed to preserve, protect and restore largely undeveloped lands, and to expand or connect areas in the public domain, including parks, greenways and other outdoor recreation areas. In many instances open space management practices are consistent with the goals of reducing hazard losses, such as the preservation of wetlands or other flood prone areas in their natural state.

Survey results indicate that four (4) jurisdictions in the county have prepared or are preparing an open space management plan or a similar plan (i.e., Greenway Master Plan or Conservation, Parks/Recreation Plan) that addresses open space.

***Stormwater Management Plan:*** A stormwater management plan is designed to address flooding associated with stormwater runoff. The stormwater management plan is typically focused on design and construction measures that are intended to reduce the impact of more frequently occurring minor urban flooding.

Crawford County and twenty-five (25) jurisdictions have prepared a stormwater management plan.

## **7.4 ADMINISTRATIVE AND TECHNICAL CAPABILITY**

Administrative capability is described by an adequacy of departmental and personnel resources for the implementation of mitigation-related activities. Technical capability relates to an adequacy of knowledge and technical expertise of local government employees or the ability to contract outside resources for this expertise in order to effectively execute mitigation activities. Common examples of skill sets and technical personnel needed for hazard mitigation include: planners with knowledge of land development/management practices, engineers or professionals trained in construction practices related to buildings and/or infrastructure (e.g. building inspectors), planners or engineers with an understanding of natural

and/or human caused hazards, emergency managers, floodplain managers, land surveyors, scientists familiar with hazards in the community, staff with the education or expertise to assess community vulnerability to hazards, personnel skilled in geographic information systems, resource development staff or grant writers, fiscal staff to handle complex grant application processes. All municipalities in the County have an identified emergency management coordinator.

## **7.5 FINANCIAL CAPABILITY**

The ability of a local government to take action is often closely associated with the amount of money available to implement policies and projects. This may take the form of grant funding or locally-based revenue and financing. The costs associated with mitigation policy and project implementation vary widely. In some cases, policies are tied to staff time or administrative costs associated with the creation and monitoring of a given program. In other cases, direct expenses are linked to an actual project such as the acquisition of flood-prone homes, which can require a substantial commitment from local, state and federal funding sources.

### *CONCLUSIONS ON LOCAL CAPABILITY*

Perhaps one of the most significant findings of the assessment is the widespread existence of several planning initiatives already in place across Crawford County. As a result, jurisdictions understand the importance of intergovernmental coordination and how it applies to multijurisdictional planning. Crawford County's local governments coordinate on a number of issues and strategies related to future land use planning and standards for regulating development, in addition to the provision of infrastructure such as sewer and water or public services such as police and fire protection. The Crawford County Planning Department is well known to municipalities and is the adhesive and subject matter experts on planning initiatives.

Crawford County's local governments should apply this same level of coordination to hazard mitigation practices, building on the work already being done in flood plain management and emergency management preparedness initiatives. This Hazard Mitigation Plan provides a vehicle to institutionalize this process. However, in order to succeed, it will require clearly articulating the benefits of participating in and sustaining the county-wide mitigation planning process. One of the best ways to obtain local buy-in and long-term success is to identify and implement achievable mitigation actions (as listed in each jurisdictions' individual Mitigation Action Plans) that will facilitate continued intergovernmental coordination not only across the county, but with state and federal agencies as well.

## **7.6 EDUCATION AND OUTREACH**

Education and outreach programs and methods are used to implement mitigation activities and communicate hazard-related information. Examples include fire safety programs that fire departments deliver to students at local schools; participation in community programs, such as National Night Out, or StormReady Certification; and activities conducted as part of hazard awareness campaigns, such as Emergency Preparedness Month, Tornado, or Flood Awareness Month. Some communities have their own public education and outreach initiatives.

Reported education and outreach activities in Crawford County are summarized as follows. Crawford County Department of Public Safety held a severe weather training exercise across the County in March 2016 to 2019 but the 2020 was cancelled due to COVID-19. The annual event allows municipalities to practice what they would do in the event of a major emergency by activating their local emergency operations centers (EOC) and testing their emergency plans. At the County level, the Crawford County EMA staffed and operated the County EOC, coordinated the deployment of local damage assessment teams to test their operation in the field, coordinated with municipal EMA Coordinators, and partnered with the American Red Cross, the County Disaster Crisis Outreach Referral Team (DCORT), and the county's volunteer organizations active in Disaster (VOAD) to establish

resources for displaced populations, such as shelters. Likewise, Crawford County Department of Public Safety also participates in the Great North Eastern Shake Out Earthquake Exercise in October and the Winter or Fall All-Hazards Exercise in November every year as a functional EOC exercise and public education program.

There are over 212 emergency operation plans that three Crawford County Department of Public Safety Staff review yearly. The reviews vary from calling the facility confirming the information in the plan is accurate to conducting emergency plan seminars with that facility’s public safety team comprising of fire, ambulance, law enforcement, municipal EMA, and others. Emphasis is placed on meeting the facility leaders along with inviting the community’s public safety team leaders to attend at least every other year to maintain that name and face recognition and strengthening those relationships prior to an emergency occurring. The emergency plans break down are as follows:

- |    |   |    |  |
|----|---|----|--|
| 51 | Municipal Emergency Operation Plans                             | 02 | Airport Emergency Action Plans   |
| 51 | Child Care, Day Care, Preschool Plans                           | 01 | Crawford County Election Day Emergency Operations Plan                   |
| 02 | State and County Correctional Facilities                        | 01 | Multi-agency Resource Center Plan  |
| 15 | High and Low Hazard Dam Emergency Action Plans                  | 09 | Active Shooter School Emergency Action Plans                             |
| 37 | Extremely Hazardous Substance Facility Off-site Response Plans  | 01 | Regional Logistics Staging Area Plan                                     |
| 01 | Crawford County Hazard Vulnerability Assessment                 | 01 | Crawford County Distribution Management Plan                             |
| 20 | Healthcare, Hospital, Long Term Assisted Living Emergency Plans | 01 | Crawford County Debris Management Plan                                   |
| 03 | Special Event Emergency Action Plans                            | 01 | Mass Distribution of Countermeasures through Points of Distribution Plan |
| 69 | Schools, Private, Colleges, University Emergency Plans          | 01 | Mass COVID-19 Testing Plan   |

The four Crawford County Department of Public Safety Staff Members presented at the following all-hazards preparedness education, outreach events, exercises, and either conducted or attended training courses from 2016 to 2020.

2016

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- *Active Shooter Program at Allegheny College, City of Meadville*
  - *Active Aging Command Bus Demonstration, City of Meadville*
  - *American Red Cross Recovery Services Program, City of Meadville*
  - *Crawford County Citizens Academy, City of Meadville*
  - *Crawford County Borough’s Association Quarterly Meetings*
  - *Crawford County Association of Townships Bi-Yearly Meetings*
  - *Crawford County Local Emergency Planning Committee Quarterly Meetings*
  - *Crawford County Safe Kids Coalition Monthly Meetings*
  - *Crawford County Community Council Monthly Meetings*
  - *Early Head start Weather Preparedness Program, City of Meadville*
  - *HazMat Awareness and Weather Preparedness for Edinboro University*



- *Leadership Meadville Chamber of Commerce, City of Meadville*
- *Local Emergency Management Coordinator Annual Dinner, City of Meadville*
- *Lights, Sirens, & Public Safety Conference, Erie*
- *PA Department of Agriculture Flock Farms Tour, Greenwood Township*
- *Parkside Commons Weather Preparedness Program, City of Meadville*
- *PennDOT Weather Preparedness Program, Vernon Township*
- *Penelec Public Education Program, Erie*
- *Port Meadville Airport Open House, Vernon Township*
- *Rainbow Dam Public Information Meeting, City of Meadville*
- *RACES Field Day, Vernon Township*
- *Skywarn Spotter Annual Training, City of Meadville*
- *Allegheny College Active Shooter Tabletop Exercise, City of Meadville*
- *CASH Full Scale Active Shooter Exercise, Linesville*
- *Crawford County Winter Weather Tabletop Exercise, County Wide*
- *Crawford County Care Center Active Shooter Tabletop Exercise, Saegertown*
- *Crawford County Fair Annual Tabletop Exercise, West Mead Township*
- *Crawford County Borough's Association Quarterly Meetings*
- *Crawford County Association of Townships Bi-Yearly Meetings*
- *Crawford County Local Emergency Planning Committee Quarterly Meetings*
- *Crawford County Safe Kids Coalition Monthly Meetings*
- *Crawford County Community Council Monthly Meetings*
- *Meadville Medical Center Closed POD Exercise, City of Meadville*
- *Meadville Medical Center & Titusville Hospital Resource Request Exercise, Meadville/Titusville*
- *National Emergency Alert System Test, County Wide*
- *Penelec Weather Exercise, Erie*
- *Pitt/Titusville Full Scale Active Shooter Exercise, City of Titusville*
- *Tall Ships Table Top Exercise, Erie*
- *Above the Line/Below the Line HazMat IQ Course*
- *Air Monitoring Instrumentation Course*
- *American Red Cross Shelter Course*
- *AWR-331 Winter Weather Hazards and Preparedness Training*
- *Bloomfield Township Sewer Authority Seminar*
- *Bomb Making Materials Awareness Program*
- *Crawford-Venango Fire School*
- *Crisis Communication in Social Media*
- *Emergency Response Training for Houses of Worship Webinar*
- *Election Rover Training*
- *G-235 Emergency Planning Training*
- *G-270.4 Recovery from Disaster Training*
- *HazMat Awareness & Operations Training Class*
- *Hazardous Material Contingency Planning*
- *Hazard Mitigation Course*
- *Hazardous Weather & Flood Preparedness*
- *Helicopter SCUBA Training*
- *Hillside Home EOP and Active Shooter Training*
- *ISC-300 Command Training*

- Knowledge Center Training
- L-970 All Hazards Supply Unit Course
- Leveraging Tools for Conducting Damage Assessment
- Linesville State Fish Hatchery Tour and Off-Site Seminar
- Lord Corporation Training Seminar
- Meadville Medical Center NIMS Training
- PEMA Fire Incident Reporting Systems Training
- PEMA Western Area Quarterly Training
- PA Fire Emergency Conference/Harrisburg
- Pipeline Safety & FBI & Paradigm Range Resources Training
- Previsor CEM Planner Training
- Roser Technologies Tour and Off-Site Seminar
- Sadsbury Township EMA Orientation
- Transcaer Chlorine Webinar Training
- TRIPR (Flammable Liquid Unit Trains) Training Course
- Voter Services Rover Training
- VOAD Disaster Recovery Training
- 9-1-1 Trainee EMA Orientation Training

## 2017

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- Leadership Meadville at DPS, City of Meadville
- National Night Out, Conneautville
- Presented certificates to state weather poster winners at Conneaut Valley Elementary School
- Stone Memorial Library Touch a Truck Program held in Conneautville
- Allegheny College Active Shooter Full Scale Exercise, City of Meadville
- Containment Boom Deployment on Pymatuning Lake with SCUBA, West Shenango Township
- Crawford County Amateur Radio Operators Field Day at Roche Park, Vernon Township
- Crawford County Borough's Association Quarterly Meetings
- Crawford County Association of Townships Bi-Yearly Meetings
- Crawford County Local Emergency Planning Committee Quarterly Meetings
- Crawford County Safe Kids Coalition Monthly Meetings
- Crawford County Community Council Monthly Meetings
- Greenleaf Corporation Table Top Exercise, Hayfield Township
- Meadville Children's Center Table Top Exercise, City of Meadville
- National Fuel Gas Table Top Exercise, City of Meadville
- Pittsburgh University at Titusville Table Top Exercise, City of Titusville
- Set-up for Thurston Classic at Allegheny College, City of Meadville
- Titusville Hospital Full Scale Exercise, City of Titusville
- Titusville School District Table Top Exercise, City of Titusville
- 2nd Quarter Local EMA Coordinator Training to West County Regional EMA
- Active Shooter 2.0: The Evolution of the Active Shooter Risk and Comm Resp Clarion
- ALICE Active Shooter Training at MASH

- Allen teaches G402 NIMS ICS for Senior Officials at Meadville Fire Dept. 7 students
- Allen teaches G402 NIMS ICS for Senior Officials at Meadville Fire Dept. 9 students
- Annual Skywarn Spotter Course Taught by NWS in Meadville (Allen) 87 Students attended
- Audio Visual Training at Public Safety Building
- Compressed Modular Emergency Resp. to Radiation Trans. Course at Meadville DEP
- County Program & Duties and Responsibility Courses
- Crawford County Community Council Meeting Guest Speaker
- Election Day Rover Training
- Four Day Class in Erie for All Hazards Section Chief Training
- Governor's Emergency Preparedness Summit in Hershey
- Hazardous Weather and Flood Preparedness Course
- ICS / EOC Interface Course, Saegertown
- IED Search Procedures Course, Erie
- Initial Damage Reporting course at West Mead #1 Fire Dept. – 23 students
- Knowledge Center Administrator Training webinar
- Knowledge Center Sara webinar
- Knowledge Center Users Conference, College Station Texas
- Meth Awareness at Meadville Fire Dept. taught by PA State Police 40 students
- MultiRAE Meter and ADM300 Rad Meter Refresher Training with DEP at DPS
- National Incident Management System Survey
- New County IP Phone Training
- Opioid Epidemic Workshop Erie
- PEMA Damage Assessment Webinar
- PEMA In-Service Training at Clarion
- Pipeline Coordinated Annual Training, Edinboro
- Tornado Awareness Course at Saegertown, 44 Students
- Hazard Mitigation for Emergency Managers
- Hazardous Materials Operations Refresher Course conducted at Townville Vol. Fire Dept.
- PEMA Western Region In-Service Training, Indiana PA
- Pipeline Coordinated Annual Training, Edinboro
- Protective Measures Course, Erie
- Western New York & Pennsylvania Railroad Training

## 2018

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- Conneautville Cub Scouts Troop 210 weather preparedness program, Conneautville
- Crawford County Floodplain Management Workshop, Woodcock Township
- Crawford County Borough's Association Quarterly Meetings
- Crawford County Association of Townships Bi-Yearly Meetings
- Crawford County Local Emergency Planning Committee Quarterly Meetings
- Crawford County Safe Kids Coalition Monthly Meetings

- *Crawford County Community Council Monthly Meetings*
- *Severe Weather Presentation at Juniper, City of Meadville*
- *Family First Day Care Preparedness Program, City of Meadville*
- *Meadville Rotary Weather Preparedness Program, Vernon Township*
- *Conneaut Lake Presbyterian Church, Conneaut Lake*
- *Leadership Meadville Preparedness Program, City of Meadville*
- *Regional Staging and Logistics Table Top Exercise, Erie*
- *Sperry Egg Farm Low Path Avian Influenza Table Top, Greenwood Township*
- *Penelec Table Top Exercise, Erie*
- *VOAD Recovery Exercise at Downtown Mall, City of Meadville*
- *Severe Weather Exercise Public Information Office, City of Meadville*
- *Severe Weather Exercise Emergency Operation Center, County Wide*
- *Severe Weather Exercise Meadville Medical Center, City of Meadville*
- *Severe Weather Exercise Emergency Operation Center, County Wide*
- *Severe Weather Exercise Titusville Hospital Center, City of Titusville*
- *Severe Weather Exercise Recovery, West Mead Township*
- *Severe Weather Exercise Continuity of Government, West Mead Township*
- *ITU Titusville Table Top Exercise, City of Titusville*
- *University of Pittsburgh at Titusville Table Top Exercise, City of Titusville*
- *Crawford County Fair Public Safety Table Top, West Mead Township*
- *Regional Logistics Staging Area Table Top Exercise, Erie*
- *Statewide Election Day Table Top Exercise, State*
- *NWPAERG Regional Full-Scale Logistics Staging Exercise, Edinboro University*
- *Titusville High School Active Shooter Table Top, City of Titusville*
- *Emergency Operations Plans for Rural Jurisdictions*
- *Knowledge Center Software Training Webinar Upgrades*
- *Knowledge Center Software Training Webinar Incident*
- *Initial Damage Assessment and Reporting Course by PEMA WA held at Crawford DPS*
- *Knowledge Center Software Training Checklists Webinar*
- *County website updates training webinar*
- *FEMA All Hazards Liaison Officer Course, Erie DPS*
- *PEMA Western Region In-Service Training, Indiana*
- *Mass Fatalities Planning & Response for Rural Communities, Saegertown*
- *Annual Skywarn Spotter Training, Meadville*
- *HazMat Operations Refresher Course at Venango Vol. Fire Dep't*
- *Department Head Continuity of Government Plan Training*
- *CEM Planner software training at Erie DPS*
- *Homeland Security Exercise & Evaluation Program*
- *PEMA Western Region Orientation Training*
- *PEMA In-Service Training, Indiana*
- *Knowledge Center Training Webinar*
- *Meadville Medical Center water infiltration training*
- *CEM Planner Training in Erie*
- *Division/Group Supervisor in Erie*
- *G -402 NIMS for Senior Officials Saegertown*
- *AWR 144 Maritime Security, Penn State Behrend*

- *KEMA Conference, Altoona*
- *Rapid Needs Assessment Course, Saegertown*
- *PA Fire and Emergency Service Institute Annual Conference,*

*Harrisburg*

- *Ice Jam Training, Oil City*

## 2019

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- *Leadership Meadville Program at Crawford County Dept. of Public Safety, City of Meadville*
- *PA Assoc. of Township Supervisors Guest Speaker, Woodcock Township*
- *Titusville High School Active Shooter Exercise, City of Titusville*
- *All Hazards Annual Spring Full Scale Exercise, County Wide*
- *MASH Active Shooter Functional Exercise, City of Meadville*
- *Red Cross Flooding Table Top Exercise, City of Meadville*
- *Tall Ships Erie 2019 Table Top Exercise, Erie*
- *National Health Functional Exercise, Crimson Contagious, Erie County*
- *Crawford County SCUBA Team with PA Helicopter Aquatic Rescue Team (PA HART) at Port*
- *Meadville Airport functional exercise, Vernon Township*
- *Crawford County Borough's Association Quarterly Meetings*
- *Crawford County Association of Townships Bi-Yearly Meetings*
- *Crawford County Local Emergency Planning Committee Quarterly Meetings*
- *Crawford County Safe Kids Coalition Monthly Meetings*
- *Crawford County Community Council Monthly Meetings*
- *Titusville Healthcare Rehabilitation Center table top exercise, City of Titusville*
- *University of Pittsburgh Titusville Campus Table Top Exercise, City of*

*Titusville*

- *Logistics Staging Area Table Top Exercise, City of Meadville*
- *Amateur Radio Red Cross Shelter Communications Exercise, State Wide*
- *Meadville Medical Center Points of Distribution Exercise, City of Meadville*
- *Great Northeast Shake Out Functional Exercise, County Wide*
- *Logistics Staging Area Full Scale Exercise, Fairgrounds, West Mead Township*
- *G0205 Recovery from Disaster Training at Pampered Palate Catering and Conference Center*
- *EMMCO West Annual Symposium*
- *ICS300 Training at Meadville Medical Center's Vernon Place*
- *Skywarn Spotter Webinar*
- *G-2035 Training at Pampered Palate Catering and Conference Center*
- *Cyber Symposium Erie Bayfront Convention Center*
- *Vessel SWAT Training aboard Brig Niagara*
- *Active Shooter Preparedness and Planning Training, New Beginnings Church of God, two sessions*
- *2nd Quarter Municipal EMC Training*
- *Judicial Center Staff Emergency Planning Training*
- *PEMA Western Area In-Service Training, Erie*

- *ERG Equipment Tracker Training, Erie*
- *Logistics Staging Area Training for Civil Air Patrol*
- *Individual Assistance Workshop, Pittsburgh*
- *Safety in Your Community Workshop, ARC*
- *Chemical Safety, Security, and Transportation Workshop, Slippery Rock University*
- *County Program Orientation and Duties and Responsibilities of the EMA Coordinator*
- *ICS-400 Course at New Vernon Place*
- *Keystone EM Association Conference, Altoona*
- *Family Reunification Workshop, Maplewood*
- *Surveillance and Detection Course, Erie Insurance*
- *Skywarn Weather Training by Cleveland Staff*
- *PA Fire & Emergency Services Conference, Harrisburg*
- *Crawford County Fair Public Safety Meeting*

## 2020

- *Residents weather preparedness program, Crawford DPS, City of Meadville*
- *First Presbyterian Church Preparedness Program, City of Meadville*
- *Crawford County COVID-19 Information Facebook Live*
- *NW PA Historical and Cultural Association Preparedness Interview*
- *Great Lakes Area Maritime Active Shooter Table Top Exercise Webinar*
- *Public Information Officer Course, Pittsburgh*
- *Planning for All Hazards Weather Exercise Including Northern Tier Healthcare Coalition*
- *Crawford County Local Emergency Planning Committee Quarterly Meetings*
- *Planning for Pipeline Explosion in Randolph Township April 4*
- *Planning for Weavertown Recertification Exercise in May*
- *PEMA Western Area In-Service Training, Pittsburgh*
- *Northern Tier Healthcare Coalition EOC Training, Clarion*
- *MGT 342 Strategic Overview of Disaster Management for W & WW Utilities, Saegertown*
- *Initial Damage Assessment, Crawford DPS*
- *Cambridge Springs Water Department Off-Site Response Plan Orientation and*
- *Emergency Operations Center*
- *WebEOC Training, Erie DPS*
- *COVID-19 Webinar by CCAP*
- *Duties and Responsibilities and County EMA Overview Courses for Greg Beveridge*
- *Demonstration of VOIP Phone Paging*
- *Meadville Medical Center COVID-19 Table Top Exercise*
- *IPAWS and WEA FEMA Webinar*
- *WebEOC Training*
- *Crawford County LEPC Meeting Webinar*
- *KEMA Coffee Break starts at 10am. Topic - FEMA FMA and BRIC*

Below Trainings were cancelled in 2020 due to the COVID-19 Pandemic

- *MGT 418 Readiness: Training Identification and Preparedness Planning, Clarion*
- *G 289 Public Information Officer Awareness Training*
- *G 402 ICS Overview for Elected and Appointed Officials*

Below Exercises were cancelled in 2020 due to the COVID-19 Pandemic

- *Annual Spring Severe Weather Exercise*
- *Pipeline Full-Scale Exercise, Randolph Township Fire Dept. & Kinder Morgan Pipeline*

## **7.7 PLAN INTEGRATION**

Hazard mitigation planning is most effective when it works in concert with other plans, regulations, and programs. Plan integration ensures that hazard mitigation planning is woven into each jurisdiction's planning and regulatory documents. Ensuring that the goals and actions of hazard mitigation are applied to comprehensive planning efforts promotes safe, resilient growth, effective emergency management and an overall reduction of risk. Per FEMA, plan integration is described as the regular consideration and management of hazard risks in a community's existing planning framework. The planning framework is the collection of plans, policies, codes, and programs that guide land use and development, how those are maintained and implemented, and the roles of a range of stakeholders to evaluate and update them. Some of the most important planning and regulatory mechanisms that can be utilized for hazard mitigation have been discussed above and include: hazard mitigation plans, emergency operations plan, comprehensive plans, building codes, floodplain ordinances, subdivision and land development ordinances, and zoning ordinances. These local planning mechanisms provide a vehicle for the implementation of adopted mitigation strategies. Effective integration of hazard mitigation occurs when the planning framework fosters development that does not increase risks from known hazards or leads to redevelopment that reduces risk from known hazards (FEMA, 2020).

Crawford County has been successful at integrating hazard mitigation planning into its planning tools through goals, objectives, and actions and will continue to do so as part of the 2020 HMP Update. The following section highlights the link between current planning in Crawford County and how the Hazard Mitigation Plan Update can be integrated to strengthen these actions in the future.

### *2014 Crawford County Comprehensive Plan*

The Crawford County Comprehensive Plan establishes a shared vision of how the County would like to guide future growth and recommendations for attaining these goals. The Comprehensive Plan identifies goals and strategies related to hazard mitigation planning, specifically as it relates to natural resource management and protection, coordinated land use and strategic development, and ensuring supportive housing and sheltering.

Table 7.7-1 outlines specific planning, zoning, and land use goals and key strategies identified in the Comprehensive Plan that are relevant to hazard mitigation planning and the Hazard Mitigation Plan Update.

**Table 7.7-1 Planning, Zoning, and Land Use Actions Relevant to Hazard Mitigation Planning**

Goals	Location in Plan	Key Strategies	Location in Plan
<b>Housing</b>			
Preserve and extend existing housing through BOCA standards and implementation.	H15	Assist municipalities with code development and enforcement.	H12
Minimize the dispersed manner in which much of the County’s new housing is developing in the Townships surrounding Meadville and Titusville.	H16	Assist municipalities with home rehabilitation needs.	H13
Mitigate the problems associated with the County’s many public housing units that are poorly situated for their residents to access public services and retail establishments.			
Encourage adaptive reuse of disused structures or infill construction of underused open space as high-density or multi-family housing.			
Support a countywide inventory of substandard housing.			
Integrate housing with retail, office or commercial uses to share infrastructure cost and populate municipal business districts.			
Provide physically-accessible housing options that are near supportive services, transportation, shopping, and jobs for people with disabilities.			
Maintain and support adequate emergency shelters for the homeless.			
Create opportunities for supportive housing for those who are chronically homeless.			
Support municipal comprehensive plans that encourage diverse housing options and a traditional approach to neighborhood design.			
Support smart site location and green development criteria for new developments.			
<b>Commerce &amp; Economic Development Goals</b>			
Integrate economic development planning with land use planning, including developing infrastructure systems in designated growth areas.	C14	The county and/or its partners could appoint a specific liaison for gas development information, to serve as the “who you gonna call?” person for the industry as well as citizens.	C 10
Target new businesses and industries to areas with existing infrastructure systems and/or to designated growth areas.	C15	Providing planning assistance and education.	C12



Promote the importance of agriculture to the local economy, and maintain farming as a viable industry through land use policies and regulations, technical assistance, community education, and funding through existing programs.		Providing coordination assistance.	
Promote the redevelopment of vacant or underutilized commercial and industrial facilities for use by new or expanding businesses, and support efforts to acquire funding for environmental remediation.			
Support municipal and county-wide infrastructure systems (such as transportation, utilities, stormwater management) as well as open space and recreation facilities that foster or enhance economic development opportunities and business growth.			
Coordinate or support economic development planning efforts that involve multiple municipalities or jurisdictions, and address regional issues and concerns.			
Encourage all businesses and industries in the county to retain a hazardous materials inventory and to file an emergency action plan with the county Emergency Management office in the event of a spill, chemical accident, etc.			
<b>Agriculture</b>			
Promote policies and practices that protect active farmland with productive soil.	A 16	Inventory prime-agricultural lands using soil types. Expand ASAs into the townships that currently do not have them but have quality agriculture soils and large farms. Reprioritize the purchase of agriculture conservation easements.	
Partner with non-profits and municipal governments to protect and preserve agricultural lands.	A 17		
Target farmland preservation easement purchases in rural and agricultural landscapes.			
Foster appreciation for rural agricultural areas by encouraging appropriate public access via designated trails or portions of tracts that are encumbered with public easements.			
Discourage the conversion of agricultural lands to other uses unless such lands are part of designated growth areas established by a comprehensive or land-use plan.			

Encourage development within designated growth areas and to allow appropriate-scale agricultural uses in all districts, to deflect encroachment into prime agricultural lands.			
Encourage, through education and technical support, participation in the Agricultural Security Areas program, the Clean and Green program, and others.			
Limit sprawl and encourage cluster development through the encouragement of mixed-use planned development uses (PUDs).			
Strive to integrate local planning and environmental mitigation efforts to ensure a designated level of treatment for wastewater, and reduce stream discharge for treated sludge in order to reduce environmental impacts and preserve agricultural lands.			
Encourage efforts by forestry/timber management organizations and their educational programs to preserve and protect our existing forests while allowing for ecologically balanced amount of forestry.			
Encourage coordination between the county, municipalities and conservation and preservation groups to link historic resource and natural resource protection and to protect the natural resource network.			
Protect and enhance ground water recharge, in-stream resources, first order perennial streams, sensitive resources (including high quality and exceptional value watersheds), and riparian buffers to preserve water quality and quantity.			
<b>Transportation</b>			
Promote and encourage the cooperation of local municipalities in the Dirt and Gravel Roads Program introduced by the County Soil and Water Conservation District, with the aim of improving water quality for streams by reducing the run-off from gravel roads.	T34		
Promote preservation of the existing dirt and gravel road network as a key element of the county's rural character, and discourage expansion of a paved road network in rural, agricultural or natural areas.			
Adopt or support policies that reduce dependence on motorized vehicles and associated environmental impacts, and instead support alternative transportation means.			

Land Use			
Promote strategic multi-municipal land use planning to direct growth, protect sensitive resources and enhance quality of life.			
Coordinate the expansion of infrastructure (water, sewer, transportation) with land use planning.			
Integrate natural resource conservation and land use planning.			
Encourage the location and expansion of diverse range of businesses, institutions and community services in the “main street” areas of cities, towns and villages.			
Encourage residency in downtowns and “main street” areas.			
Support infill development and redevelopment efforts and promote consistency with the character of existing land uses and development.			
Limit infrastructure improvements in rural areas to those supporting the agricultural industry and use context sensitive design to maintain community character.			
Promote acquisition, development and maintenance of community and neighborhood parks, trails, and recreation facilities to protect resources, provide connections, and to promote healthy lifestyles.			
Encourage the identification and protection of historic and cultural resources to enhance revitalization efforts and maintain the character of the landscape.			

Goals and objectives from the Comprehensive Plan have been incorporated into the Hazard Mitigation Plan Update in the following sections:

- *Section 2.4 Land Use and Development*
- *Section 4.4.4 Future Development and Vulnerability*

While Crawford County has been successful in working towards plan integration, more can be done. In Pennsylvania’s communities and communities around the country, an inherent barrier to optimal plan integration is the lack of resources to accomplish activities that plan integration requires.

With available resources being limited and stretched into the foreseeable future, plan integration is extremely relevant and will help leverage existing resources to the maximum extent possible.

Options for incorporating additional hazard mitigation planning principles into the Comprehensive Plan include:

- *Consider using the Hazard Mitigation Plan (HMP) to further refine and exclude high hazard areas from identified future growth areas, land use controls and zoning ordinances.*
- *Consider developing a mechanism for monitoring, evaluating and reporting out progress made towards achieving plan goals.*
- *Consider developing a safety goal and objectives to address high-hazard risks identified in the HMP.*

## *2010 Crawford County Act 167 County-Wide Stormwater Management Plan (Phase II)*

In accordance with the requirements of the Pennsylvania Stormwater Management Act 167 and guidelines established by the PA DEP, the County conducted a multiyear study of the condition of watersheds and water infrastructure in Venango. The resulting Stormwater Management Plan provides prioritized recommendations to mitigate and reduce the impacts from future development and improve the current condition of local water bodies.

Many of the goals expressed in the Plan are either directly or indirectly related to hazard mitigation planning, and include:

- *Goal 3: Provide uniform stormwater management standards throughout Crawford County.*
- *Goal 4: Encourage the management of stormwater to maintain groundwater recharge, to prevent degradation of surface and groundwater quality, and to protect water resources.*
- *Goal 5: Preserve the existing natural drainage ways and water courses.*
- *Goal 6: Ensure that existing stormwater problem areas are not exacerbated by future development and provide recommendations for improving existing problem.*

General recommendations from the Stormwater Management Plan for Crawford County call for the prioritization and refined assessment of problem areas and a focus on region-wide floodplain management. Specific recommendations proposed in the Stormwater Management Plan that are relevant to hazard mitigation planning and the Hazard Mitigation Plan Update include:

Improve municipal zoning to mitigate the negative impact of future development through special zoning techniques (e.g. watershed based, overlay, performance, or large lot zoning; growth boundaries; infill development; transfer of development rights)

- *Enhance floodplain management practices (e.g. adoption of PA Department of Community and Economic Development Model Floodplain Ordinance, participate in CRS, open space preservation in floodplain areas, acquisition of repetitive loss properties, implementation of a drainage system maintenance program) and where possible, provide for River Corridor Planning, Riparian Zone Protection, and identification and protection of special wetlands*
- *Implement design standards and policies to limit impervious cover, improve topsoil management, and incentivize low-impact development*

Several goals and objectives from the Stormwater Management Plan have been incorporated into the Mitigation Strategy (Section 6) of the Hazard Mitigation Plan Update. These goals are as follows:

- *Crawford County Mitigation Action #8: Assist municipalities in Community Rating System (CRS) participation by distributing correspondence to all property owners within identified flood hazard areas. The content of these letters will address specific requirements in accordance with the NFIP's CRS program to include: Local flood hazard, flood safety, flood insurance information, property protection measures, natural & beneficial functions of the local floodplain, local FIRM, NOAA weather radio information, floodplain development permit requirements, and substantial damage/improvement requirements.*
- *Crawford County Mitigation Action #11: Review existing county and municipal zoning regulations (if applicable) to ensure adequacy in reducing future development in identified flood hazard areas.*

- *Crawford County Mitigation Action #12: Review existing county and municipal comprehensive plans (if applicable) to ensure that designated growth and development areas are not within an identified flood hazard area.*
- *Crawford County Mitigation Action #13: Review existing county and municipal capital improvement plans (if applicable) to ensure that infrastructure improvements are not directed in hazardous areas.*
- *Crawford County Mitigation Action #16: Join the NFIP's Community Rating System (CRS).*
- *Crawford County Mitigation Action #20: Develop a monitoring program for identifying hazardous areas of concern in order to lessen the impact of future development in hazard prone areas (i.e. floodplains, landslide prone areas)*
- *Options for incorporating additional hazard mitigation planning principles into the Stormwater Management Plan include:*
- *Work with municipalities to implement the recommendations identified in the Plan.*

#### *2009 Northwest Pennsylvania- Greenways Plan: Crawford County, Pennsylvania*

In April 2009, the Northwest Pennsylvania Regional Planning and Development Commission in partnership with the Crawford County Planning Commission and other stakeholders developed a comprehensive Greenways Plan for the county. The purpose of the plan was to present the benefits of establishing a greenway network with neighboring counties. The goals and objectives of creating such a network and the plan are relevant to the County's hazard mitigation planning efforts, particularly as it relates to resource preservation and creating opportunities for non-motorized transportation opportunities.

Outlined goals of the plan directly related to hazard mitigation planning are as follows:

- *Promote the preservation of agricultural land.*
- *Encourage counties and local municipalities to work in unison to help protect their various resources by adopting open-space and land-use regulations.*
- *Options for incorporating additional hazard mitigation planning principles into the County Recreation and Open Space Plan include:*
- *Identify and prioritize high-hazard areas (i.e. flooding) prime for acquisition and conversion to open space.*

#### *2020 Crawford County Recovery Plan*

The Crawford County Recovery Plan (2020) will be updated using the HVA data and mitigation projects listed in this plan to aid in the quick and economically sound way of restoring resident's lives to Pre-disaster conditions. Recovery Outcomes by Recovery Support Functions include;

- *Community Planning & Capacity Building – Resilient recovery of communities*
- *Economic – Sustainable, diversified and resilient economy*
- *Health and Social Services – Sustainable and resilient health, education, & social services systems*

- *Housing – Adequate, resilient, and affordable housing*
- *Infrastructure Systems – Restored, modernized, hardened, and resilient systems*
- *Natural & Cultural Resources - Restored, preserved, risk-resistant, and resilient systems*

When stabilization of community lifelines is achieved, the focus of the mission shifts to achieving Recovery Outcomes. The Outcome Driven Recovery model drives an approach that emphasizes long-term resilient solutions across all lifelines and other aspects of a community. (FEMA Lifelines Toolkit v2.0)

## 8. MITIGATION STRATEGY

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### 8.1 UPDATE PROCESS SUMMARY

The intent of the Mitigation Strategy is to provide Crawford County and participating municipalities with the goals that will serve as the guiding principles for future mitigation policy and project administration, along with a list of proposed actions deemed necessary to meet those goals and reduce the impact of natural hazards. It is designed to be comprehensive and strategic in nature. The development of the strategy included a thorough review of all-natural hazards and identified policies and projects intended to not only reduce the future impacts of hazards, but also to assist Crawford County and participating municipalities achieve compatible economic, environmental and social goals. The development of this section is also intended to be strategic, in that all policies and projects are linked to establish priorities assigned to specific departments or individuals responsible for their implementation and assigned target completion deadlines. Funding sources are identified that can be used to assist in project implementation.

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 three goals and eight objectives identified in the 2015 Crawford County Hazard Mitigation Plan. The goals address the hazards facing Crawford County by organizing around the categories of mitigation. A list of these goals and objectives, which were carried over to the 2020 HMP, are provided in Section 8.2.

Actions provide more detailed descriptions of specific work tasks to help the county and its municipalities achieve prescribed goals and objectives. There were 45 actions identified in the 2015 Crawford County Hazard Mitigation Plan. A list of these actions as well as a review and summary of their progress based on comments received from stakeholders involved in the Hazard Mitigation Plan update process is included in Table 8.1-1

Based on stakeholder participation from the Crawford County MPC, the mitigation strategy was modified and updated. Each communities' 2020 mitigation action plan was provided at each meeting and sent electronically as requested to provide the opportunity for comment and update. New actions have been added to address particular hazards facing Crawford County and the consensus achieved in how to address those actions. The updated mitigation strategy is presented in Section 8.4.

**Table 8.1-1 Five-Year Mitigation Plan Review of Action**

Action #	Action Description	Review Comments
1	Create a “How To” hazard mitigation display board containing pictures and information, such as acquiring, elevating and/or retrofitting residential homes and information on the NFIP. This board will be used at special events (health fair, public awareness day, county fair).	Continued
2	Create a “facts” hazard mitigation brochure which will include information on the types of hazard mitigation projects that can be implemented due to natural and technological hazards that affect Crawford County. This will be distributed by the Crawford County Convention & Visitors Bureau.	Continued
3	Use media outlets for the distribution and publication of hazard information. This includes news releases on pre- and post- disaster awareness information.	Continued
4	Create public speaking series on hazard related topics. The series is to include topics on natural/man-made hazards, how to develop a family disaster plan/family supply kit, how to develop a business continuity plan and mitigation projects for homeowners. These speaking engagements will be offered to civic and religious organizations as well as schools throughout the county.	Continued
5	Promote the local Red Cross’s “Citizen Disaster Courses”. These courses include: Child CPR, Basic First Aid, Intro to Disaster Services, Mass Care, and Shelter Operations.	Continued
6	Update the Crawford County OES website with hazard related information and current issues/projects to include preparedness, mitigation, response, and recovery.	Continued. The OES website contains links to the current HMP, information on SafeTown, Pandemic Preparedness information, and Ready.gov
7	Work with the Crawford County School Districts to promote hazard mitigation education & awareness. This includes conducting meetings to brainstorm ways to integrate hazard mitigation into programs such as the science curriculum, mathematics, and social studies.	Continued. The Crawford County School District was included in the HMP planning process and representatives attended meetings and provided information.

Action #	Action Description	Review Comments
8	Assist municipalities in Community Rating System (CRS) participation by distributing correspondence to all property owners within identified flood hazard areas. The content of these letters will address specific requirements in accordance with the NFIP's CRS program to include: Local flood hazard, flood safety, flood insurance information, property protection measures, natural & beneficial functions of the local floodplain, local FIRM, NOAA weather radio information, floodplain development permit requirements, and substantial damage/improvement requirements.	Discontinued. After a discussion with the PA NFIP Coordinator, it was determined that the majority of communities in the County would not greatly benefit from participating in CRS. This action has been discontinued however Action #X pertaining to CRS has been carried over in the 2015 HMP for the three communities
9	Establish all-hazard resource centers to be located in each municipality's community center. The centers will act as a repository for information on local hazard identification, preparedness, and mitigation strategies for use by citizens, realtors, and financial lenders.	Continued.
10	Conduct course on the overview of the National Flood Insurance Program (NFIP) directed towards realtors, bankers, and insurers	Continued
11	Review existing county and municipal zoning regulations (if applicable) to ensure adequacy in reducing future development in identified flood hazard areas.	Complete. Communities utilized DCED's model ordinance to update floodplain management ordinances in 2012. The model ordinance includes language that reduces future development in identified flood hazard areas.
12	Review existing county and municipal comprehensive plans (if applicable) to ensure that designated growth and development areas are not within an identified flood hazard area.	Continued. Strategies were incorporated into the 2014 County Comprehensive Plan the promote growth in designated growth areas which are outside the SFHA, and encourage natural resource conservation tied to stormwater management. This process will continue as part of the annual HMP review.
13	Review existing county and municipal capital improvement plans (if applicable) to ensure that infrastructure improvements are not directed in hazardous areas.	Continued



Action #	Action Description	Review Comments
14	Work with all 51 municipalities to update floodplain ordinances adopted prior to 1987. This is to ensure that full compliance is being met in regard to the NFIP.	Complete. The County FIRMS were revised in 2012 and all participating municipalities updated and adopted new floodplain management ordinances.
15	Improve the enforcement of existing floodplain regulations by providing additional training to county and municipal officials on the NFIP.	Continued
16	Join the NFIP's Community Rating System (CRS).	Continued. This action has been carried over in the 2015 HMP for the three communities that have more than 50 NFIP policies within.
17	Provide training and support to local municipalities on the NFIP's Community Rating System (CRS) and encourage them to join the program.	Discontinued. After a discussion with the PA NFIP Coordinator, it was determined that the majority of communities in the County would not greatly benefit from participating in CRS. This action will be discontinued however Action X pertaining to joining CRS has been carried over for the three communities most likely to benefit.
18	Conduct a Hazardous Materials Commodity Flow Study along Interstate 79.	Continued
19	Conduct outreach efforts to educate municipalities about the NFIP and its requirements	Continued/Revised. This action has been combined with Action 15 and continued.
20	Develop a monitoring program for identifying hazardous areas of concern in order to lessen the impact of future development in hazard prone areas (i.e. floodplains, landslide prone areas)	Continued

Action #	Action Description	Review Comments
21	Review and analyze current regulations and ordinances and investigate amending current codes to incorporate that new development be built to withstand EF5 (Enhanced Fujita Scale) wind speeds.	Continued
22	Conduct and/or review soil surveys for the county and map vulnerable areas prone to landslide	Continued. As part of this HMP update, vulnerability was assessed using slope and frequency data.
23	Roadway elevations in low lying areas (overland flood prone areas) throughout the township	Continued
24	Install stormwater drainage controls and create ditches throughout the borough's low-lying areas to lessen the impact of overland flooding on public and private infrastructure	Continued
25	Structural elevations of residential homes along Poplar Street. During severe precipitation and snowmelt events, the French Creek is inundated with water which causes flash flood conditions for this area impacting several residential structures throughout the borough.	Continued
26	Attend county facilitated training workshop on the NFIP's Community Rating System (CRS)	Discontinued. After a discussion with the PA NFIP Coordinator, it was determined that the majority of communities in the County would not greatly benefit from participating in CRS. This action will be discontinued however municipalities that may benefit will be encouraged to obtain rating status.
27	Improve and upsize stormwater drainage infrastructure controls along North Road. Due to the general topography of the specific area, during heavy precipitation events (which can cause flash flood conditions), the current system becomes inundated and backs up due to the heavy discharge of water. This impact both private residents and public infrastructure, in particular a residential apartment complex.	Continued
28	Installation of new traffic signal poles to reduce the number of hazardous materials/ transportation accidents within the borough	Continued.
29	Wallace Avenue Bridge Replacement	Completed in 2020.

Action #	Action Description	Review Comments
30	Roadway elevation (approximately 500-600 ft.) along Schaffer Road (near the intersection of Schaffer Road & Griffin Road). The primary source of flooding is the Little Sugar Creek.	Continued. The Township elected to continue this action in the 2015 HMP.
31	Stormwater drainage system controls enhancement on North Wayland Road (between Rt. 27 and Rt. 22)	The Township utilized HMA grant funding to complete this project.
32	Improve stormwater drainage infrastructure controls near the intersection of State Route 19 and 285. Other areas of concern are Delano Road and Rock Creek Road.	The Township has completed this project.
33	Re-grade (deepen) ditches along South Lake Road to lessen the impact of overland flooding onto public and private infrastructure	Continued
34	Installation of new stormwater system along South Lake Road to significantly minimize the impact of overland flooding onto public and private infrastructure	Continued
35	Improve (upsized) stormwater drainage system along Duncan Road	Continued
36	Strengthen township floodplain ordinances (NFIP)	Complete. Floodplain management ordinance was revised and adopted in 2012 with new FIRMs.
37	Storm sewer upgrade/upsized on 200 block of Grant Street	Continued
38	Upsize culvert on Erie Street at Beck Run	Continued
39	Installation of backup water/spring wells & monitoring system for ground water levels	Continued
40	Provide generators for critical facilities, emergency shelters, and water wells	Continued
42	Construct culvert system to alleviate Church Run Creek flooding near Franklin Street Bridge and discharge water into Oil Creek near Brown Street (Confluence of Church Run Creek and Oil Creek is located at Brown Street)	Continued
43	Retrofit two existing structures or sections of (Chapmanville Fire Department and the Troy Township Hall) to serve as a tornado community safe room for immediate vicinity of residents and business owners	Continued
44	Installing, re-routing, and increasing capacity of culverts throughout the township	Continued

Action #	Action Description	Review Comments
44	Upsizing and installation of new stormwater drainage system components to lessen the impact of overland flooding onto public and private infrastructure along Pettis, Thurston, and Townline Roads	Continued. The Township has done some drainage and pipe cleanouts on Townline Roads and had met with and worked with PennDOT on Thurston Road and Barclay Road. This Action has been carried over to the 2015 plan but with newly identified roads.
45	Implement a drainage easement along Adams Road	Continued

## 8.2 MITIGATION GOALS AND OBJECTIVES

Hazard mitigation goals and objectives for the 2020 plan were developed during the 2020 HMP update after the Crawford County MPC reviewed the results of the updated Risk Assessment and Capability Analysis. Table 8.2-1 identifies the goals and objectives continued for the 2020 HMP.

**Table 8.2-1 Goals and Objectives for 2020 HMP**

Goals	Objectives
1. Protect lives, property, environmental quality, and resources of the Commonwealth, including high-risk properties.	<p>1.1. Ensure adequate training and resources for emergency organizations and personnel by developing and distributing public awareness materials about natural hazard risks, preparedness, mitigation, and emergency response (Actions # 1,3,50,52,66,75)</p> <p>1.2. Target owners of properties within identified hazard areas for additional outreach regarding mitigation and disaster preparedness Actions #19,20,28,39,48)</p>
2. Enhance consistent coordination, collaboration, and communications among stakeholders to improve response and recovery.	<p>2.1. Mitigate existing structures and infrastructure located in high hazard areas (Actions # 2, 5-15, 17,22-29-32,34,41-47, 53-65, 67-70, 82-89)</p> <p>2.2. Evaluate and update existing floodplain ordinances to meet or exceed the NFIP standards Actions #71)</p> <p>2.3. Improve the enforcement of existing floodplain regulations (Actions # 4,21,30,51,72-74)</p>

Goals	Objectives
3. Provide a framework for active hazard mitigation planning and implementation including the Whole Community.	3.1. Assess vulnerability of transportation systems and assets located in hazard areas (Actions # 35-38, 40)  3.2. Conduct a hazardous materials survey to better understand the nature and extent of hazardous materials risk throughout the county (Action # 49)
4. Build legislative and other organizational support and leverage funding for mitigation efforts.	4.1 The County will work with their state agencies and legislature to support grant funding efforts to benefit hazard mitigation projects identified in the plan (Actions # All Actions that have a significant cost)
5. Increase awareness, understanding, and preparedness across all sectors.	5.1 Partner with news media, schools, and businesses to promote mitigation and preparedness in the community (Actions # 16, 13, 18, 33, 81)

### 8.3 IDENTIFICATION & ANALYSIS OF MITIGATION TECHNIQUES

The mitigation strategy in the updated HMP should include analysis of a comprehensive range of specific techniques or actions. FEMA, through the March 2013 Local Mitigation Handbook, and PEMA, through the October 2013 Standard Operating Guide (SOG), identify four categories of hazard mitigation techniques.

Local plans and regulations: Government authorities, policies, or codes that influence the way land and buildings are developed and built. Examples include, but are not limited to: comprehensive plans, subdivision regulations, building codes and enforcement, and NFIP and CRS.

Structure and infrastructure: Modifying existing structures and infrastructure or constructing new structures to reduce hazard vulnerability. Examples include, but are not limited to: acquisition and elevation of structures in flood prone areas, utility undergrounding, structural retrofits, floodwalls and retaining walls, detention and retention structures, and culverts.

Natural systems protection: Actions that minimize damage and losses and also preserve or restore the functions of natural systems. Examples include, but are not limited to: sediment and erosion control, stream corridor restoration, forest management, conservation easements, and wetland restoration and preservation.

Education and awareness: Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate the hazards, and may also include participation in national programs. Examples include, but are not limited to: radio or television spots, websites with maps and information, provide information and training, NFIP outreach, StormReady, and Firewise Communities.

Table 8.3-1 provides a matrix identifying the mitigation techniques used for the moderate and high-risk hazards in the County. The specific actions associated with these techniques are included in Table 8.4-1.

**Table 8.3-1 Mitigation Techniques**

Hazard	Local Plans and Regulations	Structure and Infrastructure	Natural Systems Protection	Education and Awareness
Pandemic	X			X
Utility Interruption	X	X		X
Terrorism	X	X		X
Flooding	X	X	<b>X</b>	X
Dam Failure	X	X		X
Hazardous Materials	X	X		X
Tornado	X	X		X
Winter Storm	X	X	X	X

## 8.4 MITIGATION ACTION PLAN

A Mitigation Strategy Workshop was held on November 17, 2020 to develop a framework for the County Mitigation Action Plan (see meeting minutes in Appendix C). As part of the mitigation strategy review and evaluation during the Mitigation Workshop, the group went over the four new Mitigation Techniques identified by FEMA. Mitigation Action Plan worksheets were given to all participants. Potential mitigation actions developed by the HMSC were reviewed and participants were asked to provide at least one hazard related mitigation action for each municipality. Participants were given the option of taking part in the existing list of potential actions developed by the HMSC or providing new actions of their choosing specific to their community.

The final list of 61 mitigation actions in Table 8.4-1 is made up of actions developed by the HMSC along with actions developed by municipalities and other stakeholders at the Mitigation Strategy Workshop. In addition, the list includes 2010 actions and projects that were identified as still viable or not yet complete. At least one mitigation action was established for each moderate and high-risk hazard in Crawford County. More than one action is identified for several hazards. Every participating jurisdiction has at least one mitigation action. Each mitigation action is intended to address one or more of the goals and objectives identified in Section 8.2.

Mitigation actions were evaluated using the Multi-Objective Mitigation Action Prioritization criteria from the PEMA’s SOG. The criteria are as follows:

- *Effectiveness (weight: 20% of score): The extent to which an action reduces the vulnerability of people and property.*
- *Efficiency (weight: 30% of score): The extent to which time, effort, and cost is well used as a means of reducing vulnerability.*
- *Multi-Hazard Mitigation (weight: 20% of score): The action reduces vulnerability for more than one hazard.*
- *Addresses High Risk Hazard (weight: 15% of score): The action reduces vulnerability for people and property from a hazard(s) identified as high risk.*

- *Addresses Critical Communications/Critical Infrastructure (weight: 15% of score): The action pertains to the maintenance of critical functions and structures such as transportation, supply chain management, data circuits, etc.*

Scores of 1, 2, or 3 were assigned for each multi-objective mitigation action prioritization criterion where 1 is a low score and 3 is a high score. Actions were prioritized using the cumulative score assigned to each. Each mitigation action was given a priority ranking (Low, Medium, and High) based on the following:

High Priority (highlighted red): 2.5 – 3.00

Medium Priority (highlighted yellow): 1.9 – 2.49

Low Priority (highlighted green): 1.0 – 1.89

Action No.	Municipality	Action	Category	Hazards Addressed	Lead Agency	Time Schedule	Priority Score
1	Woodcock Borough	To install a system in the center of the borough that all residents in the borough can hear in an emergency.	Natural Systems Protection	Emergency notification system in the borough. A tool to notify the residents of the borough in the event of a tornado, or other like situation. At present we do not have this system.	Woodcock Borough	Short Term	2.85
2	City of Meadville	Rehabilitate the dam per NRCS design and recommendations. Design phase kicked off in the early fall of 2020.	Structure Infrastructure; Natural Systems Protection	Rainbow Lake Dam, constructed in tandem in the 1960's with the now-rehabbed Tamarack Lake Dam system, is a high-hazard flood control dam that serves to protect the residents and and property owners downstream from flooding. The dam no longer meets current flood control standards, particularly in the world of a changing climate, and is showing its age and wear. USDA NRCS has conducted a condition assessment and feasibility study and is recommending substantial rehabilitation.	City of Meadville	Short Term	2.8
3	Crawford County	Provide personal protective equipment and barriers to critical employees.	Natural Systems Protection	COVID-19 Pandemic continues to affect the residents of Crawford County.	Crawford County	Immediate	2.6

Action No.	Municipality	Action	Category	Hazards Addressed	Lead Agency	Time Schedule	Priority Score
4	East Mead Township	1. Road needs to be widened 2. Trees need to be removed 3. Actual landscaping needs to be altered to cut back on the blindness of the corner. 4. Bank needs to be so you can at least see what is coming	Local Plans Regulations; Natural Systems Protection	At the Hospice House, owned by Meadville Medical Center, on N. Wayland Road is a very blind curve for vehicles to meet let alone there is not enough room for two vehicles to pass! Emergency curve in and of itself- with accident waiting to happen. Emergency vehicles already have had too many close calls here.	East Mead Township	Immediate	2.6
5	Bloomfield Township	The action we would like to take to mitigate the Canadohta Lake Dam is either repair or replacement.	Structure Infrastructure	The hazard problem of the Canadohta Lake Dam is flooding and dam failure. This dam's structure is deteriorated and currently the one gate to let water out is not working which could cause a flooding issue if we get a large amount of rain quickly.	Bloomfield Township	Long Term	2.35
6	Borough of Conneaut Lake	Remove sediment and fallen tree branches, support the bank where it is eroding and increase the size of the pipe under State Street so that the storm water flows freely and doesn't back up causing flooding.	Structure Infrastructure	Flooding & erosion occurs along the banks of this unnamed tributary to Barber Run affecting homes and a business. The stream needs to be cleaned out and the banks need erosion control. Adding to the problem is that the pipe that goes under State Street is not large enough to handle the flow of water after heavy or prolonged rain.	Conneaut Lake Borough	Immediate	2.15
7	Borough of Conneaut Lake	Our town hall building is large with 2 levels, 2 kitchenettes, 2 bathrooms, plenty of tables and chairs and within walking distance for most borough residents. This makes it a good location for a warming center in the event of a extended power outage or other type of emergency where a shelter is required. We would like to install a Generac type generator for the building that would power the building in the event that the power would be out for an extended period.	Structure Infrastructure	Extended power outage during the winter.	Conneaut Lake Borough	Short Term	2.15



Action No.	Municipality	Action	Category	Hazards Addressed	Lead Agency	Time Schedule	Priority Score
8	Vernon Township	Install Structures upstream that would prevent an ice jam from forming in locations were flooding could have a serious financial impact.	Structure Infrastructure; Natural Systems Protection	Flooding due to Ice Jams in winter time.	Vernon Township, City of Meadville, West Mead Township	Long Term	2
9	Blooming Valley Borough	Hire contractors to perform roadside tree trimming and tree removals.	Structure Infrastructure; Natural Systems Protection	Down trees, power outages, and blocked roadways from high winds.	Blooming Valley Borough	Short Term	2
10	City of Titusville	Mitigation should include an engineering study to design and implement bank stabilization, dredging of the stream bed and inspection and repair and / or replacement of the Breed Street Bridge.	Structure Infrastructure; Natural Systems Protection	Where Trout Run enters the City is a point of concern for flooding. The streambed takes a sharp turn and causes a great deal of bank erosion during significant storm events, this in turn leads to erosion and sediment issues further downstream.	City of Titusville	Short Term	2

Action No.	Municipality	Action	Category	Hazards Addressed	Lead Agency	Time Schedule	Priority Score
11	Hayfield Township	<p>For the 1st problem, tree cutting companies will be contacted and estimates will be requested. The affected sections of the roads mentioned will be shown to them and quotations will be obtained. After quotes have been received, a determination will be made as to the affordability that this service can be obtained.</p> <p>For the 2nd problem, the affected municipal services will be contacted to request input and cost estimates. In addition, separate estimates will be required from contractors with large excavation equipment, capable of removing and replacing this size of culvert pipe. All materials and partial labor will be provided by the township for this phase. After all costs have been obtained a decision will be made regarding this project.</p>	Structure Infrastructure; Natural Systems Protection	<p>The 1st problem is the growth of trees overhanging power lines and roadways in several locations in the township. These locations include sections of the following roads: Black Road, Coleman Road, Locke Road, Denny Road and Roundtop Road.</p> <p>The 2nd problem is a deteriorating culvert pipe at the intersection of Reservoir and Mook Roads. Repairing this culvert is not possible, and a complete replacement is required. Prior to starting physical work multiple agencies must be contacted and included in this project to address re-routing or temporary stoppage of water and sewage services that currently exist next to this culvert. Excessive rainfall in this area could quickly accelerate deterioration or possibly cause immediate failure of this culvert, resulting in potential damage to the municipal services mentioned, that are located nearby.</p>	Hayfield Township	Short Term	2
12	City of Meadville	The preferred alternative would be an ice boom or weir to catch and control ice above town in areas with less damage potential.	Structure Infrastructure	Ice jamming of French Creek during cold weather causes flooding backups in the downtown area.	City of Meadville	Long Term	2

Action No.	Municipality	Action	Category	Hazards Addressed	Lead Agency	Time Schedule	Priority Score
13	Springboro Boro/ Springboro Area Water Authority	Buy a 10 minute escape breathing device...the plant operator said he did not need a 30 minute tank like the firemen would need Page 1483SDSSpecsSummaryMore Like ThisJust For YouPart#: 50254Weight: 11.0 lbsBrand: Scott Health & Safety(HM) ELSA 10 Min. Emergency Escape Breathing DeviceEscape quickly and safely with 5 or 10 minute unitsProvides 360° visibilityRefillable cylindersPrice:\$659.95Need Help? Call 800-548-1234The ELSA Emergency Escape Breathing Device gives you the protectionnted to buy a 10 minute escape, breathing device from bluebook.com	Structure Infrastructure	we have no escape device/mask in case of a chemical leak/chlorine at the water pumping station	Springboro Borough	Immediate	1.95
14	City of Meadville	Significant evaluation (condition assessment/videoing, pipe size field verification, watershed modeling, etc.) of this portion of the City's stormwater system is needed to address regular flooding.	Structure Infrastructure	The City's stormwater system continues to experience flooding during moderate to heavy rain events in the "lower Park Avenue" section of the system. The west travel lane of Park Avenue between Linden Street and Willow Street floods regularly during these storm events. Additionally, it was this section of the stormwater system that is believed to have experienced "back feeding" from French Creek during the January 2018 French Creek ice jam event.	City of Meadville	Short Term	1.95

Action No.	Municipality	Action	Category	Hazards Addressed	Lead Agency	Time Schedule	Priority Score
15	City of Meadville	A prior condition assessment has revealed that complete replacement is recommended.	Structure Infrastructure	The City's stormwater management system includes several large culverts that carry natural streams or large volume stormwater conduits. the Waelde Court culvert is approximately 600 linear feet and carries a significant portion of the City's stormwater system on the north and east end of the City. Waelde Court Alley sits atop of this culvert and carries reasonable traffic volume related to Meadville Medical Center's Liberty Street campus parking system.	City of Meadville	Short Term	1.95
16	City of Meadville	Provide Meadville and other Crawford County municipalities with resources to adequately protect municipal data. Perhaps establish a County-wide IT security consortium that provides consulting to initially evaluate IT security risk.	Education Awareness; Local Plans Regulations	Risk of cyber attack, data encryption and ransom.	City of Meadville	Immediate	1.95
17	Conneautville Borough	Purchase a three phase mobile generator that can be used at either water well.	Structure Infrastructure	There is no three phase back up generator to run the water pumps if the electricity is disrupted.	Conneautville Borough	Short Term	1.95
18	County Wide	Distribute public information over social media and news media of winter storm forecasts and updated situational awareness.	Education Awareness	When winter storms occur, information to the public needs to be disseminated over various social and news media.	Crawford County	Immediate	1.95
19	EAST FAIRFIELD TOWNSHIP	WORK WITH THE LAND OWNER TO INSTALL BETTER DRAINAGE ON THE LAND TO DIVERT THE WATER	Natural Systems Protection	THE ROAD IS SUSCEPTIBLE TO FLOODING AND FAST MOVING RUN OFF WATER FROM THE FIELD ABOVE IT. DURING HEAVY RAINS THE WATER WILL RUN DOWN THE HILLSIDE AND OVER FLOW THE CONSTRAINTS OF THE DITCH ALLOWING FAST MOVING WATER AND LARGE DEBRIS TO FILL THE ROADWAY.	East Fairfield Township	Short Term	1.9

