MCM Consulting Group, Inc.

Cameron County 2017 Hazard Mitigation Plan

Cameron County Office of Emergency Services

Certification of Annual Review Meetings

YEAR	DATE OF MEETING	PUBLIC OUTREACH ADDRESSED?*	SIGNATURE
2018			
2019			
2020			
2021			
2022			

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

Record of Changes

DATE	DESCRIPTION OF CHANGE MADE, MITIGATION ACTION COMPLETED, OR PUBLIC OUTREACH PERFORMED	CHANGE MADE BY (PRINT NAME)	CHANGE MADE BY (SIGNATURE)

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

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1. Introduction

1.1. Background

The Cameron County Board of Commissioners, in response to the Disaster Mitigation Act of 2000 (DMA 2000), organized a countywide hazard mitigation planning effort to prepare, adopt and implement a multi-jurisdictional Hazard Mitigation Plan (HMP) for Cameron County and all of its seven municipalities. The Cameron County Office of Emergency Services was charged by the County Board of Commissioners to prepare the 2011 plan. The 2011 HMP has been utilized and maintained during the 5 year life cycle.

In July of 2016, the Cameron County Commissioners were successful in securing hazard mitigation grant funding to update the county hazard mitigation plan. The pre-disaster mitigation grant funding was administered by the Pennsylvania Emergency Management Agency and provided to Cameron County as a sub-grantee. The Cameron County Commissioners assigned the Cameron County Office of Emergency Services with the primary responsibility to update the hazard mitigation plan. MCM Consulting Group, Inc. was selected to complete the update of the HMP. A local hazard mitigation planning team was developed comprised of government leaders and citizens from Cameron County. This updated HMP will provide another solid foundation for the Cameron County Hazard Mitigation Program.

Hazard mitigation describes sustained actions taken to prevent or minimize long-term risks to life and property from hazards and to create successive benefits over time. Pre-disaster mitigation actions are taken in advance of a hazard event and are essential to breaking the disaster cycle of damage, reconstruction and repeated damage. With careful selection, successful mitigation actions are cost-effective means of reducing risk of loss over the long-term.

Hazard mitigation planning has the potential to produce long-term and recurring benefits. A core assumption of mitigation is that current dollars invested in mitigation practices will significantly reduce the demand for future dollars by lessening the amount needed for recovery, repair and reconstruction. These mitigation practices will also enable local residents, businesses and industries to reestablish themselves in the wake of a disaster, getting the economy back on track sooner and with less interruption.

1.2. Purpose

The purpose of the Cameron County Hazard Mitigation Plan is:

- To protect life, safety and property by reducing the potential for future damages and economic losses that result from natural hazards;
- To qualify for additional grant funding, in both the pre-disaster and the post-disaster environment;
- To speed recovery and redevelopment following future disaster events;
- To demonstrate a firm local commitment to hazard mitigation principles; and
- To comply with both state and federal legislative requirements for local hazard mitigation plans.

1.3. Scope

This Cameron County Multi-Jurisdictional Hazard Mitigation Plan serves as a framework for saving lives, protecting assets and preserving the economic viability of the seven municipalities in Cameron County. The HMP outlines actions designed to address and reduce the impact of a full range of natural hazards facing Cameron County, including drought, earthquakes, flooding, tornados, hurricanes/tropical storms and severe winter weather. Human made hazards such as transportation accidents, hazardous materials spills and fires are also addressed.

A multi-jurisdictional planning approach was utilized for the Cameron County HMP update, thereby eliminating the need for each municipality to develop its own approach to hazard mitigation and its own planning document. Further, this type of planning effort results in a common understanding of the hazard vulnerabilities throughout the county, a comprehensive list of mitigation projects, common mitigation goals and objectives and an evaluation of a broad capabilities assessment examining policies and regulations throughout the county and its municipalities.

1.4. Authority and Reference

Authority for this plan originates from the following federal sources:

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

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

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

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

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

- PEMA: *Hazard Mitigation Planning Made Easy!*
- PEMA Mitigation Ideas: *Potential Mitigation Measures by Hazard Type: A Mitigation Planning Tool for Communities*. March 6, 2009
- PEMA: *Standard Operating Guide*. October 18, 2013

The following document produced by the National Fire Protection Association (NFPA) provided additional guidance for updating this plan:

- NFPA 1600: *Standard on Disaster/Emergency Management and Business Continuity Programs*. 2011

2. Community Profile

2.1. Geography and Environment

Cameron County covers approximately 397 square miles and is located in the north-central portion of the Commonwealth of Pennsylvania. Situated in the Allegheny Highlands of the northern Appalachian Mountains within the western Susquehanna River Valley, it is one of the smallest counties in Pennsylvania, both in area and population. It is bordered by McKean and Potter Counties to the north, Elk County to the west, Clearfield County to the south, and Clinton County to the east.