Action No.	Municipality	Action	Category	Hazards Addressed	Lead Agency	Time Schedule	Priority Score
20	West Mead Township	PennDOT needs to update its infrastructure, drainage pipes and storm sewer underdrainage prior to installation of new blacktop roadway now in the engineering stages. West Mead Township will be involved as some swales and drainage easements and maintenance may be necessary involving private property owners.	Structure Infrastructure	Upsizing and installation of new stormwater drainage system components to lessen the impact overland flooding onto public and private infrastructure along Alden Street, which is a PennDOT roadway. Entire area is located between 816 Alden Street and 20828 Alden Street Ext.	West Mead Township	Short Term	1.85
21	County Wide	Encourage municipalities to enforce zoning and building codes to not have structures built in landslide areas.	Local Plans Regulations	Buildings built on landslide potential soils will be damaged when a landslide occurs.	Crawford County	Short Term	1.85
22	Borough of Conneaut Lake	We would like to trim the trees that have a high probability of falling on power lines if there is a storm.	Structure Infrastructure	Very mature trees that have begun to lose large branches during storms and falling on power lines.	Conneaut Lake Borough	Immediate	1.85
23	Saegertown	Develop a new municipal water well.	Structure Infrastructure	Concerned about loss of a drinking water well due to drought or contamination.	Saegertown Borough	Short Term	1.8
24	Borough of Conneaut Lake	We would like to install a dry hydrant in the lake that is easily accessible to the responding fire departments . This would give us year round accessibly.	Structure Infrastructure	Need for a dry hydrant to supply water in the event of a large commercial fire in the area. Current tanker truck capacity is limited to 15-20 minutes.	Conneaut Lake Borough	Immediate	1.8
25	Wayne Township	Trim Trees in the ROW as Needed Throughout the Township	Structure Infrastructure	Utility Loss Due to Dead or Dying Trees Falling on Wires	Wayne Township	Long Term	1.8

Action No.	Municipality	Action	Category	Hazards Addressed	Lead Agency	Time Schedule	Priority Score
26	City of Meadville	Condition assessment with planned section replacement in order of priority at the recommendation of the City's Engineer	Structure Infrastructure	The City's stormwater system consists of several large culverts which are in marginal condition. The Neason Run culvert carries Neason Run, a tributary to Mill Run, which, itself, is an important urban tributary to French Creek. This culvert is approximately 3,700 linear feet, beginning at Liberty Street to the east and continuing westward to its confluence with Mill Run. The culvert requires significant maintenance and/or replacement.	City of Meadville	Short Term	1.8
27	Conneautville Borough	The soil that the dam was built with does not meet the current federal requirements and is in need of repairs.	Structure Infrastructure	High hazard dam in need of rehabilitation.	Conneautville Borough	Short Term	1.8

Action No.	Municipality	Action	Category	Hazards Addressed	Lead Agency	Time Schedule	Priority Score
28	West Fallowfield Township	The project to mitigate stormwater through stormwater improvements will be extremely costly and a tremendous financial hardship on West Fallowfield Township as a very small municipality. Proposed improvements being considered consist of the construction of a new stormwater management detention basin and storm sewer, stabilization of the open ditches with check dams to control stormwater runoff velocity, repair, restore and armor the roadway edge of pavement, roadway resurfacing, and pavement markings. The intent of the project is to provide a long-term solution for the safety of the travelling public, the management of stormwater runoff along the roadway, and to provide a significant improvement for the property owners and residents located on this roadway by restoring and reopening the original egress and ingress that was previously used by the property owners located on Rocky Glen Road.	Structure Infrastructure	<p>Closed portion of Rocky Glen Road- Northern End from intersection of SR18 southwardly approximately 2,500' to the driveway entrance of land currently owned by Frank &amp; Terrie Marrapese and described as tax parcel # 2606-020-2-A. This section of roadway was closed on August 1, 2019 due to unsafe roadway conditions that were caused by extraordinary rainfalls that created significant damages to the roadway and eroded roadside ditches.</p> <p>Rocky Glen Road is a narrow rural roadway with stormwater conveyance facilities consisting of open ditches and short segments of culverts for private driveway crossings. The ditches have eroded to depths in various places to over 7 feet. The berms of the roadway have also eroded. The bituminous surface has cracked throughout and the roadway and the roadway edges have collapsed and fallen into the ditches in several places. There are no guide rails along this roadway.</p> <p>When the culverts get plugged with debris, stormwater and debris is being cast over and across the SR0018 roadway at the intersection with Rocky Glen Road and Atlantic Road. SR0018 is a main highway, heavily traveled by all types of vehicles including semi trucks.</p>	West Fallowfield Township	Short Term	1.75
29	Venango Township	Enlarge and realign the drainage pipe and replace head and wing walls. Remove gravel bars, stabilize the stream banks with vegetation and grade and profile outlet area.	Structure Infrastructure	When quick hard rains or significant snow melt occurs, the drainage pipe and concrete head and wing walls cannot handle the water flow which causes flooding across the roadway.	Venango Township	Short Term	1.7

Action No.	Municipality	Action	Category	Hazards Addressed	Lead Agency	Time Schedule	Priority Score
30	County Wide	Encourage municipalities to enforce zoning and building codes to prohibit building in earthquake areas.	Local Plans Regulations	Structures built in earthquake areas will be damaged if an earthquake occurs.	Crawford County	Short Term	1.7
31	Conneautville Borough	Remove two buildings and turn properties into green space.	Natural Systems Protection	Two blighted properties are falling down and could impact Conneaut Creek. These are in the floodplain and are flooded frequently.	Conneautville Borough	Short Term	1.65
32	Borough of Conneaut Lake	We would like to replace this pipe with a 30" pipe and to clear the area at the end for more effective drainage.	Structure Infrastructure	Storm water causing flooding. The current pipe to carry storm water is 18" not large enough to effectively carry the storm water from 4th street down Strawberry Alley to the outlet east of 1st street. Flooding occurs on the road where storm drains back up and residents experience their basements flooding several times throughout the year. The flow from the end of the pipe is impeded by sediment build up compounding the problem.	Conneaut Lake Borough	Short Term	1.65
33	Sadsbury Township	Provide program for homeowners to install rain barrels and/or dry wells to help control storm water runoff from houses.	Education Awareness; Structure Infrastructure	Flooding	Sadsbury Township	Immediate	1.65
34	East Mead Township	Make culvert pipe larger, longer and deeper depending on the water direction. More control on pipe entrances to handle the water.	Natural Systems Protection	Various streams cross North Wayland Road in several places causing water erosion and freezing over during winter months. Uncontrollable at this time. Make culvert pipe	East Mead Township	Short Term	1.65



Action No.	Municipality	Action	Category	Hazards Addressed	Lead Agency	Time Schedule	Priority Score
35	North Shenango Township	Trim trees in the vicinity of utility lines throughout the Township, with the co-operation of the electric & phone companies.	Natural Systems Protection	Overgrown trees in utility lines throughout the township. Cause power outages when trees come down in storms.	North Shenango Township	Short Term	1.65
36	Spartansburg Borough	Council will authorize the removal of trees that pose a possible issue near powerlines within the Borough limits.	Natural Systems Protection	Older or diseased trees near powerlines often causing power outages during strong storms	Spartansburg Borough	Short Term	1.65
37	Conneautville Borough	Remove trees so the road can dry out. Enhance storm water runoff.	Structure Infrastructure	Mulberry Lane continues to be damaged by storm water runoff.	Conneautville Borough	Short Term	1.65
38	Athens Township	Coordinate with utility companies and property owners to conduct tree trimming/removal projects throughout the township where necessary.	Natural Systems Protection	There are some trees that could come down in a storm that could block roads and bring down power lines.	Athens Township	Immediate	1.65

Action No.	Municipality	Action	Category	Hazards Addressed	Lead Agency	Time Schedule	Priority Score
39	West Fallowfield Township	Replacement of the existing culvert with a substantially larger 5' x 12' precast concrete box culvert capable of handling the appropriate water volume based on hydraulic calculations performed by a certified engineer. Create inlet and outlet protection surrounding the new culvert. Make stormwater improvements to stabilize the ditches on the north and south side of the culvert. Replace roadway asphalt in the location of the culvert replacement. The estimated project roadway corridor length is approximately 1,400 lineal feet.	Structure Infrastructure	There is a culvert crossing for an unnamed tributary to Crooked Creek which is in a poor state of repair. The culvert is undersized which has caused stormwater overland flows to the top of Rocky Glen Road on multiple occasions. The downstream side of the roadway has been washed out and repaired by the township when this occurs. The concern is the potential for this culvert to be washed out and the roadway to be severed. If this occurred, 22 properties would have no vehicular access. The project scope is to replace the existing culvert crossing with a new properly sized culvert with proper inlet and outlet protection, which will prevent stormwater from topping the roadway and eroding the downstream road embankment. There is also the recurring issue of the ditches washing out and eroding the edge of pavement on the slopes approaching the culvert crossing. The northern end of Rocky Glen Road was closed on August 1, 2019 due to unsafe roadway conditions. The remainder of this road is currently open; however, this proposed culvert crossing replacement on the southern end of Rocky Glen Road is necessary to ensure the property owners on Rocky Glen maintain the only ingress and egress currently open for both private and emergency vehicular use.	West Fallowfield Township	Immediate	1.6
40	Summit Township	Contact information for utility companies and road crew on Township website. Cooperation with the fire department on clean up.No other action planned.	Natural Systems Protection	Tornados with resulting road blockages and possible power outages	Summit Township	Immediate	1.55

Action No.	Municipality	Action	Category	Hazards Addressed	Lead Agency	Time Schedule	Priority Score
41	Townville Borough	We are planning to replace a section of the old drainage pipe that has had some problems in the past.	Structure Infrastructure	Drainage area prone to flooding and overflow from excessive rain.	Townville Borough	Immediate	1.5
42	Woodcock Township	Obtaining permit to be in the creek; using excavator to remove bar and realign creek	Natural Systems Protection	Gravel/Sand bar in Woodcock Creek; may cause flooding of properties in close proximity or downstream.	Woodcock Township	Immediate	1.5
43	Oil Creek Township	Gaswell Rd- Add crossover pipes to control erosion of banks and ditches.	Structure Infrastructure	Erosion	Oil Creek Township	Immediate	1.5
44	East Mead Township	Replace Stone Culvert with proper sizing of culvert pipe and road improvement and covering.	Natural Systems Protection	On East Oil Creek Road- Major concern of actual roadway possible collapsing.	East Mead Township	Short Term	1.5
45	East Mead Township	Repair the approaches and abutments and further stabilization of the under girth of the bridge structure itself.	Structure Infrastructure	Bridge on Hinkson Road follows the guidelines of the EADS inspection program of Crawford County. Problem with approaches and abutments of the bridge.	East Mead Township	Short Term	1.5
46	East Mead Township	Installation of guide rails. Make further repairs to stabilize the bridge of the under girth of the bridge structure itself. Both ends of the bridge approaches needs repaired.	Structure Infrastructure	Smith Road Bridge data follows the guidelines of EADS inspection program of Crawford County. Attention needs to be given to the bridge approaches and abutments. Specific attention given to the under girth of the bridge structure itself was given notice in the report. Occasion road flooding occurs.	East Mead Township	Short Term	1.5
47	East Fallowfield Township	Remove existing pipes and replace with one large arch pipe big enough to handle all the water.	Structure Infrastructure	Two culverts on Pine Road that cannot handle large amounts of water, therefore the water overflows the road causing flooding.	East Fallowfield Township	Short Term	1.5

Action No.	Municipality	Action	Category	Hazards Addressed	Lead Agency	Time Schedule	Priority Score
48	West Mead Township	At this time, we do not have an immediate solution as this is a private property issue but in need of attention. We have requested assistance over many years to help mitigate the problem. We have been unable to secure any assistance from FEMA/PEMA or any state or local agencies at this time.	Structure Infrastructure	Bridge over Thurston Run was replaced many years ago and scour hole is now found at the downstream end of the bridge/pipe structure with gravel and bank erosion that has been occurring next to a home located at 11595 Thurston Road. The property owner has experienced the loss of approximately 20 feet of property so that now the bank has eroded to within 2 feet of her home. In extremely wet or heavy precipitation years, the erosion is worse and a tree is located on the bank with root exposure with the potential to topple at any time.	West Mead Township	Long Term	1.45
49	Crawford County Department of Public Safety	Crawford County should conduct another hazardous materials commodity flow study to evaluate what hazardous materials are stored, used, and transported in Crawford County.	Local Plans Regulations	The county's hazardous materials commodity flow study is outdated.	Crawford County	Short Term	1.45
50	Crawford County	Update the Crawford County Department of Public Safety, Planning, and GIS web-sites with updated information to protect the public.	Education Awareness	Educating the public on hazards that can affect them, ways to be prepared, and actions to take to mitigate the impact.	Crawford County	Short Term	1.4

Action No.	Municipality	Action	Category	Hazards Addressed	Lead Agency	Time Schedule	Priority Score
51	SOUTH SHENANGO TOWNSHIP	CULVERTS- REPLACE CULVERT WITH UP TO DATE PIPE AND BUILD A SUBSTANTIAL HEADWALL TO SUPPORT NEW TRENDING WEATHER PATTERNSTREE REMOVAL - SET BUDGET FOR HIRING TREE SERVICE AND POSSIBLE EQUIPMENT RETAL FOR TOWNSHIP EMPLOYEES ALLOTMENTS- SOME ALLOTMENTS IN THE TOWNSHIP ONLY HAVE ONE WAY IN AND ONE WAY OUT. GET EASEMENTS AND RIGHT AWAYS GRANTED TO PUT NEW ROADWAYS IN. SOME OF THE ALLOTMENTS INCLUDE (DOUTHETT,LAKEVIEW,LITTLEFAWN ACRES, SHENANGO LAKES 1, SHENANGO LAKES 2)	Local Plans Regulations	1. CULVERTS - DEEZIK RD FLOODING AND ROAD WASHOUTS2. TREE REMOVAL - VARIOUS LOCATIONS ACROSS TOWNSHIP3. ALLOTMENT ENTER AND EXIT POINTS	South Shenango Township	Short Term	1.4
52	West Shenango Township	Printing out Flyers to distribute or hang at office.Tree trimming, ditching along roadways and culverts.	Education Awareness; Local Plans Regulations; Structure Infrastructure; Natural Systems Protection	Covid 19 PandemicSevere WeatherDamage to some roadways due to past flooding	West Shenango Township	Immediate	1.4
53	Sadsbury Township	Upgrade storm sewer infrastructure and add retention areas.	Structure Infrastructure	Flooding of residential area and roadways in the Conneaut Knolls Plan of Lots	Sadsbury Township	Short Term	1.35
54	Sadsbury Township	Upgrade storm water infrastructure and add retention areas.	Structure Infrastructure	Flooding of residential properties and roadways.	Sadsbury Township	Short Term	1.35
55	Sadsbury Township	Upgrade storm water infrastructure	Structure Infrastructure	Flooding of residential properties and roadways	Sadsbury Township	Short Term	1.35
56	Sadsbury Township	Upgrade storm water infrastructure and add retention area.	Structure Infrastructure	Flooding of residential properties and roadways	Sadsbury Township	Short Term	1.35

Action No.	Municipality	Action	Category	Hazards Addressed	Lead Agency	Time Schedule	Priority Score
57	Sadsbury Township	Upgrade storm water infrastructure and add retention area.	Structure Infrastructure	Major flooding of residential properties and roadways during storm events.	Sadsbury Township	Short Term	1.35
58	Sadsbury Township	Upgrade storm water infrastructure and add retention area.	Structure Infrastructure	Major flooding during rain events	Sadsbury Township	Short Term	1.35
59	Sadsbury Township	Upgrade storm water infrastructure, add retention area, stabilize bank of Willow Run from Rt 18 to Conneaut Lake.	Structure Infrastructure	Majoring flooding of residential properties and roadways during rain events.	Sadsbury Township	Short Term	1.35
60	Sadsbury Township	Add retention area to control storm water.	Structure Infrastructure	Major flooding during rain events.	Sadsbury Township	Short Term	1.35
61	Sadsbury Township	Add retention area to control storm water. This would slow water as it traverses to Conneaut Lake and help diminish flooding downstream.	Structure Infrastructure	Flooding	Sadsbury Township	Short Term	1.35
62	Sadsbury Township	Upgrade storm water infrastructure.	Structure Infrastructure	Flooding of residential properties and roadways.	Sadsbury Township	Short Term	1.35
63	Sadsbury Township	Add new storm water infrastructure.	Structure Infrastructure	Flooding of residential properties during rain events.	Sadsbury Township	Immediate	1.35
64	Sadsbury Township	Upgrade storm water infrastructure.	Structure Infrastructure	Flooding of residential properties and roadways during rain events.	Sadsbury Township	Immediate	1.35
65	Centerville Borough	To hire a company to clean catch basins and associated piping.	Structure Infrastructure	To prevent flooding catch basins need cleaned.	Centerville Borough	Immediate	1.35
66	Crawford County Department of Public Safety	Help educate businesses and residents on how to protect against cyber attacks through education and training.	Education Awareness	Cyber Security has affected the operations of businesses and residents in Crawford County.	Crawford County, Pennsylvania State Police	Immediate	1.3
67	Oil Creek Township	Kinsack Rd- Daylighting to let sunlight onto this road surface.	Natural Systems Protection	Shaded Areas from Trees and Brush	Oil Creek Township	Short Term	1.3
68	Oil Creek Township	Foote Rd also needs daylighting to dry up shaded areas.	Natural Systems Protection	Tree Cover	Oil Creek Township	Immediate	1.3

Action No.	Municipality	Action	Category	Hazards Addressed	Lead Agency	Time Schedule	Priority Score
69	Woodcock Township	Remove beaver dams- We have built “beaver deceivers” in the past and they work, but the beavers always find another way! Gravel Bar in Woodcock Creek- Obtain proper permits to mitigate gravel bar.	Natural Systems Protection	Beaver Dams- possible cause of potential flooding Gravel Bar- possible cause of potential flooding	Woodcock Township	Immediate	1.2
70	Conneaut Township	New, wider bridge put in	Natural Systems Protection	West Road Bridge was destroyed in 2003 by Spring snow melt and a big storm (flash flooding).	Conneaut Township	Short Term	1.2
71	Rockdale Township	completely and safely demolish the house. Remove the cars	Local Plans Regulations; Structure Infrastructure	burn house and out of inspection cars. The house and cars are a blight hazard. There is a basement under the house which might attract children or teens to investigate. Ferrel animals will take up residence in this location. this house is breaking a township ordinance.	Rockdale Township	Immediate	1.2
72	Townville Borough	Need to come up with grant funds and sources to try and help with the replacement cost of the bridge.	Structure Infrastructure	Bridge will need replacing eventually	Townville Borough	Long Term	1.15
73	Rockdale Township	remove and replace culvert pipes	Structure Infrastructure	This road has deteriorated past the point of safety. It has been maintained regularly but it has been almost 20 since the initial paving and now it must be completely redone. The Township plans to remove 2 large culvert pipes in this road before any paving activity begins so that they can settle in	Rockdale Township	Short Term	1.15
73B	County-Wide	Elevation, Acquisition, Demolition & Reconstruction	Structure Infrastructure	Elevate, Acquire, and Demolish or Reconstruct structures in flooded areas	Municipalities	Long Term	1.15

Action No.	Municipality	Action	Category	Hazards Addressed	Lead Agency	Time Schedule	Priority Score
74	Borough of Conneaut Lake	A new generator is needed. Since the Conneaut Lake Borough Water Authority and Sadsbury Twp. each use a portion of the the sewage plant and Sadsbury is going to replace their generator, the borough would like to contribute to the purchase as a less expensive option and then be able to share the generator with Sadsbury. The estimated contribution would be aprox. \$50,000.	Structure Infrastructure	During a recent power outage the generator that runs the sewage plant stopped running and is not repairable.	Conneaut Lake Borough	Immediate	1.15
75	Greenwood	Ditch work.	Education Awareness; Structure Infrastructure	Weather related, heavy rains, washed out roads, high winds.(tornadoes).	Greenwood Township	Long Term	1
76	Linesville Borough	Borough Council plans to have an electric contractor install a generator for backup power that will supply all electrical needs.	Structure Infrastructure	electrical outages	Linesville Borough	Immediate	1
77	Summerhill Township	No planned action.	Local Plans Regulations	Most likely hazards in Summerhill Township are tornado and flooding.	Summerhill Township	Long Term	1
78	Spring Township	We are in constant awareness of the plugging of culverts, and are correcting any issues with replacing as needed.	Natural Systems Protection	possible flooding on some roads	Spring Township	Immediate	1
79	Beaver Township	Ongoing road improvements to combat road flooding	Structure Infrastructure; Natural Systems Protection	Flood hazards, tornado	Beaver Township	Long Term	1
80	Crawford County Department of Public Safety	Assist municipalities to create drought emergency plans.	Local Plans Regulations	Plans are needed to help municipalities respond and recovery from drought.	Crawford County, Conservation District	Short Term	1



Action No.	Municipality	Action	Category	Hazards Addressed	Lead Agency	Time Schedule	Priority Score
81	Crawford County Department of Public Safety	Conduct educational programs and distribute educational flyers near waterways.	Education Awareness	Invasive species are spread through out the county.	Crawford County		1
82	Oil Creek Township	More Culvert Pipes and more turn outs.	Structure Infrastructure	Stormwater Drainage Issues- add and replace culvert pipes and more turn outs needed.	Oil Creek Township	Short Term	1
83	Oil Creek Township	Ditching to control erosion of roadway.	Natural Systems Protection	Erosion Issue	Oil Creek Township	Short Term	1
84	Oil Creek Township	Ditching to control erosion.	Natural Systems Protection	Erosion	Oil Creek Township	Short Term	1
85	Venango Borough	Venango Borough has been actively trimming trees around the borough. This concern will be addressed by council every year.	Natural Systems Protection	Overgrown trees cause hazards to drivers by impairing view, as well as could impact utilities during a storm.	Venango Borough	Immediate	1
86	Wayne Township	Replace & Upsize Culvert Pipes as Needed Throughout the Township	Structure Infrastructure	Flooding, overflow of Culverts	Wayne Township	Long Term	1
87	Cambridge Township	Township is considering arranging for private trapping however it may not be possible outside of the road right-of-way. Township will continue attempts to negotiate with the landowner to access in order to prevent road damage and excessive manpower or resources to be expended.	Natural Systems Protection	Seasonal flooding:A large, private pond is located along the east side of Humes Hill Road. The pond elevation continues to rise due to an active beaver population. During heavy rainfall events, localized flooding results. Township personnel have discussed the situation with the property owner however access has not been granted in order to trap/ transfer the beavers. PA Game Commission has been contacted, however, they cannot order beaver trapping on private property.	Cambridge Township	Short Term	1
88	Troy Township Supervisors	Grading roads and keeping the ditches open and cleaned out.	Education Awareness	Flooding and wash outs	Troy Township	Immediate	1
89	Summerhill Township	Improving road drainage, culverts	Structure Infrastructure; Natural Systems Protection	Flooding, tornado	Summerhill Township	Long Term	1

# 9. PLAN MAINTENANCE

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## 9.1 UPDATE PROCESS SUMMARY

Monitoring, evaluating, and updating this plan is critical to maintaining its value and success in Crawford County's hazard mitigation efforts. Having the current leadership in the Planning Office will help to ensure effective implementation of mitigation activities paves the way for continued momentum in the planning process and gives direction for the future. This section explains who will be responsible for maintenance activities and what those responsibilities entail. It also provides a methodology and schedule of maintenance activities including a description of how the public will be involved on a continued basis.

## 9.2 MONITORING, EVALUATING AND UPDATING THE PLAN

The Crawford County MPC established for the 2020 HMP is designated to lead plan maintenance processes of monitoring, evaluation and updating with support and representation from all participating municipalities. The MPC will coordinate maintenance efforts, but the input needed for effective periodic evaluations will come from community representatives, local emergency management coordinators and planners, the general public, and other important stakeholders. In addition, the MPC will serve in an advisory capacity to the Crawford County Board of Commissioners, Crawford County Planning Department, and Department of Public Safety.

Each municipality will designate a community representative to monitor implementation of mitigation activities and hazard events within their respective communities. The local emergency management coordinator would be suitable for this role. This individual will be asked to work with the MPC to provide updates on applicable mitigation actions and feedback on changing hazard vulnerabilities within their community.

In addition, the municipal monitor will be responsible for reviewing the planning and land use regulatory element of the municipality's capability assessment to identify potential opportunities for continued incorporation of the HMP into local planning mechanisms and will also identify locally generated plans, information, reports, etc. that may be capable of being incorporated into the update of the 2020 HMP.

The MPC will oversee the progress made on the implementation of action items identified in the 2020 HMP and modify actions, as needed, to reflect changing conditions. The Crawford County MPC will meet annually on the third Thursday in March to evaluate the plan and discuss specific

coordination efforts that may be needed with participating jurisdictions and other stakeholders. The annual evaluation may include the participation of individual municipal monitors, or at least will include reports prepared by them.

The annual evaluation of the 2020 HMP will not only include an investigation of whether mitigation actions were completed, but also an assessment of how effective those actions were in mitigating losses. A review of the qualitative and quantitative benefits (or avoided losses) of mitigation activities will support this assessment. Results of the evaluation will then be compared to the goals and objectives established in the plan and decisions will be made regarding whether actions should be discontinued, or modified in any way in light of new developments in the community. Progress will be documented by the MPC for use in the next HMP Update and submitted to the Office of Emergency Services. Finally, the MPC will monitor incorporation elements of the HMP into other planning mechanisms. The annual reviews will be led by Allen Clark, EMA Coordinator and

Zach Norwood, Planning Director.

The 2020 HMP will be updated by the FEMA approved five-year anniversary date, as required by the Disaster Mitigation Act of 2000, or following a disaster event. Future plan updates will account for any new hazard vulnerabilities, special circumstances, or new information that becomes available. During the five-year review process, the following questions will be considered as criteria for assessing the effectiveness of the Crawford County HMP.

- *Has the nature or magnitude of hazards affecting the county changed?*
- *Are there new hazards that have the potential to impact the county?*
- *Do the identified goals and actions address current and expected conditions?*
- *Have mitigation actions been implemented or completed?*
- *Has the implementation of identified mitigation actions resulted in expected outcomes?*
- *Are current resources adequate to implement the plan?*
- *Should additional local resources be committed to address identified hazards?*

Issues that arise during monitoring and evaluation which require changes to the risk assessment, mitigation strategy, and other components of the plan will be incorporated during future updates.

Update process for plan prior to 5-year update. Any interested party wishing for an update of the HMP sooner than the 5-year update will submit such a request to the MPC for consideration through Allen Clark, EMA Coordinator of the Crawford County DPS and Zach Norwood, Director of the County Planning Office. The request shall be accompanied by a detailed rationale. The MPC will evaluate all such requests and determine whether the update request should be acted upon. If the decision is in the affirmative, an assignment will be made for an individual to author the update. The draft updated section along with a detailed rationale will be submitted to the MPC. The MPC will circulate the draft updated section to every jurisdiction participating in the plan for comment and after an appropriate period of time, the MPC shall make a decision to update the plan at least partially based on the feedback received from the other jurisdiction. County and municipal adoptions will then occur.

### **9.3 CONTINUED PUBLIC INVOLVEMENT**

As was done during the development of the 2020 HMP, the Crawford County MPC will involve the public during the evaluation and update of the HMP through various workshops and meetings. The public will have access to the current HMP through their local municipal office and Crawford County Planning and Public Safety, and via the County's web-site. Information on upcoming events related to the HMP or solicitation for comments will be announced via newsletters, newspapers, mailings, and the county website. The public is encouraged to submit comments on the HMP at any time. The Crawford County MPC will incorporate all relevant comments during the next update of the hazard mitigation plan.

# 10. PLAN ADOPTION

The Plan was submitted to the Pennsylvania State Hazard Mitigation Officer on January 25, 2021.

This section of the plan includes copies of the local adoption resolutions passed by Crawford County and its municipal governments. The completed Local Mitigation Plan Review Crosswalk can be found in Appendix B. Adoption resolution templates are provided to assist the County and municipal governments with recommended language for future adoption of the HMP.

County Adoption Resolution

**Crawford County 2020 Hazard Mitigation Plan  
County Adoption Resolution**  
Resolution No. \_\_\_\_\_  
Crawford County, Pennsylvania

**WHEREAS**, the municipalities, Crawford County, Pennsylvania is most vulnerable to natural and human-caused hazards which may result in loss of life and property, economic hardship, and threats to public health and safety, and

**WHEREAS**, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) requires state and local governments to develop and submit for approval to the President a mitigation plan that outlines processes for identifying their respective natural hazards, risks, and vulnerabilities, and

**WHEREAS**, the municipalities acknowledge the requirements of Section 322 of DMA 2000 to have an approved Hazard Mitigation Plan as a prerequisite to receiving post-disaster Hazard Mitigation Grant Program Funds, and

**WHEREAS**, the Crawford County 2020 Hazard Mitigation Plan has been developed by the Crawford County office of Emergency Services and the Crawford County Planning and Community Development Office in cooperation with other county departments, local municipal officials, institutional stakeholders, and the citizens of Crawford County, and

**WHEREAS**, a public involvement process consistent with the requirements of DMA 2000 conducted to develop the Crawford County 2020 Hazard Mitigation Plan, and

**WHEREAS**, the Crawford County 2020 Hazard Mitigation Plan recommends mitigation activities that will reduce losses to life and property affected by both natural and human-caused hazards that face the County and its municipal governments,

**NOW THEREFORE BE IT RESOLVED** by the governing for the County of Crawford that:

- o The Crawford County 2020 Hazard Mitigation Plan is hereby adopted as the official Hazard Mitigation Plan of the County, and
- o The respective officials and agencies identified in the implementation strategy of the Crawford County 2020 Hazard Mitigation Plan are hereby directed to implement the recommended activities assigned to them.
- o

**ADOPTED**, this \_\_\_\_\_ day of \_\_\_\_\_, 2021

ATTEST:

**CRAWFORD COUNTY COMMISSIONERS**

\_\_\_\_\_  
By \_\_\_\_\_  
By \_\_\_\_\_  
By \_\_\_\_\_

Municipal Adoption Resolution

**Crawford County 2020 Hazard Mitigation Plan  
Municipal Adoption Resolution**  
Resolution No. \_\_\_\_\_  
Choose an item., Crawford County, Pennsylvania

**WHEREAS**, the Choose an item., Crawford County, Pennsylvania is most vulnerable to natural and human-caused hazards which may result in loss of life and property, economic hardship, and threats to public health and safety, and

**WHEREAS**, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) requires state and local governments to develop and submit for approval to the President a mitigation plan that outlines processes for identifying their respective natural hazards, risks, and vulnerabilities, and

**WHEREAS**, the Choose an item. acknowledges the requirements of Section 322 of DMA 2000 to have an approved Hazard Mitigation Plan as a prerequisite to receiving post-disaster Hazard Mitigation Grant Program Funds, and

**WHEREAS**, the Crawford County 2020 Hazard Mitigation Plan has been developed by the Crawford County office of Emergency Services and the Crawford County Planning and Community Development Office in cooperation with other county departments, local municipal officials, institutional stakeholders, and the citizens of Crawford County, and

**WHEREAS**, a public involvement process consistent with the requirements of DMA 2000 conducted to develop the Crawford County 2020 Hazard Mitigation Plan, and

**WHEREAS**, the Crawford County 2020 Hazard Mitigation Plan recommends mitigation activities that will reduce losses to life and property affected by both natural and human-caused hazards that face the County and its municipal governments,

**NOW THEREFORE BE IT RESOLVED** by the governing for the Choose an item. :

- o The Crawford County 2020 Hazard Mitigation Plan is hereby adopted as the official Hazard Mitigation Plan of the Choose an item., and
- o The respective officials and agencies identified in the implementation strategy of the Crawford County 2020 Hazard Mitigation Plan are hereby directed to implement the recommended activities assigned to them.

**ADOPTED**, this \_\_\_\_\_ day of \_\_\_\_\_, 2021

ATTEST:

Choose an item.

\_\_\_\_\_  
By \_\_\_\_\_  
By \_\_\_\_\_  
By \_\_\_\_\_

- APPENDIX A:       References**
- APPENDIX B:       FEMA Local Mitigation Review Tool**
- APPENDIX C:       Meeting and Support Documents**
- APPENDIX D:       Municipal Flood Maps**
- APPENDIX E:       Critical Facilities**
- APPENDIX F:       HAZUS Methodology and Results Reports**
- APPENDIX G:       Dam Failure Profile**
- APPENDIX H:       Mitigation Project by FEMA Lifelines**

# APPENDIX A - BIBLIOGRAPHY

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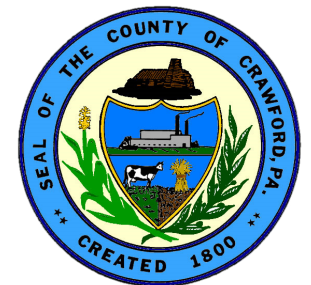
CRAWFORD COUNTY, PENNSYLVANIA

**Prepared By:**

Crawford County Department of Public Safety

Crawford County GIS

Crawford County Planning



# Appendix A - Bibliography

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National Drought Mitigation Center, 2020 - <https://drought.unl.edu/>

National Flood Insurance Program - <https://www.floodsmart.gov/>

National Integrated Drought Information System (NIDIS): U.S. Drought Portal which can be found at [www.drought.gov](http://www.drought.gov).

National Weather Service, Cleveland - [www.weather.gov/clev](http://www.weather.gov/clev)

National Weather Service - [https://www.weather.gov/cle/event\\_20181002\\_tornadoes](https://www.weather.gov/cle/event_20181002_tornadoes)

NOAA National Centers for Environmental information, Climate at a Glance: Global Mapping - <https://www.ncdc.noaa.gov/cag/>

NOAA - <https://www.ncdc.noaa.gov/>

# Appendix A - Bibliography

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Pennsylvania Criminal Intelligence Center - <https://www.psp.pa.gov/Pages/Pennsylvania-Criminal-Intelligence-Center.aspx>

Pennsylvania Department of Agriculture - [https://www.agriculture.pa.gov/Plants\\_Land\\_Water/PlantIndustry/GISC/Pages/default.aspx](https://www.agriculture.pa.gov/Plants_Land_Water/PlantIndustry/GISC/Pages/default.aspx)

Pennsylvania Department of Conservation and Natural Resources - <https://www.dcnr.pa.gov/Conservation/Water/Groundwater/PAGroundwaterInformationSystem/Pages/default.aspx>

Pennsylvania Department of Environmental Protection, Data and Tools Reports - <https://www.dep.pa.gov/DataandTools/Reports/Oil%20and%20Gas%20Reports/Pages/default.aspx>

Pennsylvania Department of Environmental Protection - <https://www.dep.pa.gov/Business/Water/PlanningConservation/Drought/Pages/default.aspx>.

Pennsylvania Department of Environmental Protection - <https://www.dep.pa.gov/Business/Water/Waterways/DamSafety/Pages/default.aspx>

Pennsylvania Emergency Management Agency, 2019 State All-Hazard Plan

Pennsylvania Hazard Mitigation Plan Standard Operating Guide, 2020 - <https://www.pema.pa.gov/Mitigation/Planning/Pages/default.aspx>

Pennsylvania iMapInvasives - <https://www.paimapinvasives.org/>

Perry Nuclear Power Plant - <https://www.nrc.gov/info-finder/reactors/perr1.html>

Storm Predication Center, Enhanced F Scale Damage Indicators - <https://www.spc.noaa.gov/efscale/>

United States Census Bureau, State and County Quick Facts - <https://www.census.gov/programs-surveys/sis/resources/data-tools/quickfacts.html>

United States Department of Agriculture - <http://www.rma.usda.gov/data/cause.html>

United States Department of Agriculture - <https://www.nass.usda.gov/Publications/AgCensus/2017/index.php>

United States Geological Society - <https://www.usgs.gov/natural-hazards/earthquake-hazards/hazards>

United States Geological Society - <https://www.usgs.gov/natural-hazards/landslide-hazards>

World Health Organization - [www.who.int](http://www.who.int)



# APPENDIX B - LOCAL MITIGATION PLAN REVIEW TOOL

## CRAWFORD COUNTY 2020 WHOLE COMMUNITY HAZARD MITIGATION PLAN UPDATE

CRAWFORD COUNTY, PENNSYLVANIA

**Prepared By:**

Crawford County Department of Public Safety

Crawford County GIS

Crawford County Planning



# Appendix B - Local Mitigation Plan Review Tool

## LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA’s evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan’s strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

<b>Jurisdiction:</b> Crawford County	<b>Title of Plan:</b> 2020 Crawford County Hazard Mitigation Plan	<b>Date of Plan:</b> January 1, 2021
<b>Local Point of Contact:</b> Allen Clark	<b>Address:</b> 632 Pine Street Meadville, PA 16335	
<b>Title:</b> EMA Coordinator		
<b>Agency:</b> Crawford County Department of Public Safety		
<b>Phone Number:</b> 814-724-2552	<b>E-Mail:</b> aclark@co.crawford.pa.us	

<b>State Reviewer:</b>	<b>Title:</b>	<b>Date:</b>
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<b>FEMA Reviewer:</b>	<b>Title:</b>	<b>Date:</b>
<b>Date Received in FEMA Region</b> <i>(insert #)</i>		
<b>Plan Not Approved</b>		

# Appendix B - Local Mitigation Plan Review Tool

Plan Approvable Pending Adoption	
Plan Approved	

## SECTION 1: REGULATION CHECKLIST

**INSTRUCTIONS:** The Regulation Checklist must be completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the Plan by Element/sub-element and to determine if each requirement has been 'Met' or 'Not Met.' The 'Required Revisions' summary at the bottom of each Element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is 'Not Met.' Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in this Plan Review Guide in Section 4, Regulation Checklist.

1. REGULATION CHECKLIST	Location in Plan (section and/or page number)	Met	Not Met
<b>Regulation (44 CFR 201.6 Local Mitigation Plans)</b>			
<b>ELEMENT A. PLANNING PROCESS</b>			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Section 3, Planning Process, pages		
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Section 3.2, The Planning Team, pages		
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Section 3.4, Public Stakeholder Participation, pages		
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Section 1.4 Authority & References, pages Section 2, Community Profile, pages Section 5.2.1 Planning & Regulatory Capability, pages Section 5.3.5 Plan Integration, pages		
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Section 7, Plan Maintenance, pages		

# Appendix B - Local Mitigation Plan Review Tool

1. REGULATION CHECKLIST	Location in Plan			
Regulation (44 CFR 201.6 Local Mitigation Plans)	(section and/or page number)		Met	Not Met
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Certification of Annual Review Meetings, page ii; Record of Changes, page iii; Section 7, Plan Maintenance, pages			
<b><u>ELEMENT A: REQUIRED REVISIONS</u></b>				
<b>ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT</b>				
B1. Does the Plan include a description of the type, location, and extent of all-natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	Section 4.3, Hazard Profiles, pages . Each hazard has a section titled Location & Extent. The same process was used in human-made hazards.			
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	Section 4.3, Hazard Profiles, pages . Each hazard has section titles Past Occurrence & Future Occurrence accompanied by tables and mapping of data			
B3. Is there a description of each identified hazard’s impact on the community as well as an overall summary of the community’s vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Section 4.3, Hazard Profiles, pages . Each hazard has a section titled Vulnerability Assessment			
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Section 4.3.1 pages			
<b><u>ELEMENT B: REQUIRED REVISIONS</u></b>				

# Appendix B - Local Mitigation Plan Review Tool

1. REGULATION CHECKLIST	Location in Plan		
Regulation (44 CFR 201.6 Local Mitigation Plans)	(section and/or page number)	Met	Not Met
<b>ELEMENT C. MITIGATION STRATEGY</b>			
C1. Does the plan document each jurisdiction’s existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Section 5.2.1, Planning & Regulatory Capability, pages Section 5.2.5, Plan Integration pages		
C2. Does the Plan address each jurisdiction’s participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Pages Section 5.3.1 Planning & Regulatory Capability Floodplain Management, pages		
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Section 6.2, Mitigation Action Plan, pages		
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Section 6.4, Mitigation Action Plan, pages		
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Section 6.1, Update Process Summary, pages Section 6.4, Mitigation Action Plan, pages		
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Section 5.3.5 Plan Integration, pages Section 7.2, Monitoring, Evaluating, and Updating the Plan pages		
<b><u>ELEMENT C: REQUIRED REVISIONS</u></b>			
<b>ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION</b> (applicable to plan updates only)			

# Appendix B - Local Mitigation Plan Review Tool

1. REGULATION CHECKLIST	Location in Plan		
Regulation (44 CFR 201.6 Local Mitigation Plans)	(section and/or page number)	Met	Not Met
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Section 3.1, Update Process & Participation Summary, pages  Pages for each step of the HMP;  Section 4.1, page  Section 5.1, page  Section 6.1, page  Section 7.1, page		
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Section 6.1, Update Process Summary, pages		
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Section 4.4.2, Ranking Results, pages  Section 6.4, Mitigation Action Plan, pages		
<b><u>ELEMENT D: REQUIRED REVISIONS</u></b>			
<b>ELEMENT E. PLAN ADOPTION</b>			
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	Once the Plan is approved by PEMA & FEMA, Crawford County will adopt the Plan by resolution, Section 8, Plan Adoption, page		
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Once Crawford County adopts the Plan by resolution, the 51 municipalities will adopt the plan by resolution, pages		

# Appendix B - Local Mitigation Plan Review Tool

1. REGULATION CHECKLIST	Location in Plan			
Regulation (44 CFR 201.6 Local Mitigation Plans)	(section and/or page number)		Met	Not Met
<u>ELEMENT E: REQUIRED REVISIONS</u>				
<b>ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)</b>				
F1.				
F2.				
<u>ELEMENT F: REQUIRED REVISIONS</u>				

# Appendix B - Local Mitigation Plan Review Tool

## SECTION 2: PLAN ASSESSMENT

**INSTRUCTIONS:** The purpose of the Plan Assessment is to offer the local community more comprehensive feedback to the community on the quality and utility of the plan in a narrative format. The audience for the Plan Assessment is not only the plan developer/local community planner, but also elected officials, local departments and agencies, and others involved in implementing the Local Mitigation Plan. The Plan Assessment must be completed by FEMA. The Assessment is an opportunity for FEMA to provide feedback and information to the community on: 1) suggested improvements to the Plan; 2) specific sections in the Plan where the community has gone above and beyond minimum requirements; 3) recommendations for plan implementation; and 4) ongoing partnership(s) and information on other FEMA programs, specifically RiskMAP and Hazard Mitigation Assistance programs. The Plan Assessment is divided into two sections:

- 1. Plan Strengths and Opportunities for Improvement*
- 2. Resources for Implementing Your Approved Plan*

Plan Strengths and Opportunities for Improvement is organized according to the plan Elements listed in the Regulation Checklist. Each Element includes a series of italicized bulleted items that are suggested topics for consideration while evaluating plans, but it is not intended to be a comprehensive list. FEMA Mitigation Planners are not required to answer each bullet item, and should use them as a guide to paraphrase their own written assessment (2-3 sentences) of each Element.

The Plan Assessment must not reiterate the required revisions from the Regulation Checklist or be regulatory in nature, and should be open-ended and to provide the community with suggestions for improvements or recommended revisions. The recommended revisions are suggestions for improvement and are not required to be made for the Plan to meet Federal regulatory requirements. The italicized text should be deleted once FEMA has added comments regarding strengths of the plan and potential improvements for future plan revisions. It is recommended that the Plan Assessment be a short synopsis of the overall strengths and weaknesses of the Plan (no longer than two pages), rather than a complete recap section by section.

Resources for Implementing Your Approved Plan provides a place for FEMA to offer information, data sources and general suggestions on the overall plan implementation and maintenance process. Information on other possible sources of assistance including, but not limited to, existing publications, grant funding or training opportunities, can be provided. States may add state and local resources, if available.

### A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.



# Appendix B - Local Mitigation Plan Review Tool

## Element A: Planning Process

How does the Plan go above and beyond minimum requirements to document the planning process with respect to:

- *Involvement of stakeholders (elected officials/decision makers, plan implementers, business owners, academic institutions, utility companies, water/sanitation districts, etc.);*
- *Involvement of Planning, Emergency Management, Public Works Departments or other planning agencies (i.e., regional planning councils);*
- *Diverse methods of participation (meetings, surveys, online, etc.); and*
- *Reflective of an open and inclusive public involvement process.*

## Element B: Hazard Identification and Risk Assessment

In addition to the requirements listed in the Regulation Checklist, 44 CFR 201.6 Local Mitigation Plans identifies additional elements that should be included as part of a plan's risk assessment. The plan should describe vulnerability in terms of:

1. *A general description of land uses and future development trends within the community so that mitigation options can be considered in future land use decisions;*
2. *The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; and*
3. *A description of potential dollar losses to vulnerable structures, and a description of the methodology used to prepare the estimate.*

How does the Plan go above and beyond minimum requirements to document the Hazard Identification and Risk Assessment with respect to:

- *Use of best available data (flood maps, HAZUS, flood studies) to describe significant hazards;*
- *Communication of risk on people, property, and infrastructure to the public (through tables, charts, maps, photos, etc.);*
- *Incorporation of techniques and methodologies to estimate dollar losses to vulnerable structures;*
- *Incorporation of Risk MAP products (i.e., depth grids, Flood Risk Report, Changes Since Last FIRM, Areas of Mitigation Interest, etc.); and*
- *Identification of any data gaps that can be filled as new data became available.*

# Appendix B - Local Mitigation Plan Review Tool

## Element C: Mitigation Strategy

How does the Plan go above and beyond minimum requirements to document the Mitigation Strategy with respect to:

- *Key problems identified in, and linkages to, the vulnerability assessment;*
- *Serving as a blueprint for reducing potential losses identified in the Hazard Identification and Risk Assessment;*
- *Plan content flow from the risk assessment (problem identification) to goal setting to mitigation action development;*
- *An understanding of mitigation principles (diversity of actions that include structural projects, preventative measures, outreach activities, property protection measures, post-disaster actions, etc);*
- *Specific mitigation actions for each participating jurisdictions that reflects their unique risks and capabilities;*
- *Integration of mitigation actions with existing local authorities, policies, programs, and resources; and*
- *Discussion of existing programs (including the NFIP), plans, and policies that could be used to implement mitigation, as well as document past projects.*

## Element D: Plan Update, Evaluation, and Implementation (Plan Updates Only)

How does the Plan go above and beyond minimum requirements to document the 5-year Evaluation and Implementation measures with respect to:

- *Status of previously recommended mitigation actions;*
- *Identification of barriers or obstacles to successful implementation or completion of mitigation actions, along with possible solutions for overcoming risk;*
- *Documentation of annual reviews and committee involvement;*
- *Identification of a lead person to take ownership of, and champion the Plan;*
- *Reducing risks from natural hazards and serving as a guide for decisions makers as they commit resources to reducing the effects of natural hazards;*
- *An approach to evaluating future conditions (i.e. socio-economic, environmental, demographic, change in built environment etc.);*
- *Discussion of how changing conditions and opportunities could impact community resilience in the long term; and*
- *Discussion of how the mitigation goals and actions support the long-term community vision for increased resilience.*

# Appendix B - Local Mitigation Plan Review Tool

## B. Resources for Implementing Your Approved Plan

Ideas may be offered on moving the mitigation plan forward and continuing the relationship with key mitigation stakeholders such as the following:

- *What FEMA assistance (funding) programs are available (for example, Hazard Mitigation Assistance (HMA)) to the jurisdiction(s) to assist with implementing the mitigation actions?*
- *What other Federal programs (National Flood Insurance Program (NFIP), Community Rating System (CRS), Risk MAP, etc.) may provide assistance for mitigation activities?*
- *What publications, technical guidance or other resources are available to the jurisdiction(s) relevant to the identified mitigation actions?*
- *Are there upcoming trainings/workshops (Benefit-Cost Analysis (BCA), HMA, etc.) to assist the jurisdictions(s)?*
- *What mitigation actions can be funded by other Federal agencies (for example, U.S. Forest Service, National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA) Smart Growth, Housing and Urban Development (HUD) Sustainable Communities, etc.) and/or state and local agencies?*

# Appendix B - Local Mitigation Plan Review Tool

## SECTION 3: MULTI-JURISDICTION SUMMARY SHEET (OPTIONAL)

**INSTRUCTIONS:** For multi-jurisdictional plans, a Multi-jurisdiction Summary Spreadsheet may be completed by listing each participating jurisdiction, which required Elements for each jurisdiction were 'Met' or 'Not Met,' and when the adoption resolutions were received. This Summary Sheet does not imply that a mini-plan be developed for each jurisdiction; it should be used as an optional worksheet to ensure that each jurisdiction participating in the Plan has been documented and has met the requirements for those Elements (A through E).

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
1	Athens	Township	Leslie Burton	35697 Centerville Road, Centerville, PA 16404	<a href="mailto:athenstwp@earthlink.net">athenstwp@earthlink.net</a>	814-694-2376		Y	Y			
2	Beaver	Township	Brenda Braden	24036 South Beaver Road, Springboro, PA 16435	<a href="mailto:beavertwp@windstream.net">beavertwp@windstream.net</a>	814-587-3555		Y	Y			
3	Bloomfield	Township	Michelle Taylor	22978 Shreve Ridge Road, Union City, PA 16438	<a href="mailto:bloomfieldtwp@mvbloomfield.net">bloomfieldtwp@mvbloomfield.net</a>	814-694-2611		Y	Y			
4	Blooming Valley	Borough	Brenda Jo Wetsell	15124 West Mill Street, Meadville, PA 16335	<a href="mailto:wetsellbj@zoominternet.net">wetsellbj@zoominternet.net</a>	814-724-5410		Y	Y			
5	Cambridge Springs	Borough	Sandra Pude	161 Carringer Street, Cambridge Springs, PA 16403	<a href="mailto:borocs@zoominternet.net">borocs@zoominternet.net</a>	814-398-2311						
6	Cambridge	Township	Debra Merritt	22533 Electric Drive, Cambridge Springs, PA 16403	<a href="mailto:cambridgetwp@verizon.net">cambridgetwp@verizon.net</a>	814-398-8327		Y	Y			
7	Centerville	Borough	Gina Thomas	P.O. Box 46, Centerville, PA 16404	<a href="mailto:centervilleborosecty@yahoo.com">centervilleborosecty@yahoo.com</a>	814-282-1239		Y	Y			
8	Cochranton	Borough	Susan Armburger	109 East Adams Street, Cochranton, PA 16314	<a href="mailto:mgr@cochrantonboro.org">mgr@cochrantonboro.org</a>	814-425-3365		Y				
9	Conneaut Lake	Borough	Christine Morian	P.O. Box 198, Conneaut Lake, PA 16316	<a href="mailto:clboro@zoominternet.net">clboro@zoominternet.net</a>	814-382-7749			Y			

# Appendix B - Local Mitigation Plan Review Tool

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
10	Conneaut	Township	Telce Varee	6007 Carpenter Road, Conneautville, PA 16406	<a href="mailto:conneauttownship@yahoo.com">conneauttownship@yahoo.com</a>	814-683-5091		Y	Y			
11	Conneautville	Borough	Allen W. Clark	P.O. Box 288, Conneautville, PA 16406	<a href="mailto:cvboro@windstream.net">cvboro@windstream.net</a>	814-587-2471		Y	Y			
12	Cussewago	Township	Deborah Acker	23748 North Mosiertown Road, PA 16433	<a href="mailto:cussewagotwp@hotmail.com">cussewagotwp@hotmail.com</a>	814-763-3322						
13	East Fairfield	Township	Lori Guianen	P.O. Box 803, Cochrannton, PA 16314	<a href="mailto:efairfieldtwp@zoominternet.net">efairfieldtwp@zoominternet.net</a>	814-638-0600		Y	Y			
14	East Fallowfield	Township	Donna Kean	P.O. Box 66, Atlantic, PA 16111	<a href="mailto:eastfallowfield@windstream.net">eastfallowfield@windstream.net</a>	814-382-8188		Y	Y			
15	East Mead	Township	Lea Ann Coston	11251 South Wayland Road, Meadville, PA 16335	<a href="mailto:Coston3@zoominternet.net">Coston3@zoominternet.net</a>	814-724-5018		Y	Y			
16	Fairfield	Township	Amanda Allen	21776 Steen Hill Road, Cochrannton, PA 16314	<a href="mailto:townshipfairfield@yahoo.com">townshipfairfield@yahoo.com</a>	814-425-3527						
17	Greenwood	Township	Brenda Braden	14743 F Road, Atlantic, PA 16111	<a href="mailto:greenwd@windstream.net">greenwd@windstream.net</a>	814-425-2114		Y	Y			
18	Hayfield	Township	Jennifer McClymonds	17882 Townhouse Road, Saegertown, PA 16433	<a href="mailto:hayfieldtwp@windstream.net">hayfieldtwp@windstream.net</a>	814-763-6115		Y	Y			
19	Hydetown	Borough	Patricia Myer	41220 State Highway 408, Titusville, PA 16354	<a href="mailto:hydetownboro@yahoo.com">hydetownboro@yahoo.com</a>	814-827-1617		Y				
20	Linesville	Borough	Amanda Harper	P.O. Box 145, Linesville, PA 16424	<a href="mailto:Linesboro2@gmail.com">Linesboro2@gmail.com</a>	814-683-4382		Y	Y			
21	Meadville	City	Andy Walker	894 Diamond Park, Meadville, PA 16335	<a href="mailto:awalker@cityofmeadville.org">awalker@cityofmeadville.org</a>	814-724-6000		Y	Y			
22	North Shenango	Township	Donna Kean	11586 Linn Road, Linesville, PA 16424	<a href="mailto:nshenango@windstream.net">nshenango@windstream.net</a>	724-927-2568		Y	Y			

# Appendix B - Local Mitigation Plan Review Tool

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
23	Oil Creek	Township	April Averill	127 McKinney Road, Titusville, PA 16354	<a href="mailto:oilcreek@zoominternet.net">oilcreek@zoominternet.net</a>	814-827-3826			Y			
24	Pine	Township	Frances Santarelli	P.O. Box 394, Linesville, PA 16424	<a href="mailto:Pinetwp683@windstream.net">Pinetwp683@windstream.net</a>	814-683-5237						
25	Randolph	Township	Joi Fultz	P.O. Box 143, Guys Mills, PA 16327	<a href="mailto:twpsecretary@windstream.net">twpsecretary@windstream.net</a>	814-789-3000		Y				
26	Richmond	Township	Rhonda Phillips	30348 State Highway 408, Townville, PA 16360	<a href="mailto:richmondtp@windstream.net">richmondtp@windstream.net</a>	814-967-3822		Y				
27	Rockdale	Township	Jill Reese	29393 Miller Station Road, Cambridge Springs, PA 16403	<a href="mailto:Rockdale1@earthlink.net">Rockdale1@earthlink.net</a>	814-398-2967		Y	Y			
28	Rome	Township	Terri See	40593 Mageetown Road, Centerville, PA 16404	<a href="mailto:rometownship@yahoo.com">rometownship@yahoo.com</a>	814-827-6550						
29	Sadsbury	Township	Rose Mumau	9888 State Highway 285, Conneaut Lake, PA 16316	<a href="mailto:sadsbury@zoominternet.net">sadsbury@zoominternet.net</a>	814-382-8579		Y	Y			
30	Saegertown	Borough	Chuck Lawrence	P.O. Box 558, Sae- gertown, PA 16433	<a href="mailto:clsagertown@saegertown-pa.com">clsagertown@saegertown-pa.com</a>	814-763-4600		Y	Y			
31	South Shenango	Township	Rebecca Andrew	6865 Collins Road, Jamestown, PA 16134	<a href="mailto:ssoffice@windstream.net">ssoffice@windstream.net</a>	724-927-2703		Y	Y			
32	Sparta	Township	Chris Jewell	24650 State Highway 89, Spartansburg, PA 16434	<a href="mailto:spartatwp@yahoo.com">spartatwp@yahoo.com</a>	814-654-7031						
33	Spartansburg	Borough	Jamie Ditzler	P.O. Box 222, Spartans- burg, PA 16434	<a href="mailto:spartansburgborough@gmail.com">spartansburgborough@gmail.com</a>	814-654-7451			Y			
34	Spring	Township	Shelby Field	23578 North Center Road, Springboro, PA 16435	<a href="mailto:springtwp@windstream.net">springtwp@windstream.net</a>	814-587-3368		Y	Y			

# Appendix B - Local Mitigation Plan Review Tool

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
35	Springboro	Borough	Tiffany McCray	P.O. Box 33, Springboro, PA 16435	<a href="mailto:Sawa103@windstream.net">Sawa103@windstream.net</a>	814-587-2700		Y	Y			
36	Steuben	Township	Tina Archer	35741 Tryonville Road, Centerville, PA 16404	<a href="mailto:steubentwpsecty@yahoo.com">steubentwpsecty@yahoo.com</a>	814-967-4499						
37	Summerhill	Township	Brenda Braden	9352 Crozier Road, Conneautville, PA 16406	<a href="mailto:Summerhill_township@windstream.net">Summerhill_township@windstream.net</a>	814-587-2343		Y	Y			
38	Summit	Township	Brenda Braden	P.O. Box 231, Harmonsburg, PA 16422	<a href="mailto:harmonsburg@zoominternet.net">harmonsburg@zoominternet.net</a>	814-382-5058		Y	Y			
39	Titusville	City	Neil Fratus	107 North Franklin Street, Titusville, PA 16354	<a href="mailto:manager@cityoftitusvillepa.gov">manager@cityoftitusvillepa.gov</a>	814-827-5300		Y	Y			
40	Townville	Borough	Leslie Battin	P.O. Box 122, Townville, PA 16360	<a href="mailto:townvilleboro@gmail.com">townvilleboro@gmail.com</a>	814-967-2487		Y	Y			
41	Troy	Township	Joy Strain	11892 East Troy Road, Titusville, PA 16354	<a href="mailto:jstrain@mpbcpa.com">jstrain@mpbcpa.com</a>	814-827-6120		Y	Y			
42	Union	Township	Jason Spencer	7263 Mercer Pike, Meadville, PA 16335	<a href="mailto:jspencer.uniontownship@gmail.com">jspencer.uniontownship@gmail.com</a>	814-795-7574		Y				
43	Venango	Borough	Amy Wellington	P.O. Box 196, Venango, PA 16440	<a href="mailto:venangoborough@hotmail.com">venangoborough@hotmail.com</a>	814-547-8195		Y	Y			
44	Venango	Township	Jill Dunlap	22506 Cemetery Road, Venango, PA 16440	<a href="mailto:venangotwp@gmail.com">venangotwp@gmail.com</a>	814-398-8489		Y	Y			
45	Vernon	Township	Robert Horvat	16678 McMath Road, Meadville, PA 16335	<a href="mailto:roberthorvat@zoominternet.net">roberthorvat@zoominternet.net</a>	814-337-8129		Y	Y			
46	Wayne	Township	Mary Kennedy	26965 Deeter Road, Cochran, PA 16314	<a href="mailto:waynetwpcc@outlook.com">waynetwpcc@outlook.com</a>	814-425-3299		Y	Y			
47	West Fallowfield	Township	Brenda Williams	P.O. Box 157, Hartstown, PA 16131	<a href="mailto:Wft2@earthlink.com">Wft2@earthlink.com</a>	814-382-8304		Y	Y			

# Appendix B - Local Mitigation Plan Review Tool

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
48	West Mead	Township	Jill Dunlap	1150 Morgan Village Road, Meadville, PA 16335	<a href="mailto:westmead@westmead.org">westmead@westmead.org</a>	814-336-1271		Y	Y			
49	West Shenango	Township	Carrie McElhane	P.O. Box 527, James-town, PA 16134	<a href="mailto:wshenangotwp@zoominternet.net">wshenangotwp@zoominternet.net</a>	724-932-3206			Y			
50	Woodcock	Borough	Sharron Diley	19741 State Highway 86, Saegertown, PA 16433	<a href="mailto:sharrondiley@yahoo.com">sharrondiley@yahoo.com</a>	814-398-4718		Y	Y			
51	Woodcock	Township	Renee Hayes	16250 State Highway 86, Saegertown, PA 16433	<a href="mailto:woodcocktwp@zoominternet.net">woodcocktwp@zoominternet.net</a>	814-763-3563		Y	Y			



# APPENDIX C - PLAN DOCUMENTATION

# CRAWFORD COUNTY 2020 WHOLE COMMUNITY HAZARD MITIGATION PLAN UPDATE

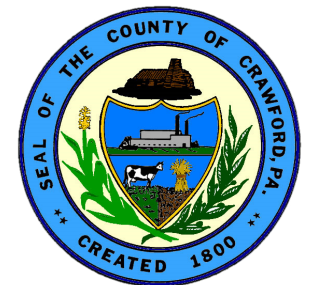
CRAWFORD COUNTY, PENNSYLVANIA

**Prepared By:**

Crawford County Department of Public Safety

Crawford County GIS

Crawford County Planning



# Appendix C - Plan Documentation

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## **Crawford County 2020 Municipal Public Safety Surveys**

1. *Athens Township*
2. *Bloomfield Fire and Ambulance*
3. *Blooming Valley Borough*
4. *Cambridge Township*
5. *Centerville Borough*
6. *Cochranton Borough*
7. *Conneaut Township*
8. *Conneautville Borough*
9. *East Fairfield Township*
10. *East Fallowfield Township*
11. *East Mead Township*
12. *Fellow's Club Volunteer Fire & Ambulance*
13. *Greenwood Township*
14. *Hayfield Fire Department*
15. *Hydetown Borough*
16. *Linesville Borough*
17. *Meadville City*
18. *North Shenango Township*
19. *Randolph Township*
20. *Richmond Township*
21. *Rockdale Township*
22. *Sadsbury Township Latta*
23. *Sadsbury Township*
24. *Saegertown Borough*
25. *South Shenango Township*
26. *Spring Township*
27. *Springboro Borough*
28. *Summerhill Township*
29. *Summit Township*
30. *Titusville City*
31. *Townville Borough*
32. *Troy Township*
33. *Union Township*
34. *Venango Borough*
35. *Venango Township*
36. *Vernon Township*

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- 37. Wayne Township
- 38. West Fallowfield Township
- 39. West Mead # 2 Fire Department
- 40. West Mead Township
- 41. Woodcock Borough
- 42. Woodcock Township

**Crawford County's 2020 Public Safety Survey**

Agency Name: ATHENS TOWNSHIP - Crawford Co.  
Agency Contact: GARY RANKIN  
Contact E-mail: GRANKIN77@GMAIL.COM

**What are the greatest hazards in your municipality or response areas?**

1. DOWN TREES - WIND DAMAGE
2. FLOODING
3. SNOW DRIFTING
4. TRUCK ROLL OVER
5. EARTH QUAKE 5.0 OR OVER

**What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?**

Plans: NEW TRUCK \$ \_\_\_\_\_  
People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
Equipment: NEW TRUCK \$ \_\_\_\_\_  
Training: AS NEEDED \$ \_\_\_\_\_  
Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

**What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?**

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
Equipment: AS NEEDED \$ \_\_\_\_\_  
Training: AS NEEDED \$ \_\_\_\_\_  
Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

Please return to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us)

# Appendix C - Plan Documentation

## Crawford County's 2020 Public Safety Survey

Agency Name: Bloomfield Twp VFD & Ambulance Service  
 Agency Contact: "Booie" Kalkbrenner, Ambulance Chief  
 Contact E-mail: booie@tbscc.com

What are the greatest hazards in your municipality or response areas?

1. LPG, fuel and oil semi tankers
2. Canadohta Lake
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: oil absorbant \$ 100.00  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: HAZMat \$ unknown  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

Please return to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) no later than August 1, 2020

## Crawford County's 2020 Public Safety Survey

Agency Name: Blooming Valley Borough  
 Agency Contact: Brenda Wetsell, Secretary  
 Contact E-mail: wnickerson@boroughs.org

What are your greatest hazards in your municipality or response areas?

1. High Winds
2. Storm Water
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises was or will be completed or purchased in 2020?

Plans: None \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises needs to be completed, purchased, or to be maintained in 2021?

Plans: None \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

Please return to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) no later than July 1, 2020

# Appendix C - Plan Documentation

## Crawford County's 2020 Public Safety Survey

Agency Name: Cambridge Township  
 Agency Contact: D Birchard  
 Contact E-mail: birch@environmental-remediation.net

What are the greatest hazards in your municipality or response areas?

1. N/A
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: N/A \$ \_\_\_\_\_  
 People/Teams: N/A \$ \_\_\_\_\_  
 Equipment: N/A \$ \_\_\_\_\_  
 Training: CS boro \$ 0  
 Exercise: N/A \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: unknown at present \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

Please return to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) no later than August 1, 2020

## Crawford County's 2020 Public Safety Survey

Agency Name: CENTERVILLE BOROUGH  
 Agency Contact: PETER COLLINS, EMA  
 Contact E-mail: CENTERVILLEBOARDSECTY@YAHOO.COM

What are your greatest hazards in your municipality or response areas?

1. 7, 30,000 gal PROPANE STORAGE TANKS
2. @ SOUTHALL GAS FACILITIES
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises was or will be completed or purchased in 2020?

Plans: REVIEW PROCEDURES \$ -0-  
 People/Teams: EMA, FIRE DEPTS, SOUTHALL \$ -0-  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises needs to be completed, purchased, or to be maintained in 2021?

Plans: REVIEW PROCEDURES \$ -0-  
 People/Teams: EMA, FIRE DEPTS, SOUTHALL \$ -0-  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

Please return to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) no later than July 1, 2020

# Appendix C - Plan Documentation

## Crawford County's 2020 Public Safety Survey

Agency Name: Cochranton Borough  
Agency Contact: Susan Armburger  
Contact E-mail: mgr@cochrantonboro.org

What are the greatest hazards in your municipality or response areas?

1. High Water
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: None \$ \_\_\_\_\_  
People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
Training: \_\_\_\_\_ \$ \_\_\_\_\_  
Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: Tree trimming time permitting \$ \_\_\_\_\_  
People/Teams: Borough Employees \$ \_\_\_\_\_  
Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
Training: \_\_\_\_\_ \$ \_\_\_\_\_  
Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

Please return to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) no later than August 1, 2020

## Crawford County's 2020 Public Safety Survey

Agency Name: Conneaut Township - Crawford County  
Agency Contact: \_\_\_\_\_  
Contact E-mail: conneauttownship@yahoo.com

What are the greatest hazards in your municipality or response areas?

1. icy Roads
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: buy more sand \$ vary  
People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
Training: \_\_\_\_\_ \$ \_\_\_\_\_  
Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
Training: \_\_\_\_\_ \$ \_\_\_\_\_  
Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

Please return to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) no later than August 1, 2020

# Appendix C - Plan Documentation

## Crawford County's 2020 Public Safety Survey

Agency Name: Conneautville Borough  
 Agency Contact: Allen Clark, Mayor  
 Contact E-mail: aclark1990@hotmail.com

What are the greatest hazards in your municipality or response areas?

1. Flash Flooding
2. High Hazard Dam Failure
3. Thunderstorms
4. Blight
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: None due to COVID-19 \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: VHF Municipal Radios \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: Update EOP and NRM \$ 0  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: Back-up generator for water wells \$ \_\_\_\_\_  
 Training: G191, IS 100 and IS 700 \$ 0  
 Exercise: Severe Weather & EOC Ops \$ 0

Please return to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) no later than August 1, 2020

## Crawford County's 2020 Public Safety Survey

Agency Name: East Fairfield Township  
 Agency Contact: Lori Guianen  
 Contact E-mail: Efairfieldtp@zoominternet.net

What are the greatest hazards in your municipality or response areas?

1. flash flood
2. poor visibility at intersections
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: N/A \$ 0  
 People/Teams: N/A \$ 0  
 Equipment: N/A \$ 0  
 Training: N/A \$ 0  
 Exercise: N/A \$ 0

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: N/A \$ 0  
 People/Teams: N/A \$ 0  
 Equipment: N/A \$ 0  
 Training: N/A \$ 0  
 Exercise: N/A \$ 0

Please return to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) no later than August 1, 2020

# Appendix C - Plan Documentation

## Crawford County's 2020 Public Safety Survey

Agency Name: East Fallowfield Township  
 Agency Contact: Donna Kean  
 Contact E-mail: eastfallowfield@windstream.net

What are the greatest hazards in your municipality or response areas?

1. Flooding
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: Replaced failing culverts & ditched roads \$ 4,000  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: None \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

Please return to Allen Clark at aclark@co.crawford.pa.us no later than August 1, 2020

FAX TO: 814-724-4605

FAX FROM: 814-333-2038

ATTENTION: ALLEN CLARK ,  
and

FROM: BILL COSTON, EMVFD

ATTENTION: DON BOVARD

FROM: LEA ANN COSTON AND  
LARRY MATTOCKS, E. MEAD  
TWP ROAD MASTER

re: PUBLIC SAFETY SURVEY AND MITIGATION RESPONSE BY NOVEMBER 30, 2020

FOR: EAST MEAD TOWNSHIP

Page 1 of 2

A. Year 2020 Public Safety Comments and Response to Survey:

What are the greatest hazards in your municipality or response areas? (comments follow because the form released did not render adequate response space).

1. East Mead Township has never been informed by PennDot, Local 911 center, Individual contract haulers, CDL drivers, when there is a transport truck or vehicle traveling thru our township that is of high risk of hauling hazard materials, wide loads requiring special permits. It was always a requirement that loads get special permits from PennDot (use to be three days in advance) and the reporting of the routes they were traveling. At the same time the permits are issued - one of the requirements should be to also include notice to the local municipalities so they are better prepared with manpower and equipment should an emergency occur on their roadways. That should even include the over-sized loads, wide-width hauling of any kind of materials and even the hauling of large equipment.

2. Hogue Hill on Route 27, five miles east of Meadville, needs a 3rd lane the entire length ! Heavy loads of truckers hold up traffic for miles. Winter time is an emergency everyday with the vehicles unable to travel the hill. Our township should not have to apply personnel for problems on this State Road.

3. Hogue Hill needs the lower limbs of trees cut back.

4. For the most part of the winter time PennDot does not get to service Hogue Hill and other lengths of Rt 27 until 10 AM. They need to service Hogue Hill by 7 AM at the latest or by 6 AM would be better and continue service until - 9 AM. Of course there are several other hills on Rt 27 are not being attended to in a timely fashion. The townships have their own township roads and hills and should not have to deliver/spred salt where Penn dot should be servicing.

5. More speed control on Route 27 and Route 77.

Page 2.....continued:



# Appendix C - Plan Documentation

Page 2

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans, People, Equipment, Training, Exercise:

The training and exercise were completed by East Mead Vol. Fire Co with this own funding. The Township in Year 2020 did not assist the Fire Co. nor did the Township render training.

What new emergency plans, people/team, equipment, training etc. for Year 2021 & costs?

Plans, People, Equipment, Training, Exercise:

East Mead Township for Year 2021 plans to utilize our employees and possibly utilize the Conservation Service to enhance the safety of our two bridges in East Mead Township; namely, Hinkson Road Bridge and Smith Road Bridge. We follow the EADS inspection survey on an annual basis and we want to apply better road approaches, guardrails, abatements. We expect the costs to be \$ 6,000.00

EAST MEAD TOWNSHIP - - MITIGATION PLAN - - NOV. 2020

EAST MEAD TOWNSHIP

23900 STATE HIGHWAY 27, MEADVILLE, PA. 16335

PHONE (814) 724-5018 - alternate because of COVID / CELL (814) 720-9781  
Lea Ann Coston, Larry Mattocks, Road Master /// Bill Coston, EMA

EMAIL ADDRESS: TOWNSHIP: coston3@zoominternet.net  
EMA: billcstn@yahoo.com  
ROAD MASTER: lsuemattaocks@hotmail.com

UPDATE: The last large, expensive, and time consuming hazard event within East Mead Township was December 17th, 2011. There have been no others of this magnitude to report. East Mead Township / East Mead Vol. Fire Co. have not been called upon to assist an adjoining township in a hazard event. The East Mead Vol. Fire Co generally is always assisting County-Wide massive fire structure events having done so within the last five years.

LOCAL PROJECTS scheduled for attention - work on with specific action towards completion:

1. Bridges within the township on Hinkson Road and Smith Road, following the guidelines of the EADS inspection program of Crawford County. The approaches to the bridges and the abutments on each bridge. Installation of guiderails. Further stabilization of the under girth of the bridge structure itself.
2. On East Oil Creek Road - Major correction and replacement of a Stone Culvert at 25705 East Oil Creek Road within the township.
3. Water Run-Off from Shartle-Walker Roads coming downward to North Wayland Road. Needs an equalization basin up on the hill for a big prevention measure. Very costly to repair this problem.
4. At the Hospice House, owned by Meadville Medical Center, on North Wayland Road is a very blind curve for vehicles to meet let alone there is not enough room for two vehicles to pass! Emergency curve in and of itself - with accident waiting to happen. Emergency vehicles already have had too many close calls here. Perhaps cars and trucks should be required to STOP and SIGNAL before entering the curve.
5. Various streams cross North Wayland Road in several places causing water erosion and freezing over during winter months. Uncontrollable at this time.

# Appendix C - Plan Documentation

## Crawford County's 2020 Public Safety Survey

Agency Name: Fellows' Club Vol. Fire & Ambulance Department  
 Agency Contact: Allen Clark, 3rd Assistant Chief  
 Contact E-mail: aclark1990@hotmail.com

What are the greatest hazards in your municipality or response areas?

1. Flash Flooding
2. High Hazard Dam Failure
3. Thunderstorms
4. Blight
5. Trees and wires down

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: Grids were updated to include Dept 20 \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: Ford F-150, SCBA G1 \$ \_\_\_\_\_  
 Training: Fire Police \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: Preplans and water supply \$ 0  
 People/Teams: Need more volunteers \$ 0  
 Equipment: Turn out gear \$ 20,000  
 Training: TIMS \$ 0  
 Exercise: Exercise preplans \$ 0

Please return to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) no later than August 1, 2020

## Crawford County's 2020 Public Safety Survey

Agency Name: Greenwood Township  
 Agency Contact: Robert M Byers  
 Contact E-mail: bobnshaun@windstream.net

What are the greatest hazards in your municipality or response areas?

1. Vitro
2. ES&R Recycling and waste Management
3. Weather
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: made plans for 2020 \$ \_\_\_\_\_  
 People/Teams: see plans \$ \_\_\_\_\_  
 Equipment: see plans \$ \_\_\_\_\_  
 Training: none \$ \_\_\_\_\_  
 Exercise: none \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: nims vest , radios for ema staff \$ unknown  
 Training: table tops on high hazards \$ \_\_\_\_\_  
 Exercise: full exercises for high hazards \$ \_\_\_\_\_

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# Appendix C - Plan Documentation

## Crawford County's 2020 Public Safety Survey

Agency Name: Hayfield Fire Department  
 Agency Contact: Jack Mahoney  
 Contact E-mail: jack.mahoney@secowarwick.com

What are the greatest hazards in your municipality or response areas?

1. severe weather
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: New SCBA purchased \$ \$12,000  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: Building maintenance anticipated \$ \$15,000  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: new turn-out gear to be purchased \$ +/- \$17,500  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

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## Crawford County's 2020 Public Safety Survey

Agency Name: Hydetown Borough  
 Agency Contact: Pat Myers / Craig Farrar  
 Contact E-mail: hydetownborough@yahoo.com / cmfarr81@gmail.com

What are the greatest hazards in your municipality or response areas?

1. Indian Run stream restoration
2. Indian Run bridge
3. Active stream between SR 8 & SR 408 flooding properties
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

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# Appendix C - Plan Documentation

724-4605

## Crawford County's 2020 Public Safety Survey

Agency Name: Linesville Borough  
 Agency Contact: Kevin Mcgrath  
 Contact E-mail: linesboro@gmail.com

What are your greatest hazards in your municipality or response areas?

1. power outage
2. wind
3. ice storms / heavy snowfall
4. flooding
5. loss of water

What new emergency plans, people/team, equipment, training, or exercises was or will be completed or purchased in 2020?

Plans: Begin work on continuity plan \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises needs to be completed, purchased, or to be maintained in 2021?

Plans: complete continuity plan \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

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## Crawford County's 2020 Public Safety Survey

Agency Name: City of Meadville  
 Agency Contact: Andrew Walker  
 Contact E-mail: awalker@cityofmeadville.org

What are the greatest hazards in your municipality or response areas?

1. Flooding
2. Hazardous Material Accidents
3. Dam Failure
4. Fires
5. Storms/Tornadoes

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: Update EOP \$ \_\_\_\_\_  
 People/Teams: Fire Chief, 2 Council Members \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: Maintain EOP \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: Annual Weather Exercise \$ \_\_\_\_\_

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# Appendix C - Plan Documentation

## Crawford County's 2020 Public Safety Survey

Agency Name: North Shenango Township  
 Agency Contact: Donna Kean  
 Contact E-mail: nshenango@windstream.net

What are the greatest hazards in your municipality or response areas?

1. Flooding
2. Semi accidents/spills on Rte 285
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: replacing old culverts & ditching \$ 5,000  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: complete replacing old culverts & ditching \$ 8,000  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

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## Crawford County's 2020 Public Safety Survey

Agency Name: Ranolph VFO & EMA  
 Agency Contact: Dan Sutter  
 Contact E-mail: Sudsy1953@gmail.com

What are the greatest hazards in your municipality or response areas?

1. TORNADO
2. FLOOD
3. POWER OUTAGE
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs? NONE

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost? NONE

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

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# Appendix C - Plan Documentation

## Crawford County's 2020 Public Safety Survey

Agency Name: Richmond Township  
Agency Contact: Bill Taylor  
Contact E-mail: taytool@windstream.net

What are the greatest hazards in your municipality or response areas?

1. Severe weather
2. Loss of electricity
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: None \$ \_\_\_\_\_  
People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
Training: \_\_\_\_\_ \$ \_\_\_\_\_  
Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: None \$ \_\_\_\_\_  
People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
Training: \_\_\_\_\_ \$ \_\_\_\_\_  
Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

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## Crawford County's 2020 Public Safety Survey

Agency Name: Rockdale Township  
Agency Contact: Jill Reese  
Contact E-mail: rockdale1@earthlink.net

What are the greatest hazards in your municipality or response areas?

1. Downed trees
2. road washouts
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: 0 \$ \_\_\_\_\_  
People/Teams: 0 \$ \_\_\_\_\_  
Equipment: 0 \$ \_\_\_\_\_  
Training: 0 \$ \_\_\_\_\_  
Exercise: 0 \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: 0 \$ \_\_\_\_\_  
People/Teams: 0 \$ \_\_\_\_\_  
Equipment: 0 \$ \_\_\_\_\_  
Training: 0 \$ \_\_\_\_\_  
Exercise: 0 \$ \_\_\_\_\_

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# Appendix C - Plan Documentation

## Crawford County's 2020 Public Safety Survey

Agency Name: SAOSBURY TWP.  
 Agency Contact: TIM LATTI  
 Contact E-mail: timlatti21@yahoo.com

What are your greatest hazards in your municipality or response areas?

1. BLIZZARD
2. SEVERE THUNDERSTORM / TORNADO
3. SEWER DISRUPTION
4. FLOODING
5. ELECTRICAL DISRUPTION (MULTIPLE DAYS)

What new emergency plans, people/team, equipment, training, or exercises was or will be completed or purchased in 2020?

Plans: IMPROVE ROAD DRAINAGE / WINTER PLANS \$ \_\_\_\_\_  
 People/Teams: ADDED (1) PERSONNEL \$ \_\_\_\_\_  
 Equipment: PURCHASED NEW DUMP TRUCK \$ \_\_\_\_\_  
 Training: PURCHASED COVID PPE \$ \_\_\_\_\_  
 Exercise: TALK ABOUT WINTER SCENARIOS \$ \_\_\_\_\_  
MONTHLY SAFETY MEETINGS

What new emergency plans, people/team, equipment, training, or exercises needs to be completed, purchased, or to be maintained in 2021?

Plans: IMPROVE PREPLANS / CONTACTS \$ \_\_\_\_\_  
 People/Teams: GET MORE PEOPLE INVOLVED \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: SPRING SEVERE WEATHER \$ \_\_\_\_\_  
 Exercise: MORE MONTHLY TALKS ABOUT PLANS \$ \_\_\_\_\_

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## Crawford County's 2020 Public Safety Survey

Agency Name: Sadsbury Township  
 Agency Contact: Rose A. Mumau  
 Contact E-mail: sadsbury@zoominternet.net

What are your greatest hazards in your municipality or response areas?

1. Flooding
2. Storm Damage
3. Wireless Communication Disruptions
4. Blizzards
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises was or will be completed or purchased in 2020?

Plans: Updated Emergency Operations Plan \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: Purchased new truck \$ 100,000  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises needs to be completed, purchased, or to be maintained in 2021?

Plans: Update Emergency Operations Plan \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: Crawford Co Emergency Weather Exercise \$ \_\_\_\_\_

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# Appendix C - Plan Documentation

## Crawford County's 2020 Public Safety Survey

Agency Name: Saegertown Borough  
 Agency Contact: Chuck Lawrence  
 Contact E-mail: clsaegertown@saegertownpa.com

What are the greatest hazards in your municipality or response areas?

1. Hazardous Materials
2. Power supply interruptions or failure
3. Flooding
4. Tornadoes
5. Severe weather (hot and cold)

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: None \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: None \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

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## Crawford County's 2020 Public Safety Survey

Agency Name: SOUTH SHENANGO TOWNSHIP  
 Agency Contact: JAMIE FRIES  
 Contact E-mail: SSROADMASTER@WINDSTREAM.NET

What are the greatest hazards in your municipality or response areas?

1. DOWN TREES
2. CLOGGED CULVERTS (FLOODING)
3. ICE STORM (DIRT ROADS)
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: HIRE TREE SERVICE / INCREASE CULVERTS \$ 5,000 - \$10,000  
 People/Teams: DAVE JONE / DAVEY TREE \$ 5,000 - \$10,000  
 Equipment: LEAF VAC \$ 3,000  
 Training: N/A \$ \_\_\_\_\_  
 Exercise: N/A \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: HIRE TREE SERVICE \$ 5,000 - \$10,000  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

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# Appendix C - Plan Documentation

## Crawford County's 2020 Public Safety Survey

Agency Name: Spring Township  
 Agency Contact: Shelby Field, Secretary  
 Contact E-mail: springtwp@windstream.net

What are the greatest hazards in your municipality or response areas?

1. possible flooding
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: none at this time \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: none at this time \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

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## Crawford County's 2020 Public Safety Survey

Agency Name: Boro of Springboro  
 Agency Contact: Tiffany McCray, Boro Secretary  
 Contact E-mail: sawa103@windstream.net

What are the greatest hazards in your municipality or response areas?

1. flooding
2. drugs
3. Blighted HOMOs
4. Chemical hazards
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

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# Appendix C - Plan Documentation

## Crawford County's 2020 Public Safety Survey

Agency Name: Summerhill Township  
 Agency Contact: Brenda Braden, Secretary/Treasurer  
 Contact E-mail: Summerhill\_township@windstream.net

What are the greatest hazards in your municipality or response areas?

1. No known hazards
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: New Emer. Manage. Coorc \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

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## Crawford County's 2020 Public Safety Survey

Agency Name: Summit Township, Crawford County  
 Agency Contact: Duane Agnew Roadmaster  
 Contact E-mail: harmonsburg@zoominternet.net

What are the greatest hazards in your municipality or response areas?

1. Fuel tank at bus garage, potential leak hazard to waterways
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: None planned \$ \_\_\_\_\_  
 People/Teams: None \$ \_\_\_\_\_  
 Equipment: None \$ \_\_\_\_\_  
 Training: None \$ \_\_\_\_\_  
 Exercise: None \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: None planned \$ \_\_\_\_\_  
 People/Teams: None \$ \_\_\_\_\_  
 Equipment: None \$ \_\_\_\_\_  
 Training: None \$ \_\_\_\_\_  
 Exercise: None \$ \_\_\_\_\_

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# Appendix C - Plan Documentation

## Crawford County's 2020 Public Safety Survey

Agency Name: City of Titusville  
 Agency Contact: Michael Wonderling  
 Contact E-mail: MWONDERLING@VERIZON.NET

What are the greatest hazards in your municipality or response areas?

1. Flooding
2. Tornado
3. Pandemic
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

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## Crawford County's 2020 Public Safety Survey

Agency Name: Townville Borough  
 Agency Contact: Justin Sullivan  
 Contact E-mail: bluetick\_22@hotmail.com

What are your greatest hazards in your municipality or response areas?

1. Storms
2. Flooding
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises was or will be completed or purchased in 2020?

Plans: None \$ \_\_\_\_\_  
 People/Teams: None \$ \_\_\_\_\_  
 Equipment: None \$ \_\_\_\_\_  
 Training: None \$ \_\_\_\_\_  
 Exercise: None \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises needs to be completed, purchased, or to be maintained in 2021?

Plans: Maintained \$ \_\_\_\_\_  
 People/Teams: None \$ \_\_\_\_\_  
 Equipment: None \$ \_\_\_\_\_  
 Training: None \$ \_\_\_\_\_  
 Exercise: None \$ \_\_\_\_\_

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# Appendix C - Plan Documentation

## Crawford County's 2020 Public Safety Survey

Agency Name: Troy Township  
 Agency Contact: Cedric Bradley  
 Contact E-mail: jstrain@mpbcpa.com

What are the greatest hazards in your municipality or response areas?

1. Traffic (speeding)
2. Wind damage (downed trees)
3. Heavy Rains (washouts and flooding)
4. Missing road signs
5. Pot holes on dirt roads

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: Cedric review of materials \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: Review of needed road signs \$ 2,000 approx  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

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## Fax

UNION TOWNSHIP  
 7236 Mercer Pike  
 Meadville PA 16335  
 Phone 814-425-2485  
 Fax 814-425-3824

**To:** Don Bovard  
**Company:** Crawford county  
**Fax no:** 814-724-4605  
**From:** Roxie Fucci  
**Date:** 11/18/20  
**Pages:** 2  
**Subject:** Mitigation Plan

Hi Don

Jason Spencer, Chair of Union Township Board of Supervisors, asked me to send this to you.

He is the person in charge of doing our mitigation plan with you as we have discussed.

Please contact him if you need additional information. He said the website was elaborate and I am not sure if he did all he needed to do.

I will not be available for the next week so please contact him directly.

Roxie Fucci  
 Secretary/Treasurer

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# Appendix C - Plan Documentation

## Crawford County's 2020 Public Safety Survey

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WVFD

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Agency Name: UNION TOWNSHIP  
 Agency Contact: JADA SPACER  
 Contact E-mail: \_\_\_\_\_

What are the greatest hazards in your municipality or response areas?

1. FLOODING
2. FALLEN TREES
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: SUPERVISOR/EMPLOYEE \$ 1500.00  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: SUPERVISOR/EMPLOYEE \$ 2000.00  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

Please return to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) no later than August 3, 2020

## Crawford County's 2020 Public Safety Survey

Agency Name: VENANGO BORO  
 Agency Contact: JAMES WALSH  
 Contact E-mail: WALSH8488@GMAIL.COM

What are your greatest hazards in your municipality or response areas?

1. DON'T HAVE ANY AT THIS TIME
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises was or will be completed or purchased in 2020?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: WVFD HASMAT OPS TRAINING \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises needs to be completed, purchased, or to be maintained in 2021?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: N/A \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

Please return to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) no later than July 1, 2020

11-16-20

# Appendix C - Plan Documentation

## Crawford County's 2020 Public Safety Survey

Agency Name: VENANGO TOWNSHIP  
 Agency Contact: JILL M DUNLAP, SECRETARY  
 Contact E-mail: venangotwp@gmail.com

What are the greatest hazards in your municipality or response areas?

1. STORMS- TREES DOWN AND/OR FLOODING ISSUES
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: PURCHASED A USED TANDEM TRUCK \$ 23,000.00  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: JUST MAINTAINING OUR CURRENT EQUIPMENT \$ 20,000.00  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

Please return to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) no later than August 1, 2020

## Crawford County's 2020 Public Safety Survey

Agency Name: Vernon Township  
 Agency Contact: Robert Horvat  
 Contact E-mail: roberthorvat@zoominternet.net

What are the greatest hazards in your municipality or response areas?

1. Industrial sites
2. Interstate 79
3. Sewer Treatment Plants
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: Police Cruiser \$ 35,000  
 Training: Police Training \$ 4,000  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: Police Training \$ 4,000  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

Please return to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) no later than August 1, 2020

# Appendix C - Plan Documentation

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Wayne Township

PAGE 01/01

## Crawford County's 2020 Public Safety Survey

Agency Name: Wayne Township  
 Agency Contact: Mary Kennedy  
 Contact E-mail: waynetwp cc @ outlook.com

What are the greatest hazards in your municipality or response areas?

1. Weather Related Incidences
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

Please return to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) no later than August 1, 2020

## Crawford County's 2020 Public Safety Survey

Agency Name: West Fallowfield Township  
 Agency Contact: Brenda Williams  
 Contact E-mail: wft2@earthlink.net

What are the greatest hazards in your municipality or response areas?

1. Fire
2. Tornado
3. Vehicular Accidents
4. Power outage
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: existing plan in place \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: existing plan in place \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: \_\_\_\_\_ \$ \_\_\_\_\_  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

Please return to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) no later than August 1, 2020

# Appendix C - Plan Documentation

## Crawford County's 2020 Public Safety Survey

Agency Name: West Mead 2 VFD  
 Agency Contact: Kris Simmons  
 Contact E-mail: ksimmons@westmead2.com

What are the greatest hazards in your municipality or response areas?

1. Arista Care Nursing Home
2. Crawford County Fairgrounds
3. Meadville Forging Co.
4. Penelec Electric Co.
5. Various tool shops

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: Plymovent Exhaust repair \$ 12,000  
 People/Teams: Recruitment \$ 1,000  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: Various state classes \$ 1,000  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: Roof repair \$ 150,000  
 People/Teams: Recruitment \$ 1,000  
 Equipment: Apparatus repairs \$ 10,000  
 Training: Various state classes \$ 1,000  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

Please return to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) no later than August 1, 2020

## Crawford County's 2020 Public Safety Survey

Agency Name: West Mead Township and West Mead Police Department  
 Agency Contact: Jill Dunlap, Secretary  
 Contact E-mail: westmead@westmead.org

What are the greatest hazards in your municipality or response areas?

1. Significant Winter Snow and Ice Storms
2. Significant Summer Rain Storms
3. Domestic Violence Police Calls
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: Safety Committee Trainings including CPR and First Aid \$ 500.00  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
 People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
 Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
 Training: Flagger Training and Safety Committee Trainings \$ 500.00  
 Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

Please return to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) no later than August 1, 2020



# Appendix C - Plan Documentation

## Crawford County's 2020 Public Safety Survey

Agency Name: Woodcock Borough  
Agency Contact: Sharron Diley  
Contact E-mail: Sharrondiley@yahoo.com

What are your greatest hazards in your municipality or response areas?

1. none
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises was or will be completed or purchased in 2020?

Plans: none \$ \_\_\_\_\_  
People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
Training: \_\_\_\_\_ \$ \_\_\_\_\_  
Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises needs to be completed, purchased, or to be maintained in 2021?

Plans: none \$ \_\_\_\_\_  
People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
Training: \_\_\_\_\_ \$ \_\_\_\_\_  
Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

Please return to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) no later than July 1, 2020

## Crawford County's 2020 Public Safety Survey

Agency Name: Woodcock Township  
Agency Contact: Renee Hayes/ Chuck Lawrence  
Contact E-mail: woodcocktp@zoominternet.net

What are the greatest hazards in your municipality or response areas?

1. flooding
2. downed trees
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises were or will be completed or purchased in 2020 and approximate costs?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
Training: \_\_\_\_\_ \$ \_\_\_\_\_  
Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

What new emergency plans, people/team, equipment, training, or exercises need to be completed, purchased, or maintained in 2021 and approximate cost?

Plans: \_\_\_\_\_ \$ \_\_\_\_\_  
People/Teams: \_\_\_\_\_ \$ \_\_\_\_\_  
Equipment: \_\_\_\_\_ \$ \_\_\_\_\_  
Training: \_\_\_\_\_ \$ \_\_\_\_\_  
Exercise: \_\_\_\_\_ \$ \_\_\_\_\_

Please return to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) no later than August 1, 2020

# Appendix C - Plan Documentation

## Crawford County Risk Assessment Summary and Mitigation Solutions Workshop

Presented on September 23, 2020



### Hazard Mitigation Plan Update Crawford County, PA

Risk Assessment Summary and  
Mitigation Solutions Workshop  
September 23, 2020



### Agenda

- Welcome and Introductions
- Project Overview and Kick-off Meeting Summary
- Risk Assessment
  - Hazard Identification
  - Risk Assessment Summary by Hazard
  - Hazard Ranking and Risk Factor (RF)
- Mitigation Strategy
  - What is a Mitigation Strategy?
  - Goals and Objectives
  - Mitigation Action Techniques
  - Mitigation Action Plan Development
- Planning Timeline
- Question and Answer Session

2

### Project Overview

- **What is Hazard Mitigation?**

Hazard mitigation is any sustained action taken to reduce or eliminate long-term risk to life and property resulting from natural and man-made hazards.
- **What is a Hazard Mitigation Plan and why have one?**
  - A Mitigation Plan is a community-driven, living document that communities use to reduce their vulnerability to hazards.
  - Communities must have a plan to apply for and receive mitigation grants in order to reduce vulnerability, and communities are able to recover more quickly from disasters.
- **Local Participation Requirements**
  - Attend Meetings.
  - Provide valuable local information.
  - Actively participate in the planning process.

3

# Appendix C - Plan Documentation

## Kick-off Meeting Summary

- Discussed Planning Process and Local Requirements
- Evaluated Hazards
- Reviewed 2015 Plan Components including Mitigation Action Plan.



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## Risk Assessment

Countywide Hazard Ranking and Risk Factor (RF)

Hazard Ranking based on Risk Factor (RF) methodology							
Hazard Risk	Hazard	Risk Assessment Category					Risk Factor
		Probability	Impact	Spatial Extent	Warning Time	Duration	
High	Pandemic	4	4	4	4	4	4
	Utility Interruption	3	3	3	4	2	3
	Terrorism	3	3	2	4	3	3
	Flooding	4	2	3	3	3	3
	Dam Failure	1	3	3	4	3	2.8
	HazMat	3	3	1	4	2	2.6
Moderate	Tornado	3	2	3	4	1	2.6
	Winter Storm	3	2	3	1	2	2.2
Low	Land Slide	1	1	2	4	2	2
	Earthquake	1	2	2	4	1	2
	Drought	1	2	3	2	1	1.8
	Invasive Species	4	2	1	1	1	1.8

6

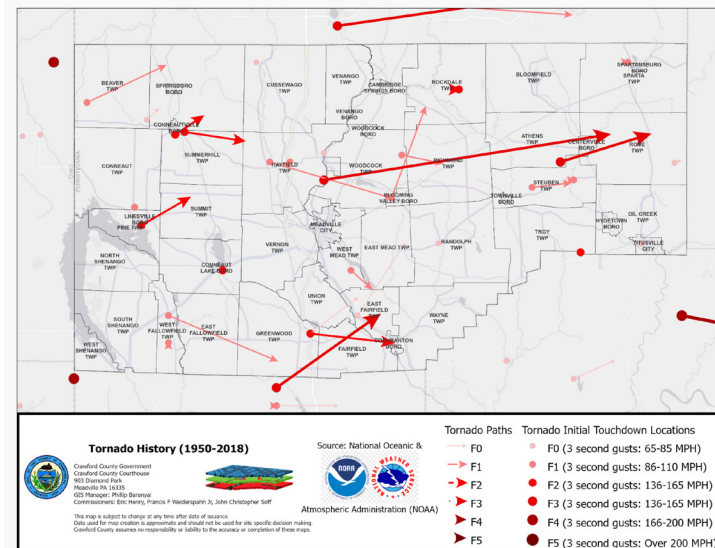
## Risk Assessment Hazard Identification

- 2015 HMP
- Hazard Identification Exercise
- State Plan evaluation



5

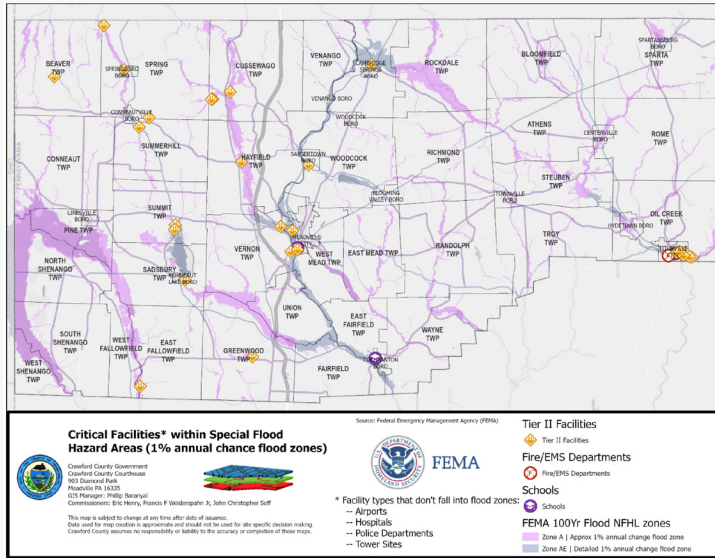
## Tornado History



7

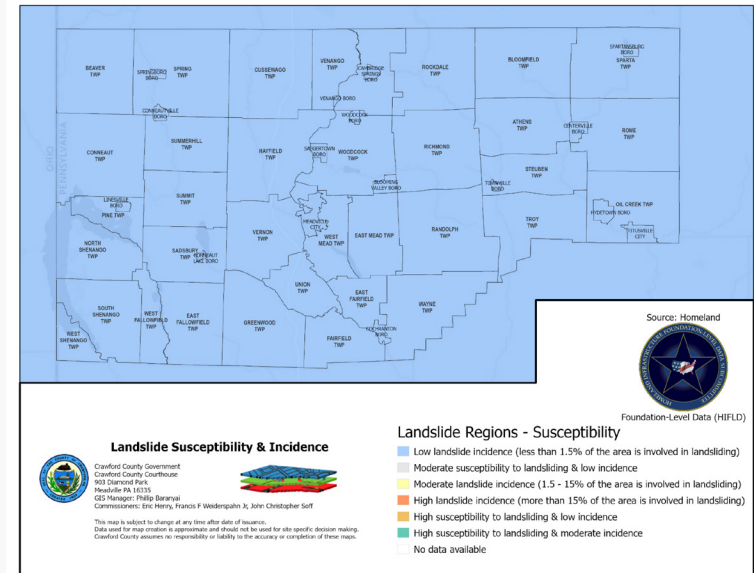
# Appendix C - Plan Documentation

## Critical Facilities Within Flood Hazard



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## Landslides



10

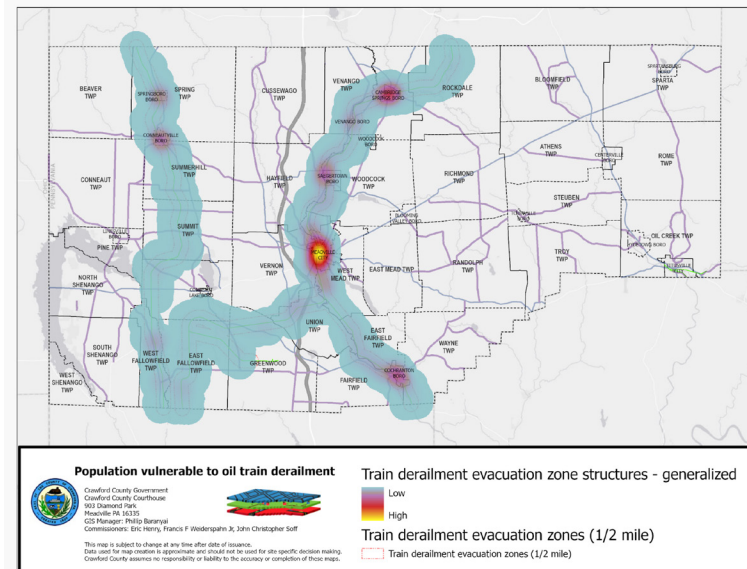
## Risk Assessment

*Flood, Flash Flood, Ice Jam*

Municipality	2010 Population	Population in SFHA	% Population in SFHA
Meadville	13,311	1,329	0.10
Titusville	5,601	678	0.12
Cochranon Borough	1,228	508	0.41
Vernon Township	5,630	416	0.07
Hayfield Township	2,940	309	0.11
Summit Township	2,027	215	0.11
Cambridge Township	1,527	214	0.14
Bloomfield Township	1,919	194	0.10
Cambridge Springs Borough	2,595	179	0.07
Woodcock Township	2,861	179	0.06
Wayne Township	1,435	153	0.11
Steuben Township	804	143	0.18
Union Township	1,010	122	0.12
Cussewago Township	1,559	120	0.08
Hidetown Borough	526	109	0.21
Pine Township	462	101	0.22
Sadsbury Township	2,933	98	0.03
South Shenango Township	2,037	95	0.05
Fairfield Township	986	92	0.09
Springboro Borough	477	85	0.18

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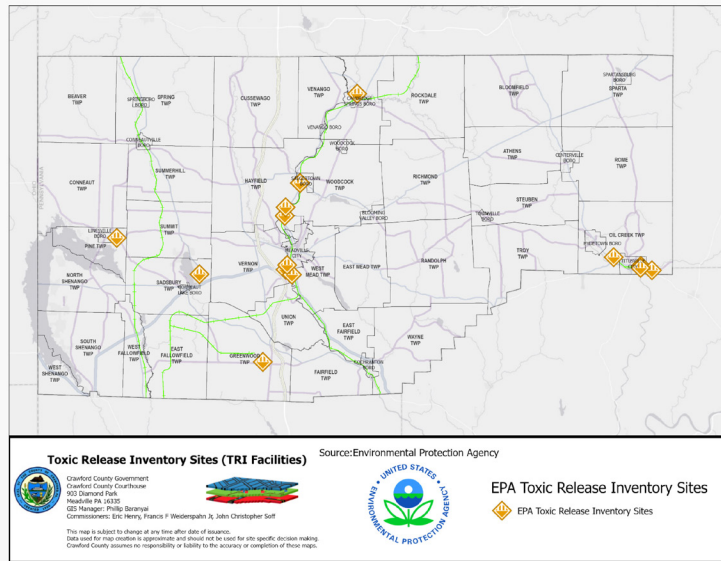
## Population Vulnerable to Train Derailment



11

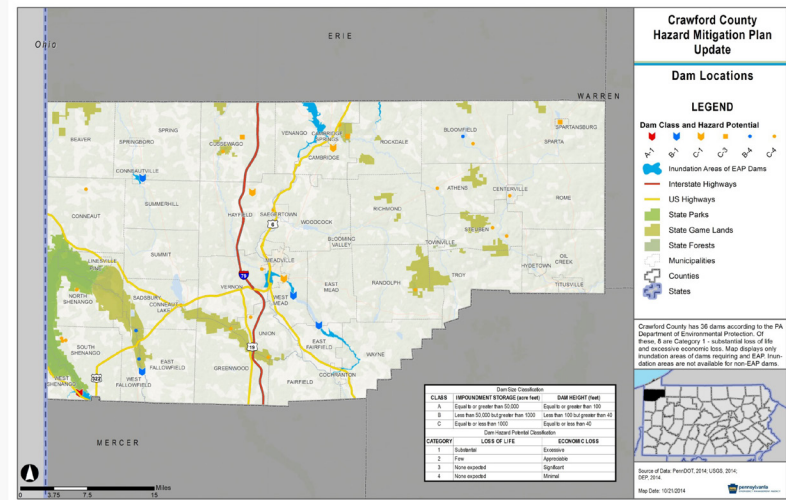
# Appendix C - Plan Documentation

## EPA Toxic Release Inventory Sites



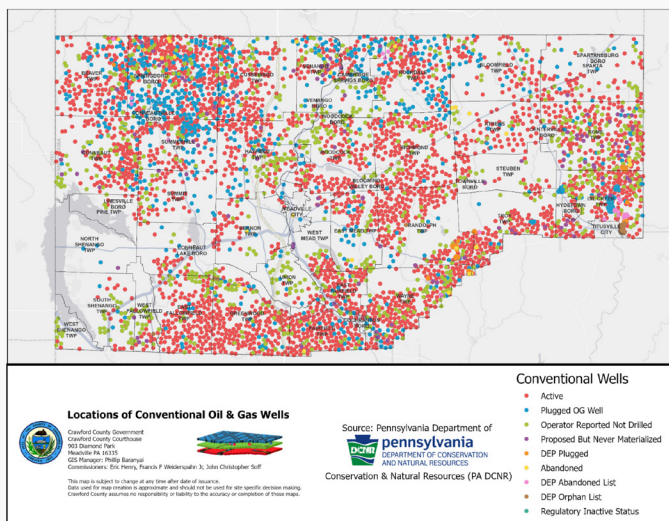
12

## Risk Assessment Dam Failure



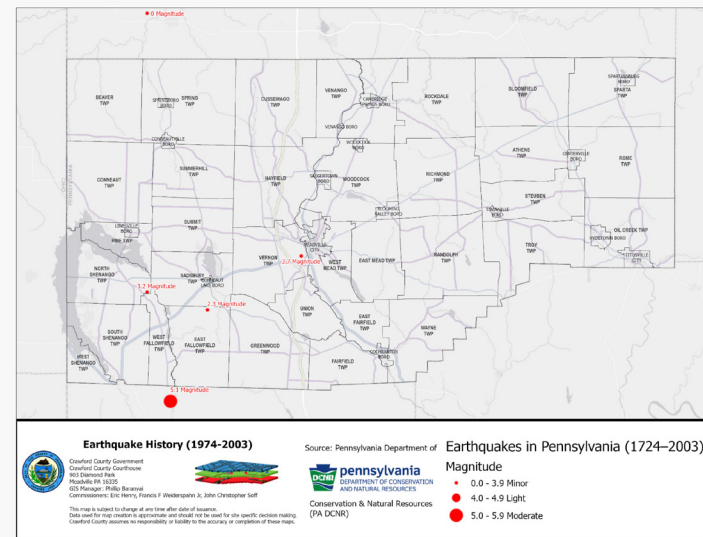
14

## Risk Assessment Environmental Hazards



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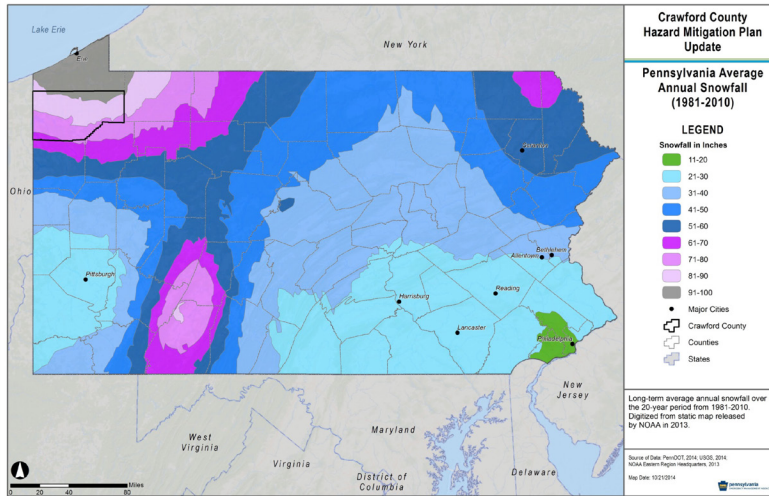
## Risk Assessment Earthquake



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# Appendix C - Plan Documentation

## Risk Assessment Winter Storm



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## Completed HVA's

- Athens
- Beaver
- Bloomfield
- Blooming Valley
- Centerville
- Cochranton
- Conneaut
- Conneautville
- East Fallowfield
- Greenwood
- Hayfield
- Linesville
- Meadville
- North Shenango
- Saegertown
- Spring
- Summerhill
- Townville
- Venango Twp.
- Vernon
- Wayne
- W. Fallowfield
- West Mead
- Woodcock Boro & Twp

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## Mitigation Strategy

*What is a Mitigation Strategy?*

- The approach you take to reduce or avoid long-term vulnerabilities to the identified hazards
- Includes:
  - Goals
  - Objectives
  - Actions and Projects



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## Mitigation Strategy

*Goals and Objectives*



- **Goals:** General guidelines that describe what your community would like to achieve.

- **Objectives:** Define strategies that must be implemented to achieve the identified goal. Objectives are more specific and measurable.



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# Appendix C - Plan Documentation

## Mitigation Strategy

### Goals and Objectives

#### Example:

- **Goal:** Increase public awareness and support for hazard mitigation.
- **Objective:** Publicize the hazard mitigation plan and encourage the implementation of mitigation actions.



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## Mitigation Strategy

### Mitigation Action Plan

- Identifies a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard.
- Example:
  - **Goal:** Increase public awareness and support for hazard mitigation.
  - **Objective:** Publicize the hazard mitigation plan and encourage the implementation of mitigation actions.
  - **Action:** Set up a booth at the County Fair and distribute hazard mitigation information.

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## Mitigation Strategy

### Goals and Objectives

Goals and Objectives 2010 HMP	
Goal	Objective
1.0 Improve upon the protection of citizens of Crawford County from all natural and man-made hazards	1.1. Ensure adequate training and resources for emergency organizations and personnel by developing and distributing public awareness materials about natural hazard risks, preparedness, and mitigation 1.2. Target owners of properties within identified hazard areas for additional outreach regarding mitigation and disaster preparedness
2.0 Reduce the current and future risks from hazards in Crawford County	2.1. Mitigate existing structures and infrastructure located in high hazard areas 2.2. Evaluate and update existing floodplain ordinances to meet or exceed the NFIP standards 2.3. Improve the enforcement of existing floodplain regulations 2.4. Ensure that flood insurance policies remain affordable through county and municipal government programs
3.0 Develop better hazard data for Crawford County and its municipalities	3.1. Assess vulnerability of transportation systems and assets located in hazard areas 3.2. Conduct a hazardous materials survey to better understand the nature and extent of hazardous materials risk throughout the county

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## Mitigation Strategy

### Mitigation Action Techniques

#### Four Categories of Mitigation Techniques:

- Local Plans and Regulations
- Structure and Infrastructure Projects
- Natural Systems Protection
- Education and Awareness Programs

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# Appendix C - Plan Documentation

## Mitigation Techniques

### Local Plans and Regulations

- Comprehensive plans
- Land use ordinances
- Subdivision regulations
- Development review
- Building codes and enforcement
- NFIP and CRS
- Capital improvement programs
- Open space preservation
- Stormwater management regulations and master plans

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## Mitigation Techniques

### Natural Systems Protection

- Sediment and erosion control
- Stream corridor restoration
- Forest management
- Conservation easements
- Wetland restoration and preservation

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## Mitigation Techniques

- Acquisitions and elevations of structures in flood prone areas
- Utility undergrounding
- Structural retrofits
- Floodwalls and retaining walls
- Detention and retention structures
- Culverts
- Safe rooms

### Structure and Infrastructure Projects

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## Mitigation Techniques

- Radio or television spots
- Websites with maps and information
- Real estate disclosure
- Provide information/training
- NFIP outreach
- StormReady
- Firewise Communities

### Education and Awareness Programs

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# Appendix C - Plan Documentation

## Mitigation Strategy

Exercise #2: Mitigation Action Evaluation and Development

### Handouts:

- Mitigation Ideas: This document will assist with brainstorming mitigation actions for your community.
- 2015 Mitigation Action Plan: Existing action(s) from the 2015 HMP. Please describe what has been completed, if anything and/or if you'd like to carry this action into the 2020 HMP.
- New Mitigation Action Form: Each municipality must have at least one mitigation action.

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## Mitigation Strategy Review

Exercise #2: Mitigation Action Evaluation and Development

UNION TOWNSHIP CAPABILITY VS. RISK MATRIX		HAZARD RISK		
		Limited	Moderate	High
OVERALL CAPABILITY	High			
	Moderate			
	Low			X

Union Township Mitigation Action #1	Installing, re-routing, and increasing capacity of culverts throughout the township
Goal / Objective Met:	Goal #2 / Objective 2.1
Category:	Structural Project Implementation
Reduce Effects on All New Structures / Infrastructure	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Reduce Effects on All Existing Structures / Infrastructure	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Continued Compliance with the NFIP	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	Low
PASTEEL Score:	11
Estimated Cost:	\$1 Million (per culvert)
Potential Funding Sources:	FEMA HMA Grant Program, PennDot, Township Funds
Lead Agency/Department Responsible:	Union Township Supervisors
Implementation Schedule:	60 Months (March 2015)

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## Plan Integration

- Incorporating risk reduction strategies into local plans, policies, codes, and programs to guide community development patterns.
- Alternatively, incorporating information such as potential development and increased risk/vulnerability into the HMP.
- Keep plan integration in mind while working through your mitigation action plan.
- The Crawford County Comprehensive Plan public meeting is scheduled for October 29<sup>th</sup>.

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## Municipal Participation

- Attend Meetings.
- Provide valuable local information and submit documentation.
- Submit at least one mitigation action.



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# Appendix C - Plan Documentation

## Timeline

Date	Task
February 22, 2019	Planning Process began
September 26, 2019	Kick-off Meeting
	Risk Assessment
	Capability Assessment
September 23, 2020	Risk Assessment Summary and Mitigation Solutions Workshop
	Mitigation Strategy Update Production
	Conduct Public Meeting
December, 2020	Deliver to PEMA/FEMA for Review
April, 2021	Distribute to Municipalities for Adoption

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## Municipal Attendees

- Conneaut
- Conneautville
- Hayfield
- Linesville
- Meadville
- Pine
- Saegertown
- Sadsbury
- Venango Twp
- Wayne
- West Mead
- Woodcock Twp
- Others

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## ANY QUESTIONS



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## THANK YOU!

- Zach Norwood, Planning Office  
814-333-7341, [znorwood@co.crawford.pa.us](mailto:znorwood@co.crawford.pa.us)
- Allen Clark, Dept. of Public Safety  
814-724-2552, [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us)



# Appendix C - Plan Documentation

## Crawford County Hazard Mitigation Plan Meetings and Correspondence Documentation

### MITIGATION PROJECT WORK SCHEDULE

Crawford County-Wide Hazard Mitigation Plan Revision Development

Organize committee, identify stakeholders schedule and Conduct kickoff meeting	Months 0 - 3	April 2019
DPS, Planning, GIS, Soil Conservation, Assessment, Chamber, Township/Borough Assocs., Cities, Housing, United Way, Family Services, Drug & Alcohol Commission, School Districts, Historical Society, CHAPS, Allegheny College/University of Pittsburgh, PA DOT, DAG, DOH, DEP, County IT, Others?		
Review previous plan	Months 0 - 4	
Collect Data, Maps & GIS Information Update community profile	Months 3 - 6	June
Conduct Risk Assessment and hold Risk Assessment Review meeting(s)	Months 6 - 9	September
Update Capability Assessment	Months 9 - 12	December
Develop Mitigation Strategy and conduct meetings	Months 12-15	March 2020
Draft plan and conduct review meetings	Months 15 - 18	June
Revise and finalize plan & solicit feedback	Months 18 - 21	September
Submit to FEMA for review, revise as required	Months 21 - 22	December
Post online, print and distribute	Months 21-22	Jan. 2021
Receive adoptions/resolutions from communities	Months 22-24	April 2021

# Appendix C - Plan Documentation

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## Hazard Mitigation Planning Notes from PEMA IST

[www.pahmp.com](http://www.pahmp.com)

PEMA will update guide to counties

Look for any county or municipality changes or updates

DECED 2015 state land use

Vulnerability and population change. Zach said decreased 1.5%.

Protected lands 2012

Seven Sectors; Emergency Management, Economic Development, Land Use, Housing, Health & Medical, Infrastructure, Natural & Cultural

Conduct webinars for housing, universities, etc.

Risk Assessment look at the states including climate change

Homeland Security Infrastructure web-site

Drug related deaths and Narcan use

Cyber attacks

Hazard Playing Cards available this summer

Structurally deficient bridges (PennDOT). Zach said Crawford County is the highest. Change name to, "Poor Bridges." County has 38 bridges and 16 are poor.

Capability Assessment Storm Water Management (soil conservation)

Opioid/Suicide Task Force

NFIP drop in policies

On-line maintenance of projects accessed

Have yearly HazMit Plan Reviews

Historical Sites added to plan

Flood hazard layers from Don Smith in Tom Hughes Office at PEMA

Look at Flood Plain Ordinances

## Minutes from Meeting Planning Team

February 22, 2019

Attending: DPS Allen & Don, Planning Zach

### The Plan and Process

Add someone from Crawford County IT to committee

Add to the list of hazards; broadband access, blighted houses,

Quarterly review and track progress towards mitigation goals

### DSP To Do List

Allen to send Phil the pipeline GIS website information

Contact Mari at FEMA

### Planning To Do List

Zach will have his department reformat the current plan so it can be edited

Use their Facebook Page to push and gather information

Change the format of the Mitigation Action Plan Pages

### GIS To Do List

Review bridge list that are more than 20 feet long. Have municipalities report bridges less than 20 feet long.

Review 9-1-1 data and verify SARA, Tier II, and Health Center data, opioid data.

### All three Departments

Each Department list the data and information they maintain that can be added to the plan

# Appendix C - Plan Documentation

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## **Notes from First Meeting Planning Team** May 15, 2019

Attending: DPS Allen and Don, Planning Zach

Planning within two weeks will have the pdf plan in Microsoft Word to be edited

June meeting with FEMA and PEMA will be just our two departments

September 2019 will be the plan kick-off meeting with everyone

Risk Assessments to go out in June and back in July

April 2020 have the final plan done

Contact Cliff Willis at Allegheny College who worked on their Comp Plan

Should the plan be laid out in steps or low hanging projects?

## **Notes from Meeting Planning Team** June 4, 2020

Attending: DPS Allen, Jill, and Don, Planning Zach, PEMA Ernie Szabo, FEMA Mari Randford

# Appendix C - Plan Documentation

**Sign-In Log  
Hazard Mitigation Meeting with PEMA & FEMA  
June 4, 2019**

#	Name – Please Print	Signature	Organization
1	Allen Clark	<i>Allen Clark</i>	Crawford DPS
2	Jill Allen	<i>Jill Allen</i>	cc-DPS
3	DON BOVARD	<i>Don R. Bovard</i>	CC DPS
4	Zach Norwood	<i>Zach Norwood</i>	CC Planning
5	Ernst Senko	<i>Ernst Senko</i>	PEMA
6	Mari Radtke	<i>Mari Radtke</i>	FEMA
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Crawford County  
Planning Department



Crawford County  
Department of Public Safety

August 2, 2019

Dear Community Partner;

Remember back to the last hazard that affected your community. Was it flooding? How about trees knocking down power lines? Was it a tornado touching down or a tractor trailer that spilt chemicals over the highway? Do you remember thinking “what do we do” or “I wish we could fix this situation”? The Crawford County Department of Public Safety and Planning Office are currently working on updating the County-wide Hazard Mitigation Plan and we need your help to do it.

The Hazard Mitigation Plan, which is updated every five years, undertakes a process to identify activities, capabilities, policies, and tools necessary to implement successful and sustainable mitigation actions. In order to compete in this 21<sup>st</sup> century economy local governments, private businesses, and non-profit agencies must ensure that we are not putting our investments at risk. We cannot simply plan for post-disaster anymore. It is important that we attempt to mitigate the disaster before it occurs. In order to qualify for federal aid for technical assistance and post-disaster funding, local municipalities must comply with the Disaster Mitigation Act of 2000 (DMA) and its implementing regulations (44CFR, Parts 201 and 206).

So, join us at our upcoming stakeholder meeting, in order to help develop a strategy that ensures the investments we are all making in Crawford County result in sound returns. A Stakeholder Meeting has been scheduled for;

**Thursday, September 26, 2019  
10:00am to Noon  
East Mead Volunteer Fire Department  
23876 State Highway 27  
Meadville, PA 16335**

Please RSVP to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) or 814-724-2552 no later than September 23 if someone from your municipality or organization can attend.

Weather and human caused emergencies affect all of us each year and working together, as the whole-community, we can be prepared when they occur and help lessen the impacts on our residents, businesses, and municipalities.