The terrain consists of wooded hills with sharp ridge lines and small flat plateaus, narrow valleys, and winding streams. Elevations range from 760 feet above sea level along the Sinnemahoning Creek at the Cameron-Clinton line, to 2,380 feet above sea level along the eastern continental divide between the left branch of Eighteen Hollow and Havens Brook in the northern part of the county. The major waterway of Cameron County is the Sinnemahoning Creek. The Sinnemahoning Creek Basin empties into the Susquehanna River, and eventually into the Chesapeake Bay. This creek basin creates a broad spectrum of recreational opportunities, natural habitats, and scenic views. The major branches are Driftwood, First Fork Creek, and Bennett Branch. The Driftwood Branch, and many of its tributaries, provides some of the best fishing in the entire Sinnemahoning Creek and upper West Branch Susquehanna River sub-basin. A portion of the Driftwood Branch, just upstream of Emporium, is designated by the Pennsylvania Fish and Boat Commission as a Delayed Harvest Fly Fishing Only Area. In addition to the Sinnemahoning, the many streams and creeks of Cameron County sustain wildlife and provide for many recreational activities such as fishing, canoeing, and hiking.

The major water features located in Cameron County are: the George B. Stevenson Reservoir, Salt Run Reservoir, Lake Bucktail, the Emporium Reservoir, the First Fork of the Sinnemahoning Creek, Clear Creek, and the Sinnemahoning Portage Creek.

Of the county's 254,208 acres, 130,800 acres are State Forest land. The forests of Cameron County are mature northern hardwoods, large thickets of mountain laurel, areas of second-growth timber and clear-cuts, isolated stands of pine and hemlock, and a few herbaceous openings.

Wildlife inhabiting the county is typical for the mix of land uses. Song birds and small mammals, such as skunk, raccoon, porcupine, woodchuck, rabbit, squirrel, moles, and voles are frequently observed. Mink and kingfishers can also be observed along the creek, along with heron, mallards, hawks, turkey, grouse, fox, white-tailed deer, elk, and bear. Poisonous snakes, including the Eastern Diamondback Rattlesnake and the Copperhead, can be encountered.

Weather patterns and climatic conditions in Cameron County are a major risk factor. The county's weather extremes are the primary contributors to many of the county's natural hazard events, including flash floods, winter storms, drought, severe temperatures, high wind, and lightning.

2.2 Community Facts

On March 29, 1860 Cameron County was established from portions of Clinton, Elk, McKean, and Potter counties; and is named for U.S. Senator Simon Cameron representing Pennsylvania [from 1845 to 1849 as a Democrat and again as a Republican in 1857 until his retirement in 1861].

Cameron County is rural in character. The core communities in Cameron County are the Borough of Emporium, the county seat, and Shippen Township. Emporium Borough contains the largest concentration of business and residential investment in the County. Shippen Township, just outside of Emporium Borough, is predominantly residential but also includes a broad mix of business development. Manufacturing in Cameron County is based in Emporium. The two dominant types of manufacturing businesses are machine shops, including tool and die shops, and sintered metals, also known as the powder metal sector. Located in a region with one of the world's best hardwood stands, there is also logging, lumber, and furniture manufacturing firms in Cameron County.

2.3. Population and Demographics

Cameron County recorded a population of 5,085 during the 2010 U.S. Census, ranking the county in 67th position among Pennsylvania's 67 counties. This is a decrease of 889 residents from the 2000 Census, which was 5,974; and a drop from 66th positon in 2000. The county has a vast seasonal/recreational population for hunting, fishing, and camping that should not be discounted. In the Cameron County Comprehensive Plan 2009, seasonal residential housing units represented 1,641 acres, or twenty-seven percent of the total developed land area and approximately less than one percent of the total land use that is not owned by the Commonwealth in Cameron County. These seasonal residential housing units include seasonal homes, second homes, as well as hunting and fishing camps.

From 1990 to 2000, Census figures show a one percent increase in population, making Cameron County the 26th slowest growing county during that timeframe. The county's population density in 2010 was approximately 12 people per square mile. The population estimate for 2015 was 4,732 persons.