# Appendix C - Plan Documentation

Sign-In Log  
Hazard Mitigation Meeting  
September 26, 2019

#	Name - Please Print	Signature	Organization
1	BEAN MAGINNIS	<i>[Signature]</i>	TERRVILLE AREA HOSPITAL
2	KEVIN M. GREATH	<i>[Signature]</i>	LINESVILLE Borough
3	ANDY WALKER	<i>[Signature]</i>	CITY OF MEADVILLE
4	CRAY FARRAR	<i>[Signature]</i>	HYDETOWN BOROUGH
5	PATRICIA MYER	<i>[Signature]</i>	Hydetown Borough
6	PHIL MYER	<i>[Signature]</i>	HYDETOWN BOROUGH
7	RANDY WINKLEMAN	<i>[Signature]</i>	HYDETOWN BORO
8	LYLE HOOPER	<i>[Signature]</i>	SAOBSURY TWP.
9	ROSE MUMMAN	<i>[Signature]</i>	Sadsbury Twp.
10	KENEY HAYES	<i>[Signature]</i>	WOOROCK TWP
11	CHUCK LAWRENCE	<i>[Signature]</i>	SPRUE BORO
12	CHAUNCEY MILLER	<i>[Signature]</i>	LORD CORP - Sadsbury
13	MARTIN WALKER	<i>[Signature]</i>	1112 IN PAARNG
14	NICHOLAS O'BRIEN	<i>[Signature]</i>	1-112 IN PAARNG
15	MATTHEW MCCOY	<i>[Signature]</i>	American Red Cross
16	BOB JEAN	<i>[Signature]</i>	COCHRANTON BORO COUNCIL
17	BARB OPATENY	<i>[Signature]</i>	COCHRANTON BORO
18	CHUCK HICKERNELL	<i>[Signature]</i>	Northwestern Rural Elec. Coop.
19	BILL COSTON	<i>[Signature]</i>	East Mead Emergency
20	LEE ANN COSTON	<i>[Signature]</i>	East Mead Area Twp
21	ROBERT HOWART	<i>[Signature]</i>	Vernon Twp
22	RANDY TAYLOR	<i>[Signature]</i>	MEADVILLE MEDICAL CENTER EM
23	JILL ALLEN	<i>[Signature]</i>	CC - DPS
24	DON BOVARD	<i>[Signature]</i>	CC - DPS
25	BRENDA BRADEN	<i>[Signature]</i>	Greenwood, Summerhill and Beaver Township

Sign-In Log  
Hazard Mitigation Meeting  
September 26, 2019

#	Name - Please Print	Signature	Organization
26	Donna Kean	<i>[Signature]</i>	North Shenango Twp East Fallowfield Twp
27	DAN DICKEY	<i>[Signature]</i>	NORTH SHENANGO TWP
28	Dave Dickson	<i>[Signature]</i>	Penncrest SD
29	TIM GLASSPOOL	<i>[Signature]</i>	PENNCREST
30	MARC BAUAS	<i>[Signature]</i>	Hydetown, Pa. Mayor
31	Jill Dunker	<i>[Signature]</i>	West Mead & Venango
32	Allen Clark	<i>[Signature]</i>	Crawford DPS
33	Zach Norwood	<i>[Signature]</i>	Crawford Planning
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# Appendix C - Plan Documentation

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## Notes from Meeting Planning Team August 6, 2020, 9:00am

Attending: DPS Allen, Jill, and Don, Planning Zach, GIS Phil

Group discussed the possibility of using Planning Federal funds to pay for a consultant to help with the plan. It was determined that it would take too long to go through the RFP process to have one hired before the plan deadline so the group will update the plan in house.

Allen will send the team the planning team members list.

Planning explained how they use Monday software for planning management and will add DPS to it.

Information will be sent to Planning regarding the Facebook page, web-site, and GIS HUB.

Team briefly reviewed the hazards from 2015 and quickly recommended moving pandemic up, keep flooding and tornado since there have been a few in the last five years, two high hazard dams are constructional unsound, and oil and gas can be removed.

Information from the CAD has been obtained using the old system and new data from the new CAD will be obtained.

Jill will work on the tool kit to send to FEMA once the plan is updated

Phil will assist with the mapping of hazards

A GIS HUB will be created for mitigation strategy collection.

An HVA has already been sent to fire, EMS, police, EMA, and municipalities.

Crawford County Soil Conservation Office was invited to this meeting.

## Notes from Meeting Utilities August 12, 2020, 10:30 am Webinar

Attending: DPS Allen & Don, PennPower John Greenwood, Penelec Chuck Evanhoff

Discussed the County Wide Hazard Mitigation Plan and went over the energy hazard profile.

Utilities will see what data they are able to provide to the county.

Any projects benefiting the utilities need to come through the municipality.

Discussed some changes in operations due to COVID-19 pandemic. Both government liaisons were working from home currently.



# Appendix C - Plan Documentation

## Allen Clark

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**From:** Allen Clark  
**Sent:** Wednesday, August 12, 2020 11:27 AM  
**To:** Don Bovard; Jill Allen  
**Cc:** Zachary Norwood; Phil Baranyai; Allen Clark  
**Subject:** RE: Hazard Profiles in the HMP

Here is the breakdown of hazards majority of it completed by August 21<sup>st</sup>;

Pandemic, Epidemic	Allen with Heather Palm
Utility Interruption	Allen with Utilities
Terrorism	Allen
Flash Flood, Flood, Ice Jam	Jill
Dam Failure	Jill
Hazardous Materials / Environmental	Allen with Dustin Wyant
Tornado, Severe Thunder Storm	Jill
Winter Storm	Don
Land Slide	Don
Earthquake	Don
Drought	Don
Invasive Species	Brian Pilarcik & Scott Sjolander

Please note web-site addresses and sites of the information and dates of information/maps that we can document. Please make sure the document in the R: Planning folder has the final updates if you save it on your computer or 911 Server. Send Phil a list of maps needed and the reference from the 2015 plan on where they were located.

Thanks!

Allen W. Clark, BS | Emergency Management Coordinator  
Crawford County Department of Public Safety

632 Pine Street | Meadville, PA 16335  
Office: 814-724-2552 | Mobile: 814-720-4871  
24 Hour: 814-724-2548 | Fax: 814-724-4605  
[aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) | [www.crawfordcountypa.net](http://www.crawfordcountypa.net)



## Minutes from Meeting Planning Team

August 20, 2020, 2:00pm

Webinar

Attending: DPS Allen & Don, Planning Zach, GIS Phil

The HMP Team reviewed where they were at in the planning process for the plan. The three DPS Staff have divided the hazards up and will be updating them with subject matter experts.

The National Mitigation Framework will be included as well as the Community Lifelines by Allen.

Page 112 Education and Outreach can be updated from the ASOW reports by Allen.

Reviewed the invitation list and will include churches, VOAD, businesses, and academia.

Discussed the significant emergencies since 2016 including tornados, flooding, ice jam, pandemic, and cyber events.

Don and Allen will send Zach and Phil the Mitigation Strategy for incorporation into the GIS HUB which will allow the HMP Team to manage and monitor the data.

Zach showed a template of the web-site and FAQ.

Phil will be working on maps for the different hazard profiles.

# Appendix C - Plan Documentation

**Allen Clark**

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**From:** Allen Clark  
**Sent:** Tuesday, August 25, 2020 10:33 AM  
**Subject:** 2020 Public Safety Survey  
**Attachments:** Crawford County Hazard & Gaps Survey.pdf

**Importance:** High

Good Morning Municipal EMA Coordinators and Municipalities;

Please see attached a very short survey that we need completed from each municipality for our County-Wide Hazard Mitigation Plan. We've tried to make this process as easy as possible. If someone from each of the 51 municipalities would complete this and send it to me as soon as possible it would be greatly appreciated. You can e-mail, fax, or just call me.

If you have already completed the form, thank you! I have received 10 out of 51 municipalities returning the survey. If you have any questions or you would rather just call me and tell me the information please reach out to me at your convenience. This information is very valuable to the plan and the emergency preparedness of your municipality and residents.

Sincerely,

Allen W. Clark, BS | Emergency Management Coordinator  
Crawford County Department of Public Safety

632 Pine Street | Meadville, PA 16335  
Office: 814-724-2552 | Mobile: 814-720-4871  
24 Hour: 814-724-2548 | Fax: 814-724-4605  
[aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) | [www.crawfordcountypa.net](http://www.crawfordcountypa.net)



**Allen Clark**

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**From:** Allen Clark  
**Sent:** Wednesday, September 2, 2020 2:20 PM  
**Subject:** Next Hazard Mitigation Plan Webinar  
**Attachments:** HVA Stakeholder Webinar Letter.docx; Crawford Co HVA Matrix Composite 2020.pdf; HVA Stakeholder Webinar Letter.pdf

Good Afternoon Municipalities and Local EMA Coordinators;

Please see the attached letter regarding the next webinar meeting as we continue to update the County-wide Hazard Mitigation Plan. You do not need to print the HVA Matrix out, just review it prior to the webinar and have any questions regarding the document ready for the webinar.

Please RSVP to me if you can attend so we have a record of your participation.

Sincerely,

Allen W. Clark, BS | Emergency Management Coordinator  
Crawford County Department of Public Safety

632 Pine Street | Meadville, PA 16335  
Office: 814-724-2552 | Mobile: 814-720-4871  
24 Hour: 814-724-2548 | Fax: 814-724-4605  
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# Appendix C - Plan Documentation



Crawford County  
Planning Office



Crawford County  
Department of Public Safety

September 2, 2020

Dear Community Partners;

Remember back to the last hazard that affected your community. Was it flooding? How about trees knocking down power lines? Was it a tornado touching down or a tractor trailer that spilt chemicals over the highway? Do you remember thinking “what do we do” or “I wish we could fix this situation”? The Crawford County Department of Public Safety and Planning Office are currently working on updating the County-wide Hazard Mitigation Plan and we need your help to do it. We will be reviewing our hazard vulnerability assessments and start working on hazard mitigation actions / projects.

The Hazard Mitigation Plan, which is updated every five years, undertakes a process to identify activities, capabilities, policies, and tools necessary to implement successful and sustainable mitigation actions. In order to compete in this 21<sup>st</sup> century economy local governments, private businesses, and non-profit agencies must ensure that we are not putting our investments at risk. We cannot simply plan for post-disaster anymore. It is important that we attempt to mitigate the disaster before it occurs.

So, join us at our next Hazard Mitigation Plan Stakeholder Webinar, in order to help develop a strategy that ensures the investments we are all making in Crawford County result in sound returns. A Stakeholder Webinar has been scheduled for;

**Wednesday, September 23<sup>rd</sup>, 2020**

**2:00pm to 3:00pm**

**GoTo Meeting Webinar**

<https://global.gotomeeting.com/join/501462893>

**You can also dial in using your phone**

**United States: +1 (408) 650-3123**

**Access Code: 501-462-893**

Please RSVP to Allen Clark at [aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) or 814-724-2552 no later than September 21<sup>st</sup> if someone from your municipality or organization can attend.

Weather and human caused emergencies affect all of us each year and working together, as the whole-community, we can be prepared when they occur and help lessen the impacts on our residents, businesses, and municipalities.

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**Allen Clark**

**From:** Allen Clark  
**Sent:** Wednesday, September 9, 2020 12:24 PM  
**Subject:** Where does your drinking water come from?

**Importance:** High

Good Afternoon Municipalities;

We are still working on the County-Wide Hazard Mitigation Plan updates and we need to know if your municipality has municipal drinking water system or if the drinking water comes from residential private water wells.

Please let me know **ONLY** if you have a municipal public water system that you or an authority maintains. I think most drinking water come from water wells but one municipalities obtains their water from a creek.

Thank you again for all you help,

Allen W. Clark, BS | Emergency Management Coordinator  
Crawford County Department of Public Safety

632 Pine Street | Meadville, PA 16335  
Office: 814-724-2552 | Mobile: 814-720-4871  
24 Hour: 814-724-2548 | Fax: 814-724-4605  
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# Appendix C - Plan Documentation

## Allen Clark

**From:** Allen Clark  
**Sent:** Wednesday, September 23, 2020 9:42 AM  
**Subject:** FW: Next Hazard Mitigation Plan Webinar  
**Attachments:** Crawford Co HVA Matrix Composite 2020.pdf; HVA Stakeholder Webinar Letter.pdf

Good Morning;

Just a friendly reminder of the Hazard Mitigation Plan Webinar today at 2:00pm via GoTo Meeting.

Thank you,

Allen W. Clark, BS | Emergency Management Coordinator  
Crawford County Department of Public Safety

632 Pine Street | Meadville, PA 16335  
Office: 814-724-2552 | Mobile: 814-720-4871  
24 Hour: 814-724-2548 | Fax: 814-724-4605  
[aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) | [www.crawfordcountypa.net](http://www.crawfordcountypa.net)



**From:** Allen Clark  
**Sent:** Wednesday, September 2, 2020 2:20 PM  
**Subject:** Next Hazard Mitigation Plan Webinar

Good Afternoon Municipalities and Local EMA Coordinators;

Please see the attached letter regarding the next webinar meeting as we continue to update the County-wide Hazard Mitigation Plan. You do not need to print the HVA Matrix out, just review it prior to the webinar and have any questions regarding the document ready for the webinar.

Please RSVP to me if you can attend so we have a record of your participation.

Sincerely,

Allen W. Clark, BS | Emergency Management Coordinator  
Crawford County Department of Public Safety

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## Allen Clark

**From:** Allen Clark  
**Sent:** Tuesday, October 6, 2020 2:16 PM  
**Subject:** Crawford County-wide Hazard Mitigation Planning

Good Afternoon Crawford County Municipalities and Hazard Mitigation Stakeholders;

Remember back to the last hazard that affected your community. Was it flooding? How about trees knocking down power lines? Was it a tornado touching down, or a tractor trailer that spilled chemicals over the highway? Do you remember thinking "what do we do" or "I wish we could fix this situation"? The Crawford County Department of Public Safety, Planning, & GIS Offices are currently working on updating the County-wide Hazard Mitigation Plan and we need your help to do it.

The County-wide Hazard Mitigation Plan, which is updated every five years, undertakes a process to identify activities, capabilities, policies, and tools necessary to implement successful and sustainable mitigation actions. In order to compete in this 21<sup>st</sup> century economy local governments, private businesses, and non-profit agencies must ensure that we are not putting our investments at risk. We cannot simply plan for post-disaster anymore. It is important that we attempt to mitigate the disaster before it occurs. In order to qualify for federal aid for technical assistance and post-disaster funding, local municipalities must comply with the Disaster Mitigation Act of 2000 (DMA) and its implementing regulations (44CFR, Parts 201 and 206).

Please go to this web-site to review information about the potential hazards in Crawford County, to sign-up to be on the planning team, and to submit a mitigation project;

<https://2020-hazard-mitigation-plan-crawfordcountypa.hub.arcgis.com/>

Municipal Leaders please enter at least one Mitigation Project for your municipality no later than November 30<sup>th</sup>

Weather and human caused emergencies affect all of us each year and working together, as the whole-community, we can be prepared when they occur and help lessen the impacts on our residents, businesses, and municipalities.

Sincerely,

Allen W. Clark, BS | Emergency Management Coordinator  
Crawford County Department of Public Safety

632 Pine Street | Meadville, PA 16335  
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1

# Appendix C - Plan Documentation

## Allen Clark

**From:** Allen Clark  
**Sent:** Monday, October 19, 2020 8:58 AM  
**Subject:** FW: Crawford County-wide Hazard Mitigation Planning  
**Attachments:** Crawford County Hazard & Gaps Survey.pdf  
**Importance:** High

Good Morning Municipalities and Local EMA Coordinators;

Just a friending reminder to please submit **at least one** hazard mitigation project for the County-Wide Hazard Mitigation Plan. It will only take a couple minutes to complete and will be very helpful in our planning. Any questions please let me know. So far we have Conneautville Borough, West Mead Township, and Venango Township that have submitted projects.

I'm also missing the attached form from the following municipalities; Cambridge Springs, Cambridge Township, Conneaut Lake, Cussewago, East Fairfield, East Mead, Fairfield, Hydetown, Oil Creek, Pine, Randolph, Richmond, Rockdale, Rome, Steuben, Spartansburg, Sparta, South Shenango, Summit, Troy, Union, and West Shenango. Please send the form back to me completed or call me at the office and I can complete it for you.

Thank you!

Allen W. Clark, BS | Emergency Management Coordinator  
Crawford County Department of Public Safety

632 Pine Street | Meadville, PA 16335  
Office: 814-724-2552 | Mobile: 814-720-4871  
24 Hour: 814-724-2548 | Fax: 814-724-4605  
[aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) | [www.crawfordcountypa.net](http://www.crawfordcountypa.net)



**From:** Allen Clark <AClark@co.crawford.pa.us>  
**Sent:** Tuesday, October 6, 2020 2:16 PM  
**Subject:** Crawford County-wide Hazard Mitigation Planning

Good Afternoon Crawford County Municipalities and Hazard Mitigation Stakeholders;

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## Allen Clark

**From:** Allen Clark  
**Sent:** Thursday, October 22, 2020 11:23 AM  
**To:** Zachary Norwood; Phil Baranyai; Jill Allen; Don Bovard  
**Cc:** Greg Beveridge; Allen Clark  
**Subject:** HMP Updates  
**Attachments:** Appendix E Critical Facilities.pdf

Good Morning HMP Team;

Here is where we are at with the 2020 Hazard Mitigation Plan Update;

Zach, the hazards that DPS and Phil updated are all done and ready to be moved to final formatting. We may need one map from Phil yet? Can we still edit the plan in the new format?

Need to hold a public meeting with notice in the newspaper. We should use GoTo Meeting for this. Anyone have experience with a public notice for a webinar meeting? We had no one for the in person meeting in 2015 but it is a federal requirement.

Final Plan needs to be to FEMA and PEMA as soon as possible in January 2021. Earlier the better.

We need 20 municipalities to send in their hazards list and 45 municipalities to enter a project/action on the GIS HUB. Update page 41 in new Draft.

We should have another webinar with the municipalities to go over projects/actions in early November. DPS will set this up.

Can we get the GIS HUB information on Planning and GIS's Facebook Pages now?

Section 6 Mitigation Strategy. We can't update this section until we obtain projects from the municipalities. Planning, GIS, and DPS can enter projects/strategies for county-wide mitigation efforts so each of our three departments should enter something. Reminder we have to have a project/action for each of our hazards listed.

Appendix A Bibliography. Do we need it? We've cited in each hazard where our information came from.

Appendix B Local Mitigation Plan Review Tool. Needs updated which DPS can do.

Appendix C Meeting and Other Participation. I have this information and it says it's on the HMP CD.

Appendix D Local Municipality Flood Vulnerability Maps. Phil do you have/obtain these? Last ones is dated 2015 in the 2015 plan.

Appendix E Critical Facilities. Phil I think you have this done. 2015 is attached for your reference.

Appendix F Hazus Methodology and Results. Phil I thought I saw this in the folder already. Please confirm.

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# Appendix C - Plan Documentation

## Allen Clark

**From:** Don Bovard  
**Sent:** Monday, November 2, 2020 3:58 PM  
**Cc:** Allen Clark  
**Subject:** Countywide Hazard Mitigation Planning training webinar  
**Attachments:** 2020-11-17 Countywide Hazard Mitigation Planning Flyer.pdf

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

To: Crawford County's municipal emergency management coordinators & municipal elected/appointed officials

Good afternoon.

You're invited to attend the **Countywide Hazard Mitigation Planning** training webinar on **Tuesday, November 17<sup>th</sup>, 2020**. Please see the attached flyer for the details.

**Please contact me to register for the webinar no later than Sunday, November 15<sup>th</sup>, 2020. Please provide the following information:**

- Name
- Agency/Organization
- Session preference: Morning (9 a.m. – 11 a.m.) or Afternoon (2 p.m. to 4 p.m.) or Evening (6 p.m. – 8 p.m.)
- Phone number
- Email address

**FYI: Your municipality must submit at least one hazard mitigation action (project) to be eligible to adopt the countywide hazard mitigation plan. This webinar will assist with that process.**

Another FYI: The **Countywide Hazard Mitigation Planning** training webinar will serve as the 2020 4<sup>th</sup> quarter training session for Crawford County's municipal emergency management coordinators.

Thank you. Have a nice evening.

Don

Don R. Bovard, BA | Operations & Training Officer  
Crawford County Department of Public Safety

632 Pine Street | Meadville, PA 16335  
Office: 814-336-4079 | Mobile: 814-720-2939  
24-Hour: 814-724-2548 | Fax: 814-724-4605  
[dbovard@co.crawford.pa.us](mailto:dbovard@co.crawford.pa.us) | [www.crawfordcountypa.net](http://www.crawfordcountypa.net)

## Allen Clark

**From:** Allen Clark  
**Sent:** Monday, November 9, 2020 12:41 PM  
**Subject:** FW: Hazard Mitigation Plan Public Webinar Meeting

**Importance:** High

Good Afternoon Crawford County Municipalities and Hazard Mitigation Stakeholders;

Remember back to the last hazard that affected your community. Was it flooding? How about trees knocking down power lines? Was it a tornado touching down, or a tractor trailer that spilled chemicals over the highway? Do you remember thinking "what do we do" or "I wish we could fix this situation"? The Crawford County Department of Public Safety, Planning, & GIS Offices are currently working on updating the County-wide Hazard Mitigation Plan and we need your help to do it.

The County-wide Hazard Mitigation Plan, which is updated every five years, undertakes a process to identify activities, capabilities, policies, and tools necessary to implement successful and sustainable mitigation actions. In order to compete in this 21<sup>st</sup> century economy local governments, private businesses, and non-profit agencies must ensure that we are not putting our investments at risk. We cannot simply plan for post-disaster anymore. It is important that we attempt to mitigate the disaster before it occurs. In order to qualify for federal aid for technical assistance and post-disaster funding, local municipalities must comply with the Disaster Mitigation Act of 2000 (DMA) and its implementing regulations (44CFR, Parts 201 and 206).

**Please go to this web-site to review information about the potential hazards in Crawford County, to sign-up to be on the planning team, and to submit a mitigation project;**

<https://2020-hazard-mitigation-plan-crawfordcountypa.hub.arcgis.com/>

Crawford County will be hosting a Public Meeting Webinar to review the results of our hazard vulnerability studies and review hazard mitigation projects and actions. This Public Meeting Webinar will be held on

**November 19<sup>th</sup> at 9:00am. Please contact me for the log in information.**

Weather and human caused emergencies affect all of us each year and working together, as the whole-community, we can be prepared when they occur and help lessen the impacts on our residents, businesses, and municipalities.

Sincerely,

Allen W. Clark, BS | Emergency Management Coordinator  
Crawford County Department of Public Safety

632 Pine Street | Meadville, PA 16335  
Office: 814-724-2552 | Mobile: 814-720-4871  
24 Hour: 814-724-2548 | Fax: 814-724-4605  
[aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) | [www.crawfordcountypa.net](http://www.crawfordcountypa.net)

# Appendix C - Plan Documentation

Allen Clark

**From:** Allen Clark  
**Sent:** Friday, November 13, 2020 8:50 AM  
**Subject:** FW: Countywide Hazard Mitigation Planning training webinar  
**Attachments:** 2020-11-17 Countywide Hazard Mitigation Planning Flyer.pdf

Good Morning;

Crawford County Department of Public Safety will be hosting Countywide Hazard Mitigation Planning training webinar at three different times to accommodate your schedule. Please see the attached notice and process to register for any one of these webinars. The same information will be shared at each of the three times.

Sincerely,

Allen W. Clark, BS | Emergency Management Coordinator  
Crawford County Department of Public Safety

632 Pine Street | Meadville, PA 16335  
Office: 814-724-2552 | Mobile: 814-720-4871  
24 Hour: 814-724-2548 | Fax: 814-724-4605  
[aclark@co.crawford.pa.us](mailto:aclark@co.crawford.pa.us) | [www.crawfordcountypa.net](http://www.crawfordcountypa.net)



**From:** Don Bovard <[dbovard@co.crawford.pa.us](mailto:dbovard@co.crawford.pa.us)>  
**Sent:** Monday, November 2, 2020 3:58 PM  
**Cc:** Allen Clark <[AClark@co.crawford.pa.us](mailto:AClark@co.crawford.pa.us)>  
**Subject:** Countywide Hazard Mitigation Planning training webinar

Good afternoon.

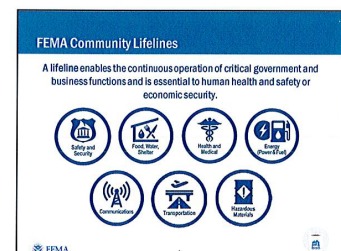
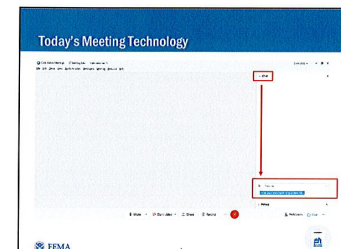
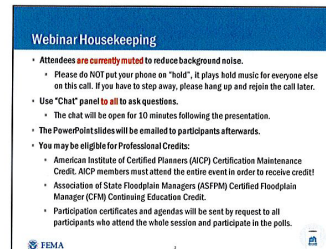
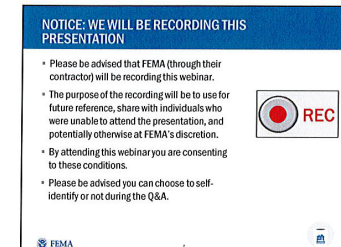
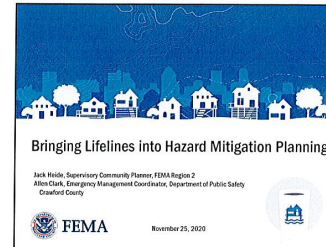
You're invited to attend the **Countywide Hazard Mitigation Planning** training webinar on **Tuesday, November 17<sup>th</sup>, 2020**. Please see the attached flyer for the details.

**Please contact me to register for the webinar no later than Sunday, November 15<sup>th</sup>, 2020.** Please provide the following information:

- Name
- Agency/Organization

1

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1

# Appendix C - Plan Documentation

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### Why a Lifelines Construct?

Lifelines provide an outcome-based, survivor-centric frame of reference that assists responders with the following:

- ✓ Determining the scale/complexity of a disaster.
- ✓ Identifying impacts to basic, critical lifesaving and life-sustaining services.
- ✓ Developing operational priorities/objectives that focus response efforts.
- ✓ Communicating disaster-related information across all levels of public, private, and non-profit sectors.
- ✓ Guiding response operations to support/facilitate integration across mission areas.

### FEMA Community Lifelines and Components


- SAFETY AND SECURITY**  
Law Enforcement/Security, Fire Service, Search and Rescue, Government Services, Community Safety
- FOOD, WATER, SHELTER**  
Food, Water, Shelter, Agriculture
- HEALTH AND MEDICAL**  
Medical Care, Public Health, Patient Movement, Medical Supply Chain, Facility Management
- ENERGY**  
Power Grid, Fuel

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### Polling Question 2

### Crawford County, Pennsylvania

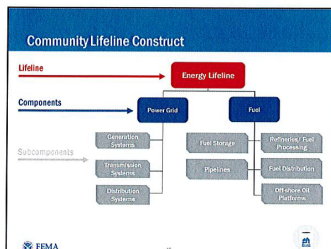
- Implement FEMA's seven Lifelines into plans, emergency operations center reports, and displays based on federal documents.
- Included Lifelines in the Summary section of the County-wide Hazard Mitigation Plan.



FEMA Community Lifelines Implementation Tools/Version 2.0/November 2018


### FEMA Community Lifelines and Components

- COMMUNICATION**  
Infrastructure, Responder Communications, Alerts, Warnings and Messages, Finance, 911 and Dispatch
- TRANSPORTATION**  
Highway/Roadway/Motor Vehicle, Mass Transit, Railway, Aviation, Maritime
- HAZARDOUS MATERIAL**  
Highway/Roadway/Motor Vehicle, Mass Transit, Railway, Aviation, Maritime




### Amount of Hazards Affected by Lifelines in Crawford County

HIGH	MEDIUM	LOW
<ul style="list-style-type: none"> <li>Pandemic</li> <li>Utility Interruption</li> <li>Other Terrorism</li> <li>Flooding</li> <li>Dam Failure</li> <li>Heatwave</li> <li>Tsunami</li> </ul>	<ul style="list-style-type: none"> <li>Winter Storm</li> </ul>	<ul style="list-style-type: none"> <li>Landslide</li> <li>Earthquake</li> <li>Drought</li> <li>Invasive Species</li> </ul>



### Crawford County Community Lifeline Integration: Terrorism

- Lifeline Planning Factors (Maximum Anticipated or Known Impacts)
  - Number of...
    - Oil systems facilities with at least moderate damage
    - Total debris (tons)
    - Hazardous materials facilities damaged
    - Highway bridges with at least moderate damage
    - Railway bridges with at least moderate damage
    - Airport runways with at least moderate damage



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### Crawford County Community Lifeline Integration: Terrorism

- Lifeline Stabilization Target
  - All contaminated areas are identified and secure
  - Multimodal routes (air, rail, road, pipeline) are clear of debris and accessible by normal or alternate means.



### Crawford County Community Lifeline Integration: Terrorism

- County Assistance Lines of Effort
  - Emergency Repairs and Augmentations to Infrastructure
  - Maintain relationships with Tier II facilities
  - Maintain absorbent material stockpiles, resources, and equipment for Public Safety Agencies
  - Provide Hazardous Materials Training and Exercises to Public Safety Agencies
  - Assess and Map Community Risks
  - Prevent Development and Limit Density in Hazard Areas





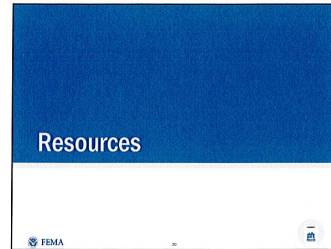
# Appendix C - Plan Documentation

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FEMA Community Lifelines Addressed per Mitigation Project

Mitigation Project	Project Name	COMMUNITY LIFELINES						Project Status
		Public Safety	Health & Safety	Financial Stability	Basic Needs	Community Resilience	Government Operations	
Project 1	Example Project	+	+	+	+	+	+	Completed
Project 2	Example Project	+	+	+	+	+	+	In Progress
Project 3	Example Project	+	+	+	+	+	+	Planned

Source: FEMA Mitigation Assistance Virtual Action Toolkit



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You May Be Eligible for Professional Credits

Participation certificates and agendas will be sent to all participants who attended the whole session and participated in the polls.

- American Institute of Certified Planners (AICP) Certification Maintenance (Credit course number: #9209087)
- Association of State Floodplain Managers (ASFPM) Certified Floodplain Manager (CFM) Continuing Education Credit

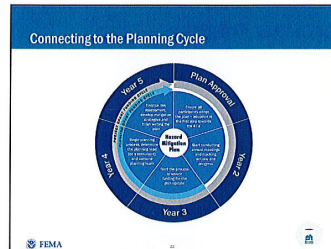
Contact Information

**JACK HEIDE**  
Superior Community Planner  
Mitigation District  
FEMA Region 2  
jheide@fema.dhs.gov

**ALLEN W. CLARK, BS**  
Emergency Management Coordinator  
Department of Public Safety  
Clarendon County  
aclark@co.clarendon.sc.us

Resources

- FEMA Guide to Virtual Hazard Mitigation Planning Meetings
- FEMA Community Lifelines Implementation Toolkit Version 2.0 November 2019
- FEMA Incident Stabilization Guide November 2019 (Operational Draft)
- Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards
- Hazard Mitigation Assistance Mitigation Action Portfolio



Questions?

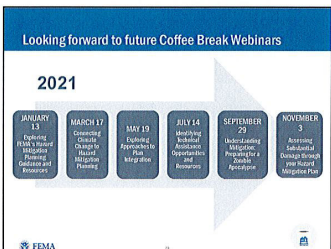
Please type your question(s) in the chat!

Thank you for Participating Today!

THANK YOU

We hope to see you all at the next Coffee Break!

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Upcoming FEMA Region 3 Coffee Break

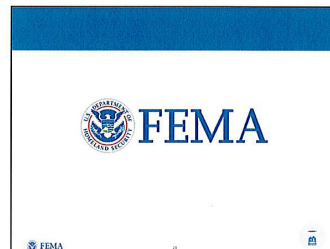
January 13, 2021

Exploring FEMA's Hazard Mitigation Planning Guidance and Resources

To register, please follow the link\* to: <https://femaregion3coffeebreaks.eventbrite.com>

To sign up for the Region 3 Resilience Report Newsletter and upcoming Coffee Break webinars, please follow the link\* to: <http://bit.ly/FEMA-Region-III>

\*Please note, links will be sent out after this presentation.



4

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5

# APPENDIX D - LOCAL MUNICIPALITY FLOOD VULNERABILITY

## CRAWFORD COUNTY 2020 WHOLE COMMUNITY HAZARD MITIGATION PLAN UPDATE

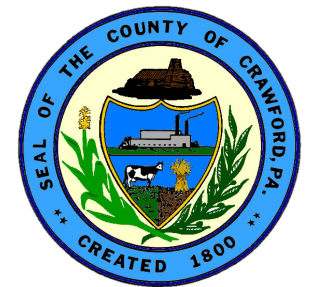
CRAWFORD COUNTY, PENNSYLVANIA

**Prepared By:**

Crawford County Department of Public Safety

Crawford County GIS

Crawford County Planning



# Appendix D - Local Municipality Flood Vulnerability

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## **Critical Facilities within Special Flood Hazard Areas in Crawford County's Local Municipalities**

1. Athens Township
2. Beaver Township
3. Bloomfield Township
4. Blooming Valley Borough
5. Cambridge Springs Borough
6. Cambridge Township
7. Centerville Borough
8. Cochranon Borough
9. Conneaut Lake Borough
10. Conneaut Township
11. Conneautville Borough
12. Cussewago Township
13. East Fairfield Township
14. East Fallowfield Township
15. East Mead Township
16. Fairfield Township
17. Greenwood Township
18. Hayfield Township
19. Hydetown Borough
20. Linesville Borough
21. Meadville City
22. North Shenango Township
23. Oil Creek Township
24. Pine Township
25. Randolph Township
26. Richmond Township
27. Rockdale Township
28. Rome Township
29. Sadsbury Township
30. Saegertown Borough
31. South Shenango Township
32. Sparta Township
33. Spartansburg Borough
34. Spring Township
35. Springboro Borough

# Appendix D - Local Municipality Flood Vulnerability

---

36. Steuben Township

37. Summerhill Township

38. Summit Township

39. Titusville City

40. Townville Borough

41. Troy Township

42. Union Township

43. Venango Borough

44. Venango Township

45. Vernon Township

46. Wayne Township

47. West Fallowfield Township

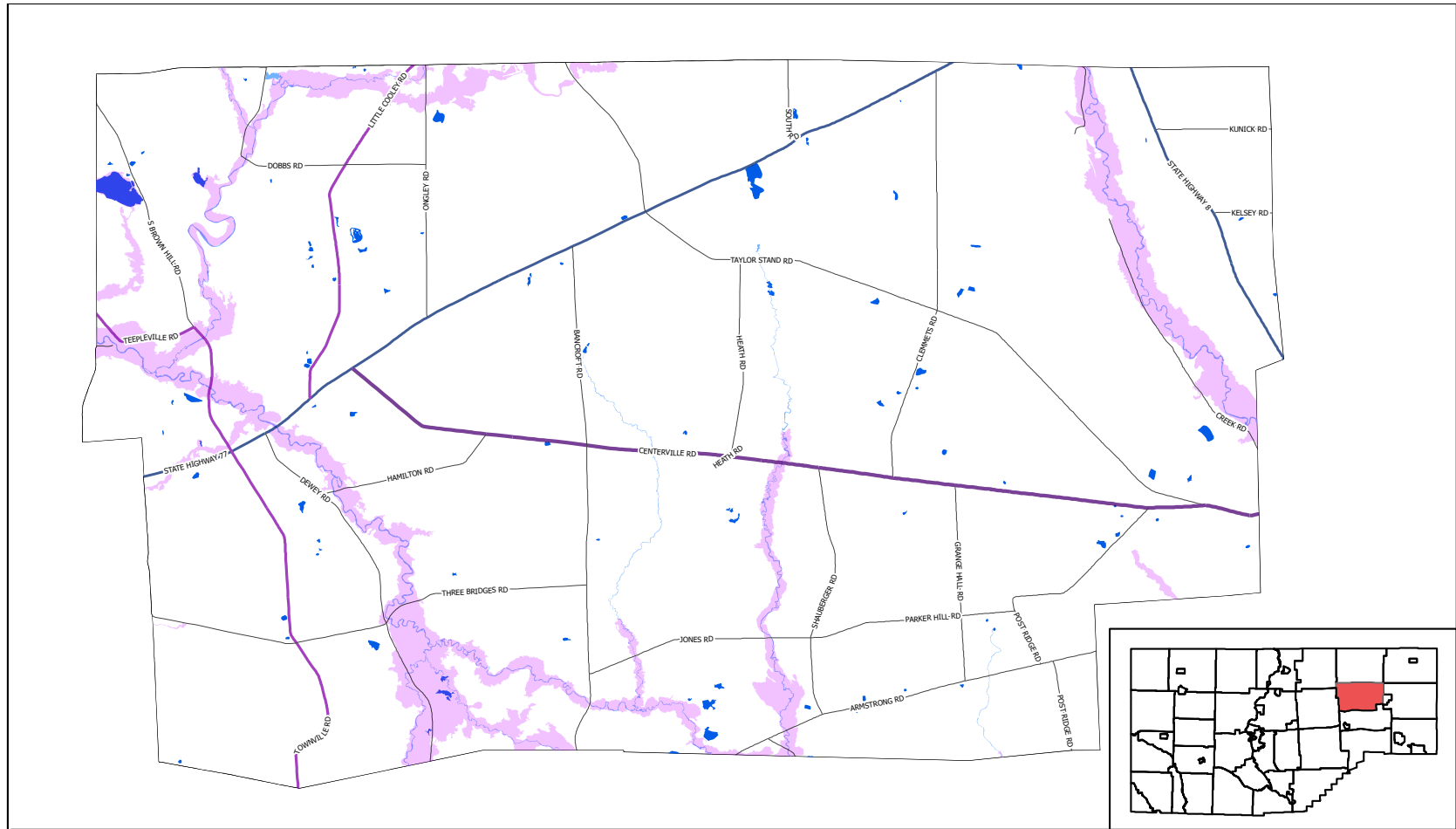
48. West Mead Township

49. West Shenango Township

50. Woodcock Borough

51. Woodcock Township

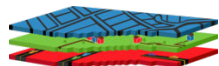
# Appendix D - Local Municipality Flood Vulnerability



## Athens Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



This map is subject to change at any time after date of issuance.  
Data used for map creation is approximate and should not be used for site specific decision making.  
Crawford County assumes no responsibility or liability to the accuracy or completion of these maps.

Source: Federal Emergency Management Agency (FEMA)



FEMA

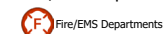
\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools



FEMA 100Yr Flood NFHL zones

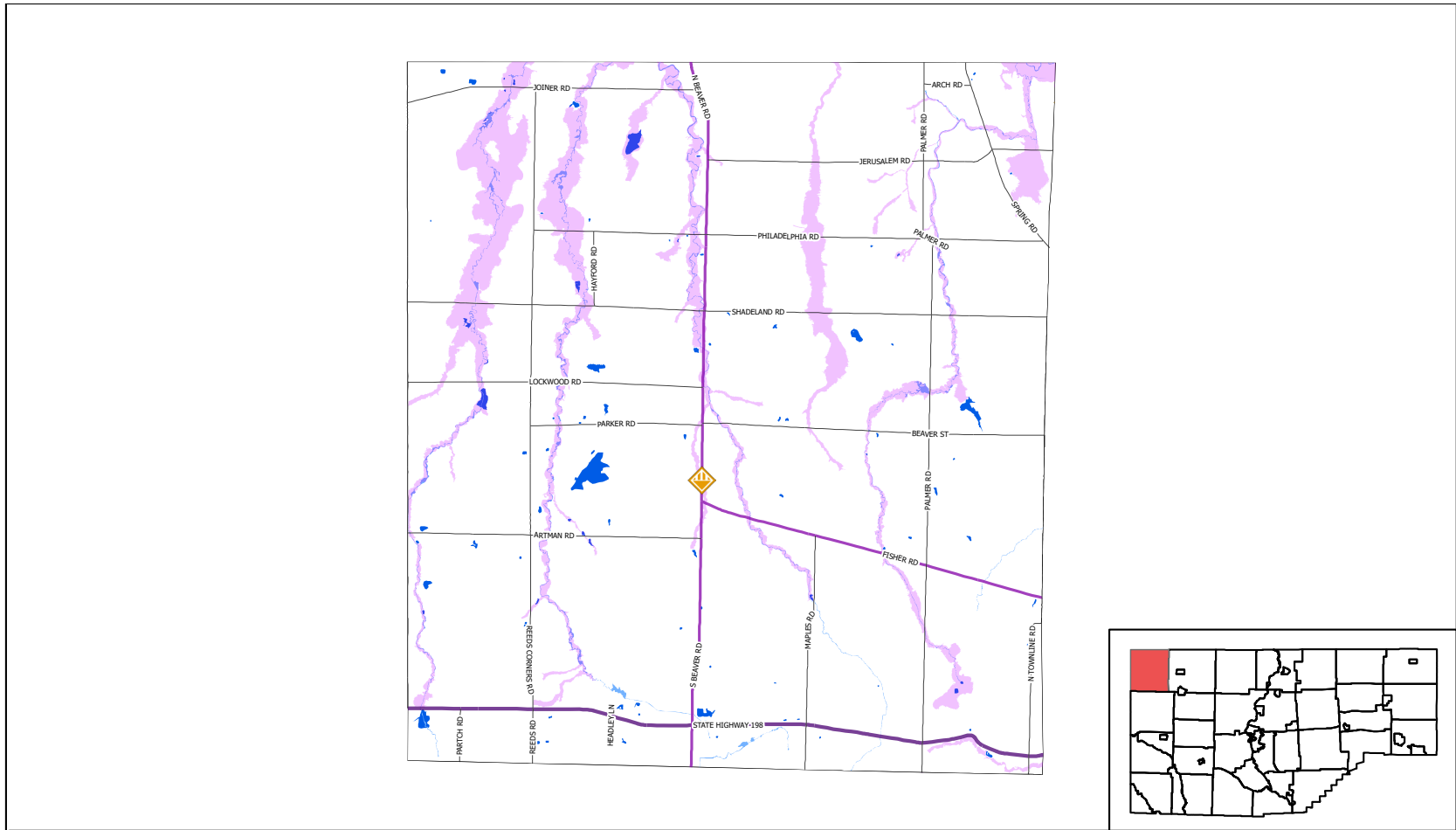
Zone A | Approx 1% annual change flood zone

Zone AE | Detailed 1% annual change flood zone

Lakes



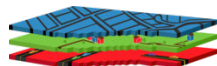
# Appendix D - Local Municipality Flood Vulnerability



## Beaver Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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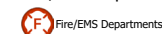


FEMA

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools



FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone

Zone AE | Detailed 1% annual change flood zone

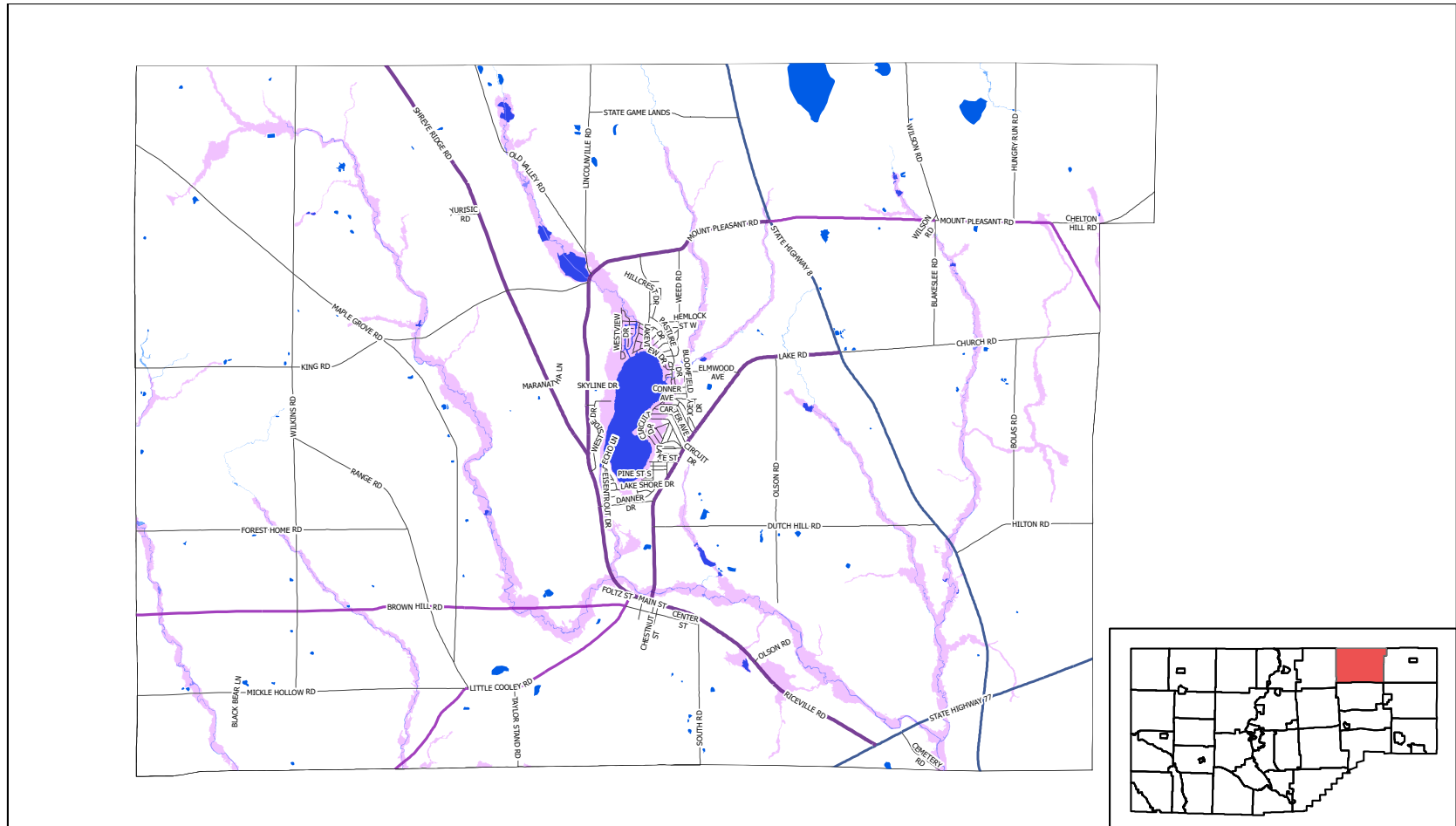
Lakes



\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

# Appendix D - Local Municipality Flood Vulnerability

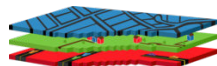


## Bloomfield Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)

Source: Federal Emergency Management Agency (FEMA)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



FEMA

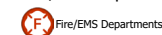
### Tier II Facilities



### FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone  
Zone AE | Detailed 1% annual change flood zone

### Fire/EMS Departments Rivers \ Streams



Lakes



Schools

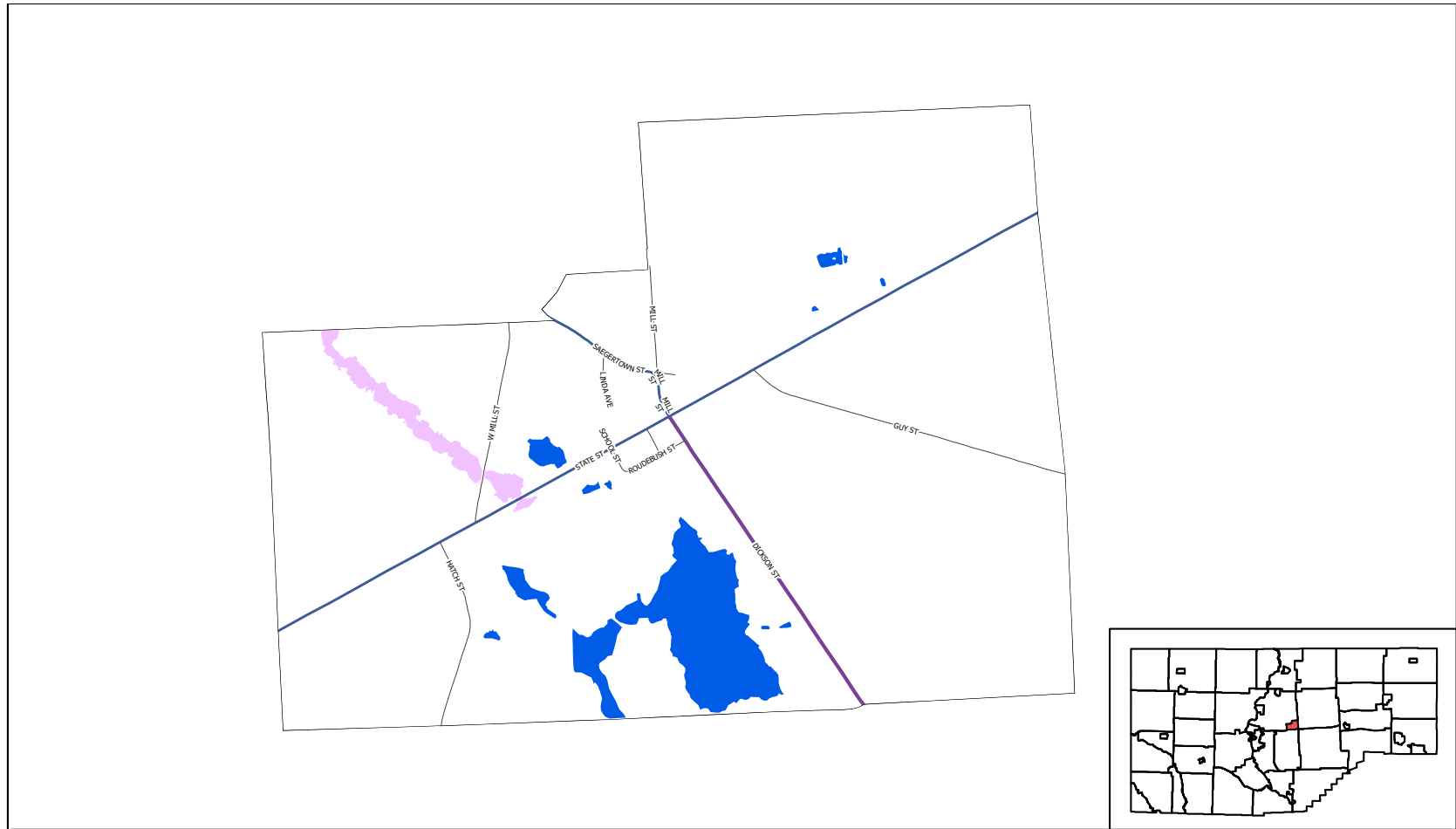


\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

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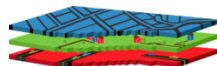
# Appendix D - Local Municipality Flood Vulnerability



## Blooming Valley Borough, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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FEMA

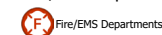
\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools



FEMA 100Yr Flood NFHL zones

- Zone A | Approx 1% annual change flood zone
- Zone AE | Detailed 1% annual change flood zone

Lakes





# Appendix D - Local Municipality Flood Vulnerability

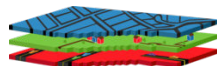


## Cambridge Springs Borough, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)

Source: Federal Emergency Management Agency (FEMA)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



FEMA

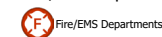
Tier II Facilities



FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual chance flood zone  
Zone AE | Detailed 1% annual chance flood zone

Fire/EMS Departments Rivers \ Streams



Lakes

Schools

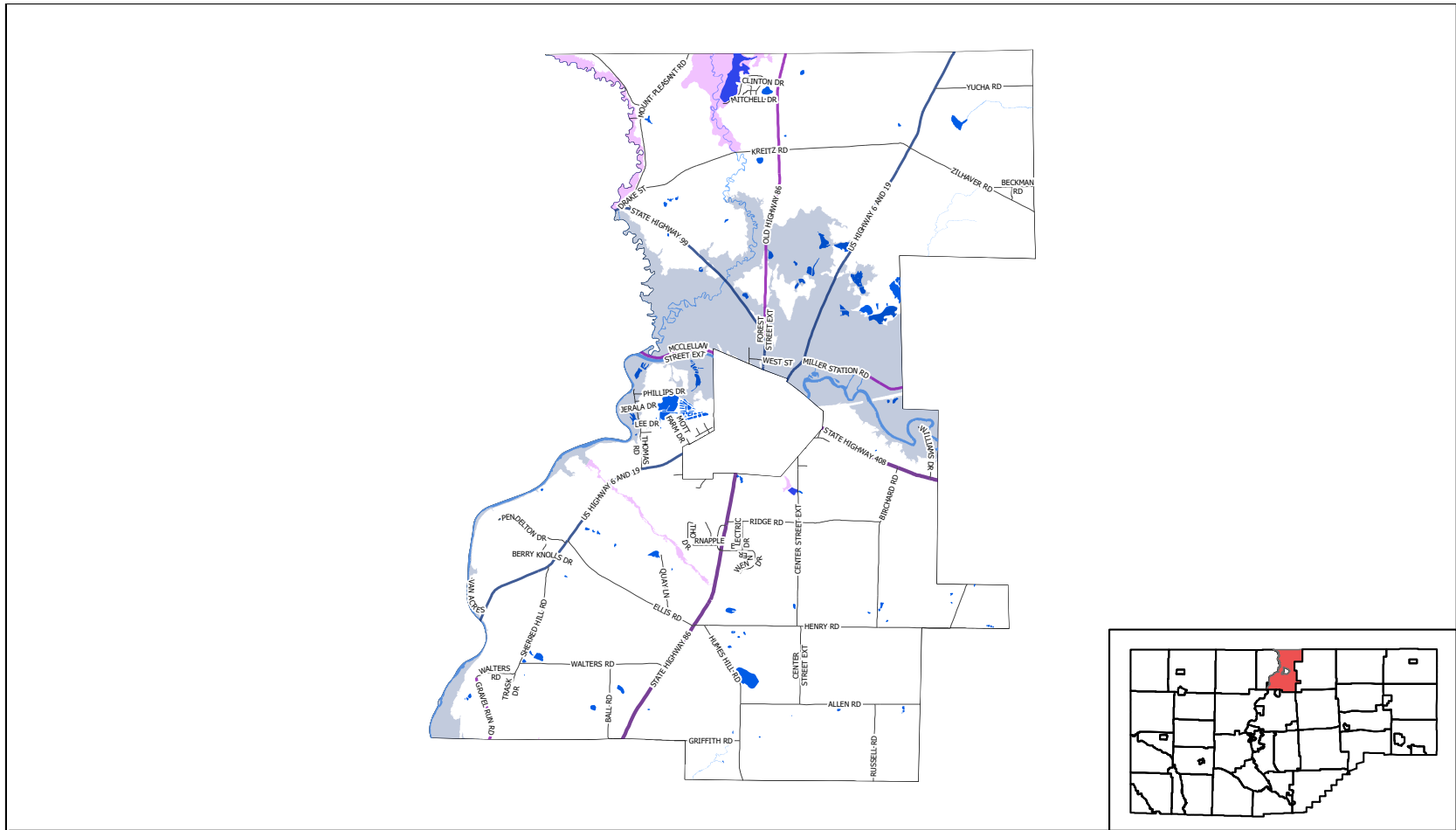


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- Airports
- Hospitals
- Police Departments
- Tower Sites

# Appendix D - Local Municipality Flood Vulnerability

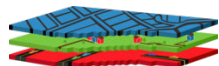


## Blooming Valley Borough, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)

Source: Federal Emergency Management Agency (FEMA)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



FEMA

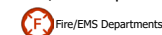
Tier II Facilities



FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone  
Zone AE | Detailed 1% annual change flood zone

Fire/EMS Departments Rivers \ Streams



Lakes

Schools

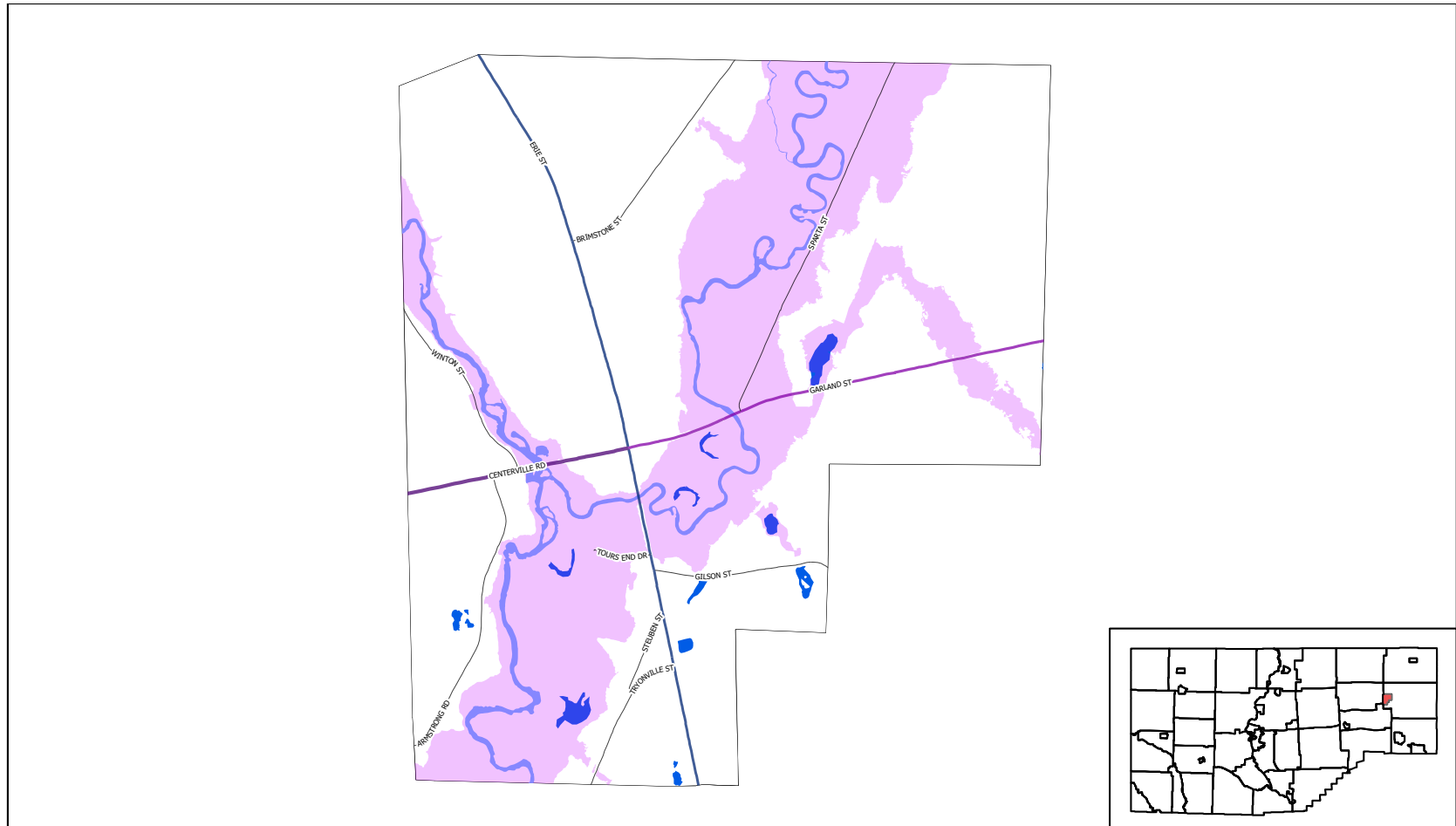


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- Police Departments
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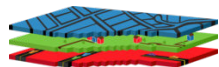
# Appendix D - Local Municipality Flood Vulnerability



## Centerville Borough, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

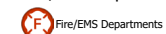
\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools



FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone

Zone AE | Detailed 1% annual change flood zone

Lakes



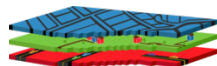
# Appendix D - Local Municipality Flood Vulnerability



## Cochranton Borough, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

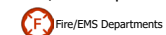
\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools



FEMA 100Yr Flood NFHL zones

- Zone A | Approx 1% annual change flood zone
- Zone AE | Detailed 1% annual change flood zone

Lakes



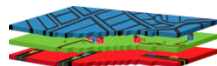
# Appendix D - Local Municipality Flood Vulnerability



## Conneaut Lake Borough, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

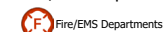
Tier II Facilities



FEMA 100yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone  
Zone AE | Detailed 1% annual change flood zone

Fire/EMS Departments Rivers \ Streams



Lakes

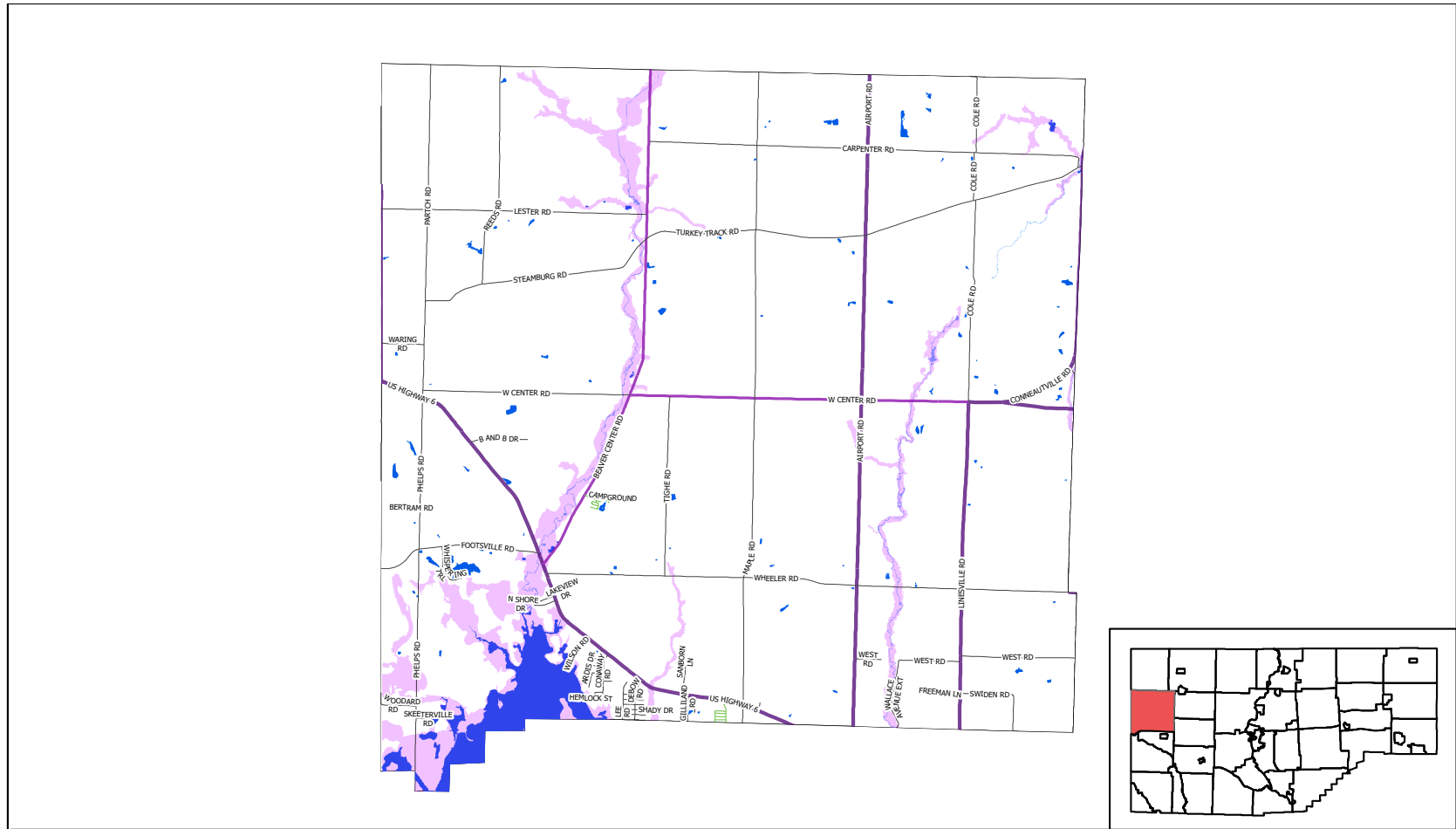
Schools



\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

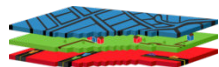
# Appendix D - Local Municipality Flood Vulnerability



## Conneaut Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

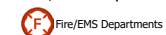
\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools



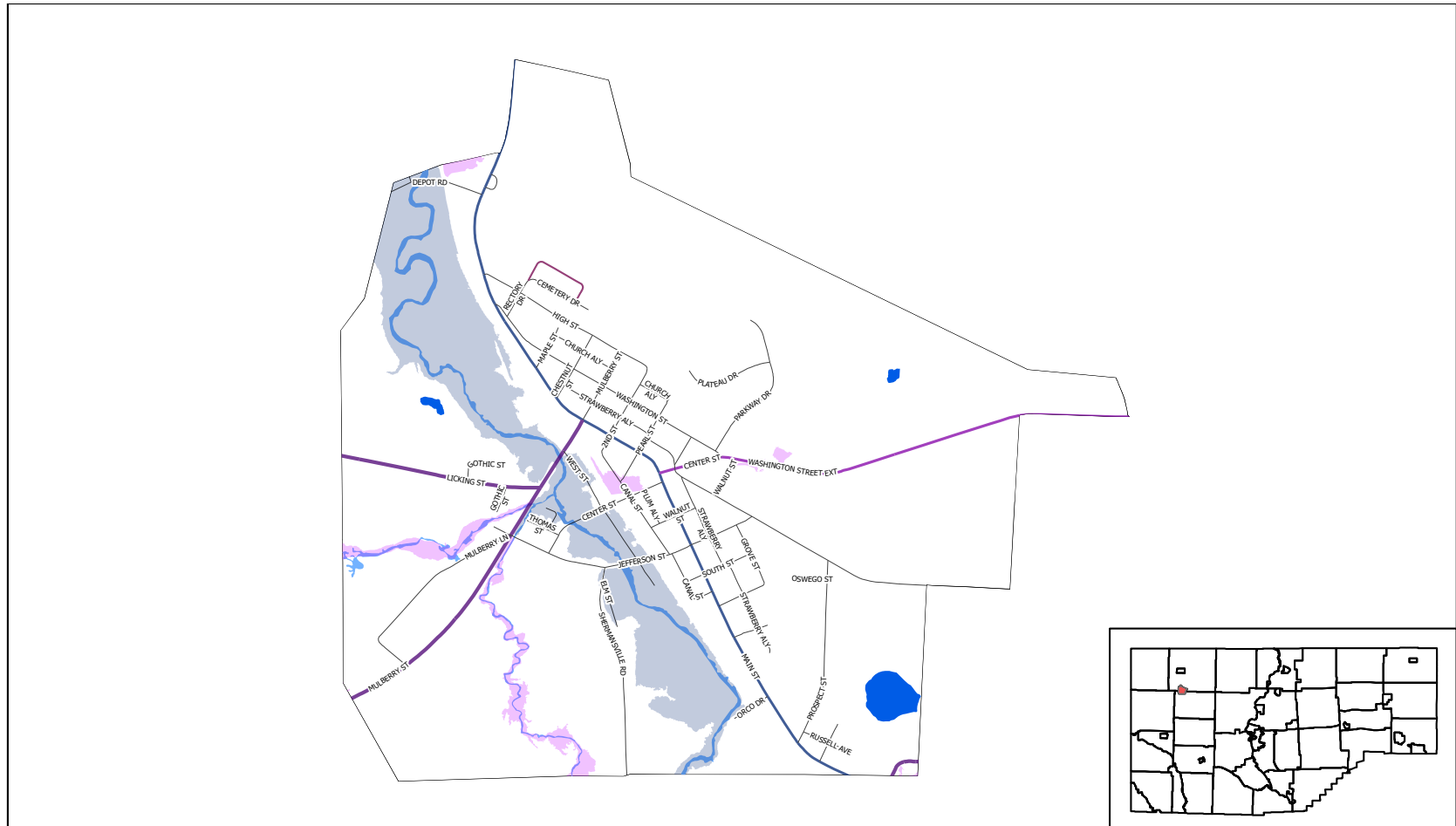
FEMA 100Yr Flood NFHL zones

- Zone A | Approx 1% annual change flood zone
- Zone AE | Detailed 1% annual change flood zone

Lakes



# Appendix D - Local Municipality Flood Vulnerability

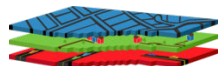


## Conneautville Borough, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)

Source: Federal Emergency Management Agency (FEMA)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



FEMA

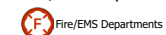
Tier II Facilities



FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone  
Zone AE | Detailed 1% annual change flood zone

Fire/EMS Departments Rivers \ Streams



Lakes

Schools



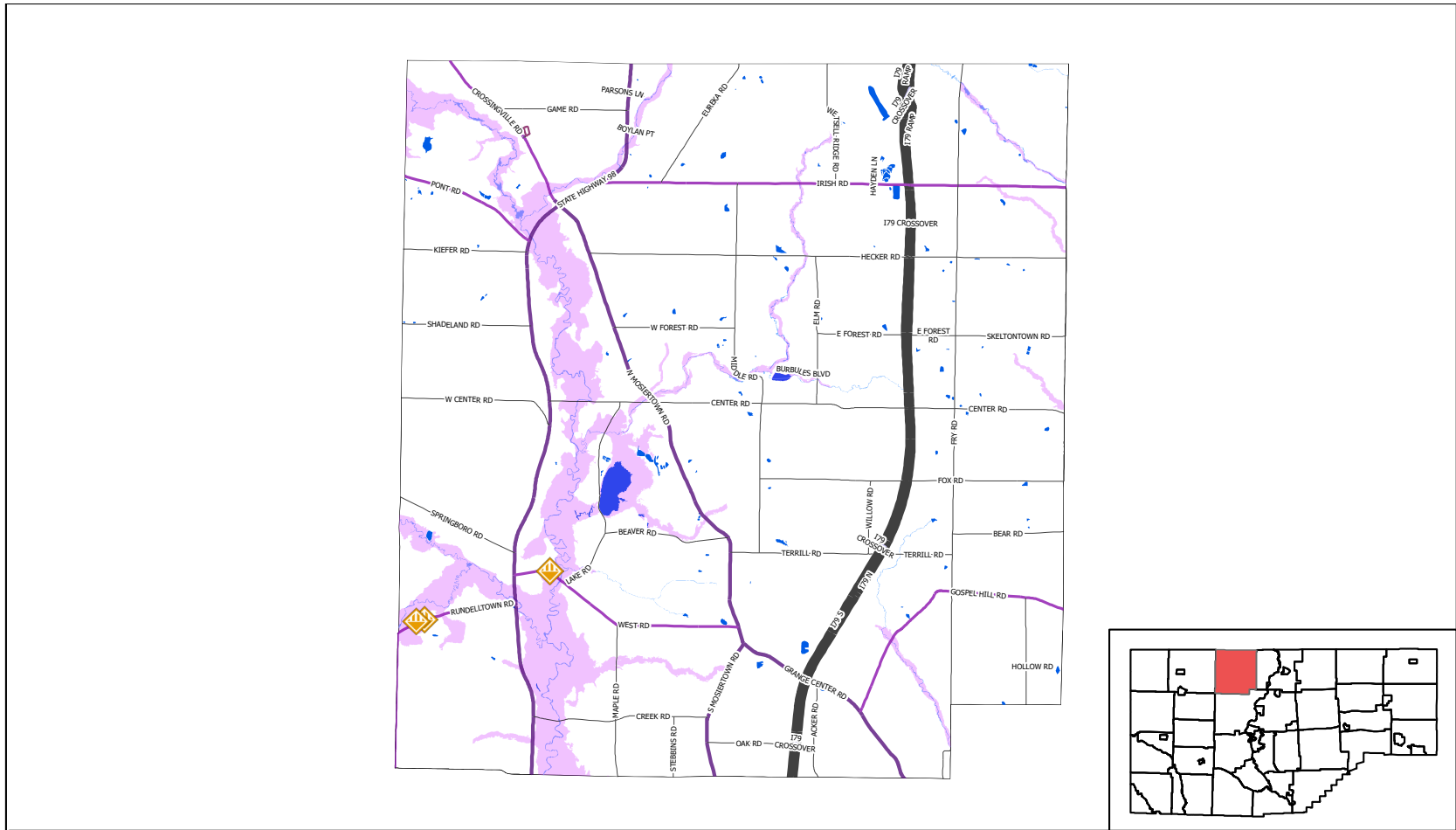
Schools

\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

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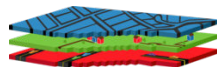
# Appendix D - Local Municipality Flood Vulnerability



## Cussewago Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

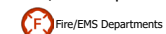
\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools



FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone

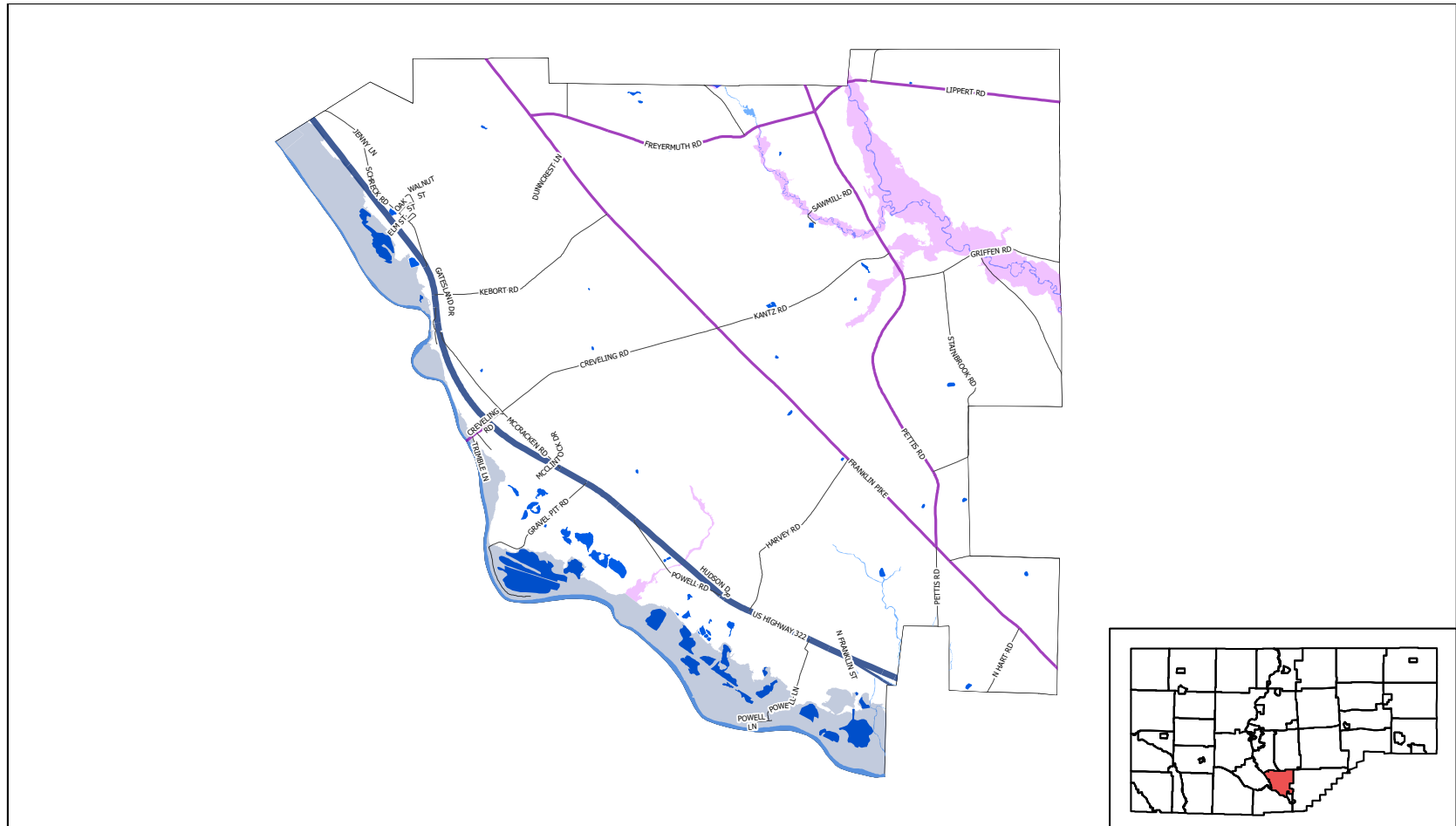
Zone AE | Detailed 1% annual change flood zone

Lakes





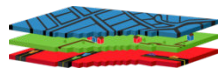
# Appendix D - Local Municipality Flood Vulnerability



## East Fairfield Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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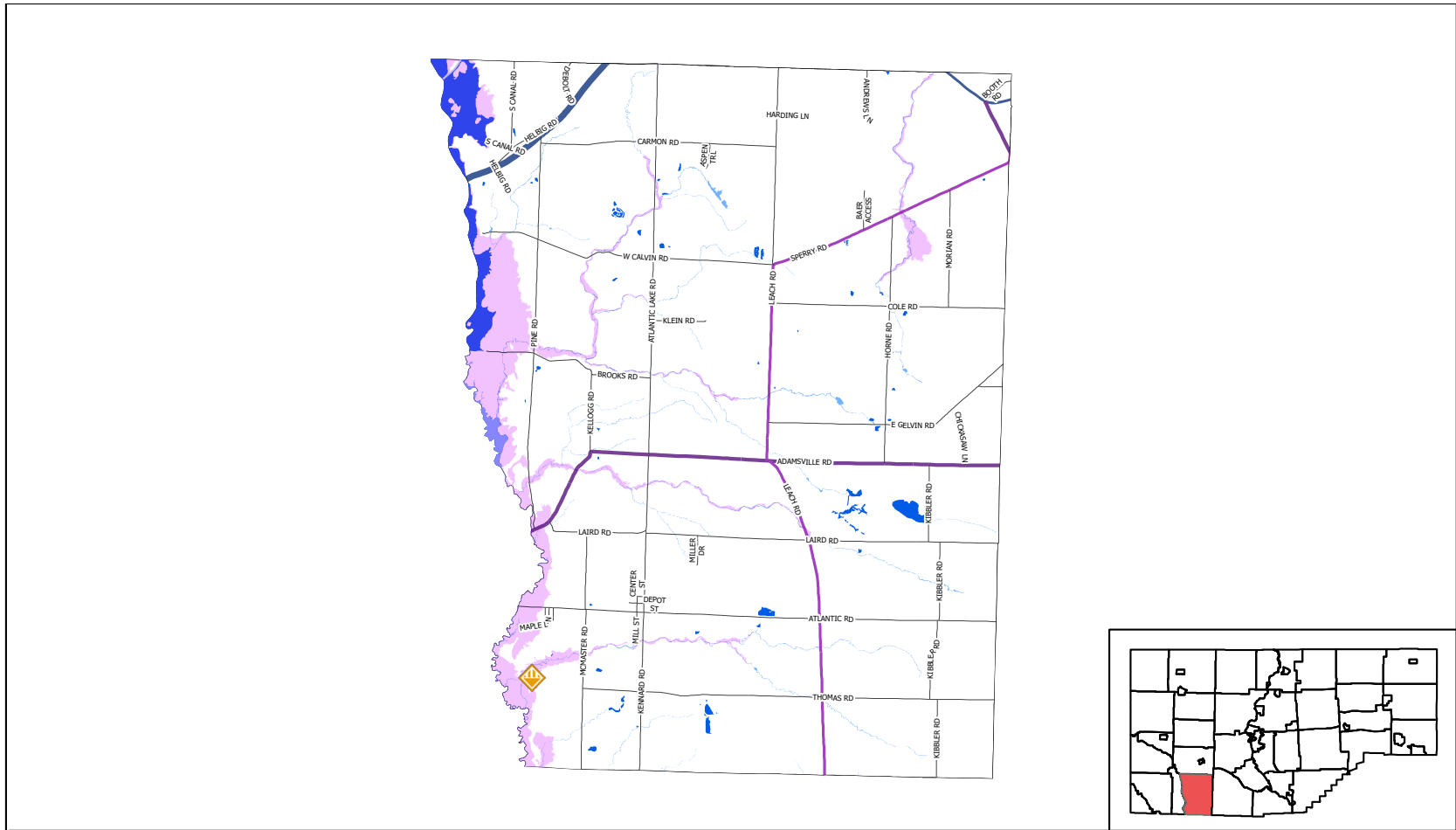
Source: Federal Emergency Management Agency (FEMA)



- \* Facility types that don't fall into flood zones:
- Airports
  - Hospitals
  - Police Departments
  - Tower Sites

<b>Tier II Facilities</b>	<b>FEMA 100Yr Flood NFHL zones</b>
Tier II Facilities	Zone A   Approx 1% annual change flood zone
<b>Fire/EMS Departments Rivers \ Streams</b>	Zone AE   Detailed 1% annual change flood zone
Fire/EMS Departments	Rivers \ Streams
<b>Schools</b>	Lakes
Schools	

# Appendix D - Local Municipality Flood Vulnerability

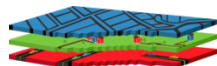


## East Fallowfield Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)

Source: Federal Emergency Management Agency (FEMA)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



FEMA

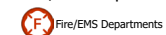
Tier II Facilities



FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone  
Zone AE | Detailed 1% annual change flood zone

Fire/EMS Departments Rivers \ Streams



Lakes

Schools

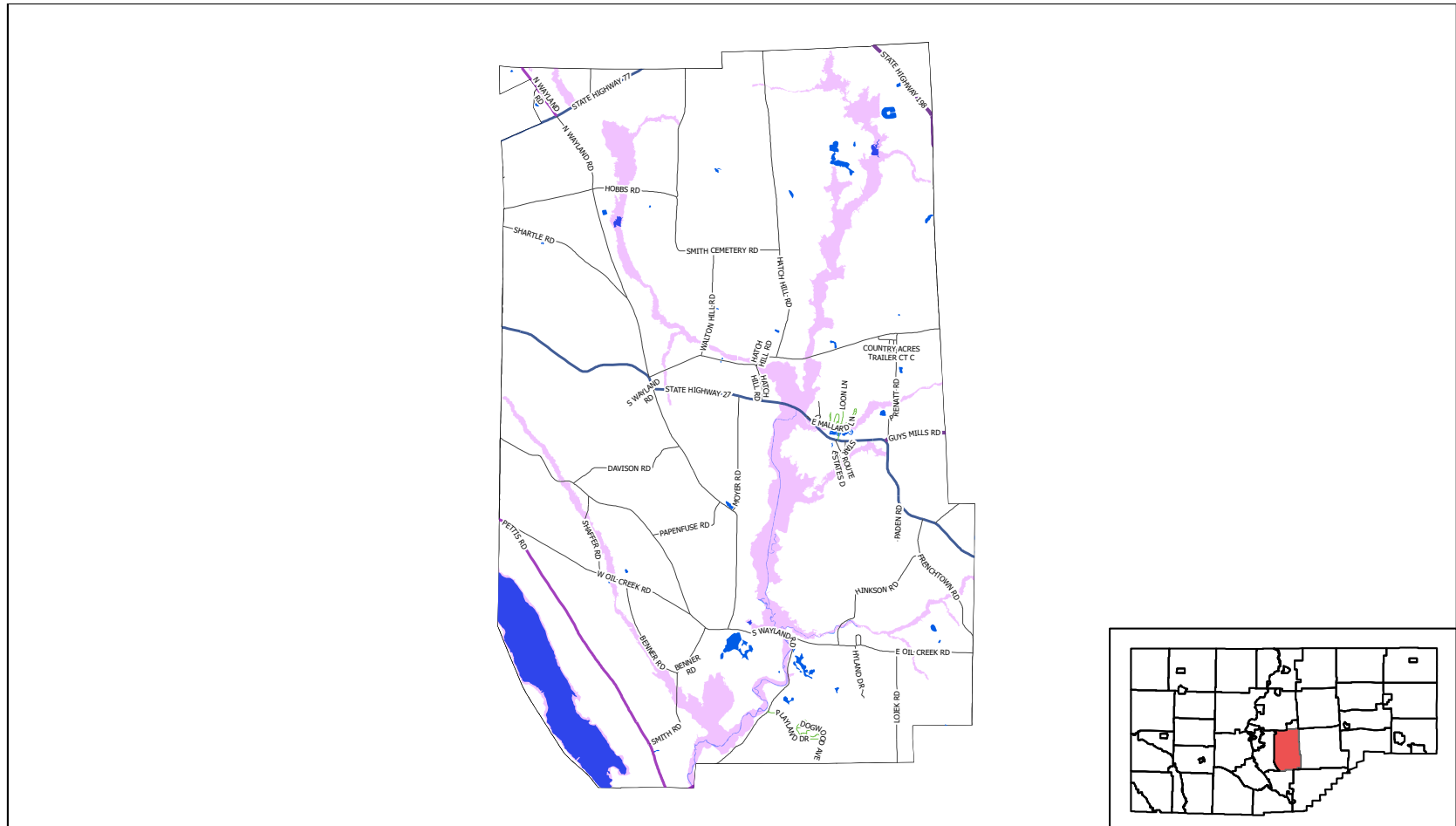


\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

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# Appendix D - Local Municipality Flood Vulnerability

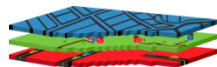


## East Mead Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)

Source: Federal Emergency Management Agency (FEMA)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



FEMA

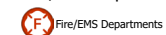
Tier II Facilities



FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone  
Zone AE | Detailed 1% annual change flood zone

Fire/EMS Departments Rivers \ Streams



Lakes

Schools

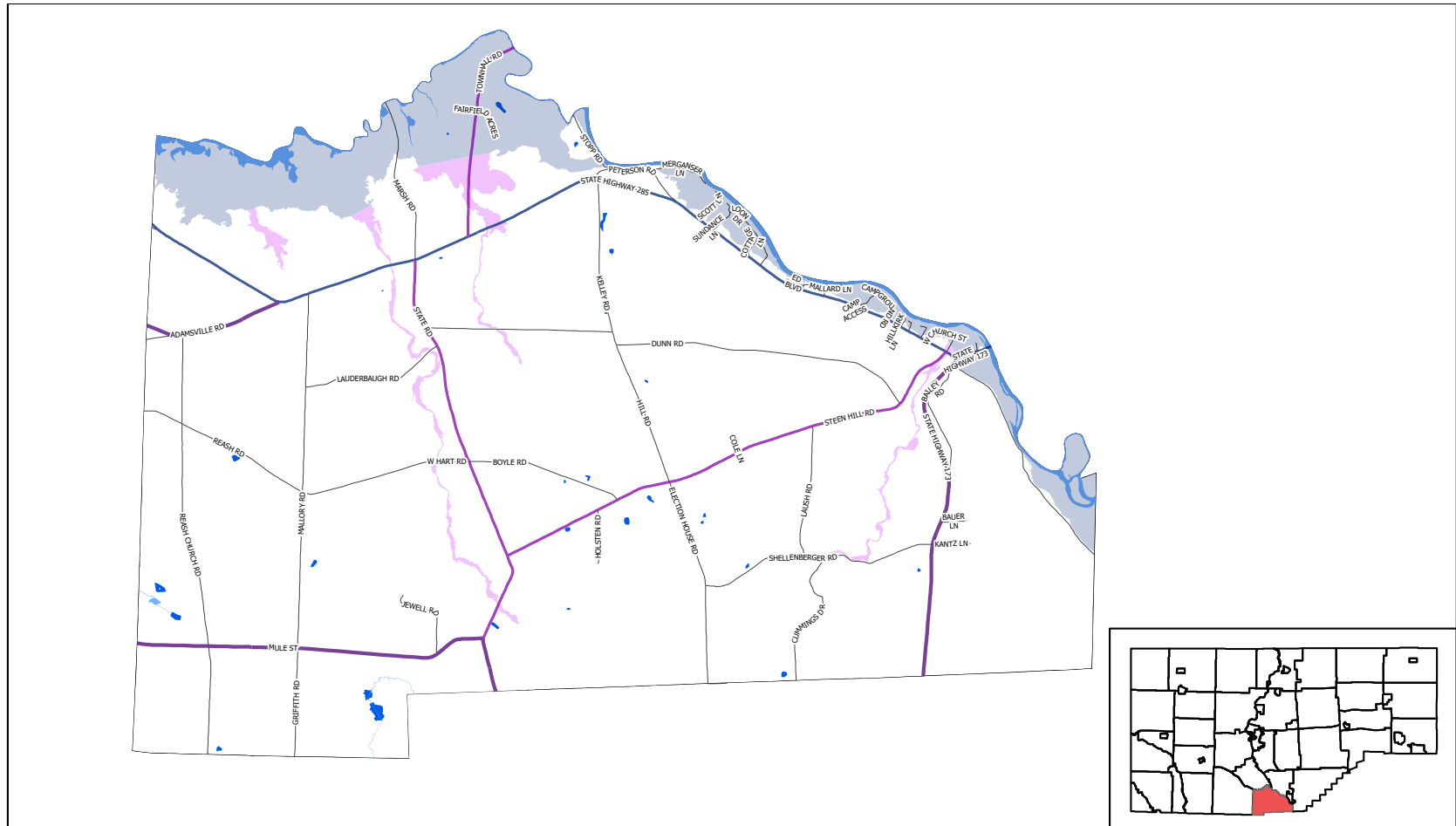


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\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

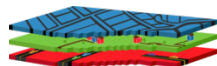
# Appendix D - Local Municipality Flood Vulnerability



## Fairfield Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

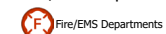
Tier II Facilities



FEMA 100Yr Flood NFHL zones

- Zone A | Approx 1% annual change flood zone
- Zone AE | Detailed 1% annual change flood zone

Fire/EMS Departments Rivers \ Streams

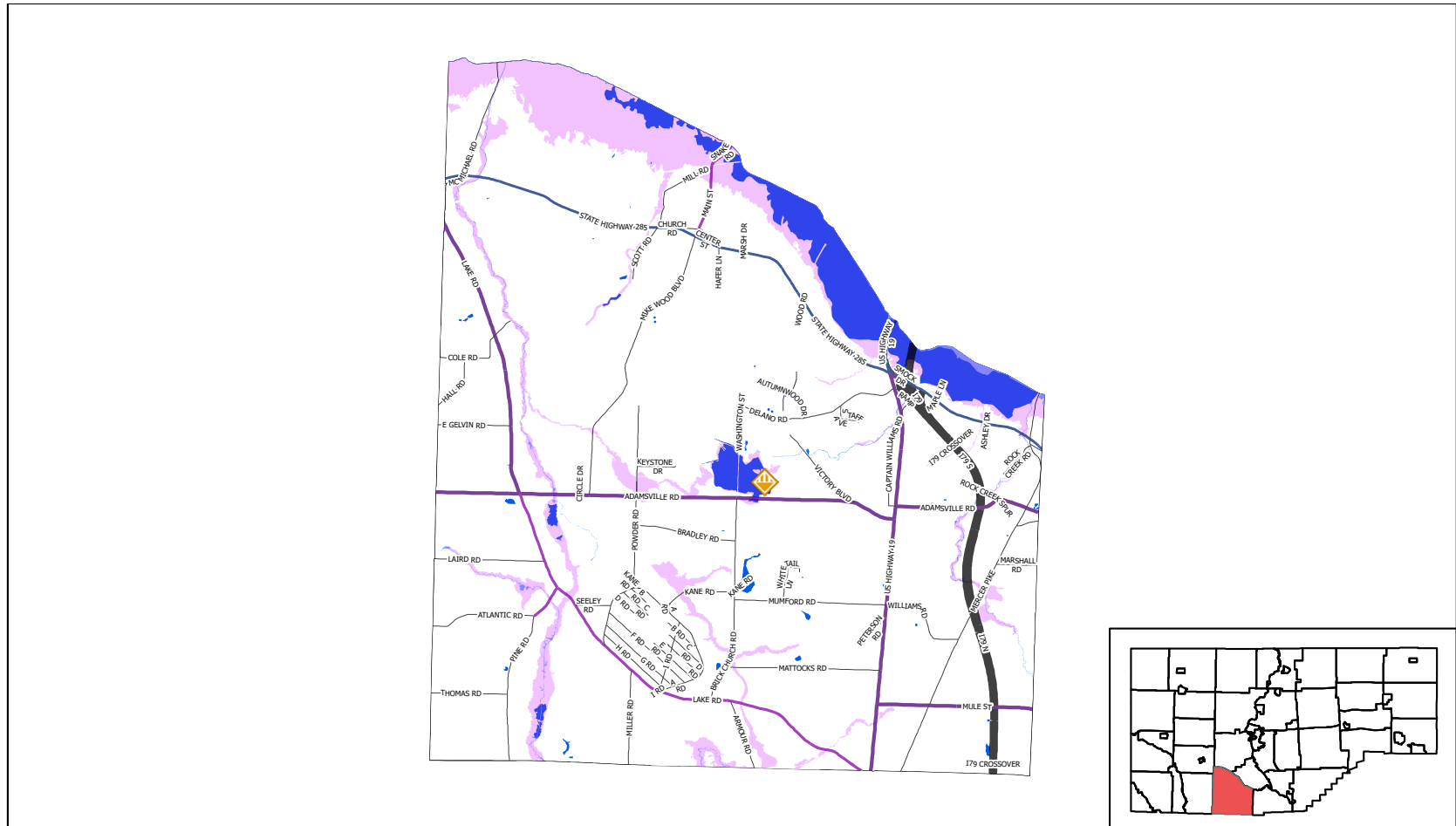


Lakes

Schools



# Appendix D - Local Municipality Flood Vulnerability

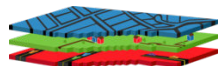


## Greenwood Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)

Source: Federal Emergency Management Agency (FEMA)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



FEMA

Tier II Facilities

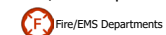


FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone

Zone AE | Detailed 1% annual change flood zone

Fire/EMS Departments Rivers \ Streams



Lakes



Schools

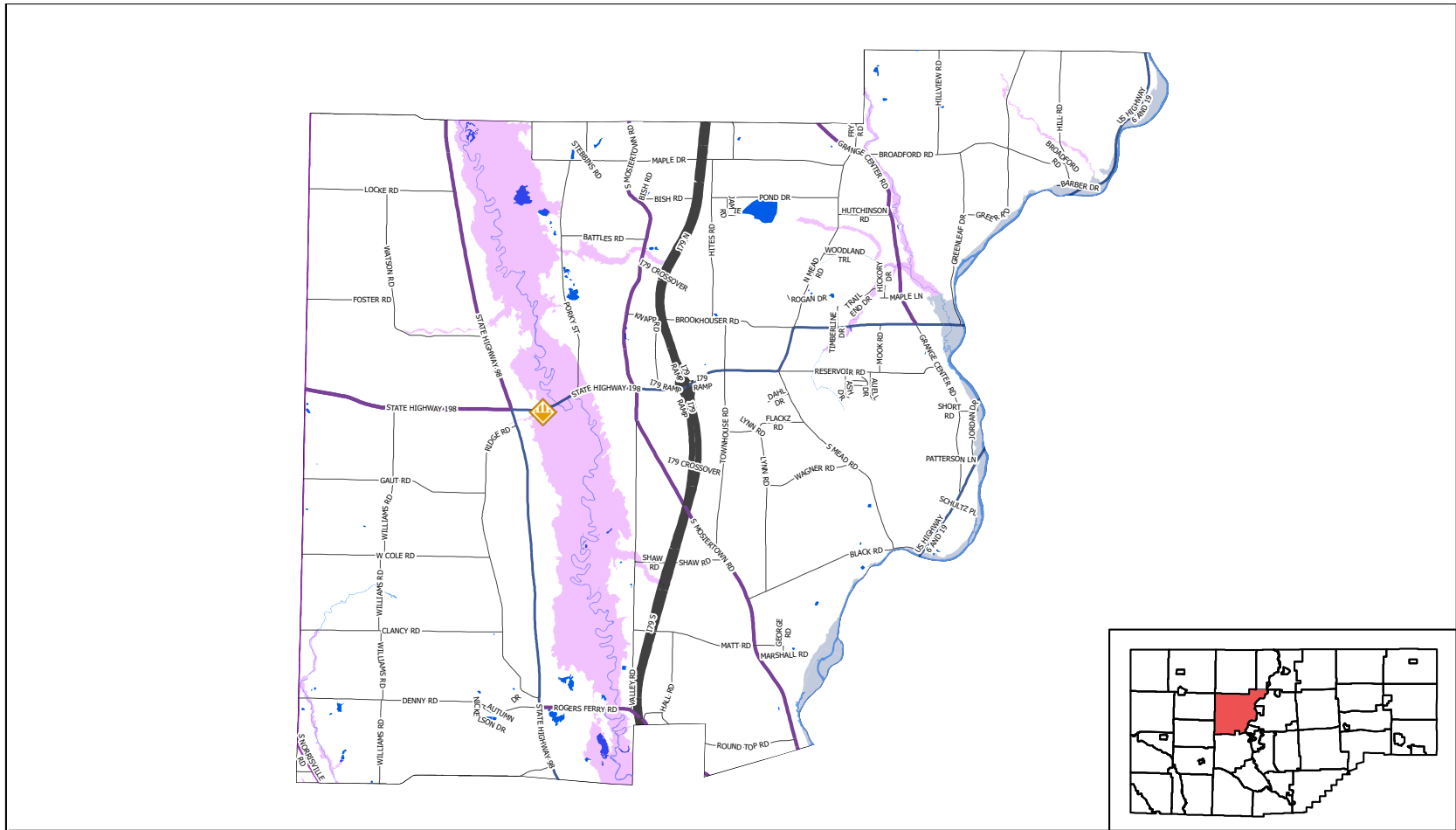


\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

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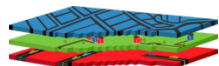
# Appendix D - Local Municipality Flood Vulnerability



## Hayfield Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

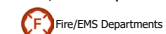
Tier II Facilities



FEMA 100Yr Flood NFHL zones

- Zone A | Approx 1% annual change flood zone
- Zone AE | Detailed 1% annual change flood zone

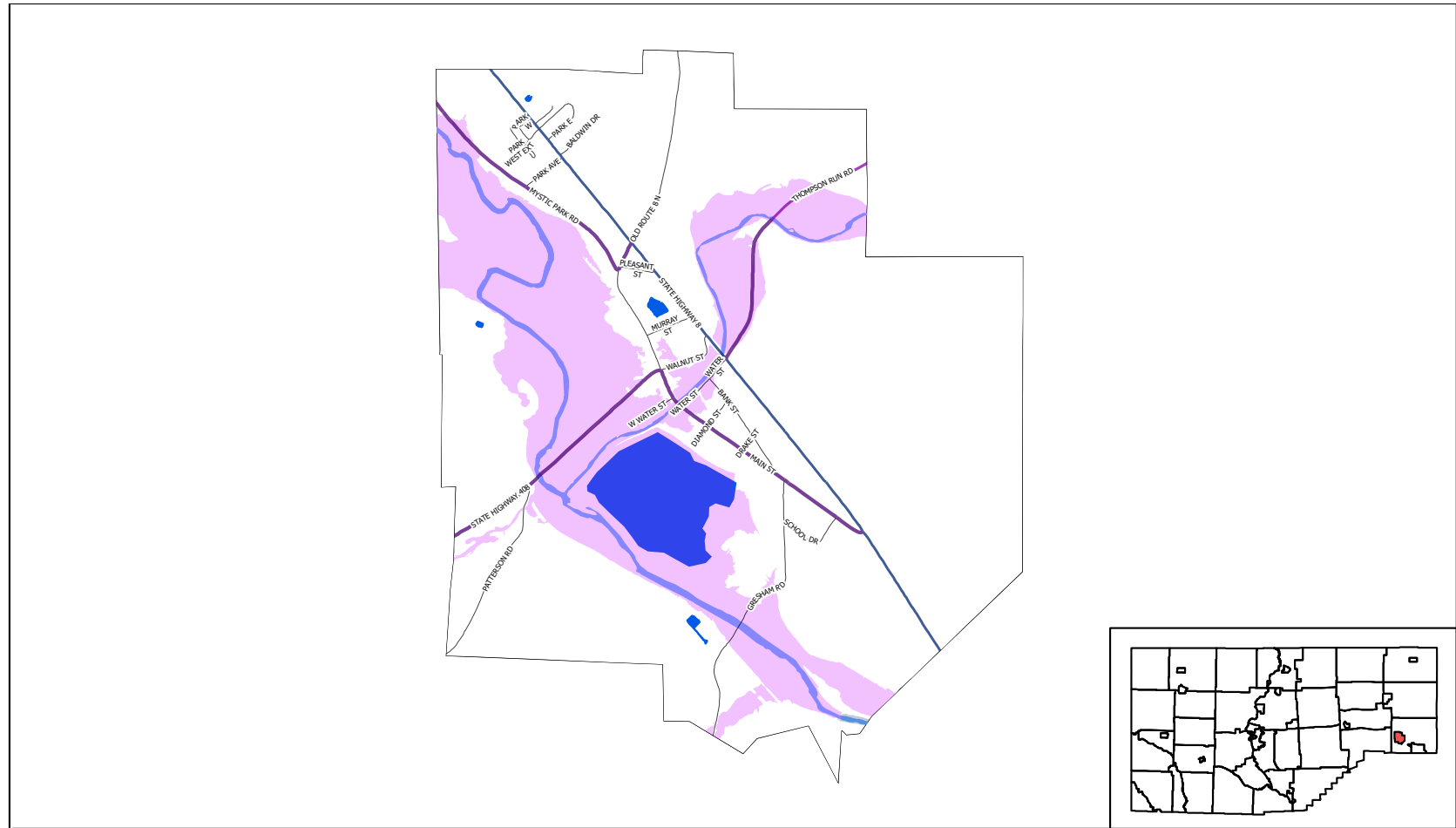
Fire/EMS Departments Rivers \ Streams



Lakes



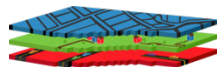
# Appendix D - Local Municipality Flood Vulnerability



## Hydetown Borough, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

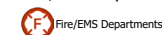
\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools



FEMA 100Yr Flood NFHL zones

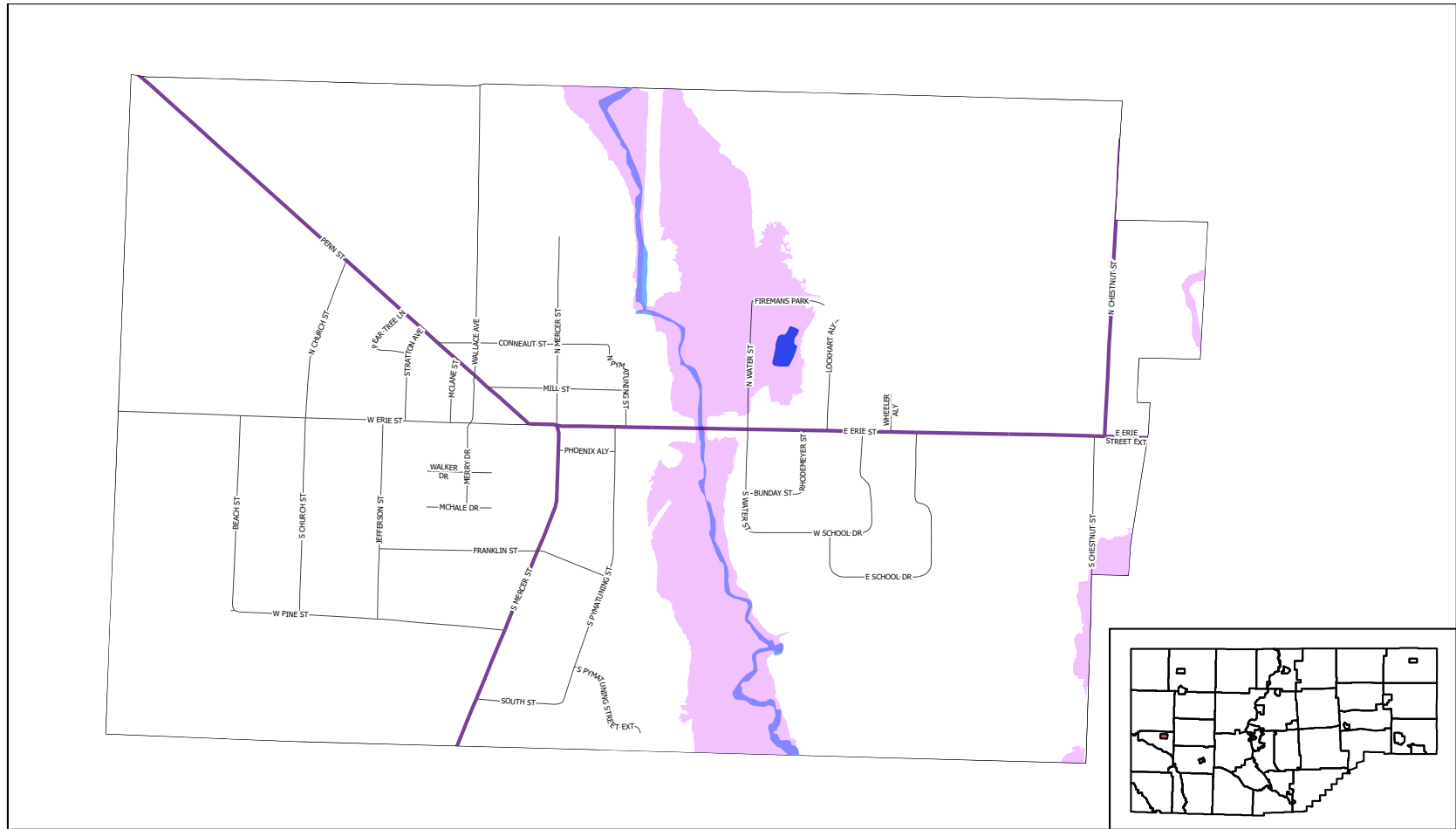
Zone A | Approx 1% annual chance flood zone

Zone AE | Detailed 1% annual chance flood zone

Lakes



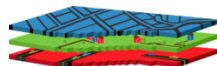
# Appendix D - Local Municipality Flood Vulnerability



## Linesville Borough, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

Tier II Facilities

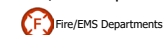


FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual chance flood zone

Zone AE | Detailed 1% annual chance flood zone

Fire/EMS Departments Rivers \ Streams



Lakes

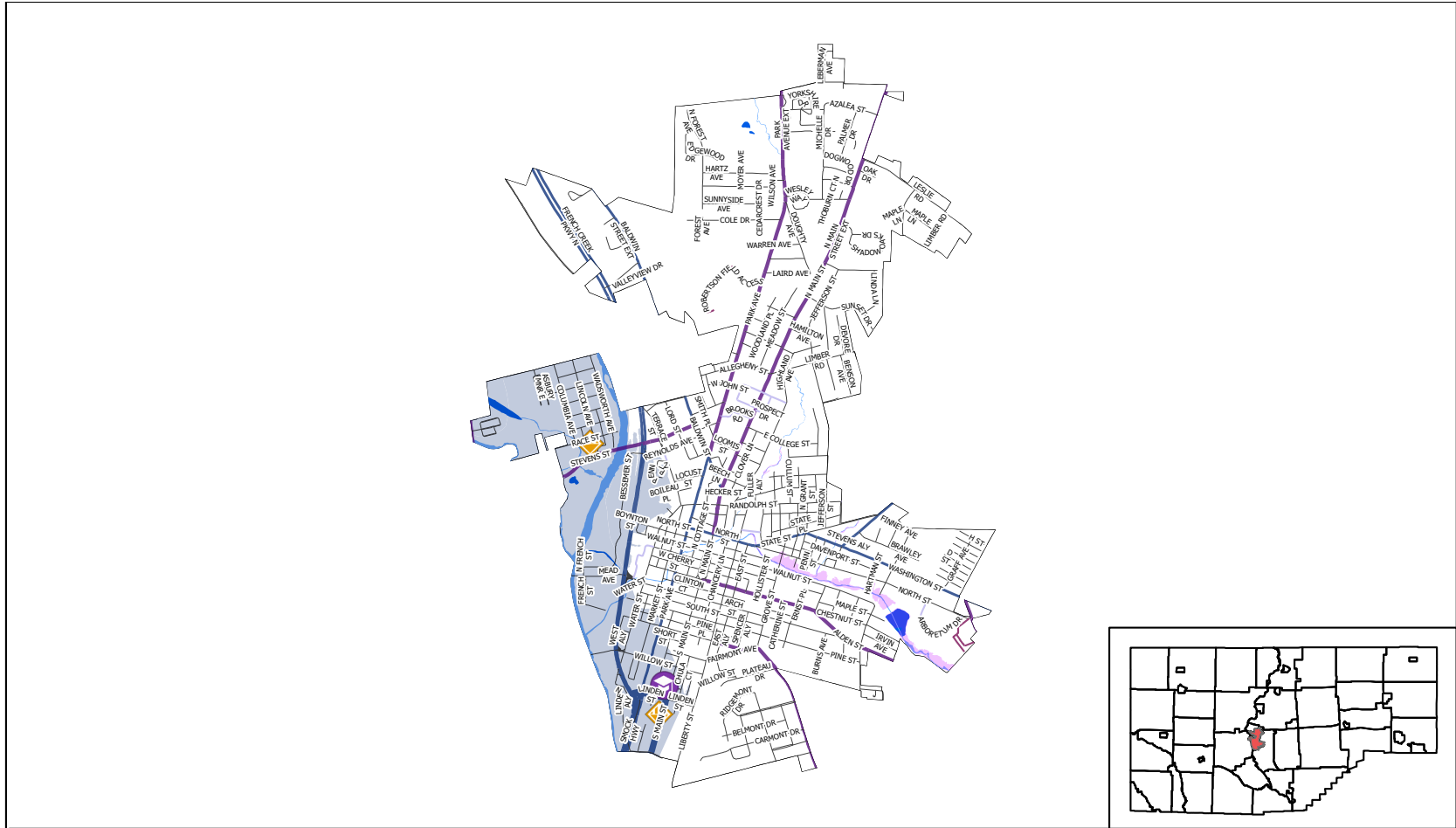


\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites



# Appendix D - Local Municipality Flood Vulnerability

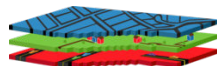


## Meadville City, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)

Source: Federal Emergency Management Agency (FEMA)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



FEMA

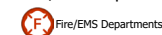
Tier II Facilities



FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone  
Zone AE | Detailed 1% annual change flood zone

Fire/EMS Departments Rivers \ Streams



Lakes

Schools

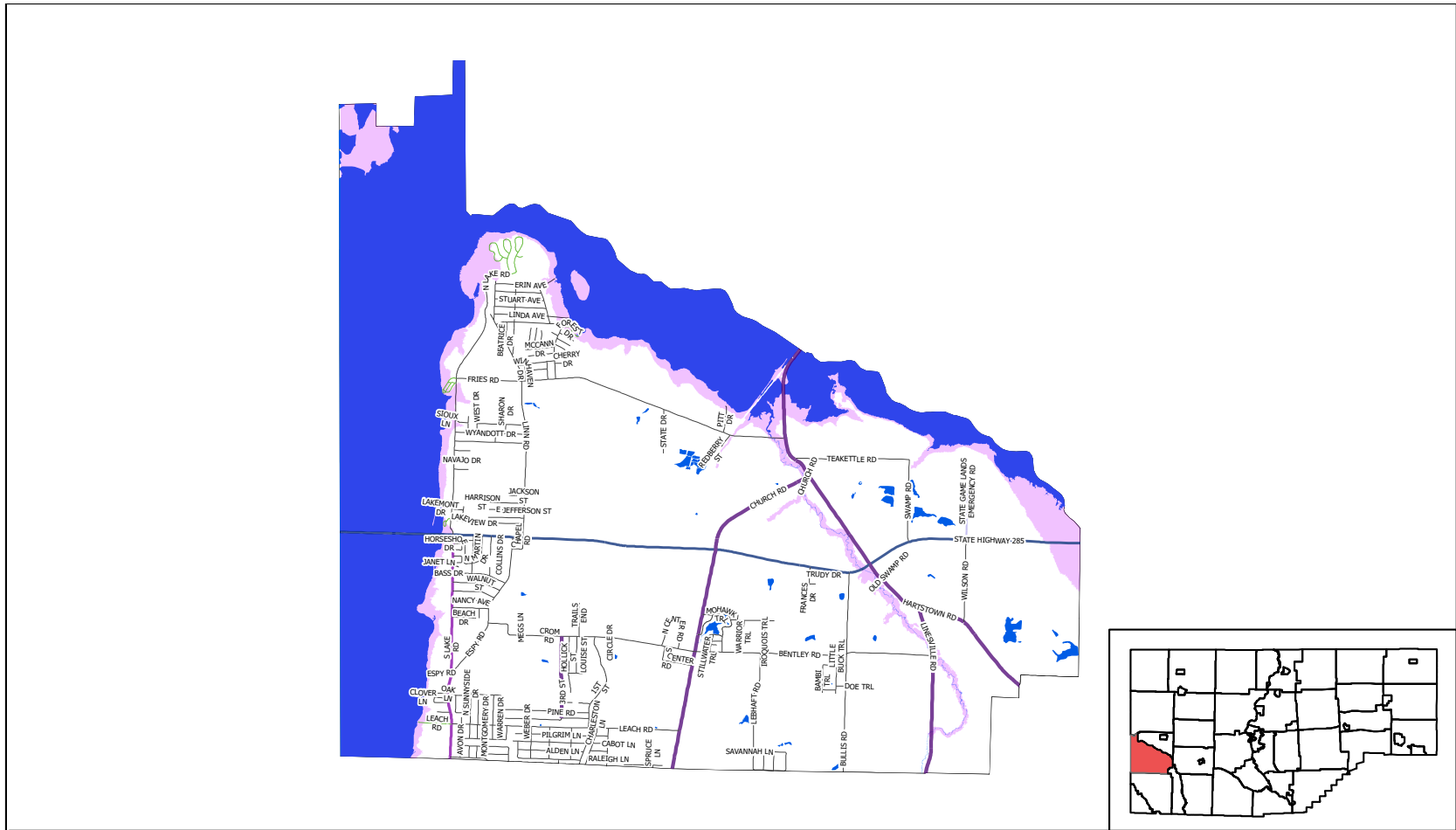


\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

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# Appendix D - Local Municipality Flood Vulnerability

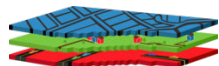


## North Shenango Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)

Source: Federal Emergency Management Agency (FEMA)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



FEMA

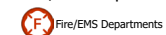
Tier II Facilities



FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual chance flood zone  
Zone AE | Detailed 1% annual chance flood zone

Fire/EMS Departments Rivers \ Streams



Lakes

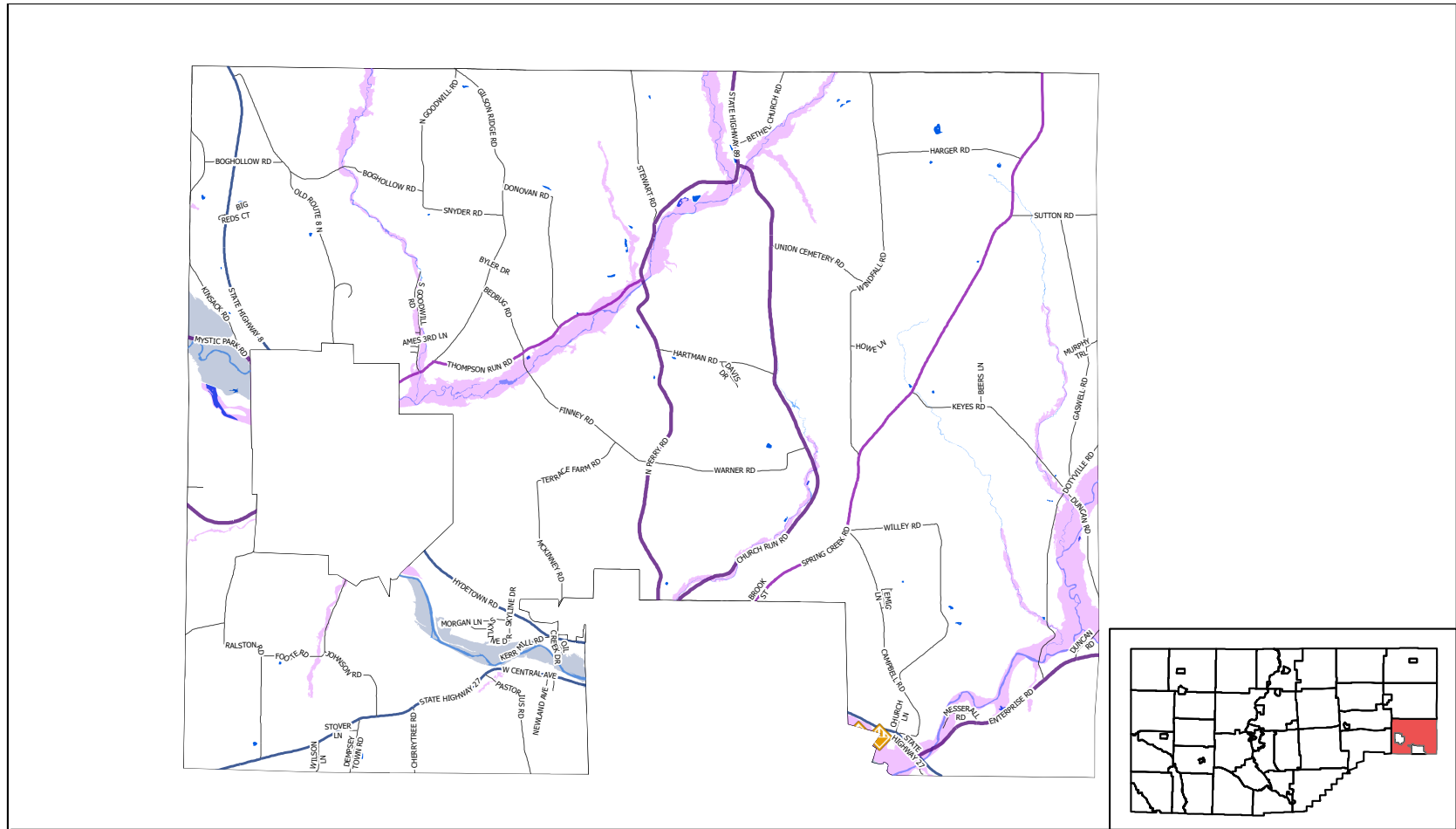


\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

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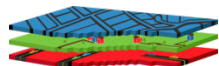
# Appendix D - Local Municipality Flood Vulnerability



## Oil Creek Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

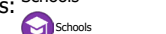
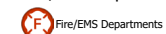
\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

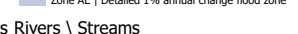
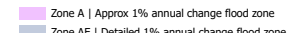
Tier II Facilities



Fire/EMS Departments Rivers \ Streams



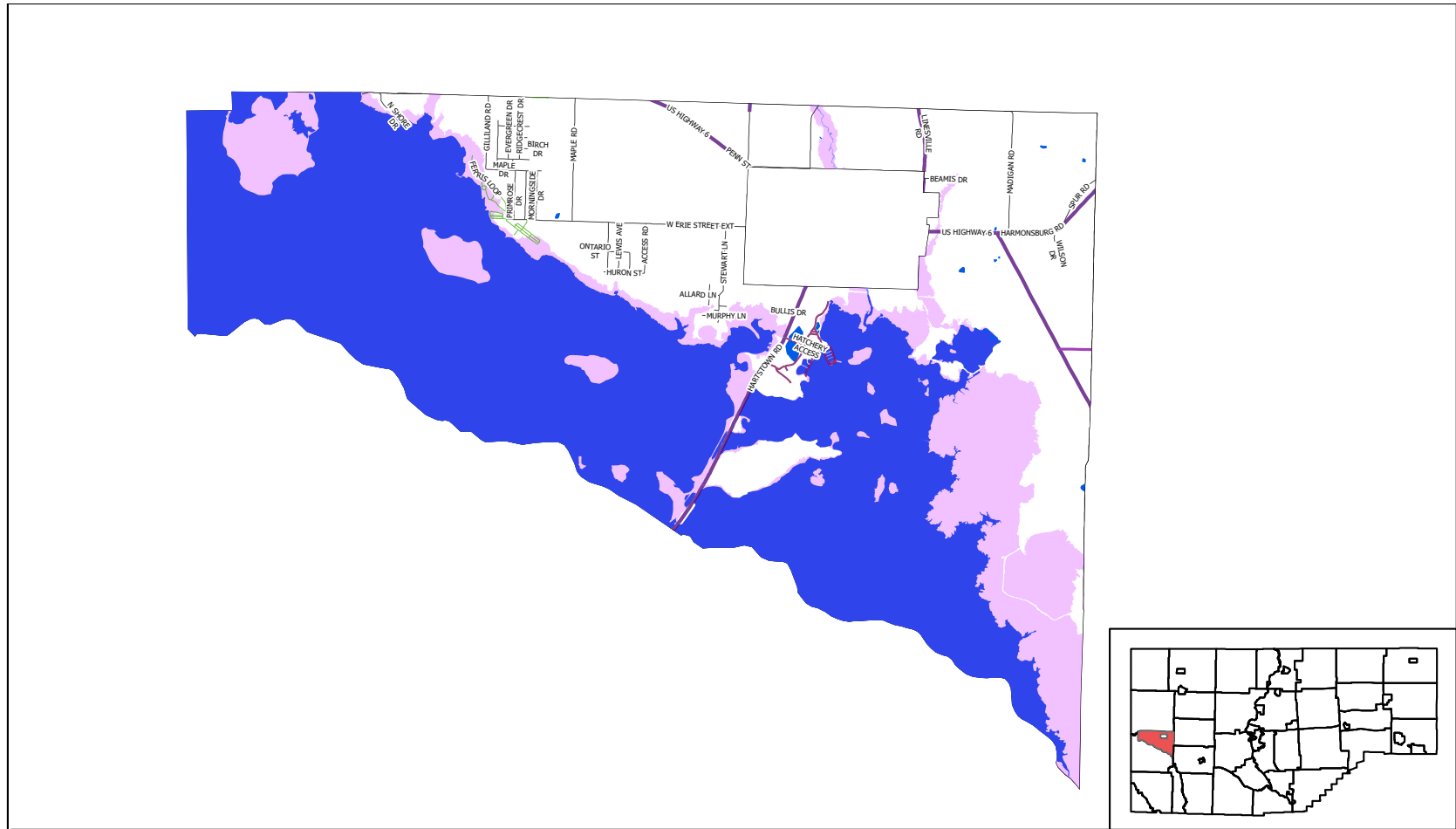
FEMA 100Yr Flood NFHL zones



Schools



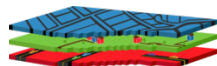
# Appendix D - Local Municipality Flood Vulnerability



## Pine Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

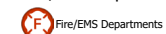
\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools



FEMA 100yr Flood NFHL zones

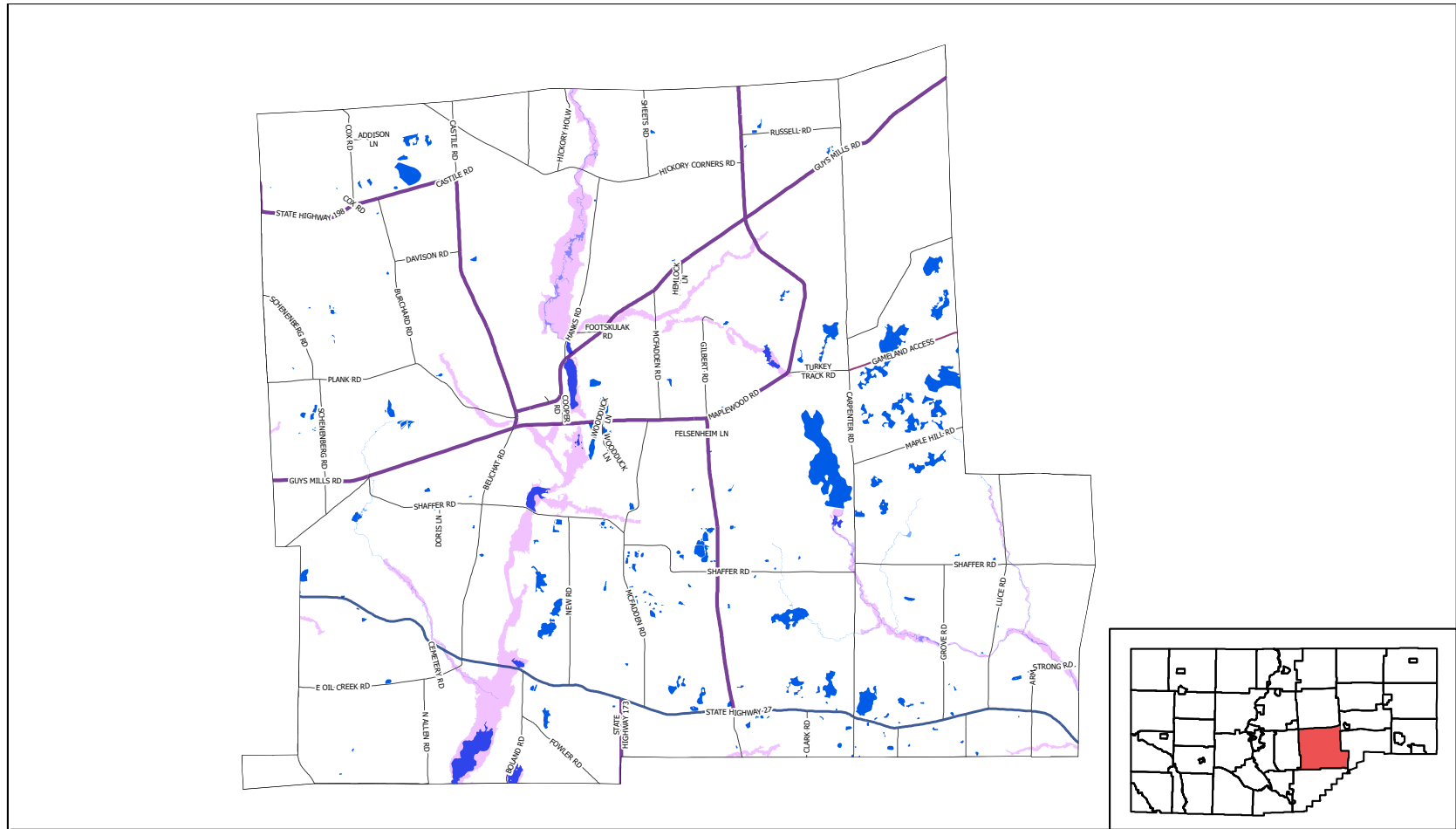
Zone A | Approx 1% annual chance flood zone

Zone AE | Detailed 1% annual chance flood zone

Lakes

Schools

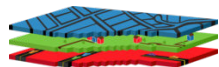
# Appendix D - Local Municipality Flood Vulnerability



## Randolph Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



Source: Federal Emergency Management Agency (FEMA)



FEMA

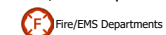
Tier II Facilities



FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone  
Zone AE | Detailed 1% annual change flood zone

Fire/EMS Departments Rivers \ Streams



Lakes

Schools

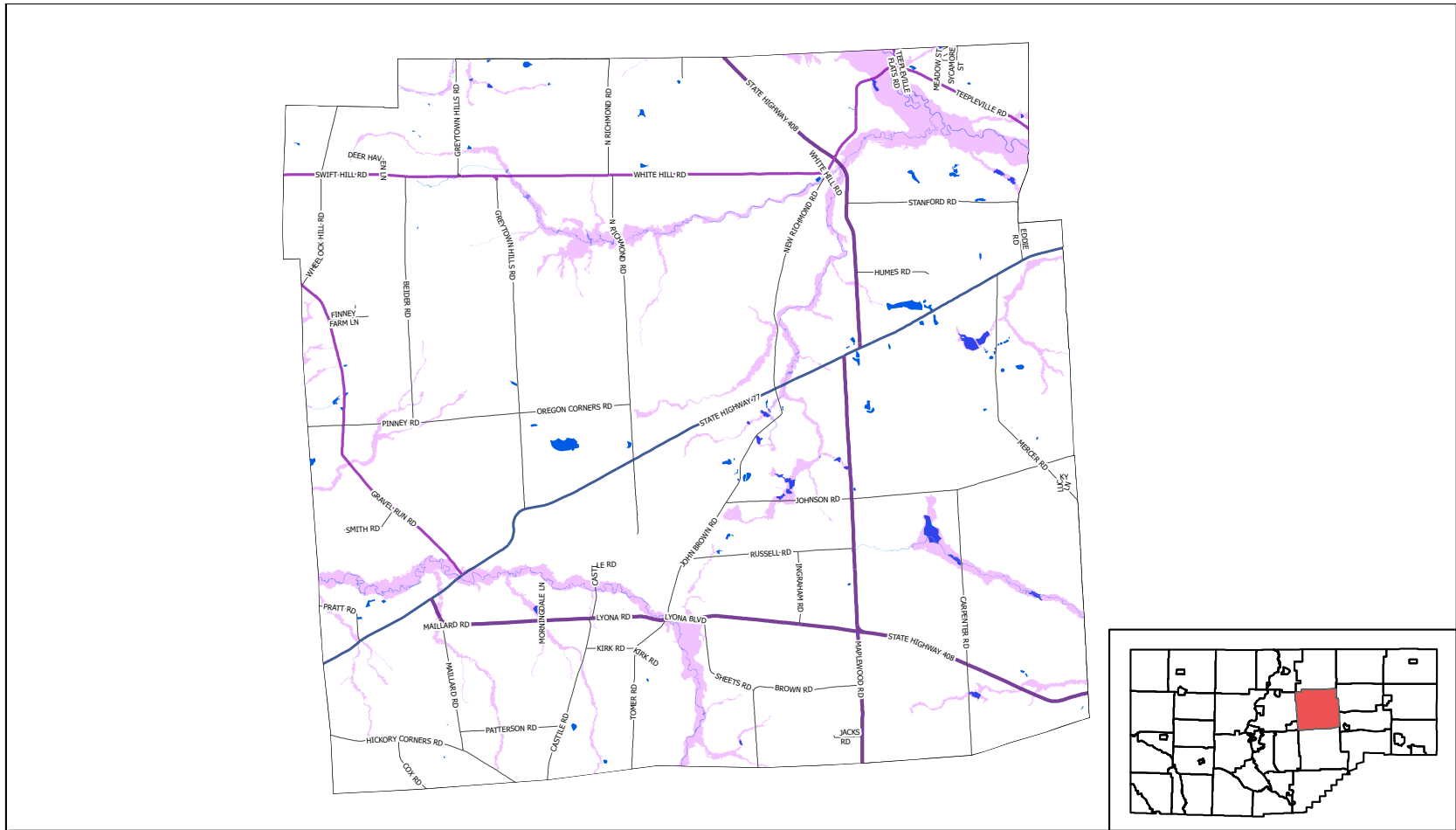


\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

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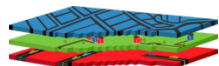
# Appendix D - Local Municipality Flood Vulnerability



## Richmond Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



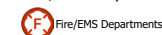
FEMA

- \* Facility types that don't fall into flood zones:
- Airports
  - Hospitals
  - Police Departments
  - Tower Sites

### Tier II Facilities



### Fire/EMS Departments Rivers \ Streams



### Schools



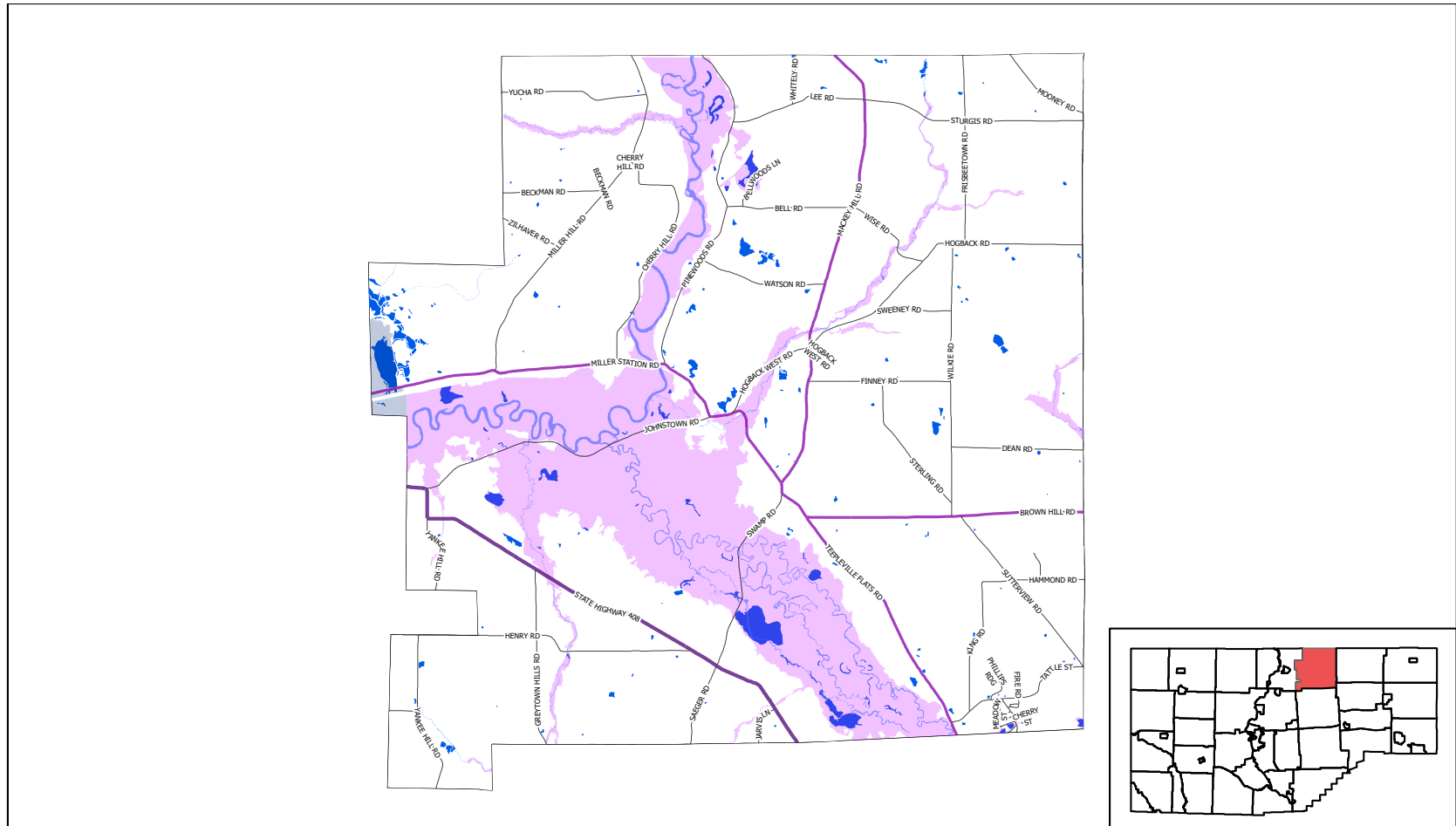
### FEMA 100Yr Flood NFHL zones

- Zone A | Approx 1% annual change flood zone
- Zone AE | Detailed 1% annual change flood zone

### Lakes



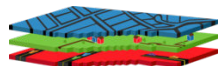
# Appendix D - Local Municipality Flood Vulnerability



## Rockdale Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

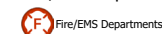
\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools



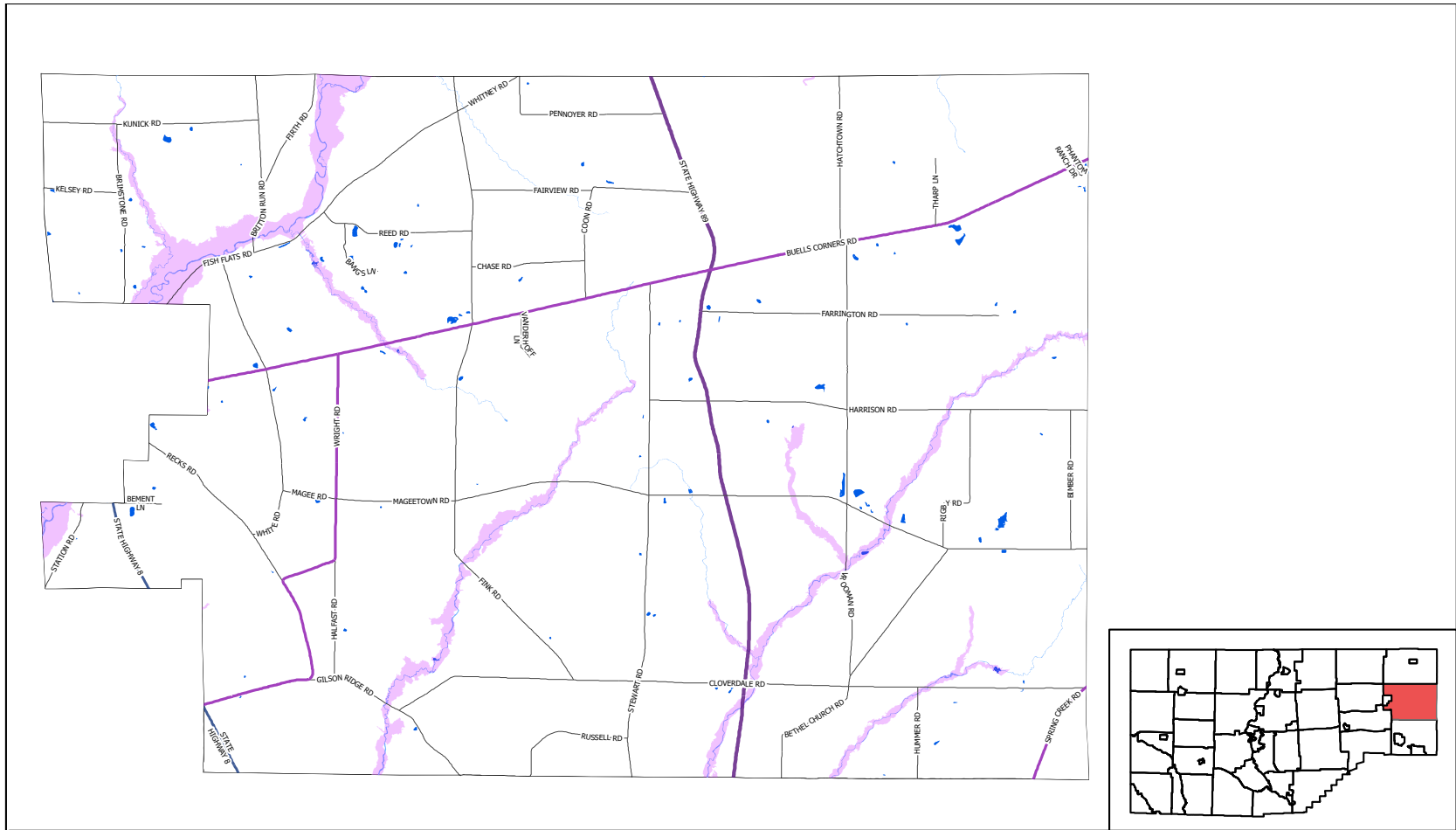
FEMA 100Yr Flood NFHL zones

- Zone A | Approx 1% annual change flood zone
- Zone AE | Detailed 1% annual change flood zone

Lakes



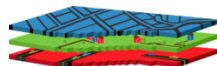
# Appendix D - Local Municipality Flood Vulnerability



## Rome Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

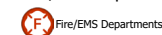
Tier II Facilities



FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual chance flood zone  
Zone AE | Detailed 1% annual chance flood zone

Fire/EMS Departments Rivers \ Streams



Lakes

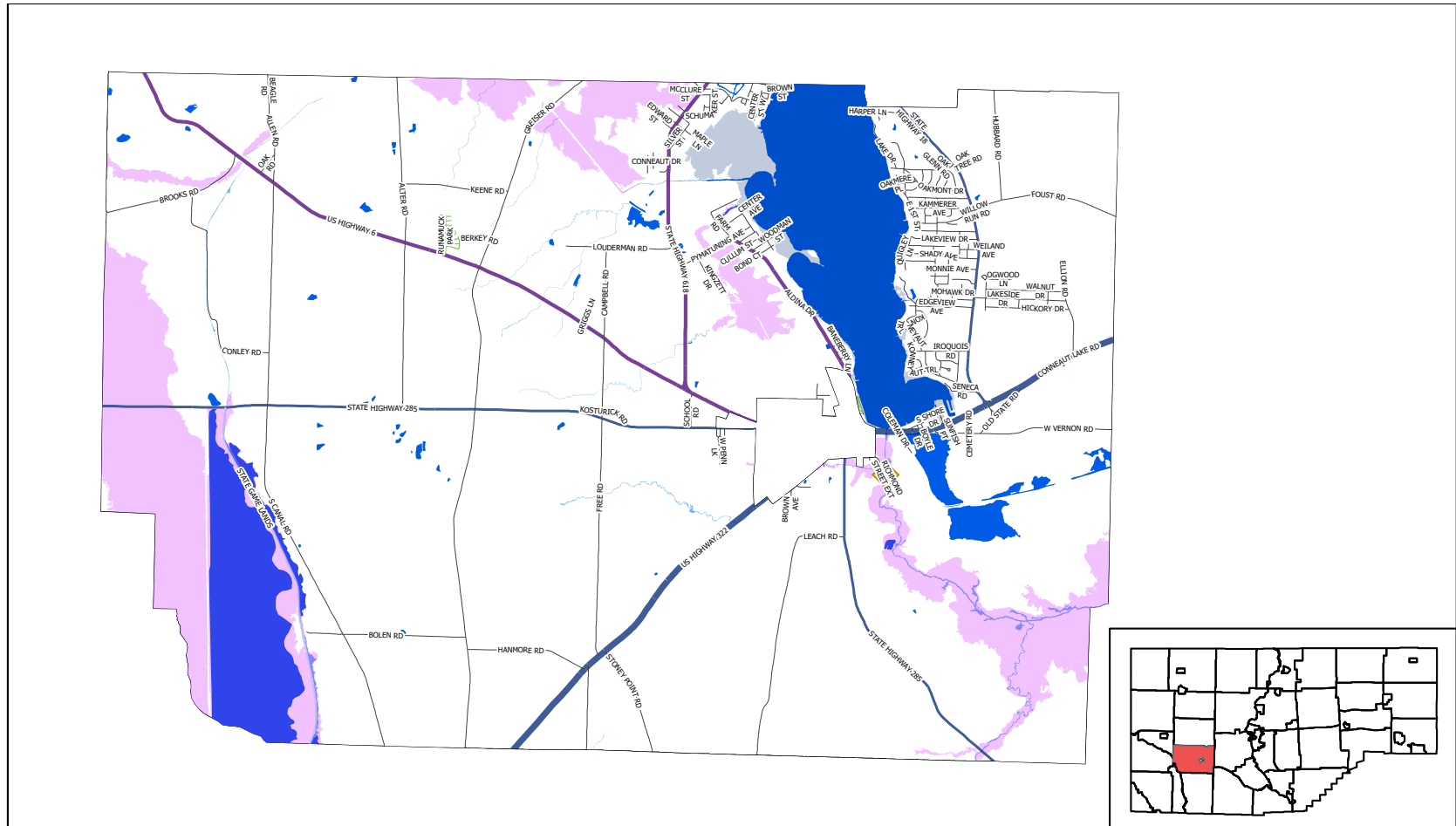


\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites



# Appendix D - Local Municipality Flood Vulnerability

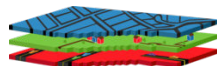


## Sadsbury Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)

Source: Federal Emergency Management Agency (FEMA)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



FEMA

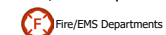
Tier II Facilities



FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone  
Zone AE | Detailed 1% annual change flood zone

Fire/EMS Departments Rivers \ Streams



Lakes



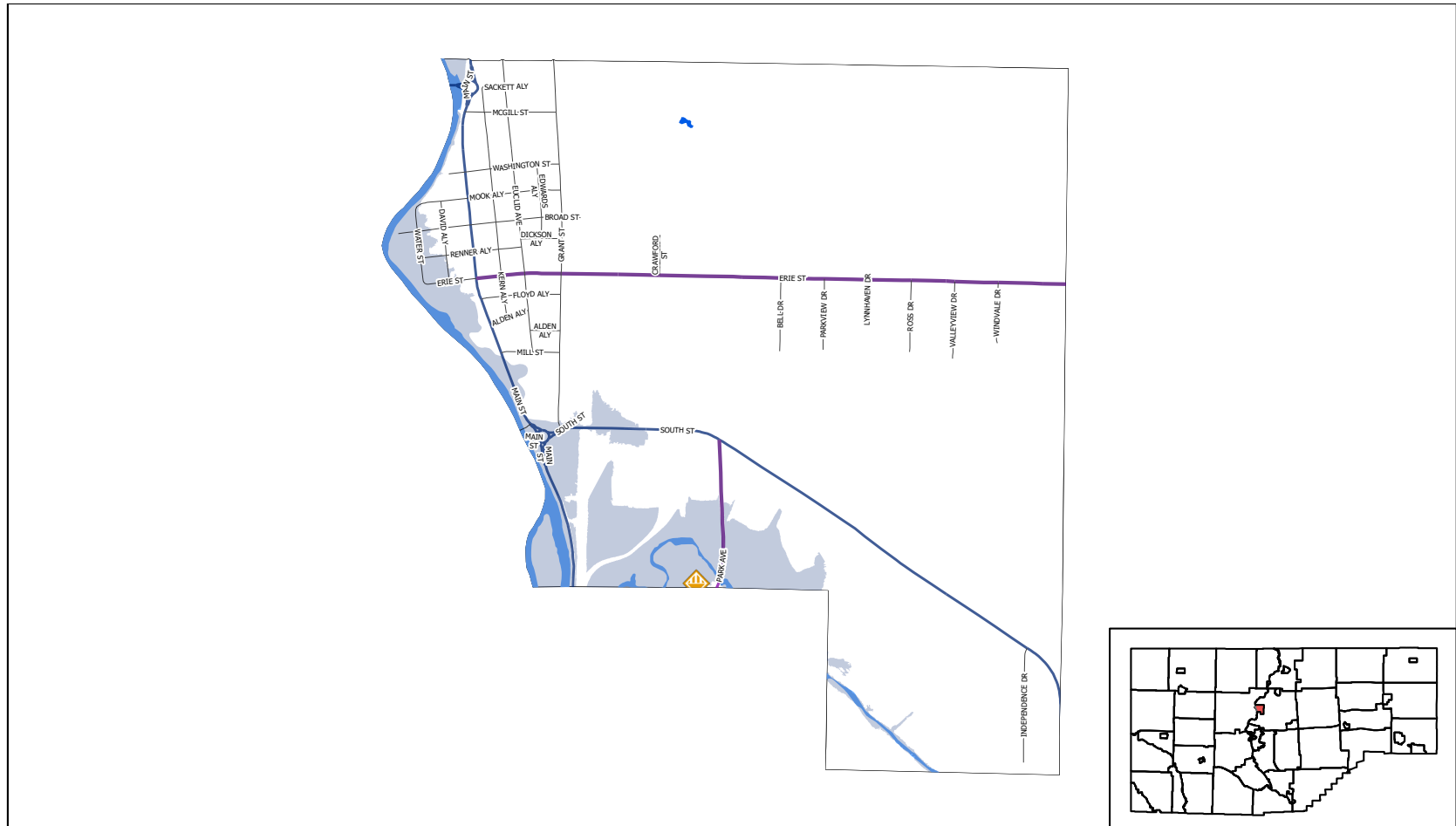
Schools

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\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

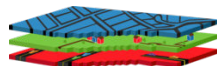
# Appendix D - Local Municipality Flood Vulnerability



## Saegertown Borough, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

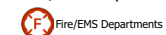
\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools



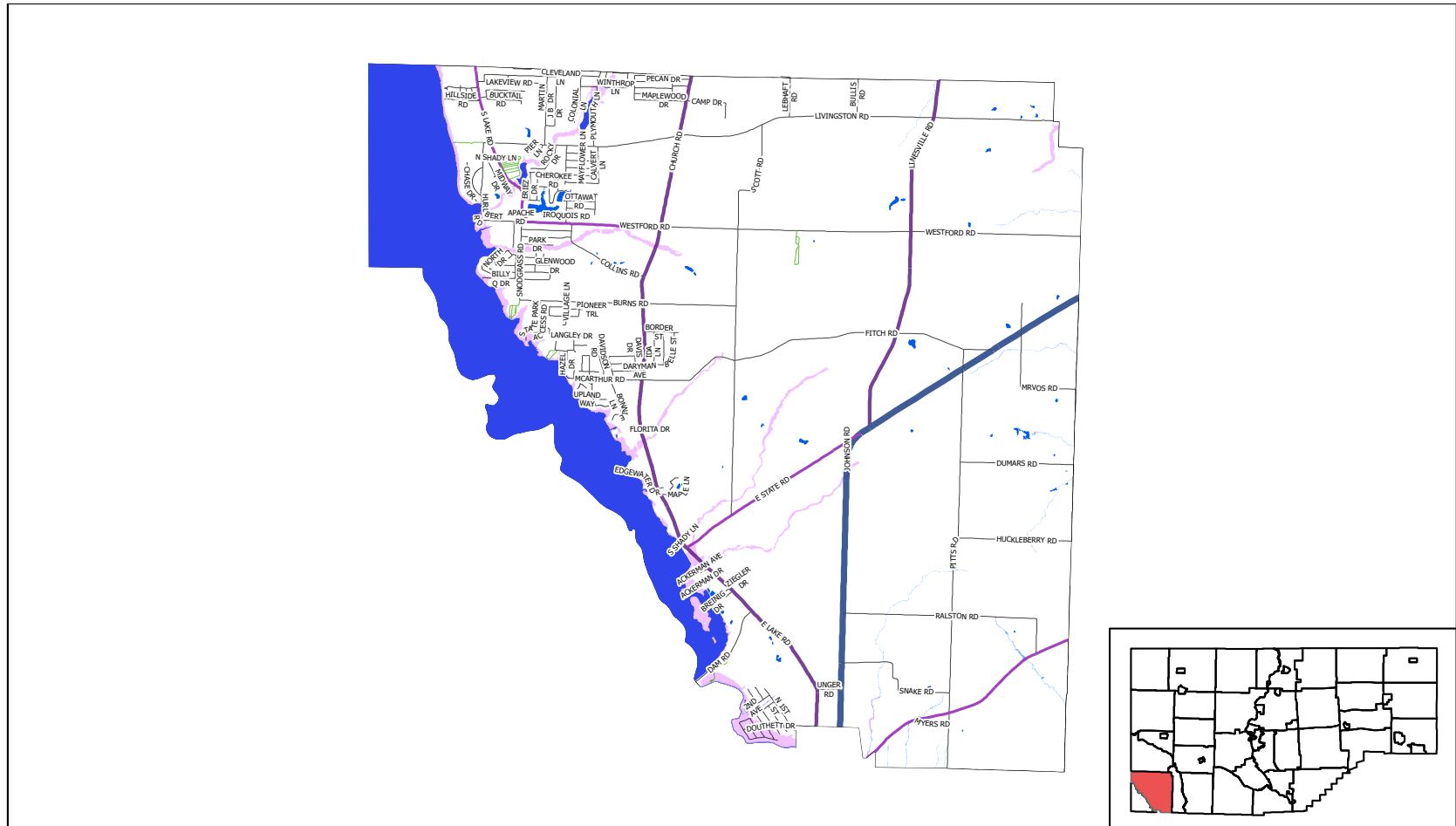
FEMA 100Yr Flood NFHL zones

- Zone A | Approx 1% annual change flood zone
- Zone AE | Detailed 1% annual change flood zone

Lakes



# Appendix D - Local Municipality Flood Vulnerability

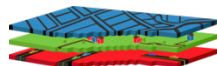


## South Shenango Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)

Source: Federal Emergency Management Agency (FEMA)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



FEMA

Tier II Facilities

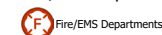


FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone

Zone AE | Detailed 1% annual change flood zone

Fire/EMS Departments Rivers \ Streams



Lakes



Schools

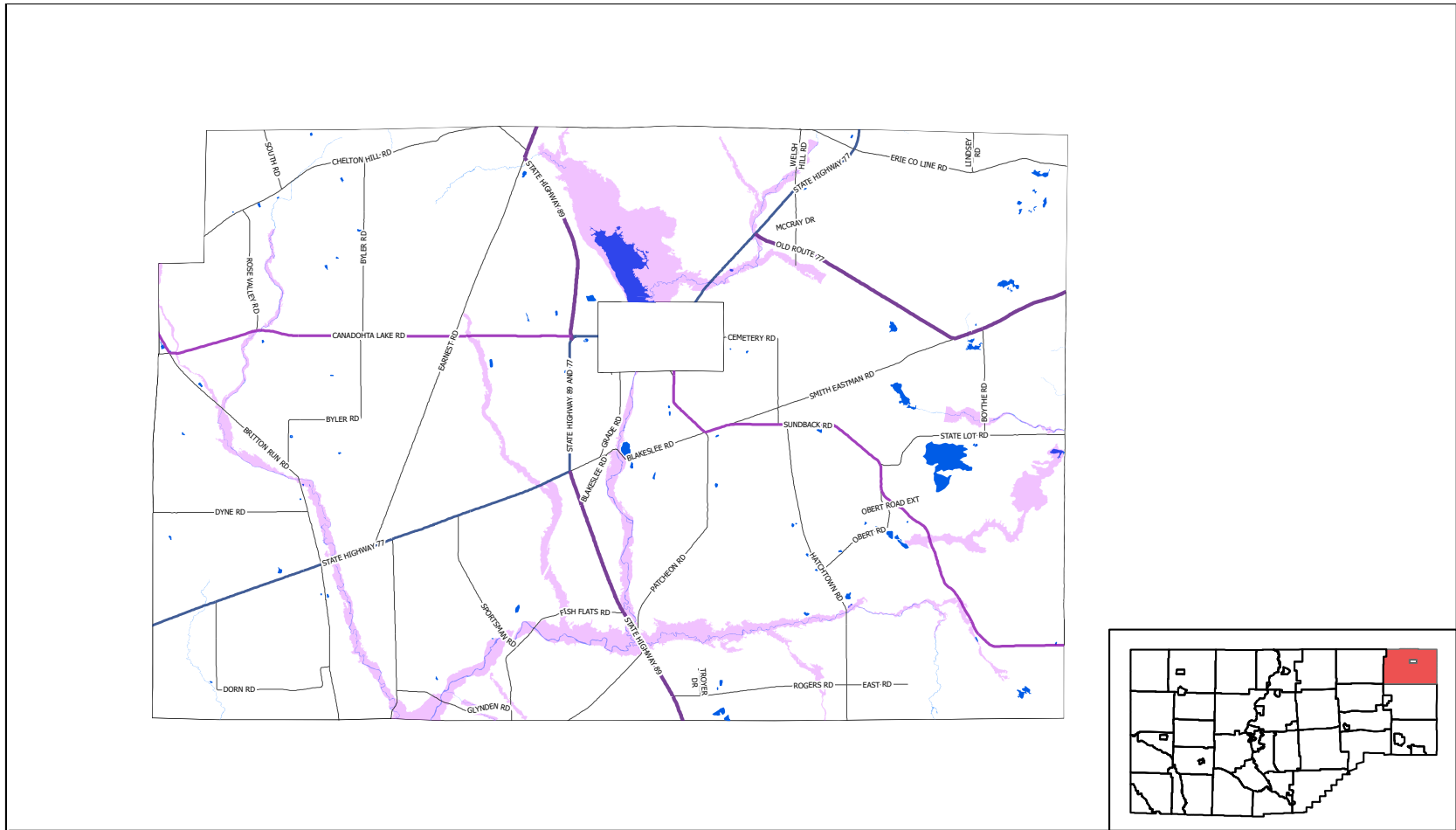


\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

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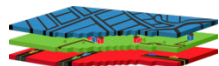
# Appendix D - Local Municipality Flood Vulnerability



## Sparta Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

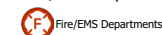
\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools



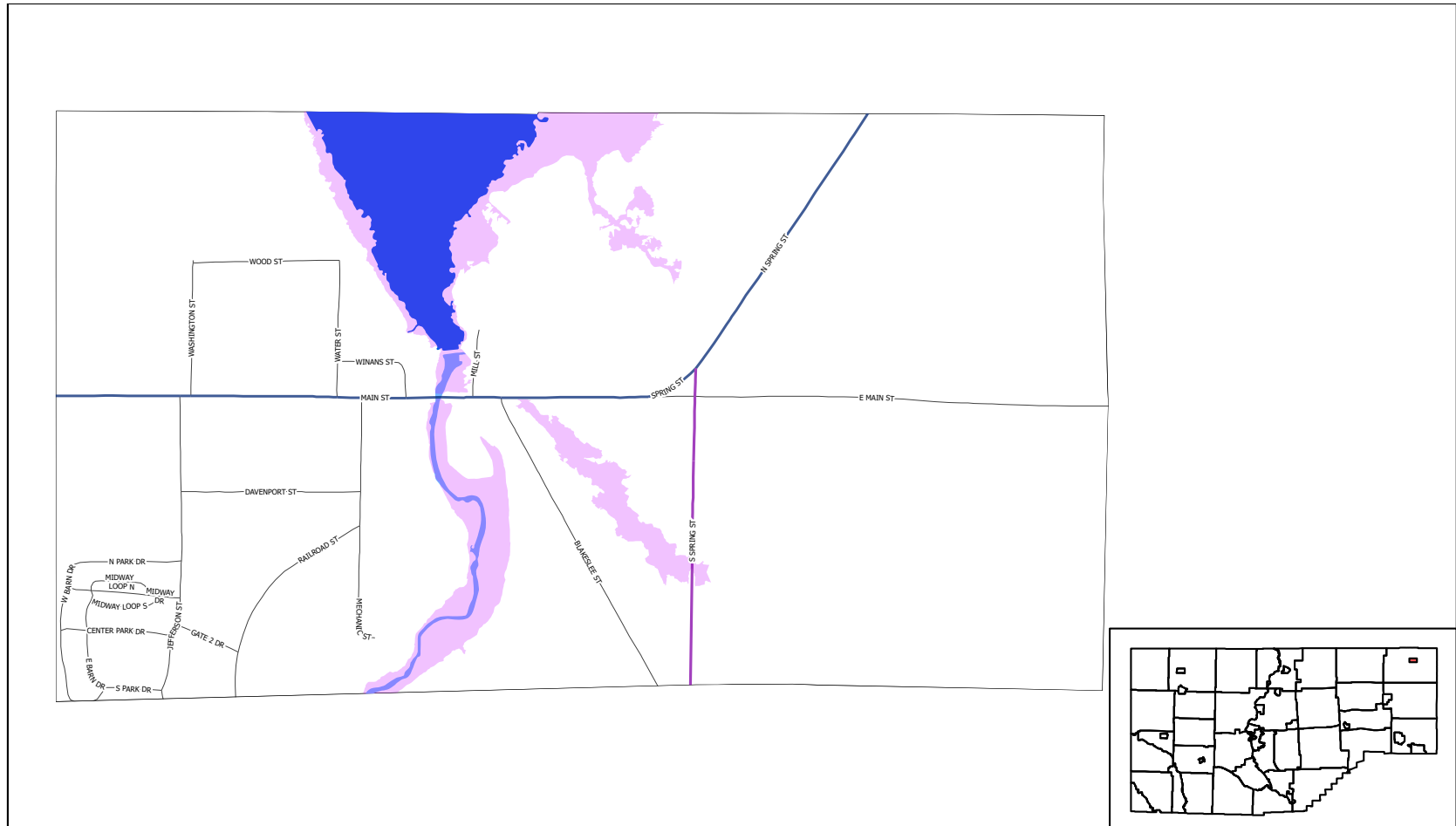
FEMA 100Yr Flood NFHL zones

- Zone A | Approx 1% annual change flood zone
- Zone AE | Detailed 1% annual change flood zone

Lakes



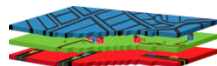
# Appendix D - Local Municipality Flood Vulnerability



## Spartansburg Borough, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

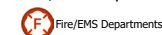
Tier II Facilities



FEMA 100yr Flood NFHL zones

- Zone A | Approx 1% annual chance flood zone
- Zone AE | Detailed 1% annual chance flood zone

Fire/EMS Departments Rivers \ Streams

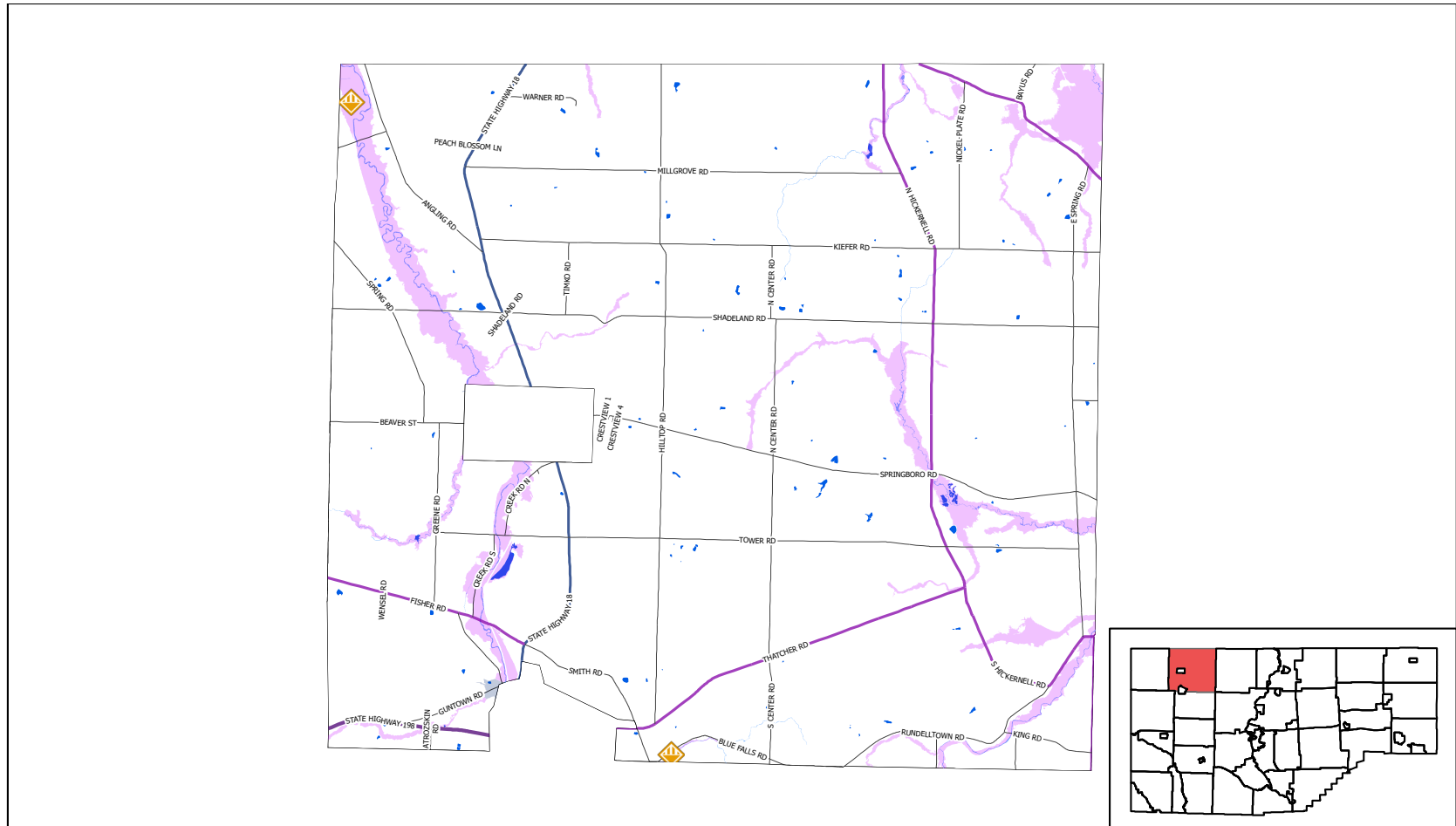


Lakes

Schools



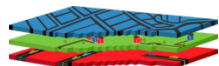
# Appendix D - Local Municipality Flood Vulnerability



## Spring Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)

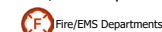


FEMA

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools



FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone

Zone AE | Detailed 1% annual change flood zone

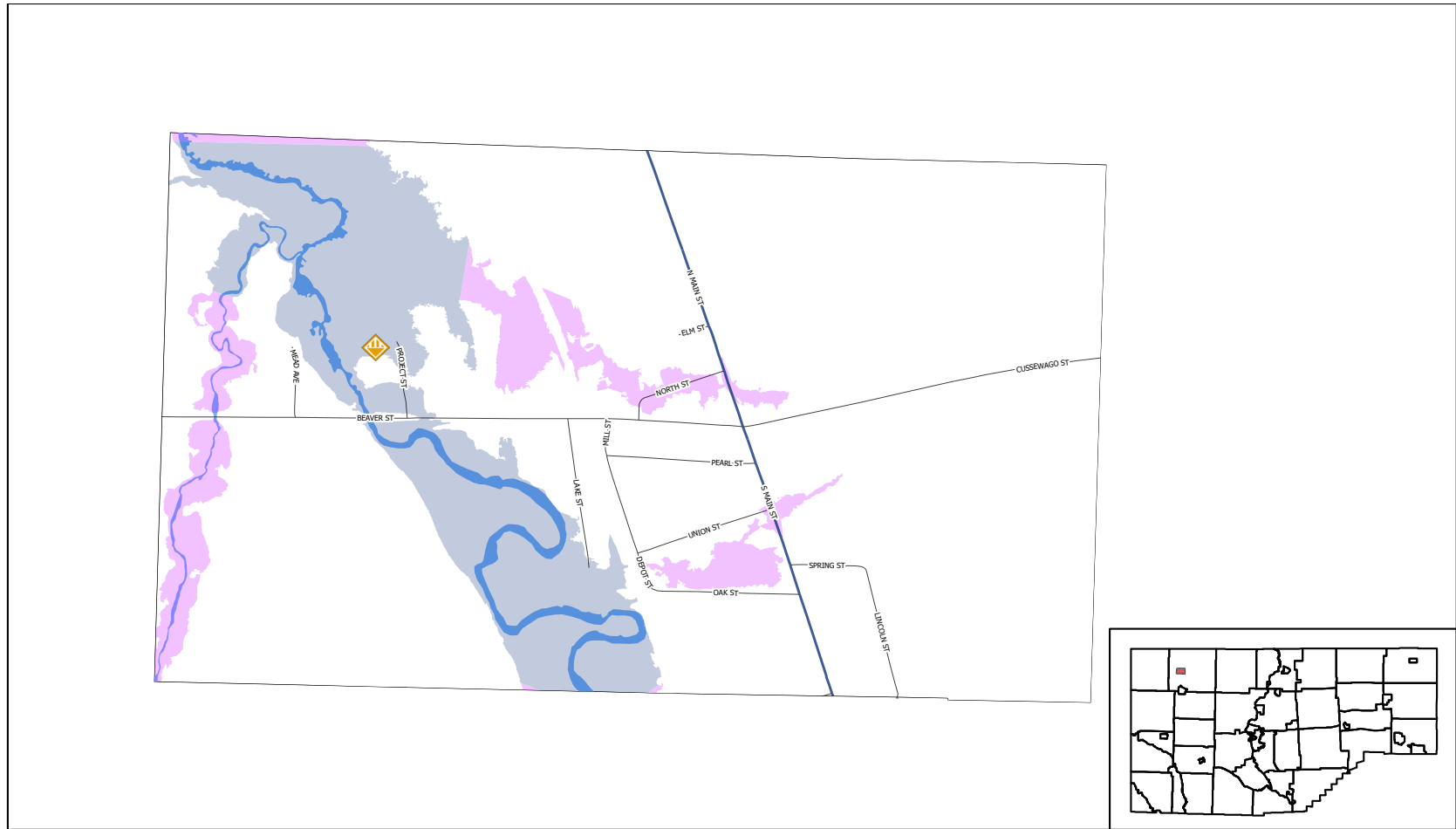
Lakes



\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

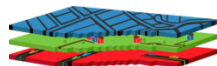
# Appendix D - Local Municipality Flood Vulnerability



## Springboro Borough, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)

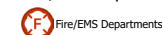


FEMA

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools



FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone

Zone AE | Detailed 1% annual change flood zone

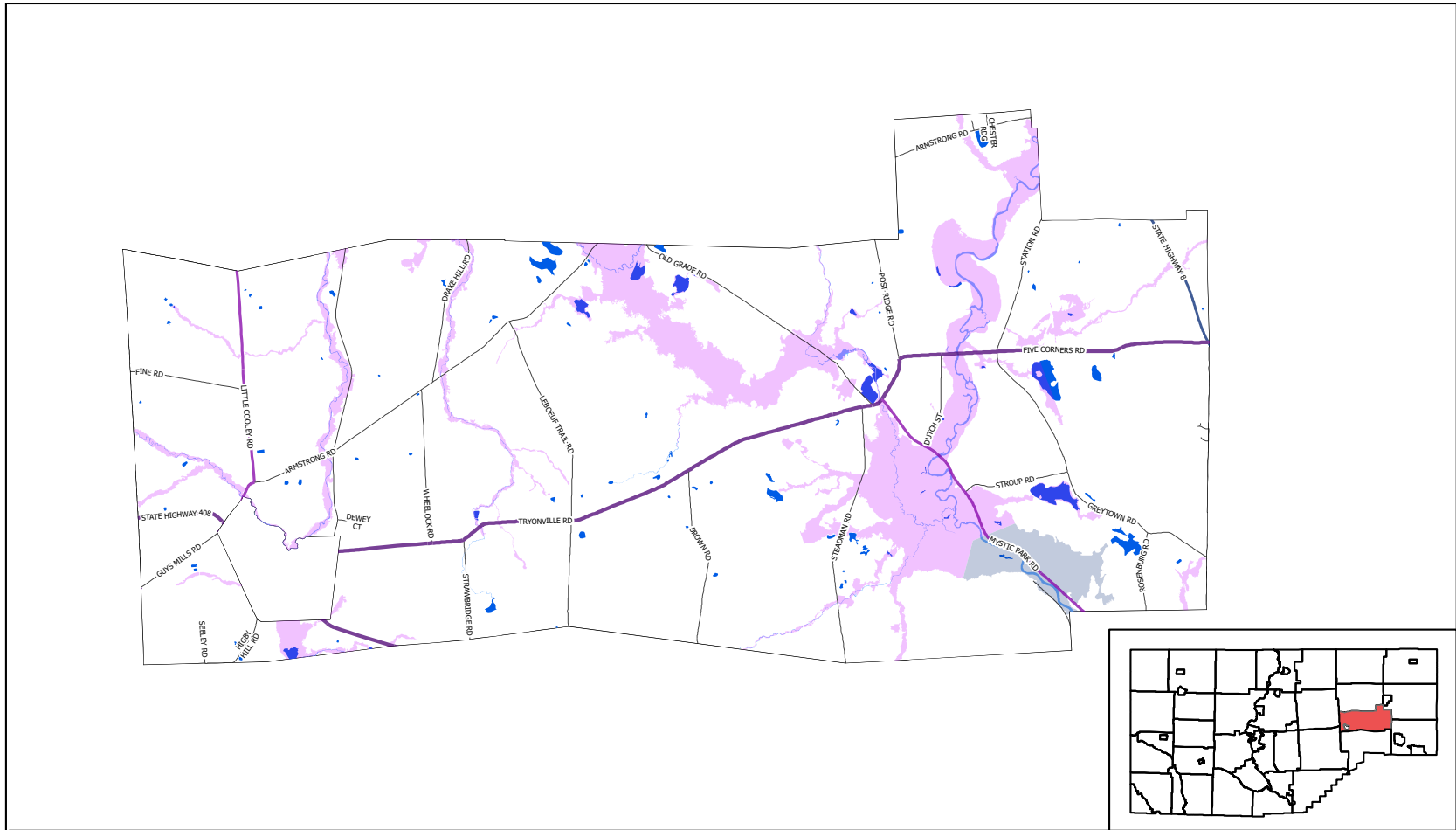
Lakes



\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

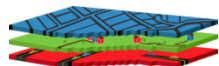
# Appendix D - Local Municipality Flood Vulnerability



## Steuben Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

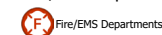
Tier II Facilities



FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone  
Zone AE | Detailed 1% annual change flood zone

Fire/EMS Departments Rivers \ Streams



Lakes

Schools

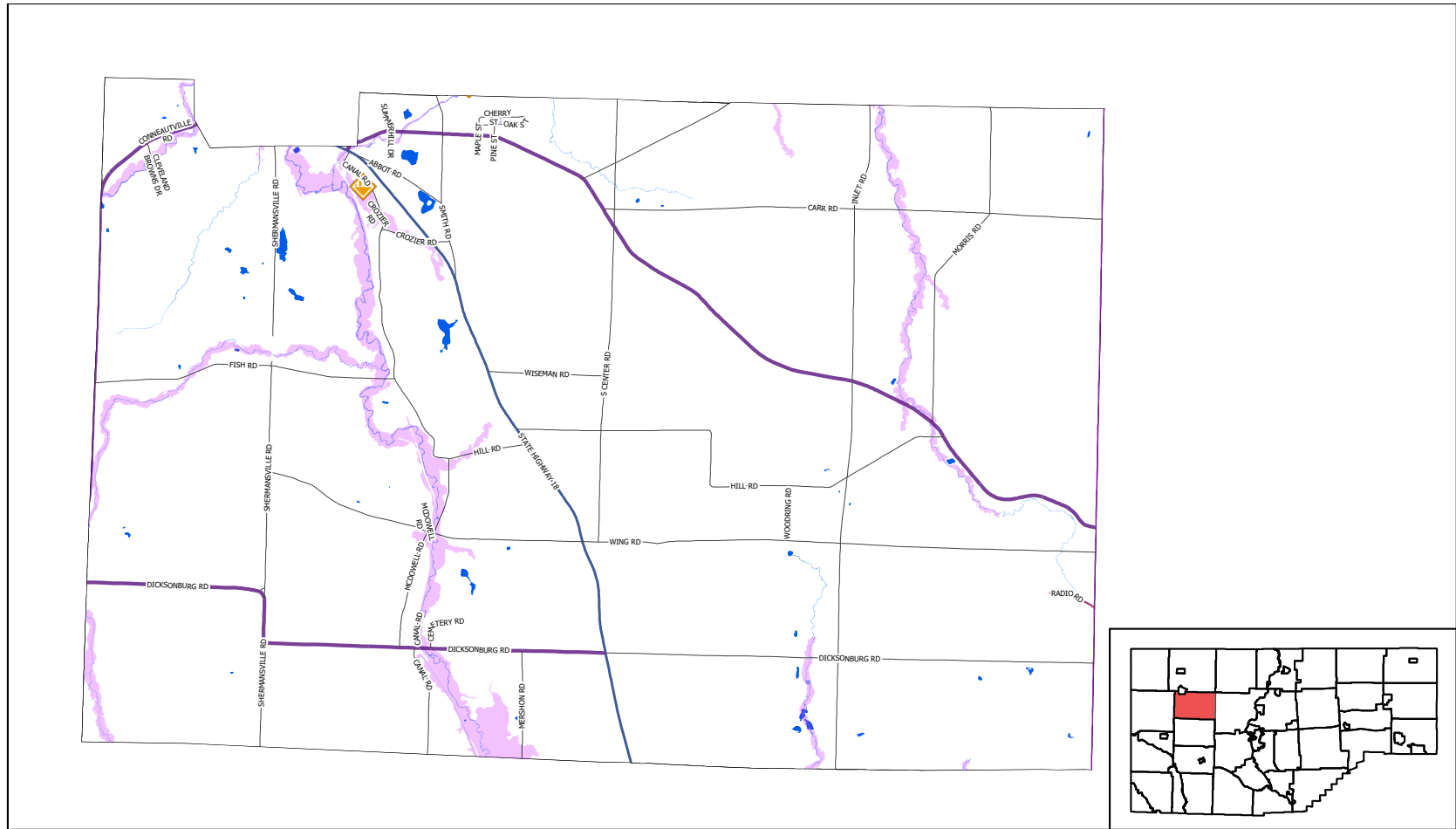


\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites



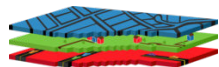
# Appendix D - Local Municipality Flood Vulnerability



## Summerhill Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



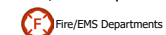
FEMA

- \* Facility types that don't fall into flood zones:
- Airports
  - Hospitals
  - Police Departments
  - Tower Sites

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools

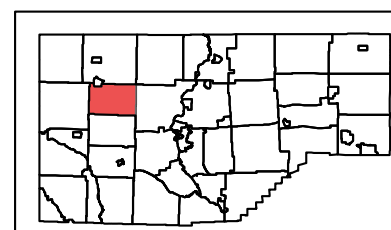


FEMA 100Yr Flood NFHL zones

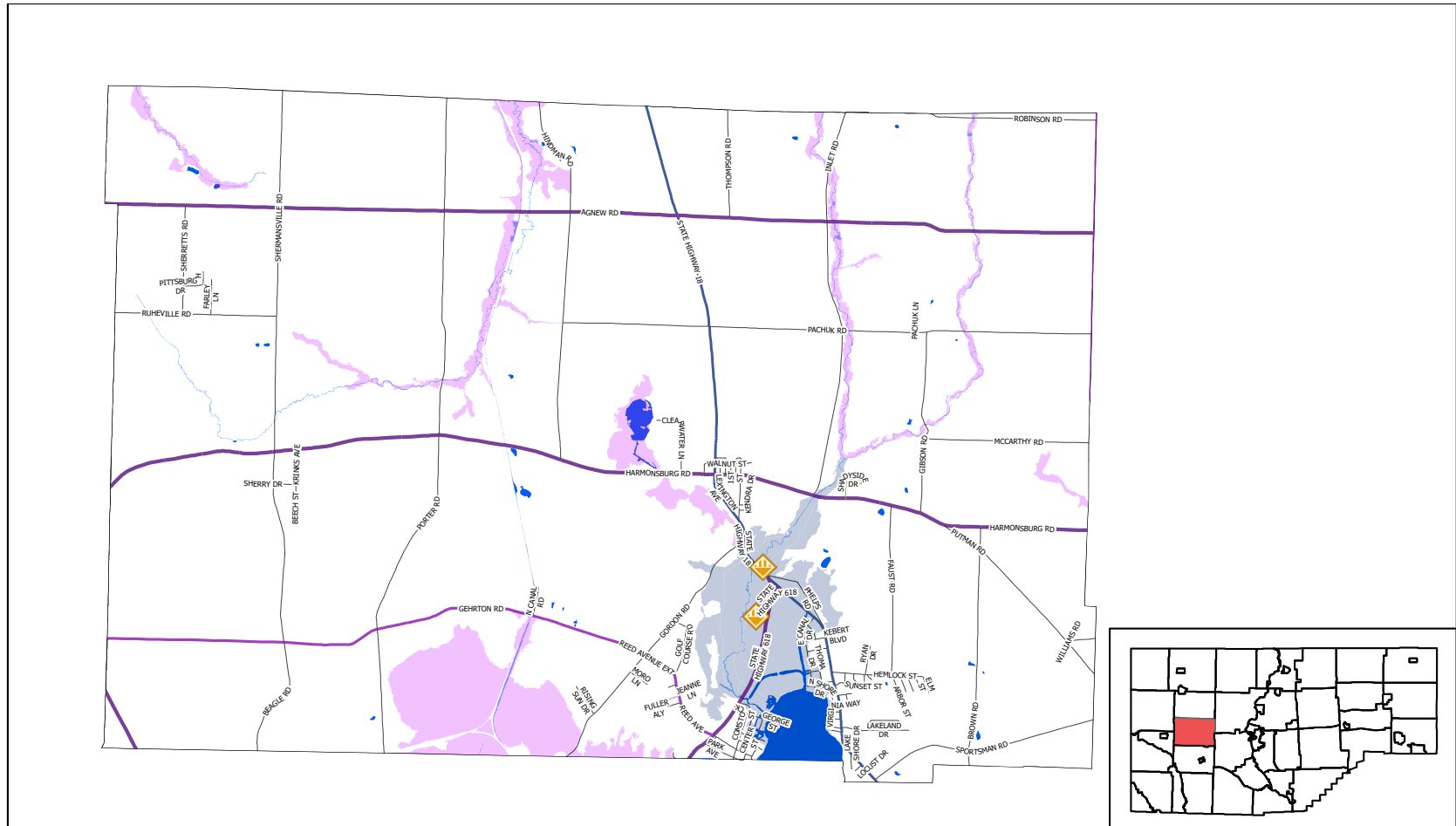
Zone A | Approx 1% annual change flood zone

Zone AE | Detailed 1% annual change flood zone

Lakes



# Appendix D - Local Municipality Flood Vulnerability

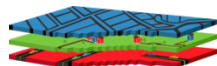


## Summit Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)

Source: Federal Emergency Management Agency (FEMA)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyal  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



FEMA

Tier II Facilities

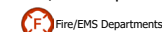


FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone

Zone AE | Detailed 1% annual change flood zone

Fire/EMS Departments Rivers \ Streams



Schools



Lakes

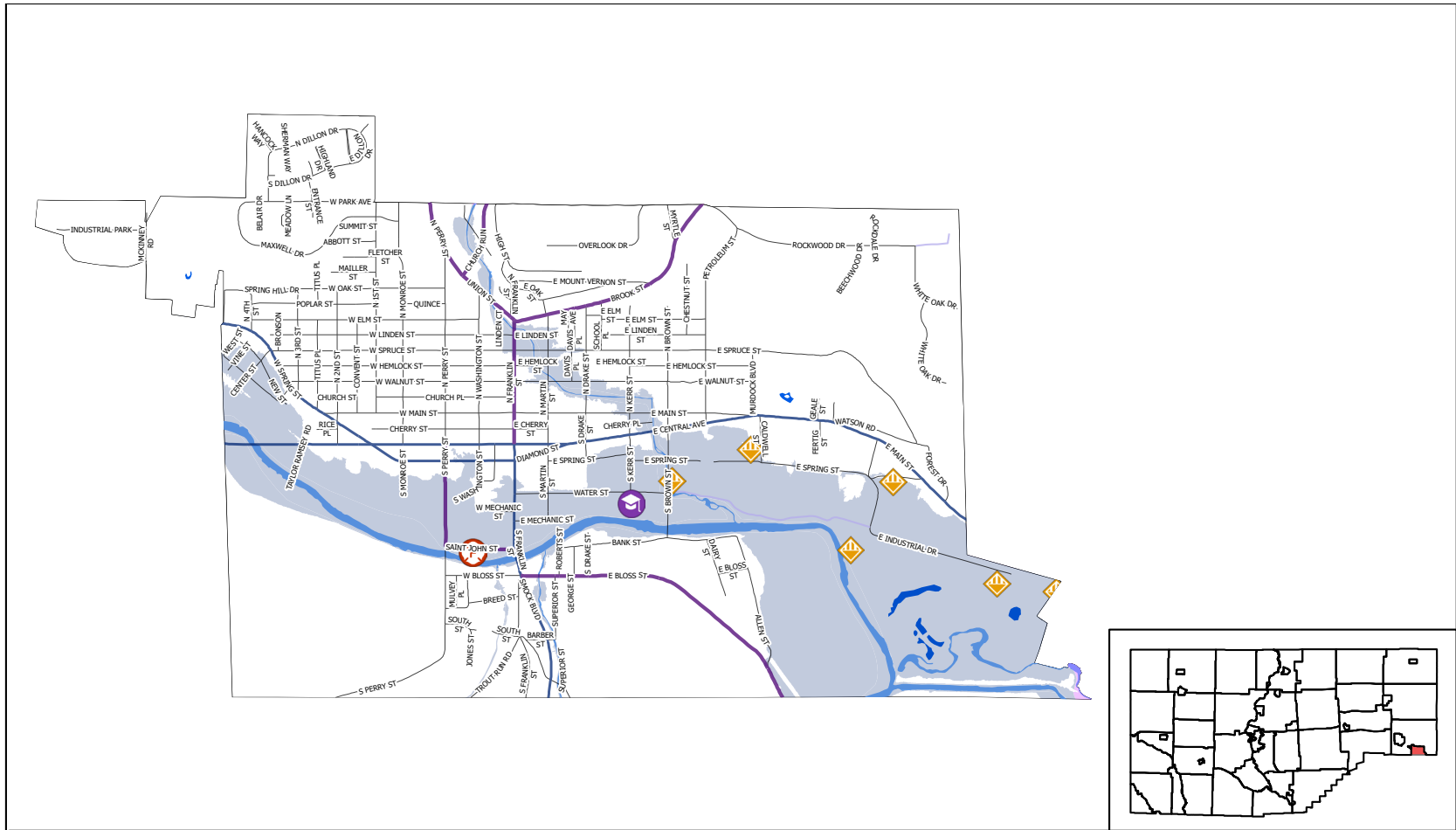


\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

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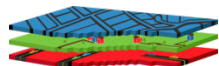
# Appendix D - Local Municipality Flood Vulnerability



## Titusville City, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

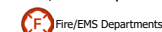
Tier II Facilities



FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone  
Zone AE | Detailed 1% annual change flood zone

Fire/EMS Departments Rivers \ Streams



Lakes

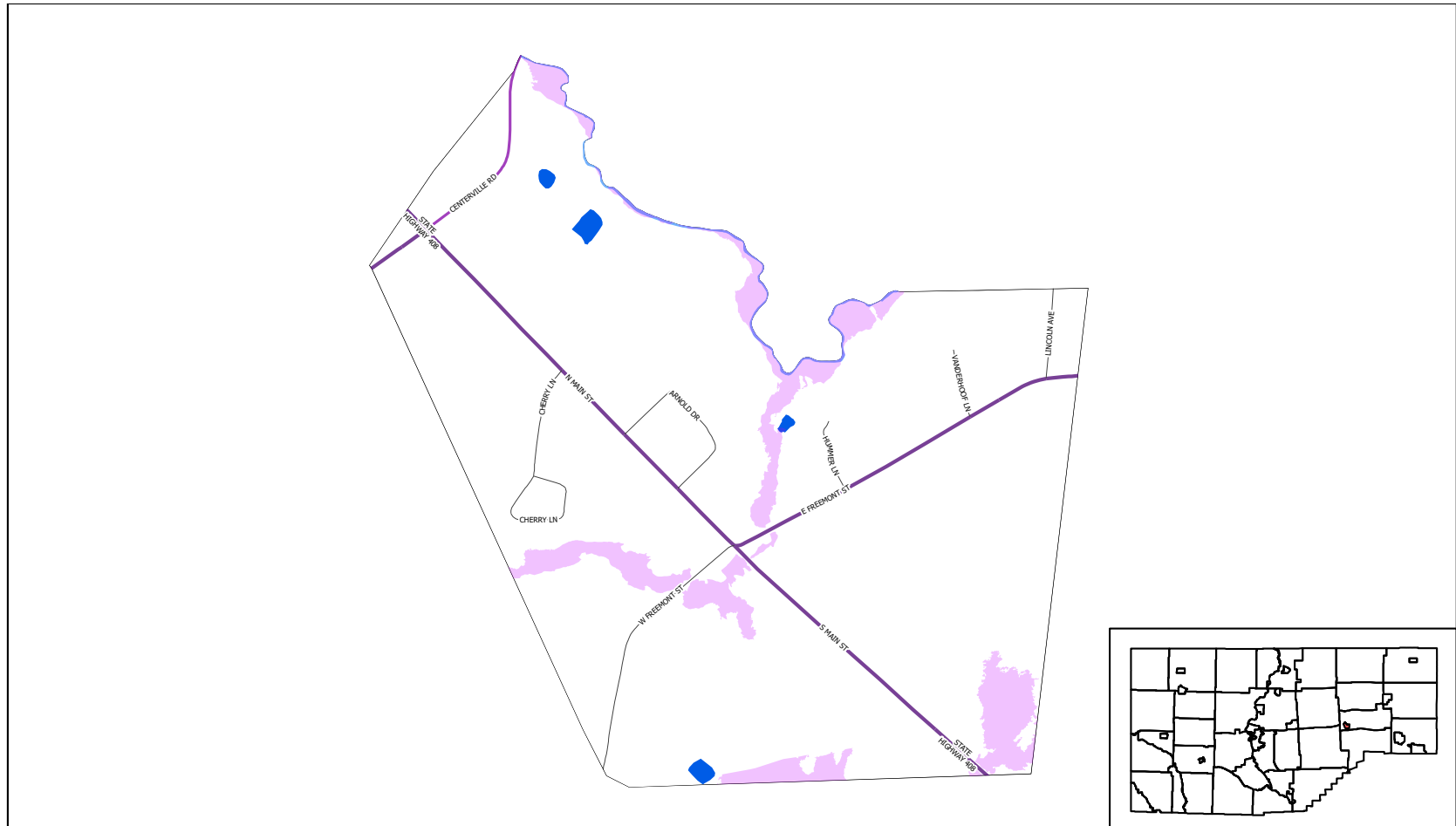
Schools



\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

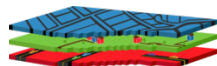
# Appendix D - Local Municipality Flood Vulnerability



## Townville Borough, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Data used for map creation is approximate and should not be used for site specific decision making.  
Crawford County assumes no responsibility or liability to the accuracy or completion of these maps.

Source: Federal Emergency Management Agency (FEMA)



FEMA

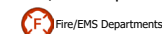
\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools



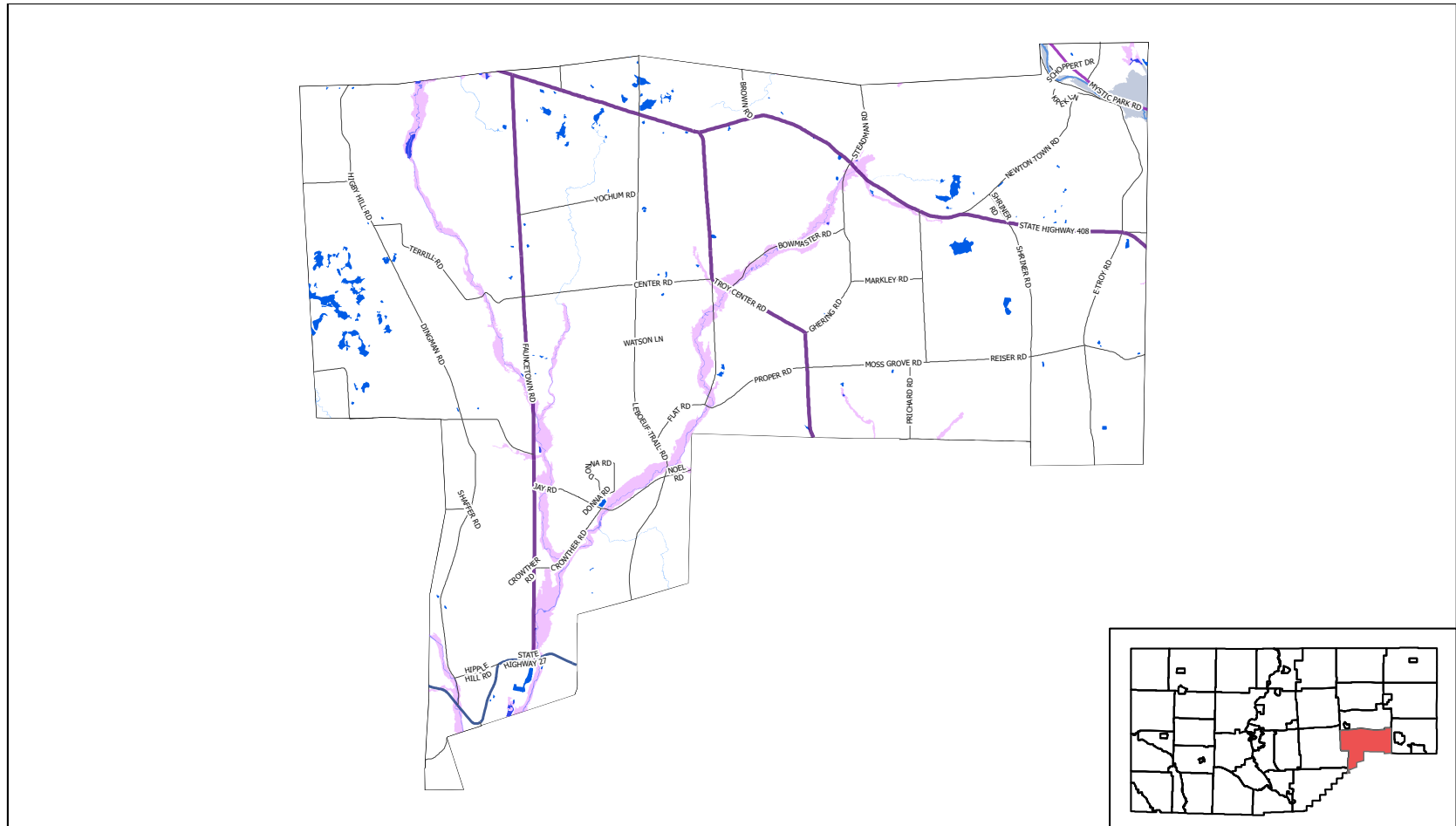
FEMA 100Yr Flood NFHL zones

- Zone A | Approx 1% annual chance flood zone
- Zone AE | Detailed 1% annual chance flood zone

Lakes



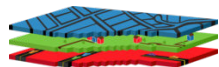
# Appendix D - Local Municipality Flood Vulnerability



## Troy Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

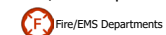
\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools



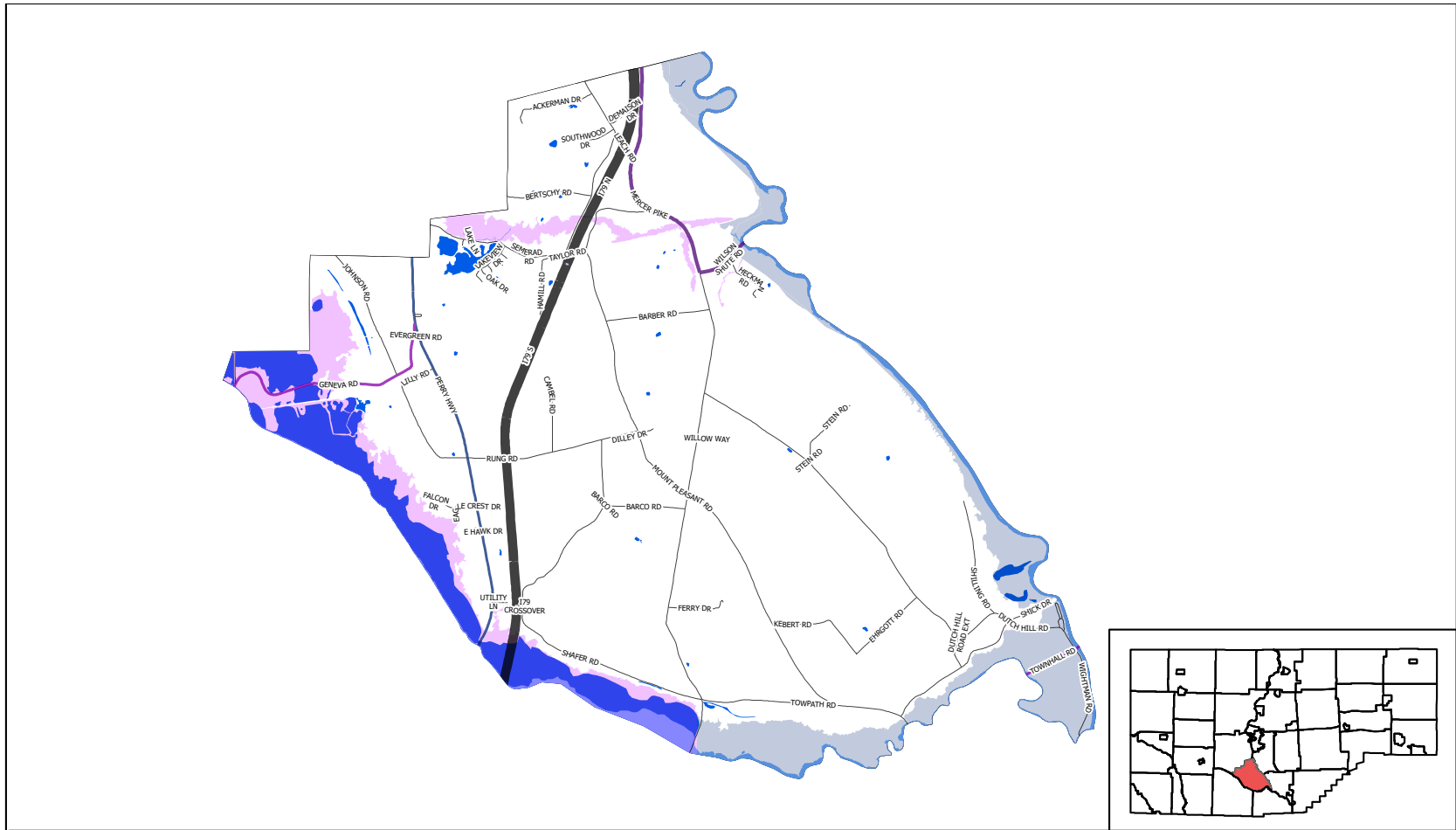
FEMA 100Yr Flood NFHL zones

- Zone A | Approx 1% annual change flood zone
- Zone AE | Detailed 1% annual change flood zone

Lakes



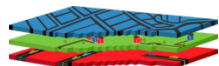
# Appendix D - Local Municipality Flood Vulnerability



## Union Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

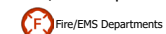
\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools



FEMA 100Yr Flood NFHL zones

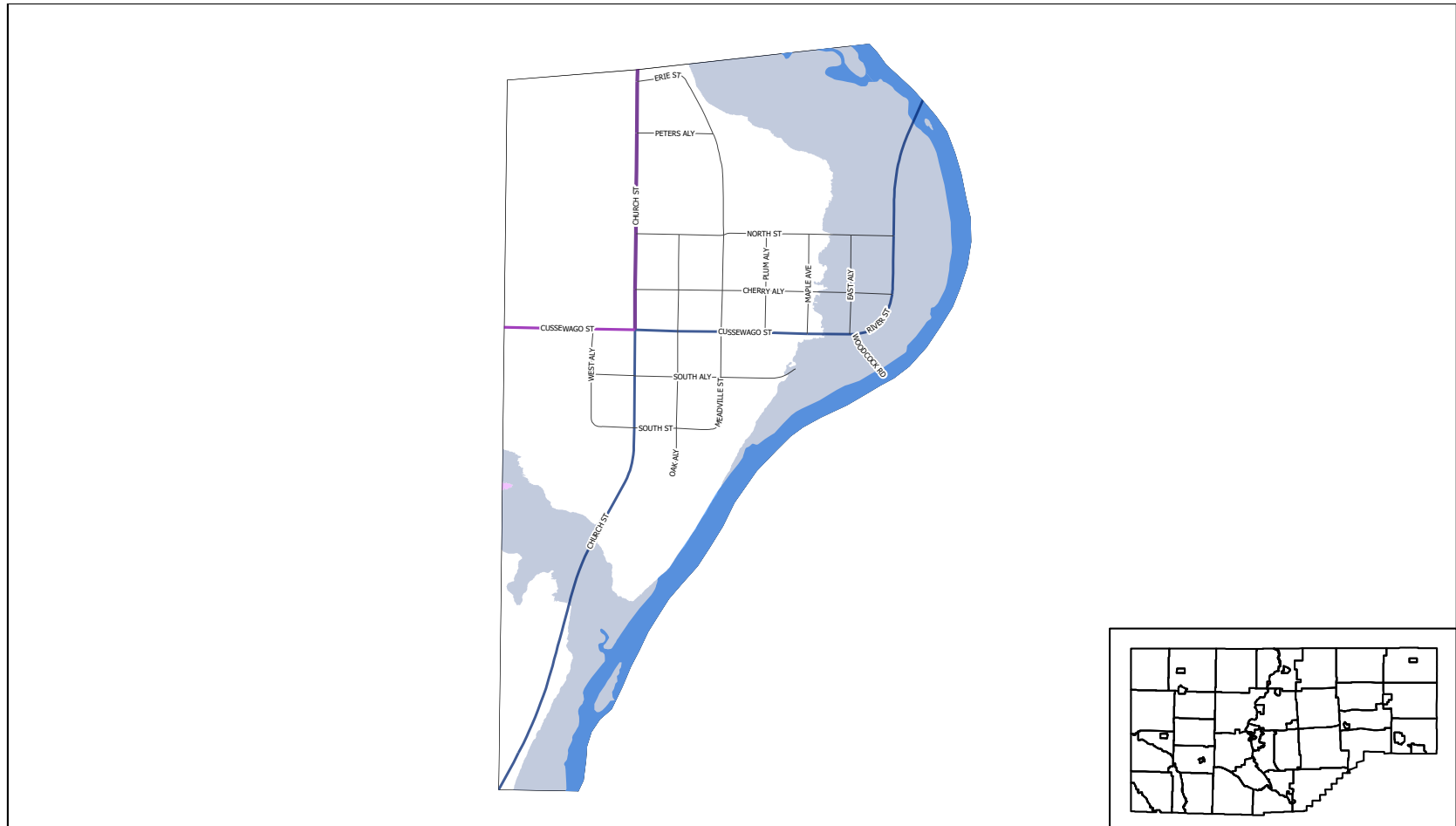
Zone A | Approx 1% annual change flood zone

Zone AE | Detailed 1% annual change flood zone

Lakes



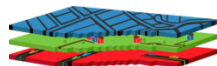
# Appendix D - Local Municipality Flood Vulnerability



## Venango Borough, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

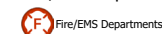
\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools



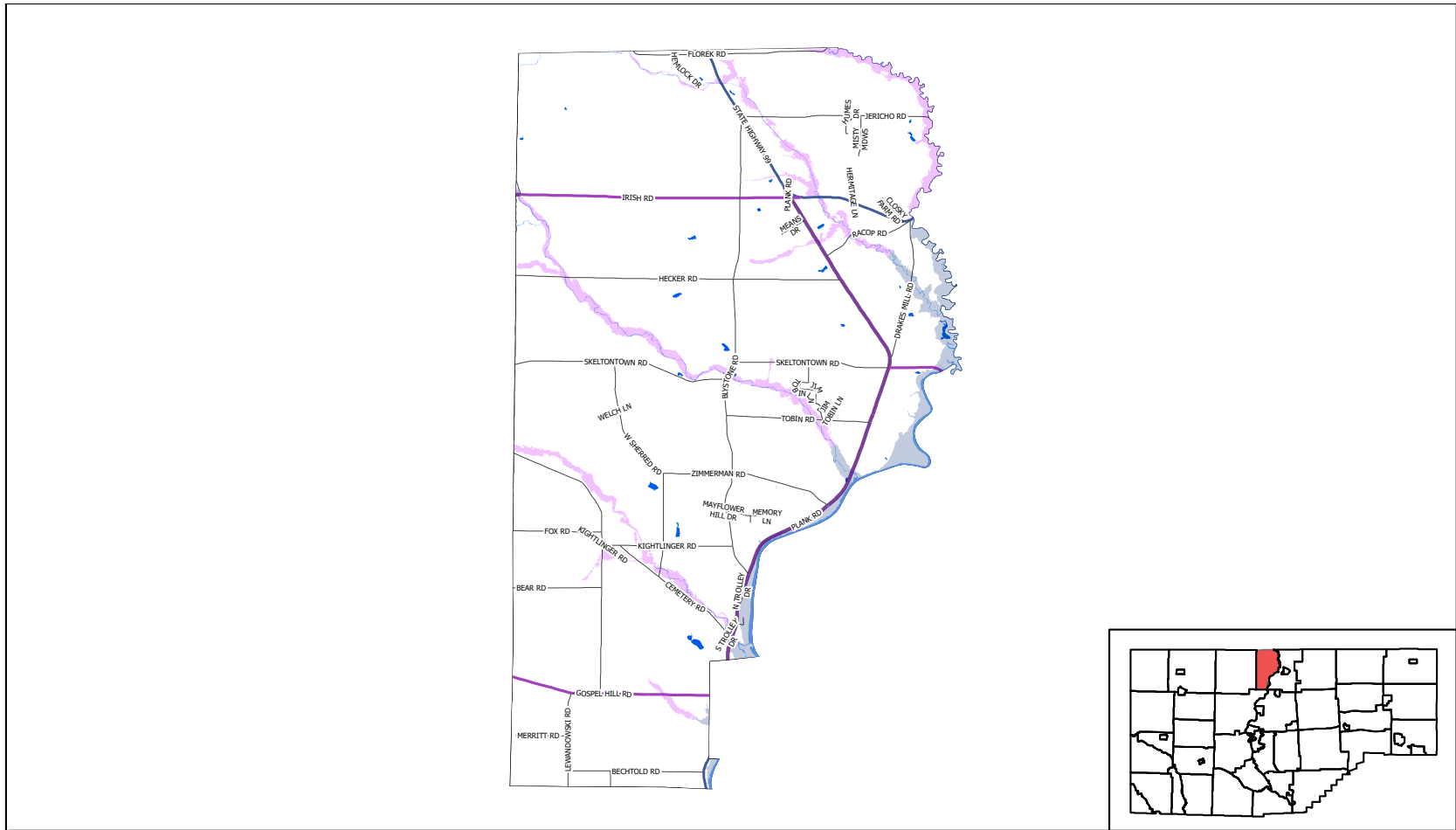
FEMA 100yr Flood NFHL zones

- Zone A | Approx 1% annual change flood zone
- Zone AE | Detailed 1% annual change flood zone

Lakes



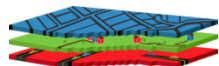
# Appendix D - Local Municipality Flood Vulnerability



## Venango Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Source: Federal Emergency Management Agency (FEMA)



FEMA

\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

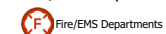
Tier II Facilities



FEMA 100Yr Flood NFHL zones

- Zone A | Approx 1% annual change flood zone
- Zone AE | Detailed 1% annual change flood zone

Fire/EMS Departments Rivers \ Streams

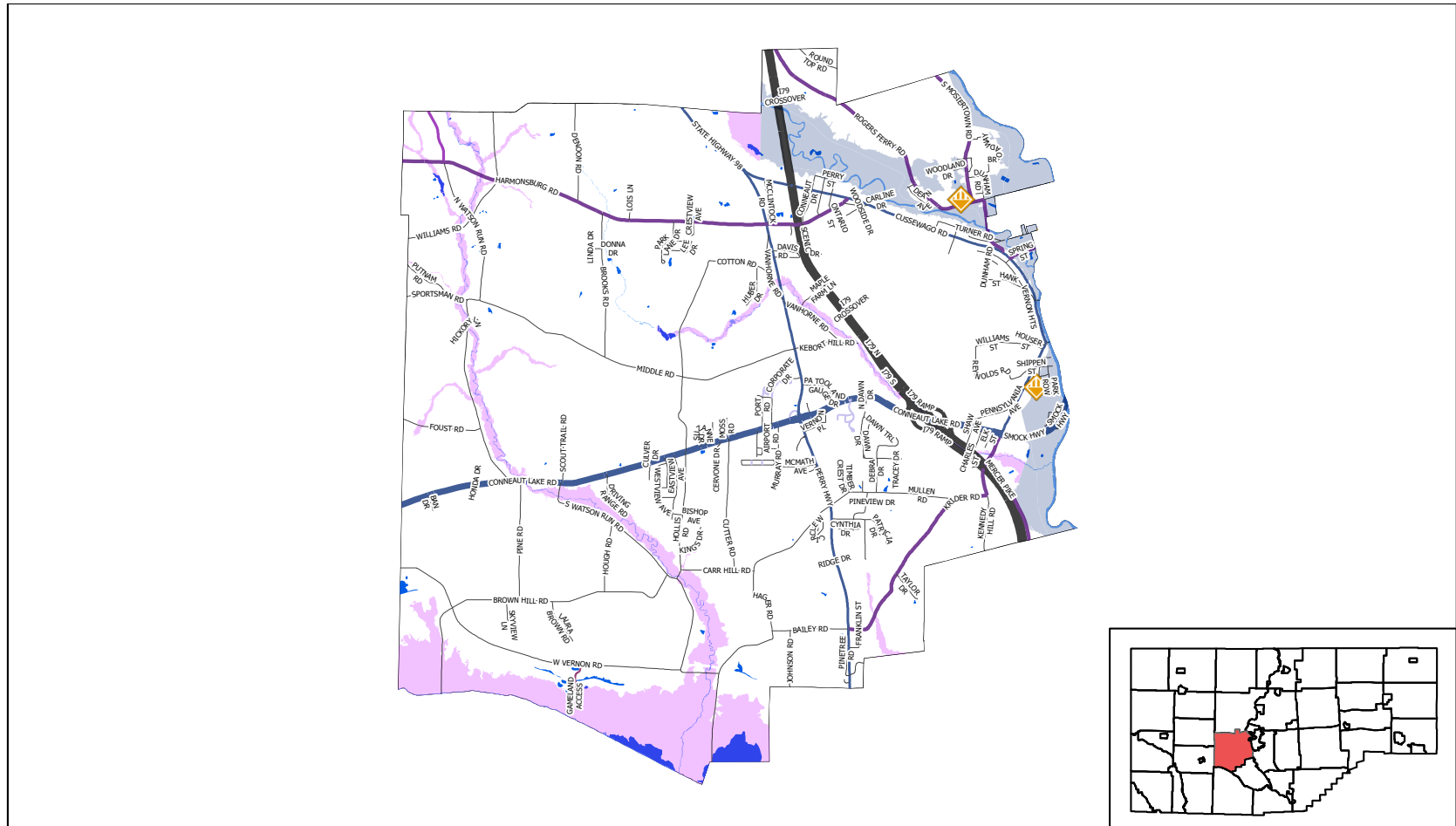


Lakes





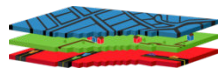
# Appendix D - Local Municipality Flood Vulnerability



## Vernon Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



Source: Federal Emergency Management Agency (FEMA)

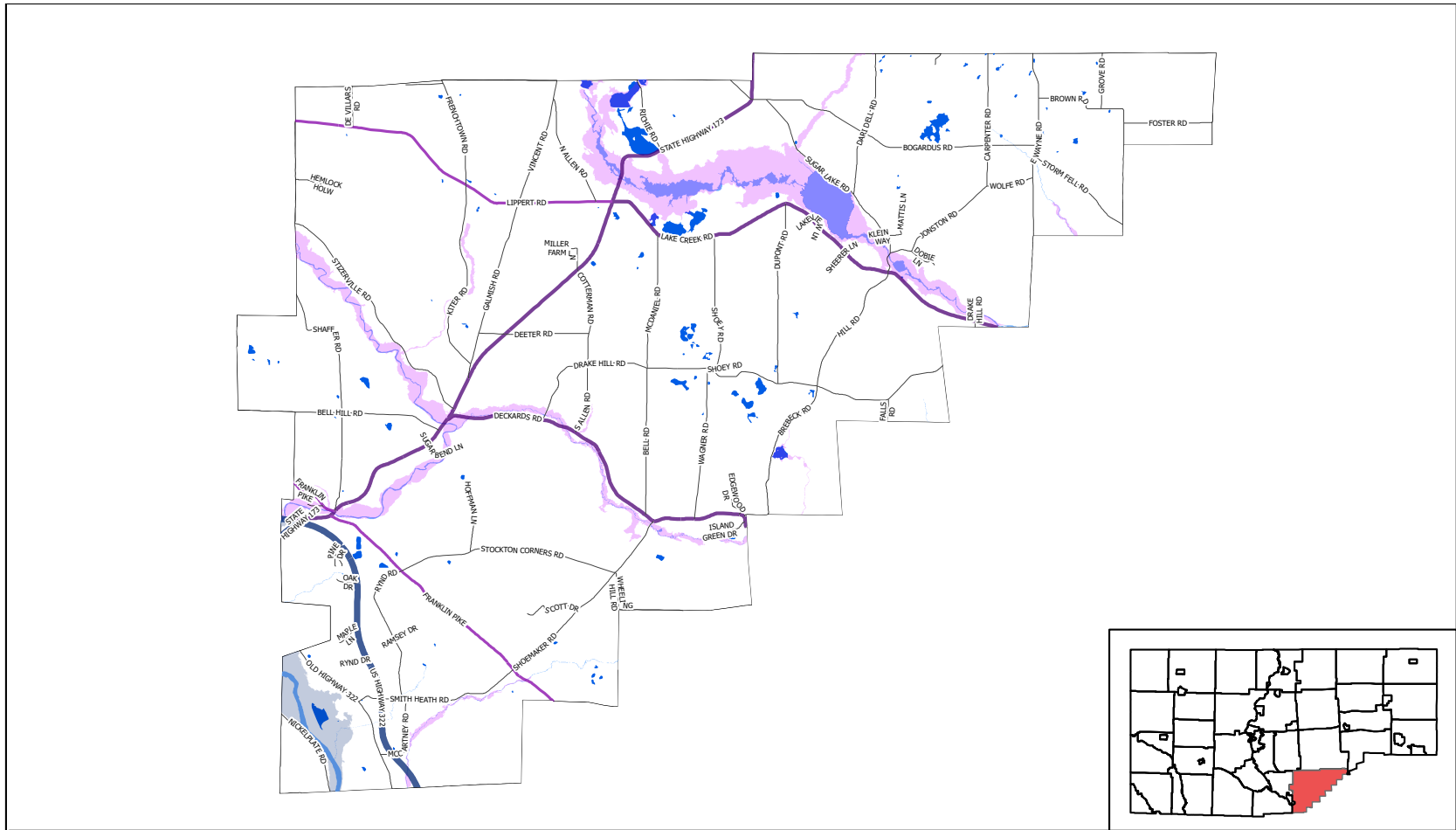


- Tier II Facilities
  - Tier II Facilities
- Fire/EMS Departments Rivers \ Streams
  - Fire/EMS Departments
  - Rivers \ Streams
- Schools
  - Schools
- FEMA 100Yr Flood NFHL zones
  - Zone A | Approx 1% annual change flood zone
  - Zone AE | Detailed 1% annual change flood zone
- Lakes
  - Lakes

- \* Facility types that don't fall into flood zones:
- Airports
  - Hospitals
  - Police Departments
  - Tower Sites

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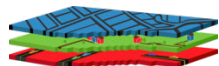
# Appendix D - Local Municipality Flood Vulnerability



## Wayne Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyal  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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Crawford County assumes no responsibility or liability to the accuracy or completion of these maps.

Source: Federal Emergency Management Agency (FEMA)



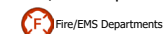
FEMA

- \* Facility types that don't fall into flood zones:
- Airports
  - Hospitals
  - Police Departments
  - Tower Sites

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools



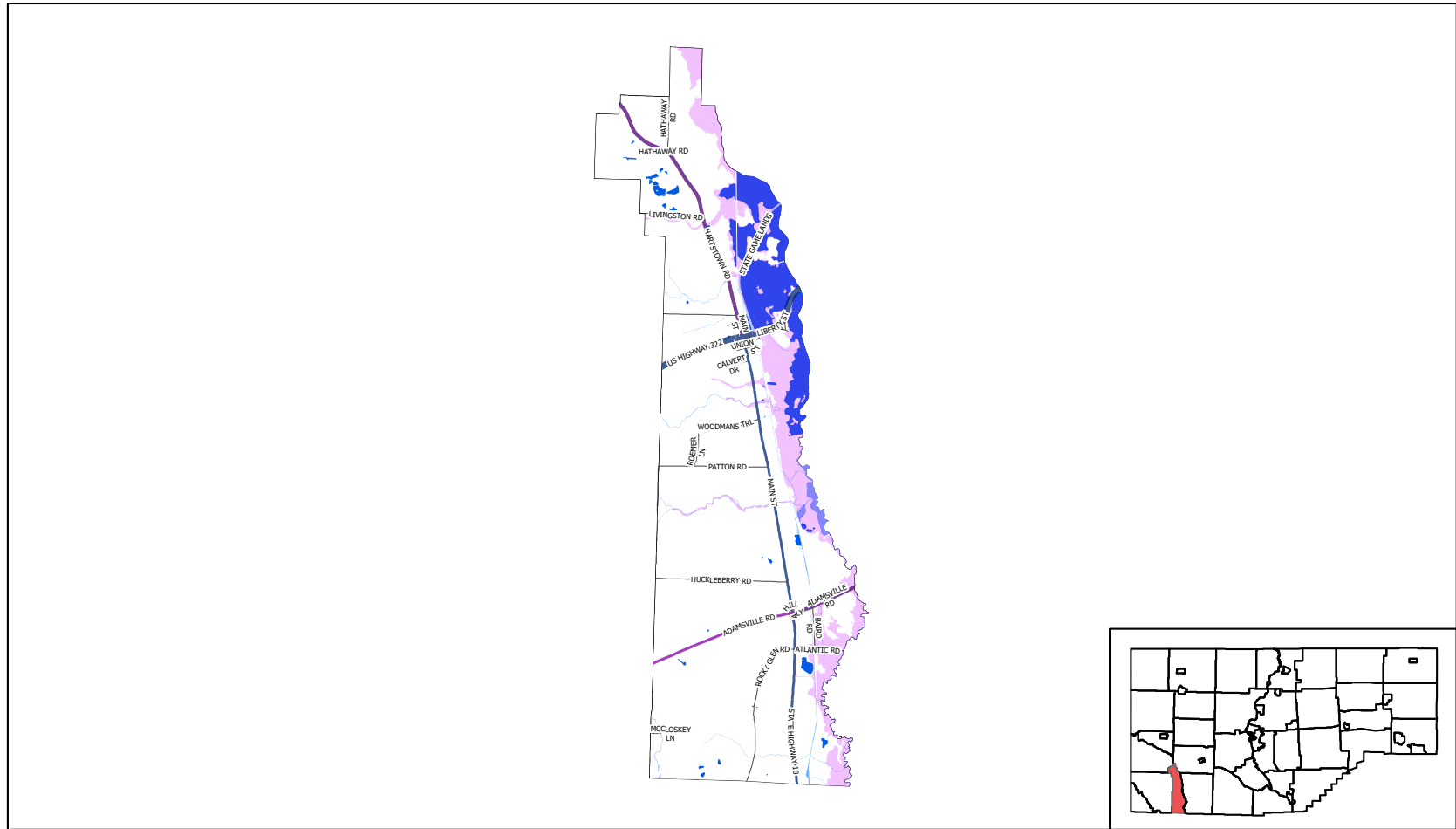
FEMA 100Yr Flood NFHL zones

- Zone A | Approx 1% annual change flood zone
- Zone AE | Detailed 1% annual change flood zone

Lakes



# Appendix D - Local Municipality Flood Vulnerability

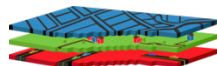


## West Fallowfield Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)

Source: Federal Emergency Management Agency (FEMA)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



FEMA

\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

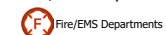
Tier II Facilities



FEMA 100Yr Flood NFHL zones

- Zone A | Approx 1% annual chance flood zone
- Zone AE | Detailed 1% annual chance flood zone

Fire/EMS Departments Rivers \ Streams



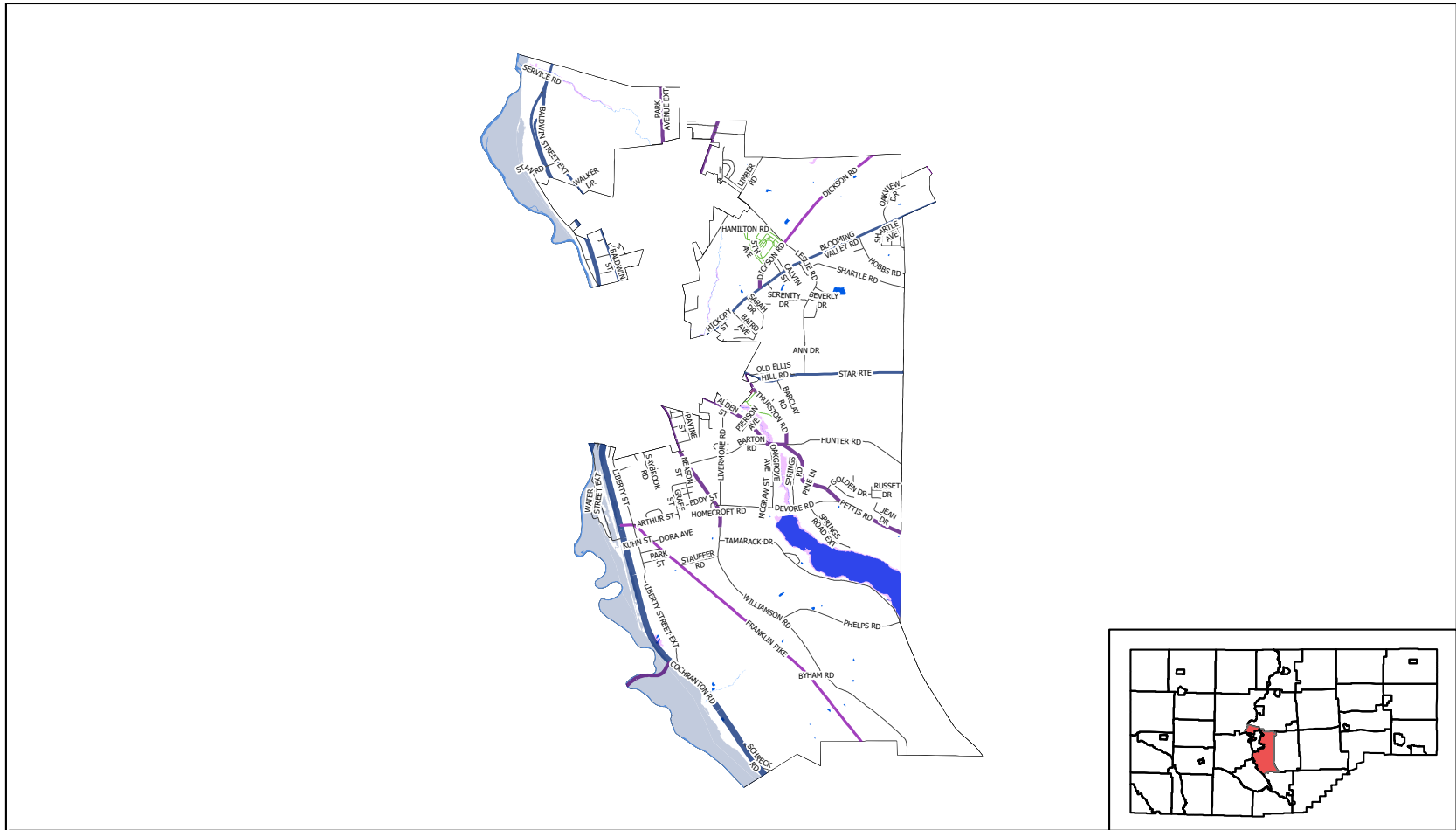
Lakes



Schools



# Appendix D - Local Municipality Flood Vulnerability

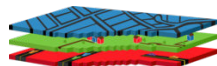


## West Mead Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)

Source: Federal Emergency Management Agency (FEMA)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



FEMA

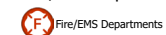
Tier II Facilities



FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone  
Zone AE | Detailed 1% annual change flood zone

Fire/EMS Departments Rivers \ Streams



Lakes



Schools

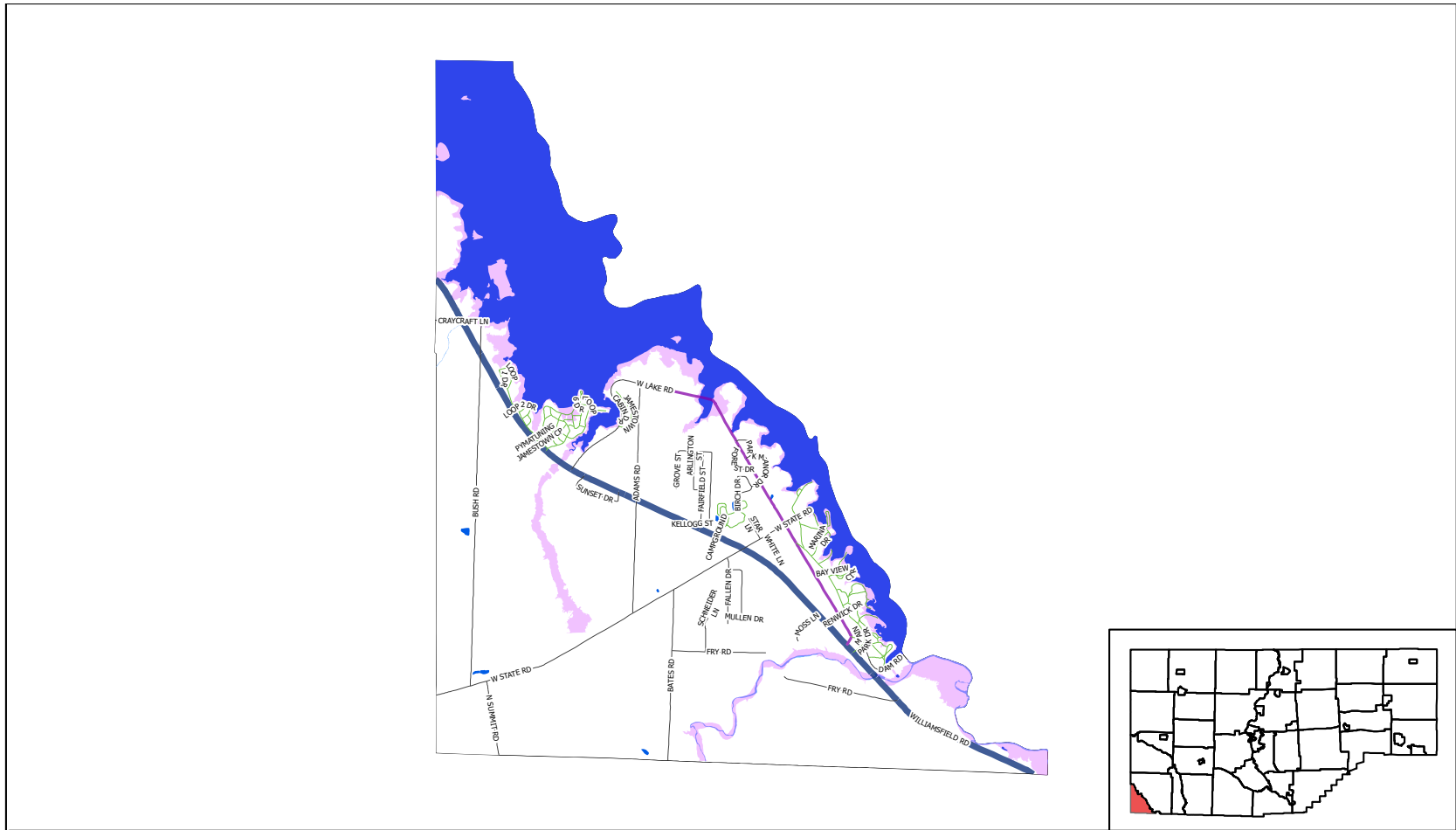


\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

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# Appendix D - Local Municipality Flood Vulnerability

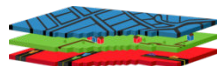


## West Shenango Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)

Source: Federal Emergency Management Agency (FEMA)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



FEMA

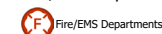
Tier II Facilities



FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone  
Zone AE | Detailed 1% annual change flood zone

Fire/EMS Departments Rivers \ Streams



Lakes

Schools

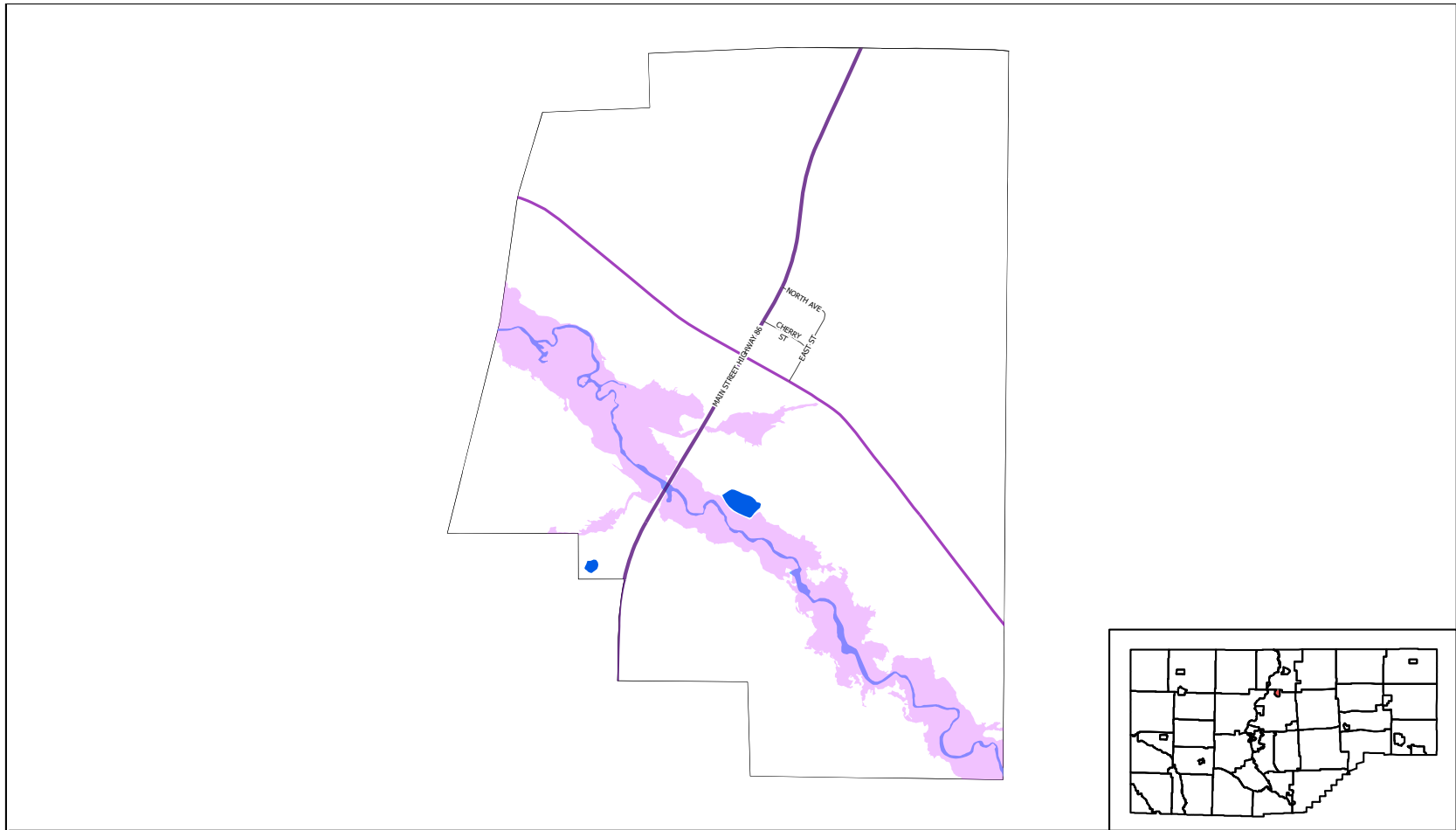


\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

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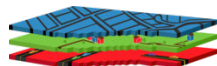
# Appendix D - Local Municipality Flood Vulnerability



## Woodcock Borough, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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FEMA

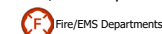
\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

Tier II Facilities



Fire/EMS Departments Rivers \ Streams



Schools



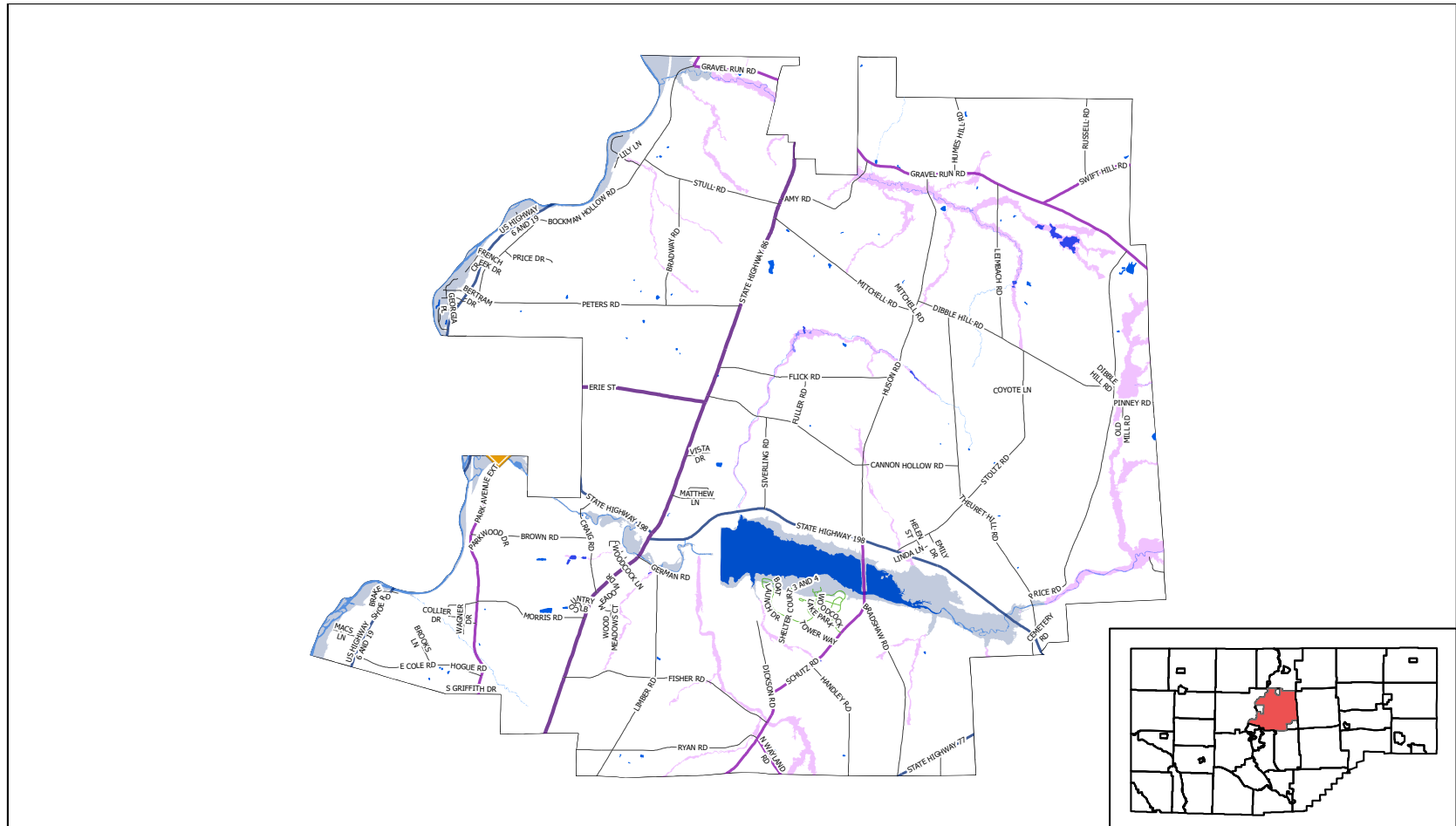
FEMA 100Yr Flood NFHL zones

- Zone A | Approx 1% annual change flood zone
- Zone AE | Detailed 1% annual change flood zone

Lakes



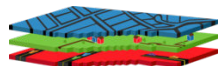
# Appendix D - Local Municipality Flood Vulnerability



## Woodcock Township, Crawford County PA Critical Facilities\* within Special Flood Hazard Areas (1% annual chance flood zones)



Crawford County Government  
Crawford County Courthouse  
903 Diamond Park  
Meadville PA 16335  
GIS Manager: Phillip Baranyai  
Commissioners: Eric Henry, Francis F Weiderspahn Jr, John Christopher Soff



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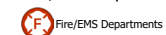


FEMA

### Tier II Facilities



### Fire/EMS Departments Rivers \ Streams



### Schools



### FEMA 100Yr Flood NFHL zones

Zone A | Approx 1% annual change flood zone

Zone AE | Detailed 1% annual change flood zone

Lakes

\* Facility types that don't fall into flood zones:

- Airports
- Hospitals
- Police Departments
- Tower Sites

# APPENDIX E - CRITICAL FACILITIES

# CRAWFORD COUNTY 2020 WHOLE COMMUNITY HAZARD MITIGATION PLAN UPDATE

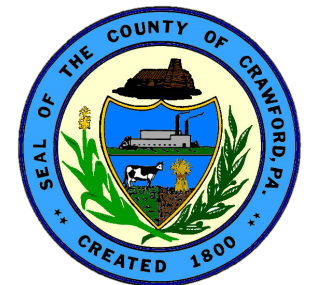
CRAWFORD COUNTY, PENNSYLVANIA

**Prepared By:**

Crawford County Department of Public Safety

Crawford County GIS

Crawford County Planning





# Appendix E - Critical Facilities

Facility Name	Municipality	911 Address #	Street Name	Post Office	Zipcode	Facility Type	In SHA?
CONNEAUT LAKE AIRPORT	SADSBURY TWP		US HIGHWAY 322	CONNEAUT LAKE	16316	Airport	
KARDOSH PERSONAL USE AIRPORT	SUMMERHILL TWP		WOODRING RD	CONNEAUTVILLE	16406	Airport	
MERRYS PYMATUNING AIRPORT	CONNEAUT TWP		AIRPORT RD	LINESVILLE	16424	Airport	
MORTONS	CAMBRIDGE TWP		STATE HIGHWAY 99	CAMBRIDGE SPRINGS	16403	Airport	
NISLEY PERSONAL USE AIRPORT	WOODCOCK TWP		STATE HIGHWAY 77	MEADVILLE	16335	Airport	
PAUL PERSONAL USE AIRPORT	ROME TWP		STEWART RD	CENTERVILLE	16404	Airport	
PORT MEADVILLE AIRPORT	VERNON TWP		PORT RD	MEADVILLE	16335	Airport	
RUST PERSONAL USE AIRPORT	WOODCOCK TWP		AMY RD	SAEGERTOWN	16433	Airport	
BLOOMFIELD VOL FIRE & AMB	BLOOMFIELD TWP	22978	SHREVE RIDGE RD	UNION CITY	16438	Fire/ EMS	
BLOOMING VALLEY VOL FIRE DEPT	BLOOMING VALLEY BORO	15244	MILL ST	SAEGERTOWN	16433	Fire/ EMS	
CAMBRIDGE SPRINGS VOL FIRE DEPT	CAMBRIDGE SPRINGS BORO	302	VENANGO AVE	CAMBRIDGE SPRINGS	16403	Fire/ EMS	
CENTERVILLE VOL FIRE & AMB	CENTERVILLE BORO	39567	CENTERVILLE RD	CENTERVILLE	16404	Fire/ EMS	
COCHRANTON VOL FIRE	COCHRANTON BORO	113	E ADAMS ST	COCHRANTON	16314	Fire/ EMS	
CONNEAUT LAKE AREA AMB SVC (CLAAS)	CONNEAUT LAKE BORO	290	S FOURTH ST	CONNEAUT LAKE	16316	Fire/ EMS	
CONNEAUT LAKE FIRE DEPT (STATION 2)	SADSBURY TWP	10833	STATE HIGHWAY 18	CONNEAUT LAKE	16316	Fire/ EMS	
CONNEAUT LAKE VOL FIRE DEPT (STATION 3)	SADSBURY TWP	11877	CONNEAUT LAKE RD	CONNEAUT LAKE	16316	Fire/ EMS	

# Appendix E - Critical Facilities

Within 1.5 miles of fixed Hazmat Facility?	Within Dam Inundation Area?	Within 0.25 miles of major road (Hazmat-Fixed)?	Within 0.25 miles of Rail (Hazmat-Fixed)?	Within 1000 yards of Conventional Oil/Gas well	Date last edited
		Y		Y	2021-01-11 15:25
				Y	2021-01-11 15:25
Y		Y		Y	2021-01-11 15:25
	Y			Y	2021-01-11 15:25
				Y	2021-01-11 15:25
				Y	2021-01-11 15:25
				Y	2021-01-11 15:25
Y		Y		Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
Y		Y	Y	Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
				Y	2021-01-11 15:25
Y		Y		Y	2021-01-11 15:25
Y					2021-01-11 15:25
Y		Y			2021-01-11 15:25

# Appendix E - Critical Facilities

Facility Name	Municipality	911 Address #	Street Name	Post Office	Zipcode	Facility Type	In SHA?
CONNEAUTVILLE VOL FIRE & AMB	CONNEAUTVILLE BORO	1015	STAWBERRY ALY	CONNEAUTVILLE	16406	Fire/ EMS	
CRAWFORD COUNTY SCUBA TEAM	WEST MEAD TWP	20487	RYAN RD	MEADVILLE	16335	Fire/ EMS	
EAST MEAD VOL FIRE DEPT	EAST MEAD TWP	23876	STATE HIGHWAY 27	MEADVILLE	16335	Fire/ EMS	
EMERGYCARE- TITUSVILLE	TITUSVILLE CITY	223	SAINT JOHNS ST	TITUSVILLE	16354	Fire/ EMS	Y
FALLOWFIELD VOL FIRE DEPT (STATION 11)	WEST FALLOWFIELD TWP	6759	CENTER ST	HARTSTOWN	16131	Fire/ EMS	
FALLOWFIELD VOL FIRE DEPT (STATION 13)	EAST FALLOWFIELD TWP	9328	ATLANTIC RD	ATLANTIC	16111	Fire/ EMS	
GREENWOOD VOL FIRE DEPT	GREENWOOD TWP	15444	STATE HIGHWAY 285	CONNEAUT LAKE	16316	Fire/ EMS	
HAYFIELD VOL FIRE DEPT	HAYFIELD TWP	15417	STATE HIGHWAY 198	MEADVILLE	16335	Fire/ EMS	
HYDETOWN VOL FIRE DEPT	HYDETOWN BORO	12666	MAIN ST	HYDETOWN	16328	Fire/ EMS	
LINESVILLE VOL FIRE & AMB	LINESVILLE BORO	200	PENN ST	LINESVILLE	16424	Fire/ EMS	
MEADVILLE AREA AMB SVC (MAAS)	MEADVILLE CITY	872	WATER ST	MEADVILLE	16335	Fire/ EMS	
MEADVILLE CENTRAL FIRE DEPT	MEADVILLE CITY	850	PARK AVE	MEADVILLE	16335	Fire/ EMS	
NORTH SHENANGO VOL FIRE DEPT	NORTH SHENANGO TWP	2887	STATE HIGHWAY 285	ESPYVILLE	16354	Fire/ EMS	
RANDOLPH VOL FIRE DEPT	RANDOLPH TWP	11475	STATE HIGHWAY 198	GUYS MILLS	16327	Fire/ EMS	
SAEGERTOWN VOL FIRE DEPT	SAEGERTOWN BORO	607	ERIE ST	SAEGERTOWN	16433	Fire/ EMS	
SPARTANSBURG VOL FIRE & AMB	SPARTANSBURG BORO	330	MAIN ST	SPARTANSBURG	16434	Fire/ EMS	

# Appendix E - Critical Facilities

Within 1.5 miles of fixed Hazmat Facility?	Within Dam Inundation Area?	Within 0.25 miles of major road (Hazmat-Fixed)?	Within 0.25 miles of Rail (Hazmat-Fixed)?	Within 1000 yards of Conventional Oil/Gas well	Date last edited
	Y	Y	Y	Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
				Y	2021-01-11 15:25
Y		Y			2021-01-11 15:25
		Y	Y		2021-01-11 15:25
			Y	Y	2021-01-11 15:25
Y				Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
Y		Y			2021-01-11 15:25
Y	Y		Y	Y	2021-01-11 15:25
Y	Y	Y		Y	2021-01-11 15:25
				Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
Y	Y	Y	Y	Y	2021-01-11 15:25
					2021-01-11 15:25

# Appendix E - Critical Facilities

Facility Name	Municipality	911 Address #	Street Name	Post Office	Zipcode	Facility Type	In SHA?
SPRINGBORO VOL FIRE DEPT	SPRINGBORO BORO	176	N MAIN ST	SPRINGBORO	16435	Fire/EMS	
SUMMIT VOL FIRE & AMB	SUMMIT TWP	10870	PLUM ST	HARMONSBURG	16422	Fire/EMS	
TITUSVILLE FIRE DEPT	TITUSVILLE CITY	315	N FRANKLIN ST	TITUSVILLE	16354	Fire/EMS	
TOWNVILLE VOL FIRE & AMB	TOWNVILLE BORO	33441	N MAIN ST	TOWNVILLE	16360	Fire/EMS	
VENANGO VOL FIRE DEPT	VENANGO BORO	21486	MEADVILLE ST	VENANGO	16440	Fire/EMS	
VERNON CENTRAL FIRE DEPT	VERNON TWP	16589	MCMATH RD	MEADVILLE	16335	Fire/EMS	
VERNON TWP VOL FIRE DEPT	VERNON TWP	13227	DUNHAM RD	MEADVILLE	16335	Fire/EMS	
WEST MEAD #1 VOL FIRE DEPT	WEST MEAD TWP	20914	ALDEN ST EXT	MEADVILLE	16335	Fire/EMS	
WEST MEAD #1 VOL FIRE DEPT (LIBERTY ST)	WEST MEAD TWP	10482	LIBERTY ST EXT	MEADVILLE	16335	Fire/EMS	
WEST MEAD #2 VOL FIRE DEPT	WEST MEAD TWP	20607	RYAN RD	MEADVILLE	16335	Fire/EMS	
WEST MEAD #2 VOL FIRE DEPT (FAIRGROUNDS)	WEST MEAD TWP	13560	GRAND ST	MEADVILLE	16335	Fire/EMS	
MEADVILLE MEDICAL CENTER- GROVE STREET	MEADVILLE CITY	1034	GROVE ST	MEADVILLE	16335	Hospital	
MEADVILLE MEDICAL CENTER- LIBERTY STREET	MEADVILLE CITY	751	LIBERTY ST	MEADVILLE	16335	Hospital	
TITUSVILLE HOSPITAL	TITUSVILLE CITY	406	W OAK ST	TITUSVILLE	16354	Hospital	
CAMBRIDGE SPRINGS POLICE DEPT	CAMBRIDGE SPRINGS BORO	154	CARRINGER ST	CAMBRIDGE SPRINGS	16403	Police	
COCHRANTON POLICE DEPT	COCHRANTON BORO	109	E ADAMS ST	COCHRANTON	16314	Police	

# Appendix E - Critical Facilities

Within 1.5 miles of fixed Hazmat Facility?	Within Dam Inundation Area?	Within 0.25 miles of major road (Hazmat-Fixed)?	Within 0.25 miles of Rail (Hazmat-Fixed)?	Within 1000 yards of Conventional Oil/Gas well	Date last edited
Y			Y	Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
Y		Y		Y	2021-01-11 15:25
		Y			2021-01-11 15:25
	Y	Y	Y	Y	2021-01-11 15:25
Y				Y	2021-01-11 15:25
Y	Y	Y		Y	2021-01-11 15:25
	Y	Y			2021-01-11 15:25
Y		Y	Y	Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
Y		Y		Y	2021-01-11 15:25
Y	Y	Y		Y	2021-01-11 15:25
Y		Y		Y	2021-01-11 15:25
Y	Y	Y	Y	Y	2021-01-11 15:25
				Y	2021-01-11 15:25

# Appendix E - Critical Facilities

Facility Name	Municipality	911 Address #	Street Name	Post Office	Zipcode	Facility Type	In SHA?
CONNEAUT LAKE REGIONAL POLICE DEPT	SADSBURY TWP	9878	STATE HWY 285	CONNEAUT LAKE	16316	Police	
LINESVILLE POLICE DEPT	LINESVILLE BORO	103	E ERIE ST	LINESVILLE	16424	Police	
MEADVILLE CITY POLICE DEPT	MEADVILLE CITY	894	DIAMOND PARK	MEADVILLE	16335	Police	
PA FISH & BOAT COMMISSION	VERNON TWP	11528	STATE HIGHWAY 98	MEADVILLE	16335	Police	
PA STATE POLICE- MEADVILLE	VERNON TWP	11176	MURRAY RD	MEADVILLE	16335	Police	
PYMATUNING STATE PARK POLICE	WEST SHENANGO TWP	2660	WILLIAMSFIELD RD	JAMESTOWN	16134	Police	
TITUSVILLE CITY POLICE DEPT	TITUSVILLE CITY	323	N FRANKLIN ST	TITUSVILLE	16354	Police	
VERNON TWP POLICE DEPT	VERNON TWP	16678	MCMATH RD	MEADVILLE	16335	Police	
WEST MEAD TWP POLICE DEPT	WEST MEAD TWP	1150	MORGAN VILLAGE RD	MEADVILLE	16335	Police	
AIR PRODUCTS & CHEMICALS INC	GREENWOOD TWP	5019	VICTORY BLVD	COCHRANTON	16314	SARA Facility	
BLOOMFIELD TWP SEWER AUTHORITY	BLOOMFIELD TWP	22791	SHREVE RIDGE RD	UNION CITY	16438	SARA Facility	
C AND J INDUSTRIES	MEADVILLE CITY	760	WATER ST	MEADVILLE	16335	SARA Facility	
CAMBRIDGE SPRINGS WTP	CAMBRIDGE SPRINGS BORO	299	SNOW ALY	CAMBRIDGE SPRINGS	16403	SARA Facility	Y
CENTERRA CO-OP	CAMBRIDGE SPRINGS BORO	206	GRANT ST	CAMBRIDGE SPRINGS	16403	SARA Facility	
CONNEAUT LAKE JOINT MUNI AUTH	CONNEAUT LAKE BORO	9900	RICHMOND AVE EXT	CONNEAUT LAKE	16316	SARA Facility	Y
CONNEAUT LAKE WTP	CONNEAUT LAKE BORO	201	N FIRST ST	CONNEAUT LAKE	16316	SARA Facility	

# Appendix E - Critical Facilities

Within 1.5 miles of fixed Hazmat Facility?	Within Dam Inundation Area?	Within 0.25 miles of major road (Hazmat-Fixed)?	Within 0.25 miles of Rail (Hazmat-Fixed)?	Within 1000 yards of Conventional Oil/Gas well	Date last edited
				Y	2021-01-11 15:25
Y		Y			2021-01-11 15:25
Y		Y		Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
		Y			2021-01-11 15:25
Y		Y		Y	2021-01-11 15:25
				Y	2021-01-11 15:25
Y					2021-01-11 15:25
Y				Y	2021-01-11 15:25
Y		Y			2021-01-11 15:25
Y	Y	Y	Y	Y	2021-01-11 15:25
Y	Y	Y	Y	Y	2021-01-11 15:25
Y		Y	Y	Y	2021-01-11 15:25
Y					2021-01-11 15:25
Y		Y			2021-01-11 15:25



# Appendix E - Critical Facilities

Facility Name	Municipality	911 Address #	Street Name	Post Office	Zipcode	Facility Type	In SHA?
GREENLEAF CORPORATION	HAYFIELD TWP	18695	GREENLEAF DR	SAEGERTOWN	16433	SARA Facility	
ITU INC	TITUSVILLE CITY	818	W SPRING ST	TITUSVILLE	16354	SARA Facility	
JM SMUCKER COMPANY	VERNON TWP	18746	MILL ST	MEADVILLE	16335	SARA Facility	
LINESVILLE FISH CULTURE STATIO	PINE TWP	13300	HARTSTOWN RD	LINESVILLE	16424	SARA Facility	
LINESVILLE MUNICIPAL AUTHORITY	LINESVILLE BORO	109	E ERIE ST	LINESVILLE	16424	SARA Facility	
LINESVILLE PINE JOINT WWTP	PINE TWP	13609	HARTSTOWN RD	LINESVILLE	16424	SARA Facility	
MEADVILLE FORGING COMPANY	WEST MEAD TWP	15309	BALDWIN STREET EXT	MEADVILLE	16335	SARA Facility	
MOLDED FIBERGLASS TRAY CO	PINE TWP	6175	US HIGHWAY 6	LINESVILLE	16424	SARA Facility	
NW CRAWFORD CO SEWER AUTH	SPRINGBORO BORO	105	PROJECT ST	SPRINGBORO	16435	SARA Facility	Y
PARKER LORD	CAMBRIDGE SPRINGS BORO	124	GRANT ST	CAMBRIDGE SPRINGS	16403	SARA Facility	
PARKER LORD	SAEGERTOWN BORO	601	SOUTH ST	SAEGERTOWN	16433	SARA Facility	
PETERS HEAT TREAT INC	WEST MEAD TWP	11010	MCHENRY ST	MEADVILLE	16335	SARA Facility	
PROGRESS FOR INDUSTRY, INC.	SAEGERTOWN BORO	201	GRANT ST	SAEGERTOWN	16433	SARA Facility	
ROSER TECHNOLOGIES INC.	TITUSVILLE CITY	347	E INDUSTRIAL DR	TITUSVILLE	16354	SARA Facility	Y
SAEG WATER TREAT WELL #1	SAEGERTOWN BORO	407	KERN ALY	SAEGERTOWN	16433	SARA Facility	
SAEG WATER TREAT WELL #2	SAEGERTOWN BORO	416	GRANT ST	SAEGERTOWN	16433	SARA Facility	

# Appendix E - Critical Facilities

Within 1.5 miles of fixed Hazmat Facility?	Within Dam Inundation Area?	Within 0.25 miles of major road (Hazmat-Fixed)?	Within 0.25 miles of Rail (Hazmat-Fixed)?	Within 1000 yards of Conventional Oil/Gas well	Date last edited
Y				Y	2021-01-11 15:25
Y					2021-01-11 15:25
Y	Y				2021-01-11 15:25
Y		Y			2021-01-11 15:25
Y		Y			2021-01-11 15:25
Y		Y			2021-01-11 15:25
Y			Y	Y	2021-01-11 15:25
Y		Y			2021-01-11 15:25
Y			Y	Y	2021-01-11 15:25
Y	Y		Y	Y	2021-01-11 15:25
Y	Y	Y	Y	Y	2021-01-11 15:25
Y	Y	Y	Y		2021-01-11 15:25
Y	Y		Y	Y	2021-01-11 15:25
Y				Y	2021-01-11 15:25
Y	Y	Y	Y	Y	2021-01-11 15:25
Y	Y	Y	Y	Y	2021-01-11 15:25

# Appendix E - Critical Facilities

Facility Name	Municipality	911 Address #	Street Name	Post Office	Zipcode	Facility Type	In SHA?
SAEG WATER TREAT WELL #3	SAEGERTOWN BORO	785	SOUTH ST	SAEGERTOWN	16433	SARA Facility	
SAEG WATER TREAT WELL #4	HAYFIELD TWP	18542	N MEAD RD	SAEGERTOWN	16433	SARA Facility	
SAEG WATER TREAT WELL #5	SAEGERTOWN BORO	1991	INDEPENDENCE DR	SAEGERTOWN	16433	SARA Facility	
SAEGERTOWN WATER TREATMENT- MUNICIPAL BLDG	SAEGERTOWN BORO	603	ERIE ST	SAEGERTOWN	16433	SARA Facility	
SAEGERTOWN WWTP	SAEGERTOWN BORO	180	PARK AVE	SAEGERTOWN	16433	SARA Facility	Y
SPRINGBORO AREA WATER AUTHORITY	SPRINGBORO BORO	138	BEAVER ST	SPRINGBORO	16435	SARA Facility	
TITUSVILLE DAIRY PRODUCTS	TITUSVILLE CITY	217	S WASHINGTON ST	TITUSVILLE	16354	SARA Facility	
TITUSVILLE WTP	OIL CREEK TWP	220	OIL CREEK DR	TITUSVILLE	16354	SARA Facility	
TITUSVILLE WWTP	TITUSVILLE CITY	303	E INDUSTRIAL DR	TITUSVILLE	16354	SARA Facility	Y
VERIZON	TITUSVILLE CITY	217	W SPRING ST	TITUSVILLE	16354	SARA Facility	Y
VERNON TWP WWTP- FREDERICKSBURG	VERNON TWP	17946	TURNER RD	MEADVILLE	16335	SARA Facility	
VERNON TWP WWTP- WATSON RUN	VERNON TWP	9868	S WATSON RUN RD	MEADVILLE	16335	SARA Facility	
VITRO FLAT GLASS	GREENWOOD TWP	5123	VICTORY BLVD	COCHRANTON	16314	SARA Facility	
WINDSTREAM	MEADVILLE CITY	227	ARCH ST	MEADVILLE	16335	SARA Facility	
ALICE SCHAFFER ANNEX / CONNEAUT AREA SENIOR HIGH SCHOOL	LINESVILLE BORO	220	W SCHOOL DR	LINESVILLE	16424	School	
ALLEGHENY COLLEGE	MEADVILLE CITY	520	N MAIN ST	MEADVILLE	16335	School	

# Appendix E - Critical Facilities

Within 1.5 miles of fixed Hazmat Facility?	Within Dam Inundation Area?	Within 0.25 miles of major road (Hazmat-Fixed)?	Within 0.25 miles of Rail (Hazmat-Fixed)?	Within 1000 yards of Conventional Oil/Gas well	Date last edited
Y	Y	Y		Y	2021-01-11 15:25
Y				Y	2021-01-11 15:25
Y	Y			Y	2021-01-11 15:25
Y	Y	Y	Y	Y	2021-01-11 15:25
Y	Y	Y	Y	Y	2021-01-11 15:25
Y			Y	Y	2021-01-11 15:25
Y		Y			2021-01-11 15:25
Y				Y	2021-01-11 15:25
Y				Y	2021-01-11 15:25
Y		Y			2021-01-11 15:25
Y	Y	Y			2021-01-11 15:25
Y				Y	2021-01-11 15:25
Y				Y	2021-01-11 15:25
Y	Y	Y	Y	Y	2021-01-11 15:25
Y		Y			2021-01-11 15:25
Y		Y			2021-01-11 15:25

# Appendix E - Critical Facilities

Facility Name	Municipality	911 Address #	Street Name	Post Office	Zipcode	Facility Type	In SHA?
AMISH SCHOOL	ROME TWP	41982	BUELLS CORNERS RD	SPARTANSBURG	16434	School	
BRITTON RUN SCHOOL	SPARTA TWP	23666	BRITTON RUN RD	SPARTANSBURG	16434	School	
BRUSH RUN SCHOOL	ROME TWP	45126	FARRINGTON RD	SPARTANSBURG	16434	School	
CALVARY BAPTIST	MEADVILLE CITY	543	RANDOLPH ST	MEADVILLE	16335	School	
CAMBRIDGE SPRINGS HIGH SCHOOL	CAMBRIDGE SPRINGS BORO	698	VENANGO AVE	CAMBRIDGE SPRINGS	16403	School	
CHASE ROAD SCHOOL	ROME TWP	43085	CHASE RD	SPARTANSBURG	16434	School	
CHERRY RIDGE SCHOOL	SPARTA TWP	25265	STATE HIGHWAY 89	SPARTANSBURG	16434	School	
COCHRANTON ELEMENTARY SCHOOL	COCHRANTON BORO	225	S FRANKLIN ST	COCHRANTON	16314	School	
COCHRANTON JR/SR HIGH SCHOOL	COCHRANTON BORO	105	SECOND ST	COCHRANTON	16314	School	Y
CONNEAUT AREA SENIOR HIGH SCHOOL	LINESVILLE BORO	302	W SCHOOL DR	LINESVILLE	16424	School	
CONNEAUT LAKE ELEMENTARY SCHOOL	CONNEAUT LAKE BORO	630	LINE ST	CONNEAUT LAKE	16316	School	
CONNEAUT LAKE MIDDLE SCHOOL	SADSBURY TWP	10331	US HIGHWAY 6	CONNEAUT LAKE	16316	School	
CONNEAUT VALLEY ELEMENTARY SCHOOL	SPRING TWP	22154	STATE HIGHWAY 18	CONNEAUTVILLE	16406	School	
CONNEAUT VALLEY MIDDLE SCHOOL	SPRING TWP	22154	STATE HIGHWAY 18	CONNEAUTVILLE	16406	School	
CRAWFORD CENTRAL ADMIN BLDG	VERNON TWP	11280	MERCER PIKE	MEADVILLE	16335	School	
CRAWFORD COUNTY VO-TECH SCHOOL	MEADVILLE CITY	860	THURSTON RD	MEADVILLE	16335	School	

# Appendix E - Critical Facilities

Within 1.5 miles of fixed Hazmat Facility?	Within Dam Inundation Area?	Within 0.25 miles of major road (Hazmat-Fixed)?	Within 0.25 miles of Rail (Hazmat-Fixed)?	Within 1000 yards of Conventional Oil/Gas well	Date last edited
				Y	2021-01-11 15:25
				Y	2021-01-11 15:25
				Y	2021-01-11 15:25
Y				Y	2021-01-11 15:25
Y		Y	Y	Y	2021-01-11 15:25
				Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
			Y	Y	2021-01-11 15:25
	Y		Y	Y	2021-01-11 15:25
Y		Y			2021-01-11 15:25
Y		Y			2021-01-11 15:25
Y		Y		Y	2021-01-11 15:25
				Y	2021-01-11 15:25
				Y	2021-01-11 15:25
Y		Y			2021-01-11 15:25
		Y			2021-01-11 15:25

# Appendix E - Critical Facilities

Facility Name	Municipality	911 Address #	Street Name	Post Office	Zipcode	Facility Type	In SHA?
CUSSEWAGO ELEMENTARY SCHOOL	CUSSEWAGO TWP	23761	N MOSIERTOWN RD	SAEGERTOWN	16433	School	
DENNY UNION SUNDAY SCHOOL	HAYFIELD TWP	15028	STATE HIGHWAY 98	MEADVILLE	16335	School	
DUTCH HILL SCHOOL	ROME TWP	20421	STATE HIGHWAY 89	SPARTANSBURG	16434	School	
EAST END ELEMENTARY SCHOOL	MEADVILLE CITY	640	WALNUT ST	MEADVILLE	16335	School	
FAITH BUILDERS	RANDOLPH TWP	28500	GUYS MILLS RD	GUYS MILLS	16327	School	
FIRST DISTRICT ELEMENTARY SCHOOL	MEADVILLE CITY	725	N MAIN ST	MEADVILLE	16335	School	
FRENCH CREEK VALLEY CHRISTIAN SCHOOL	WOODCOCK TWP	420	NORTH ST	SAEGERTOWN	16433	School	
GREENWOOD ELEMENTARY SCHOOL	GREENWOOD TWP	15161	STATE HIGHWAY 285	CONNEAUT LAKE	16316	School	
HYDETOWN ELEMENTARY SCHOOL	HYDETOWN BORO	12294	GRESHAM RD	TITUSVILLE	16354	School	
JAMESTOWN ELEMENTARY SCHOOL	SOUTH SHENANGO TWP	3938	DOUTHETT DR	JAMESTOWN	16134	School	
LOG CABIN SCHOOL	SPARTA TWP	42444	CANADOHTA LAKE RD	SPARTANSBURG	16434	School	
MAIN STREET SCHOOL	TITUSVILLE CITY	117	W MAIN ST	TITUSVILLE	16354	School	
MAPLE GROVE SCHOOL	ROME TWP	18700	WHITE RD	CENTERVILLE	16404	School	
MAPLEWOOD JR/SR HIGH SCHOOL	RANDOLPH TWP	30383	GUYS MILLS RD	GUYS MILLS	16327	School	
MAPLEWOOD MIDDLE SCHOOL	STEUBEN TWP	32695	STATE HIGHWAY 408	TOWNVILLE	16360	School	
MAPLEWOOD PRESCHOOL	TOWNVILLE BORO	33328	N MAIN ST	TOWNVILLE	16360	School	

# Appendix E - Critical Facilities

Within 1.5 miles of fixed Hazmat Facility?	Within Dam Inundation Area?	Within 0.25 miles of major road (Hazmat-Fixed)?	Within 0.25 miles of Rail (Hazmat-Fixed)?	Within 1000 yards of Conventional Oil/Gas well	Date last edited
		Y		Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
Y		Y		Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
Y		Y		Y	2021-01-11 15:25
Y	Y		Y	Y	2021-01-11 15:25
Y				Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
		Y			2021-01-11 15:25
				Y	2021-01-11 15:25
Y		Y			2021-01-11 15:25
				Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25



# Appendix E - Critical Facilities

Facility Name	Municipality	911 Address #	Street Name	Post Office	Zipcode	Facility Type	In SHA?
MEADOW VIEW SCHOOL	RANDOLPH TWP	9292	MCFADDEN RD	GUYS MILLS	16327	School	
MEADVILLE SENIOR HIGH SCHOOL	MEADVILLE CITY	930	NORTH ST	MEADVILLE	16335	School	
MELODY ECHOS	WAYNE TWP	7300	VINCENT RD	COCHRANTON	16314	School	
MILLER AMISH SCHOOL	SPARTA TWP	40413	STATE HIGHWAY 77	CENTERVILLE	16404	School	
NEASON HILL ELEMENTARY SCHOOL	WEST MEAD TWP	11293	WILLIAMSON RD	MEADVILLE	16335	School	
OILCREEK SCHOOL	SPARTA TWP	42180	GLYNDEN RD	SPARTANSBURG	16434	School	
OLD HARMONSBURG SCHOOL	SUMMIT TWP	14254	CEMETERY RD	MEADVILLE	16335	School	
ORCHARD KNOB SCHOOL	ROME TWP	20663	BRITTON RUN RD	CENTERVILLE	16404	School	
PALMER SCHOOL	BEAVER TWP	23739	PALMER RD	SPRINGBORO	16435	School	
PENNCREST PRESCHOOL	SAEGERTOWN BORO	341	MAIN ST	SAEGERTOWN	16433	School	
PLAINVIEW GOSPEL SCHOOL	RANDOLPH TWP	29386	GUYS MILLS RD	GUYS MILLS	16327	School	
PLEASANT VALLEY SCHOOL	EAST FALLOWFIELD TWP	8741	LAIRD RD	ATLANTIC	16111	School	
RED OAK SCHOOL	ROME TWP	45590	BUELLS CORNERS RD	SPARTANSBURG	16434	School	
RUNDELL CHRISTIAN SCHOOL	SPRING TWP	12679	RUNDELLTOWN RD	CONNEAUTVILLE	16406	School	
SAEGERTOWN AREA HIGH SCHOOL	HAYFIELD TWP	18079	MOOK RD	SAEGERTOWN	16433	School	
SAEGERTOWN ELEMENTARY SCHOOL	HAYFIELD TWP	18741	STATE HIGHWAY 198	SAEGERTOWN	16433	School	

# Appendix E - Critical Facilities

Within 1.5 miles of fixed Hazmat Facility?	Within Dam Inundation Area?	Within 0.25 miles of major road (Hazmat-Fixed)?	Within 0.25 miles of Rail (Hazmat-Fixed)?	Within 1000 yards of Conventional Oil/Gas well	Date last edited
				Y	2021-01-11 15:25
Y		Y			2021-01-11 15:25
					2021-01-11 15:25
				Y	2021-01-11 15:25
Y		Y			2021-01-11 15:25
				Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
				Y	2021-01-11 15:25
				Y	2021-01-11 15:25
Y	Y	Y	Y	Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
		Y		Y	2021-01-11 15:25
				Y	2021-01-11 15:25
				Y	2021-01-11 15:25
Y				Y	2021-01-11 15:25
Y				Y	2021-01-11 15:25

# Appendix E - Critical Facilities

Facility Name	Municipality	911 Address #	Street Name	Post Office	Zipcode	Facility Type	In SHA?
SCHOOL HOUSE	SOUTH SHENANGO TWP	5666	SCOTT RD	JAMESTOWN	16134	School	
SECOND DISTRICT ELEMENTARY SCHOOL	MEADVILLE CITY	1216	S MAIN ST	MEADVILLE	16335	School	Y
SETON SCHOOL	MEADVILLE CITY	385	PINE ST	MEADVILLE	16335	School	
SHADY LANE SCHOOL	SPARTA TWP	24105	EARNEST RD	SPARTANSBURG	16434	School	
SHIRLEY RUN SCHOOL	ROME TWP	45559	MAGEETOWN RD	CENTERVILLE	16404	School	
SPARTANSBURG ELEMENTARY SCHOOL	SPARTANSBURG BORO	150	WATER ST	SPARTANSBURG	16434	School	
ST. TITUS SCHOOL	TITUSVILLE CITY	528	W MAIN ST	TITUSVILLE	16354	School	
TAYLOR STAND SCHOOL	ATHENS TWP	35346	STATE HIGHWAY 77	CENTERVILLE	16404	School	
TITUSVILLE AREA MIDDLE SCHOOL	TITUSVILLE CITY	415	WATER ST	TITUSVILLE	16354	School	Y
TITUSVILLE JR HIGH SCHOOL	TITUSVILLE CITY	302	E WALNUT ST	TITUSVILLE	16354	School	
TITUSVILLE SR HIGH SCHOOL	TITUSVILLE CITY	302	E WALNUT ST	TITUSVILLE	16354	School	
TOWER HILL SCHOOL	EAST FALLOWFIELD TWP	3546	LEACH RD	ATLANTIC	16111	School	
TOWNVILLE CHRISTIAN SCHOOL	TROY TWP	36927	PROPER RD	TITUSVILLE	16354	School	
UNIV OF PITT- CBT	VERNON TWP	18282	TECHNOLOGY DR	MEADVILLE	16335	School	
UNIV OF PITT- PYMATUNING ECOLOGY LAB	PINE TWP	13142	HARTSTOWN RD	LINESVILLE	16424	School	
UNIV OF PITT- TSVL	TITUSVILLE CITY	504	E MAIN ST	TITUSVILLE	16354	School	

# Appendix E - Critical Facilities

Within 1.5 miles of fixed Hazmat Facility?	Within Dam Inundation Area?	Within 0.25 miles of major road (Hazmat-Fixed)?	Within 0.25 miles of Rail (Hazmat-Fixed)?	Within 1000 yards of Conventional Oil/Gas well	Date last edited
				Y	2021-01-11 15:25
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Y	Y	Y		Y	2021-01-11 15:25
Y		Y			2021-01-11 15:25
Y					2021-01-11 15:25

# Appendix E - Critical Facilities

Facility Name	Municipality	911 Address #	Street Name	Post Office	Zipcode	Facility Type	In SHA?
WEAVER AMISH SCHOOL	EAST FALLOWFIELD TWP	6311	ATLANTIC LAKE RD	HARTSTOWN	16131	School	
WEST END ELEMENTARY SCHOOL	VERNON TWP	12068	BROOKS RD	MEADVILLE	16335	School	
WESTVIEW CHRISTIAN SCHOOL	SPRING TWP	9162	TOWER RD	SPRINGBORO	16435	School	
ALDORF SITE	SPARTA TWP	40371	CANADOHTA LAKE RD	SPARTANSBURG	16434	Tower Site	
AMERICAN TOWER CORP	SPARTA TWP	39275	STATE HIGHWAY 77	CENTERVILLE	16404	Tower Site	
AMERICAN TOWER CORP.	WAYNE TWP	8003	WAYNE RD	GUYS MILLS	16327	Tower Site	
AMERICAN TOWER CORPORATION	BLOOMING VALLEY BORO	25974	GUY ST	SAEGERTOWN	16433	Tower Site	
AMERICAN TOWERS, INC.	SOUTH SHENANGO TWP	4831	SNAKE RD	JAMESTOWN	16134	Tower Site	
AMERICAN TOWERS, INC.	SOUTH SHENANGO TWP	4831	SNAKE RD	JAMESTOWN	16134	Tower Site	
AMERICAN TOWERS, LLC	RICHMOND TWP	17225	RICHMOND RD	GUYS MILLS	16327	Tower Site	
AMERICAN TOWER-SITE #15363	SADSBURY TWP	8909	KEENE RD	CONNEAUT LAKE	16316	Tower Site	
ARMSTRONG TOWER	VERNON TWP	18211	REYNOLDS RD	MEADVILLE	16335	Tower Site	
AT&T COMMUNICATIONS OF PENNA.,INC	EAST MEAD TWP	22904	STATE HIGHWAY 27	MEADVILLE	16335	Tower Site	
ATC SEQUOIA LLC	ATHENS TWP	19471	TAYLOR STAND RD	CENTERVILLE	16404	Tower Site	
CIG COMP TOWER	ATHENS TWP	34152	STATE HIGHWAY 77	CENTERVILLE	16404	Tower Site	
COAXIAL CABLE TV CORP	CAMBRIDGE SPRINGS BORO	826	LURA RD	CAMBRIDGE SPRINGS	16403	Tower Site	

# Appendix E - Critical Facilities

Within 1.5 miles of fixed Hazmat Facility?	Within Dam Inundation Area?	Within 0.25 miles of major road (Hazmat-Fixed)?	Within 0.25 miles of Rail (Hazmat-Fixed)?	Within 1000 yards of Conventional Oil/Gas well	Date last edited
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Y				Y	2021-01-11 15:25

# Appendix E - Critical Facilities

Facility Name	Municipality	911 Address #	Street Name	Post Office	Zipcode	Facility Type	In SHA?
COCHRANTON WATER TOWER	WAYNE TWP	30929	US HIGHWAY 322	COCHRANTON	16314	Tower Site	
COMM OF PA	EAST MEAD TWP	12705	HATCH HILL RD	MEADVILLE	16335	Tower Site	
CONNEAUT LAKE WATER TOWER	CONNEAUT LAKE BORO	645	HIGH ST	CONNEAUT LAKE	16316	Tower Site	
CONNEAUTVILLE WATER TOWER	CONNEAUTVILLE BORO	305	PROSPECT ST	CONNEAUTVILLE	16406	Tower Site	
CROWN COMMUNICATIONS	UNION TWP	18739	BARCO RD	MEADVILLE	16335	Tower Site	
CROWN COMMUNICATIONS	CUSSEWAGO TWP	22857	FRY RD	VENANGO	16440	Tower Site	
CROWN COMMUNICATIONS	RICHMOND TWP	28455	STATE HIGHWAY 77	GUYS MILLS	16327	Tower Site	
CROWN COMMUNICATIONS	UNION TWP	18739	BARCO RD	MEADVILLE	16335	Tower Site	
CROWN COMMUNICATIONS	VERNON TWP	18417	REYNOLDS RD	MEADVILLE	16335	Tower Site	
CROWN COMMUNICATIONS	SUMMERHILL TWP	20131	SMITH RD	CONNEAUTVILLE	16406	Tower Site	
CROWN COMMUNICATIONS	CAMBRIDGE TWP	14594	US HIGHWAY 6 AND 19	CAMBRIDGE SPRINGS	16403	Tower Site	
CROWN COMMUNICATIONS	HAYFIELD TWP	18011	BLACK RD	MEADVILLE	16335	Tower Site	
CROWN COMMUNICATIONS	HAYFIELD TWP	16917	STATE HIGHWAY 198	SAEGERTOWN	16433	Tower Site	
CROWN TOWER	VERNON TWP	18235	REYNOLDS RD	MEADVILLE	16335	Tower Site	
CROWN-ATLANTIC COMPANY	SUMMERHILL TWP	20131	SMITH RD	CONNEAUTVILLE	16406	Tower Site	
DOBSON CELLULAR SYSTEMS, INC	CUSSEWAGO TWP	18029	GOSPEL HILL RD	SAEGERTOWN	16433	Tower Site	

# Appendix E - Critical Facilities

Within 1.5 miles of fixed Hazmat Facility?	Within Dam Inundation Area?	Within 0.25 miles of major road (Hazmat-Fixed)?	Within 0.25 miles of Rail (Hazmat-Fixed)?	Within 1000 yards of Conventional Oil/Gas well	Date last edited
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				Y	2021-01-11 15:25



# Appendix E - Critical Facilities

Facility Name	Municipality	911 Address #	Street Name	Post Office	Zipcode	Facility Type	In SHA?
DUCOMM COMMUNICATIONS	SADSBURY TWP	12887	FOUST RD	CONNEAUT LAKE	16316	Tower Site	
DUNN RD	FAIRFIELD TWP	23142	DUNN RD	COCHRANTON	16314	Tower Site	
FAIRGROUNDS TOWER	WEST MEAD TWP	13443	5TH AVE	MEADVILLE	16335	Tower Site	
FAMILY LIFE MINISTRIES	CUSSEWAGO TWP	18544	HECKER RD	EDINBORO	16412	Tower Site	
GLOBAL TOWER PARTNERS	VERNON TWP	17081	ROUND TOP RD	MEADVILLE	16335	Tower Site	
GLOBAL TOWERS LLC	FAIRFIELD TWP	22828	DUNN RD	COCHRANTON	16314	Tower Site	
K2 TOWERS, LLC	EAST FALLOWFIELD TWP	3541	LEACH RD	ATLANTIC	16111	Tower Site	
LIMBER RD WATER TOWER	MEADVILLE CITY	657	LIMBER RD	MEADVILLE	16335	Tower Site	
LINESVILLE WATER TOWER	CONNEAUT TWP	14745	AIRPORT RD	LINESVILLE	16424	Tower Site	
MEAD TOWER	HAYFIELD TWP	16846	MEAD RD	SAEGERTOWN	16433	Tower Site	
MEADVILLE PARKING GARAGE	MEADVILLE CITY	890	MULBERRY ST	MEADVILLE	16335	Tower Site	
MEADVILLE TELEPHONE COMPANY	VERNON TWP	18309	REYNOLDS RD	MEADVILLE	16335	Tower Site	
MOBILCOM	VERNON TWP	16318	SUNBROOK RD	MEADVILLE	16335	Tower Site	
MOBILCOM	VERNON TWP	18235	REYNOLDS RD	MEADVILLE	16335	Tower Site	
MOBILCOM	EAST MEAD TWP	22761	STATE HIGHWAY 27	MEADVILLE	16335	Tower Site	
MOBILCOM	SPARTA TWP	47337	ERIE CO LINE RD	CORRY	16407	Tower Site	

# Appendix E - Critical Facilities

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# Appendix E - Critical Facilities

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MOBILCOM	SPRING TWP	9577	SPRINGBORO RD	SPRINGBORO	16435	Tower Site	
MOBILCOM	HAYFIELD TWP	17136	MEAD RD	SAEGERTOWN	16433	Tower Site	
NEW CINGULAR WIRELESS PCS, LLC	GREENWOOD TWP	4808	US HIGHWAY 19	COCHRANTON	16314	Tower Site	
NORTH TOWER	CUSSEWAGO TWP	21577	HILLVIEW RD	SAEGERTOWN	16433	Tower Site	
PA OFFICE OF ADMIN	SUMMERHILL TWP	8981	STATE HIGHWAY 198	CONNEAUTVILLE	16406	Tower Site	
PA RSA 1 LIMITED PARTNERS	NORTH SHENANGO TWP	2414	STATE HIGHWAY 285	LINESVILLE	16424	Tower Site	
PEGASUS TOWER COMPANY LTD	PINE TWP	14620	AIRPORT RD	LINESVILLE	16424	Tower Site	
PENN ELECTRIC CO- OFF TAYLOR STAND RD	ATHENS TWP	19644	TAYLOR STAND RD	CENTERVILLE	16404	Tower Site	
PENN ELECTRIC CO- OFF TAYLOR STAND RD	ATHENS TWP	19644	TAYLOR STAND RD	CENTERVILLE	16404	Tower Site	
PENNSYLVANIA RSA 1 LIMITED	OIL CREEK TWP	12036	SPRING CREEK RD	TITUSVILLE	16354	Tower Site	
PENNSYLVANIA RSA 1 LIMITED PARTNERSHIP	WAYNE TWP	24484	BELL HILL RD	COCHRANTON	16314	Tower Site	
RAMCO COMMUNICATIONS	SPARTA TWP	46426	ERIE CO LINE RD	CORRY	16407	Tower Site	
SBA TOWERS	ROCKDALE TWP	29744	LEE RD	UNION CITY	16438	Tower Site	
SBA TOWERS	EAST MEAD TWP	12618	TOWNLINE RD	MEADVILLE	16335	Tower Site	
SBA TOWERS II LLC	WOODCOCK TWP	20616	RYAN RD	MEADVILLE	16335	Tower Site	
SPRINT PCS CL 33XC066	HAYFIELD TWP	16798	BROOKHOUSER RD	SAEGERTOWN	16433	Tower Site	

# Appendix E - Critical Facilities

Within 1.5 miles of fixed Hazmat Facility?	Within Dam Inundation Area?	Within 0.25 miles of major road (Hazmat-Fixed)?	Within 0.25 miles of Rail (Hazmat-Fixed)?	Within 1000 yards of Conventional Oil/Gas well	Date last edited
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# Appendix E - Critical Facilities

Facility Name	Municipality	911 Address #	Street Name	Post Office	Zipcode	Facility Type	In SHA?
SPRINT PROPERTY TAX DEPT.	VERNON TWP	10330	KRIDER RD	MEADVILLE	16335	Tower Site	
SPRINTCOM, INC.	GREENWOOD TWP	2842	MERCER PIKE	COCHRANTON	16314	Tower Site	
SPRINTCOM, INC.	CUSSEWAGO TWP	26399	FRY RD	EDINBORO	16412	Tower Site	
SPRINTCOM, INC.	CUSSEWAGO TWP	26399	FRY RD	EDINBORO	16412	Tower Site	
USSS FBI GOV OFFICE	TROY TWP	13949	LEBOEUF TRAIL RD	TOWNVILLE	16360	Tower Site	
VERIZON WIRELESS	SPARTA TWP	22964	PATCHEON RD	SPARTANSBURG	16434	Tower Site	
VERIZON WIRELESS	ROME TWP	18086	VROOMAN RD	CENTERVILLE	16404	Tower Site	
VERIZON WIRELESS	BLOOMFIELD TWP	23783	OLSON RD	UNION CITY	16438	Tower Site	
VILKIE COMMUNICATIONS	SUMMERHILL TWP	13000	RADIO RD	CONNEAUTVILLE	16406	Tower Site	
WEST TOWER	SUMMIT TWP	8758	AGNEW RD	LINESVILLE	16424	Tower Site	
WEST TOWER	HAYFIELD TWP	16631	WILLIAMS RD	MEADVILLE	16335	Tower Site	
	SADSBURY TWP	9706	TOWNLIN RD	CONNEAUT LAKE	16316	Tower Site	
	CONNEAUT TWP	18792	STATE LINE RD	CONNEAUTVILLE	16406	Tower Site	
	WOODCOCK TWP	20691	PRICE RD	SAEGERTOWN	16433	Tower Site	

# Appendix E - Critical Facilities

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# APPENDIX F - HAZUS: FLOOD GLOBAL RISK REPORT

## CRAWFORD COUNTY 2020 WHOLE COMMUNITY HAZARD MITIGATION PLAN UPDATE

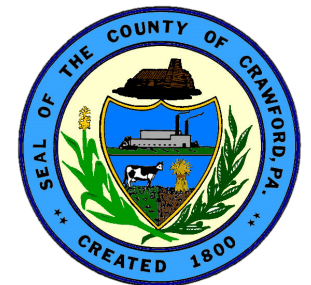
CRAWFORD COUNTY, PENNSYLVANIA

**Prepared By:**

Crawford County Department of Public Safety

Crawford County GIS

Crawford County Planning



# Appendix F - Hazus: Flood Global Risk Report



## Hazus: Flood Global Risk Report

**Region Name:** PA\_FL\_CrawfordCo  
**Flood Scenario:** 100yr  
**Print Date:** Monday, August 31, 2020

**Disclaimer:**

This version of Hazus utilizes 2010 Census Data. Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.



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# Appendix F - Hazus: Flood Global Risk Report



## General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- Pennsylvania

Note:  
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is approximately 1,038 square miles and contains 4,969 census blocks. The region contains over 35 thousand households and has a total population of 88,765 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 44,439 buildings in the region with a total building replacement value (excluding contents) of 10,021 million dollars. Approximately 91.46% of the buildings (and 71.19% of the building value) are associated with residential housing.



## Building Inventory

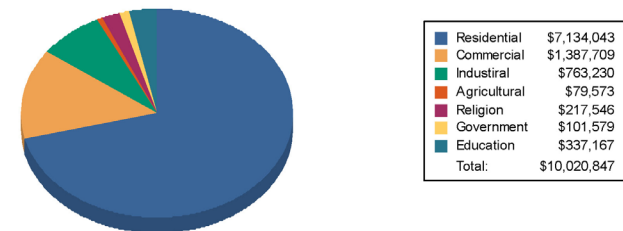
### General Building Stock

Hazus estimates that there are 44,439 buildings in the region which have an aggregate total replacement value of 10,021 million dollars. Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1  
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure (\$1000)	Percent of Total
Residential	7,134,043	71.2%
Commercial	1,387,709	13.8%
Industrial	763,230	7.6%
Agricultural	79,573	0.8%
Religion	217,546	2.2%
Government	101,579	1.0%
Education	337,167	3.4%
<b>Total</b>	<b>10,020,847</b>	<b>100%</b>

Building Exposure by Occupancy Type for the Study Region (\$1000's)



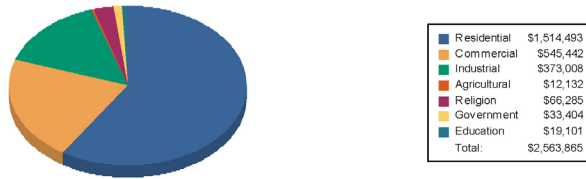
# Appendix F - Hazus: Flood Global Risk Report



**Table 2**  
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure (\$1000)	Percent of Total
Residential	1,514,493	59.1%
Commercial	545,442	21.3%
Industrial	373,008	14.5%
Agricultural	12,132	0.5%
Religion	66,285	2.6%
Government	33,404	1.3%
Education	19,101	0.7%
<b>Total</b>	<b>2,563,865</b>	<b>100%</b>

Building Exposure by Occupancy Type for the Scenario (\$1000's)



### Essential Facility Inventory

For essential facilities, there are 3 hospitals in the region with a total bed capacity of 289 beds. There are 72 schools, 31 fire stations, 12 police stations and 1 emergency operation center.



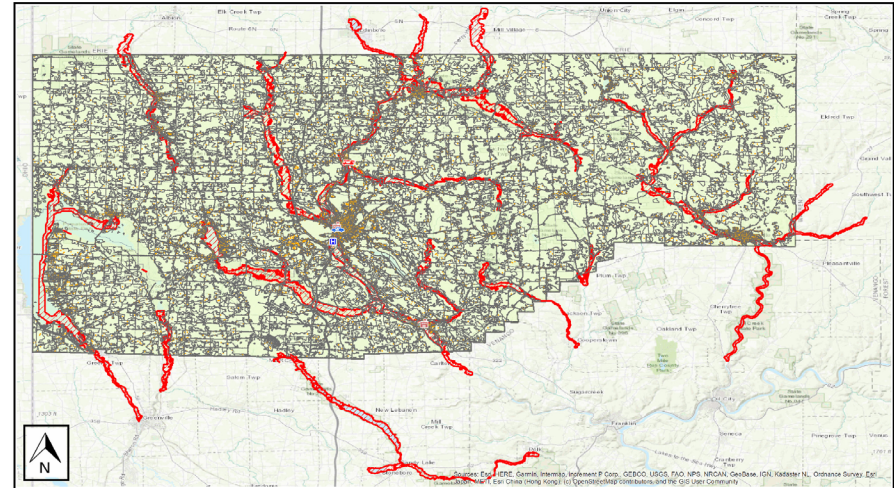
### Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

**Study Region Name:** PA\_FL\_CrawfordCo  
**Scenario Name:** 100yr  
**Return Period Analyzed:** 100  
**Analysis Options Analyzed:** No What-ifs

### Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



# Appendix F - Hazus: Flood Global Risk Report



## Building Damage

### General Building Stock Damage

Hazus estimates that about 962 buildings will be at least moderately damaged. This is over 64% of the total number of buildings in the scenario. There are an estimated 152 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = \$300K) Overview Map

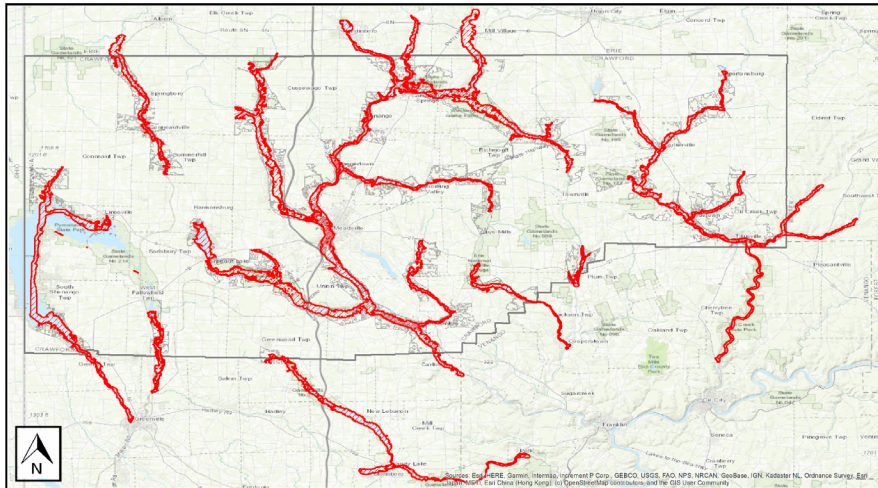
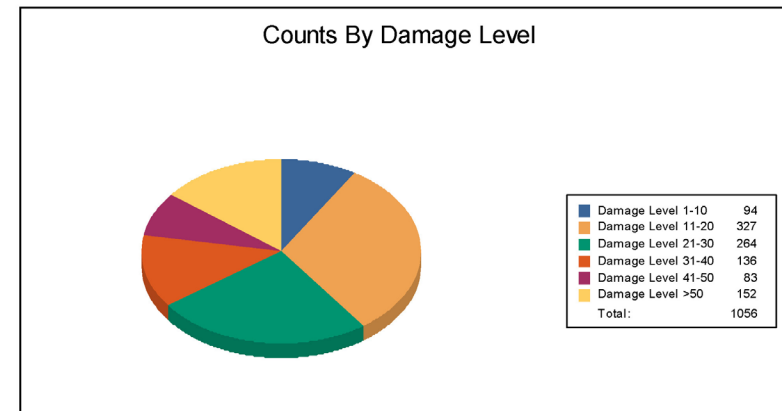


Table 3: Expected Building Damage by Occupancy

Occupancy	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	1	5	16	84	1	5	0	0	1	5	0	0
Education	1	100	0	0	0	0	0	0	0	0	0	0
Government	1	50	1	50	0	0	0	0	0	0	0	0
Industrial	1	8	5	38	5	38	1	8	1	8	0	0
Religion	0	0	0	0	0	0	0	0	0	0	0	0
Residential	90	9	305	30	258	25	135	13	81	8	152	15
<b>Total</b>	<b>94</b>		<b>327</b>		<b>264</b>		<b>136</b>		<b>83</b>		<b>152</b>	

Counts By Damage Level



# Appendix F - Hazus: Flood Global Risk Report



Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	1	100	0	0	0	0	0	0	0	0
Manuf/Housing	0	0	0	0	0	0	0	0	0	0	43	100
Masonry	22	8	84	32	73	28	34	13	22	8	28	11
Steel	3	13	14	58	5	21	1	4	1	4	0	0
Wood	69	10	226	31	185	26	101	14	59	8	81	11



## Essential Facility Damage

Before the flood analyzed in this scenario, the region had 289 hospital beds available for use. On the day of the scenario flood event, the model estimates that 289 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

Classification	# Facilities			
	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	1	0	0	0
Fire Stations	31	1	0	1
Hospitals	3	1	0	1
Police Stations	12	1	0	1
Schools	72	2	0	2

If this report displays all zeros or is blank, two possibilities can explain this.

- (1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.
- (2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.



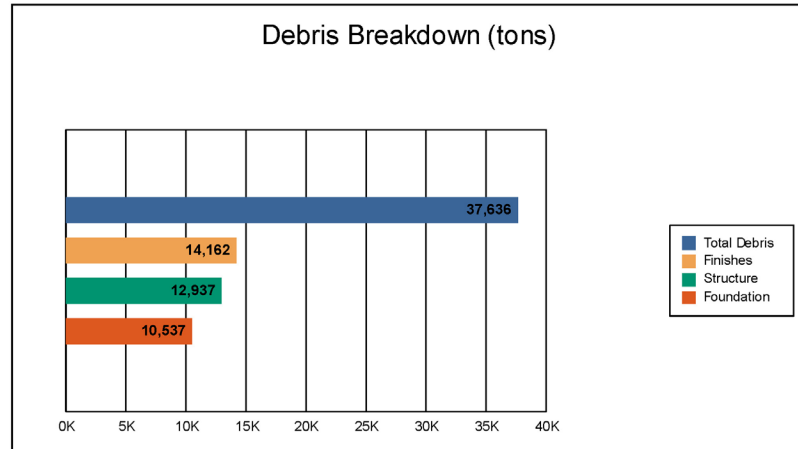
# Appendix F - Hazus: Flood Global Risk Report



## Induced Flood Damage

### Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.



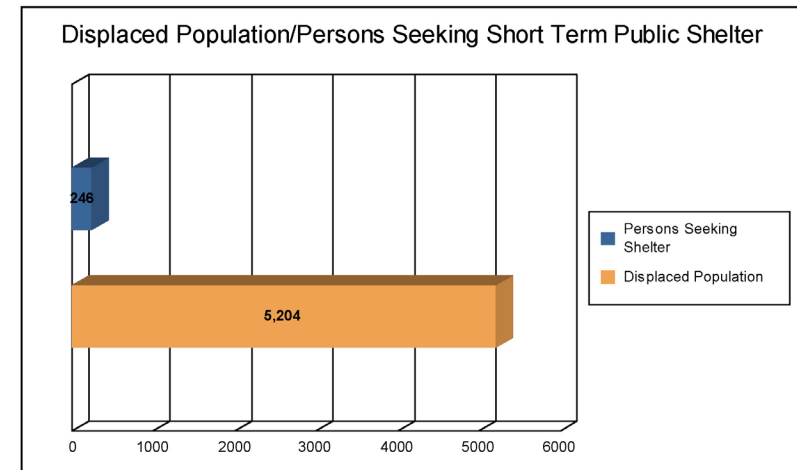
The model estimates that a total of 37,636 tons of debris will be generated. Of the total amount, Finishes comprises 38% of the total, Structure comprises 34% of the total, and Foundation comprises 28%. If the debris tonnage is converted into an estimated number of truckloads, it will require 1506 truckloads (@25 tons/truck) to remove the debris generated by the flood.



## Social Impact

### Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 1,735 households (or 5,204 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 246 people (out of a total population of 88,765) will seek temporary shelter in public shelters.



# Appendix F - Hazus: Flood Global Risk Report



## Economic Loss

The total economic loss estimated for the flood is 1,127.65 million dollars, which represents 43.98 % of the total replacement value of the scenario buildings.

### Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

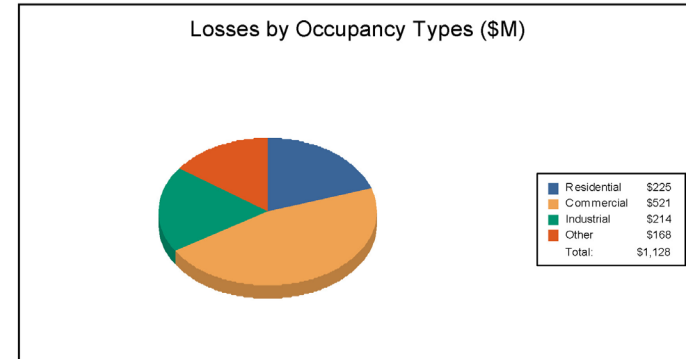
The total building-related losses were 670.30 million dollars. 41% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 19.93% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.



**Table 6: Building-Related Economic Loss Estimates**  
(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
<b>Building Loss</b>						
	Building	116.92	66.43	46.87	7.05	241.27
	Content	59.23	173.02	128.73	42.02	402.99
	Inventory	0.00	4.60	21.31	0.14	26.05
	<b>Subtotal</b>	<b>176.15</b>	<b>244.05</b>	<b>196.90</b>	<b>49.20</b>	<b>670.30</b>
<b>Business Interruption</b>						
	Income	1.05	104.85	5.24	10.29	121.43
	Relocation	31.17	36.11	4.09	7.14	78.51
	Rental Income	13.93	26.31	1.07	1.60	42.91
	Wage	2.48	107.38	4.91	99.73	214.50
	<b>Subtotal</b>	<b>48.63</b>	<b>274.65</b>	<b>15.31</b>	<b>118.76</b>	<b>457.35</b>
ALL	<b>Total</b>	<b>224.78</b>	<b>520.70</b>	<b>214.21</b>	<b>167.96</b>	<b>1,127.65</b>

Losses by Occupancy Types (\$M)



# Appendix F - Hazus: Flood Global Risk Report



## Appendix A: County Listing for the Region

Pennsylvania  
 - Crawford



## Appendix B: Regional Population and Building Value Data

	Building Value (thousands of dollars)			Total
	Population	Residential	Non-Residential	
<b>Pennsylvania</b>				
Crawford	88,765	7,134,043	2,886,804	10,020,847
<b>Total</b>	<b>88,765</b>	<b>7,134,043</b>	<b>2,886,804</b>	<b>10,020,847</b>
<b>Total Study Region</b>	<b>88,765</b>	<b>7,134,043</b>	<b>2,886,804</b>	<b>10,020,847</b>



# APPENDIX H - FEMA COMMUNITY LIFELINES ADDRESSED PER MITIGATION PROJECT

## CRAWFORD COUNTY 2020 WHOLE COMMUNITY HAZARD MITIGATION PLAN UPDATE

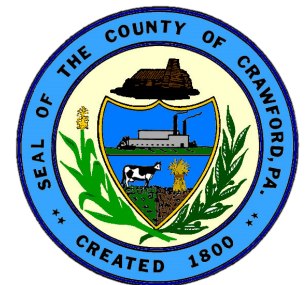
CRAWFORD COUNTY, PENNSYLVANIA

**Prepared By:**

Crawford County Department of Public Safety








Crawford County GIS

Crawford County Planning



















# Appendix H - FEMA Lifelines Addressed/Mitigation Project

		COMMUNITY LIFELINES						
HAZARD	PROJECT NAME	 SAFETY & SECURITY	 FOOD, WATER, SHELTER	 HEALTH & MEDICAL	 ENERGY	 COMMUNICATIONS	 TRANSPORTATION	 HAZARDOUS MATERIALS
All Hazards	County-wide Mitigation Education on web-sites	X	X	X	X	X	X	X
	Woodcock Borough Emergency notification siren system	X		X		X		
	East Mead Twp widen Wayland Road to access hospice house						X	
Pandemic	County-wide provide PPE, testing, and vaccinations			X				








# Appendix H - FEMA Lifelines Addressed/Mitigation Project

		COMMUNITY LIFELINES						
HAZARD	PROJECT NAME	 SAFETY & SECURITY	 FOOD, WATER, SHELTER	 HEALTH & MEDICAL	 ENERGY	 COMMUNICATIONS	 TRANSPORTATION	 HAZARDOUS MATERIALS
Utility Interruption	Linesville purchase generator				X			
	Summit Township update website with information				X			
	Blooming Valley Borough, Venango Borough, South Shenango, Hayfield Twp, North Shenango, West Shenango, Wayne Twp, Spartansburg Boro, Pine Twp. & Conneaut Lake Borough trim trees along power lines				X			
	Conneaut Lake Borough purchase generator for town hall				X			
	Saegertown Borough develop new municipal water well				X			
	Conneautville Borough purchase generator for water wells				X			
	Conneaut Lake Borough purchase generator for sewer plant				X			
	Conneaut Lake Borough install dry hydrant in the lake				X			








# Appendix H - FEMA Lifelines Addressed/Mitigation Project

		COMMUNITY LIFELINES						
HAZARD	PROJECT NAME	 SAFETY & SECURITY	 FOOD, WATER, SHELTER	 HEALTH & MEDICAL	 ENERGY	 COMMUNICATIONS	 TRANSPORTATION	 HAZARDOUS MATERIALS
Terrorism	County-wide educate mitigating cyber attacks	X						
	City of Meadville provide resources to adequately protect municipal data	X						
	Establish a County-Wide IT security consortium	X						
Flood, Ice Jams	West Mead Twp. Stormwater drainage on Alden St.		X				X	
	Venango Twp. Stormwater drainage on Center Rd.		X				X	
	Vernon Twp. & City of Meadville Install structures to prevent ice jam on French Creek		X				X	
	Greenwood Twp. Enhance ditches		X				X	
	West Mead Twp. Repair bridge pipe on Thurston Rd.		X				X	
	Townville Boro. Replace drainage pipe near SR 408		X				X	
	Townville Boro Replace bridge on W. Freemont St		X				X	








# Appendix H - FEMA Lifelines Addressed/Mitigation Project

		COMMUNITY LIFELINES						
HAZARD	PROJECT NAME	 SAFETY & SECURITY	 FOOD, WATER, SHELTER	 HEALTH & MEDICAL	 ENERGY	 COMMUNICATIONS	 TRANSPORTATION	 HAZARDOUS MATERIALS
<b>Flood, Ice Jams (Continued)</b>	Woodcock Twp. Remove debris from Woodcock Creek		X				X	
	Spring Township clean out culvert pipes		X				X	
	Conneautville remove two blighted houses from falling into creek		X					
	Summerhill Township enhance drainage		X				X	
	Conneautville remove trees and enhance drainage on Mulberry Lane		X				X	
	Conneaut Township repair West Road Bridge		X				X	
	Sadsbury Township upgrade storm water infrastructure and add retention area Lakeview Drive Area, Konneyaut Trail, Iroquois Road, and Seneca Road		X				X	
	Conneaut Lake Borough replace culvert pipe on 1st Street		X				X	
	Conneaut Lake Borough remove sediments and trees from stream		X				X	
	West Fallowfield Township stormwater improvements and culvert pipe improvements Rocky Glen Road		X				X	








# Appendix H - FEMA Lifelines Addressed/Mitigation Project

		COMMUNITY LIFELINES						
HAZARD	PROJECT NAME	 SAFETY & SECURITY	 FOOD, WATER, SHELTER	 HEALTH & MEDICAL	 ENERGY	 COMMUNICATIONS	 TRANSPORTATION	 HAZARDOUS MATERIALS
<b>Flood, Ice Jams (Continued)</b>	East Fairfield Township install drainage on McCracken Road		X				X	
	Oil Creek Township add crossover pipes on Gaswell Road		X				X	
	Oil Creek Township add ditching to control erosion of roadway							
	Oil Creek Township remove trees to allow daylight on Kinsack Road		X				X	
	South Shenango Township replace culverts on Deezik Road		X				X	
	City of Meadville conduct stormwater assessment and planned section replacement at lower Park Ave, Neason Run, and Mill Run		X				X	
	East Fallowfield Twp replace two culvert pipes on Pine Road		X				X	
	East Mead Twp Smith Road Bridge, Hinkson Road Bridge, East Oil Creek Road bidge and road North Wayland Rd improvements		X				X	
	Hayfield Twp. Replace culvert pipe at Reservoir and Mook Roads		X				X	

# Appendix H - FEMA Lifelines Addressed/Mitigation Project

		COMMUNITY LIFELINES						
HAZARD	PROJECT NAME	 SAFETY & SECURITY	 FOOD, WATER, SHELTER	 HEALTH & MEDICAL	 ENERGY	 COMMUNICATIONS	 TRANSPORTATION	 HAZARDOUS MATERIALS
<b>Flood, Ice Jams (Continued)</b>	Rockdale Twp remove and replace culvert pipes		X				X	
	Centerville Boro clean out catch basins		X				X	
	City of Titusville study, design, and construction of Trout Run including Breed Street Bridge		X				X	
	Wayne Twp. Replace and upsize culvert pipes		X				X	
	Cambridge Township remove beavers that cause flooding of Humes Hill Road		X				X	
	Beaver Township ongoing road improvement		X				X	
<b>Dam Failure</b>	Conneautville Dam rehabilitation		X				X	
	Bloomfield Township repair or replace Canadohta Lake Dam		X				X	
	City of Meadville rehabilitation of Rainbow Dam		X					

# Appendix H - FEMA Lifelines Addressed/Mitigation Project

		COMMUNITY LIFELINES						
HAZARD	PROJECT NAME	 SAFETY & SECURITY	 FOOD, WATER, SHELTER	 HEALTH & MEDICAL	 ENERGY	 COMMUNICATIONS	 TRANSPORTATION	 HAZARDOUS MATERIALS
Hazardous Materials	Springboro need escape mask for water treatment plant		X					X
	Rockdale Twp. Remove house and vehicles		X					X
	Crawford County DPS conduct Hazardous Materials Commodity Flow Study		X				X	X
Tornado, Wind Storm	Woodcock Borough Emergency notification siren system	X		X		X		
Winter Storm	County-wide use social media to send weather information		X	X			X	
Land Slide	All Municipalities enforce not building on loose soils		X	X				
Earthquake	All Municipalities enforce not building on faults	X		X				
Drought	County-wide Drought EOP for Municipalities to update		X					
Invasive Species	County-wide education information on drying boats before leaving and entering waterways	X						