With a land area of 397.5 square miles, it is the second smallest county in Pennsylvania. Cameron County has five townships and two boroughs: Driftwood and Emporium Boroughs, and Gibson, Grove, Lumber, Portage and Shippen Townships. Shippen Township is the largest township in square miles and has the largest population for the county with 2,232 people. Emporium Borough, the county seat, is the second most densely populated

area of the county with 2,073 people and is the smallest in square miles. *Table 1 - Municipal Population* provides a distribution of county population per municipality obtained from the U.S. Census Bureau, Population Estimates Program. This table also depicts the population change for each municipality from the past two U.S. Census. Unless otherwise indicated, the 2010 population estimates are used for various assessments throughout this hazard mitigation plan update.

Table 1 - Municipal Population

Municipality	Square Miles	Acreage	2000 Population	2010 Population
Driftwood Borough	1.8	1,152	103	67
Emporium Borough	0.7	448	2,526	2,073
Gibson Township	94.5	60,480	222	164
Grove Township	73.5	47,040	129	183
Lumber Township	51.4	32,896	241	195
Portage Township	18.1	11,584	258	171
Shippen Township	157.2	100,608	2,495	2,232
TOTAL	397.5	254,208	5,974	5,085

The median income of households in Cameron County is $41,157. This is approximately $12,000 less than the national median household income (U.S. Census, 2014). In the same time frame, eight percent of the Cameron County population lived in poverty; 18.7 percent of related children under 18 are below the poverty line, compared with approximately seven percent of people 65 years or older. *Table 2 - Population Comparison* below shows a comparison between Cameron County, the Commonwealth of Pennsylvania and the United States for the percentage below the poverty level and the median household incomes.

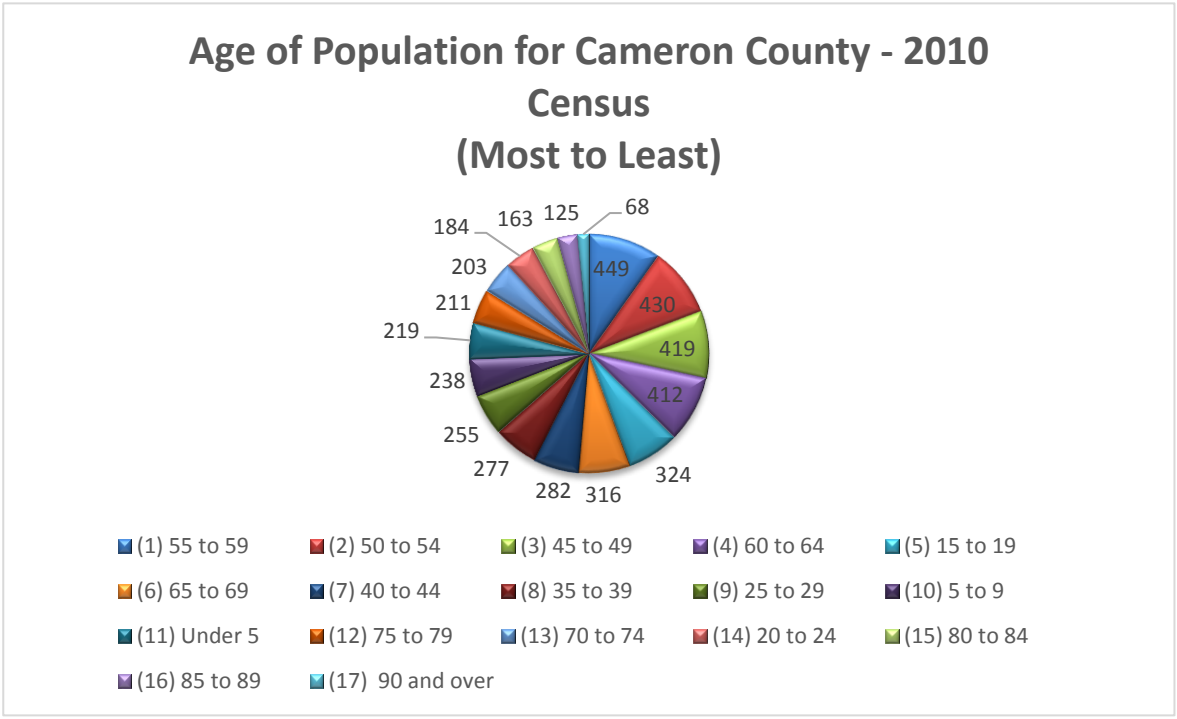
Table 2 - Population Comparison

	United States	Pennsylvania	Cameron County
Percentage of all population below poverty level	11.5%	13.5%	8%
Median household income	$53,482	$53,115	$41,157

According to the 2010 Census, the population for the entire United States grew at a faster rate in the older ages than in the younger ages. In the Age and Sex Composition: 2010 it states the population aged 45 to 64 grew at a rate of 31.5 percent. During the 2000 census the median age of Cameron County population is 41.3 years with 24.5 percent of the population under 18 years of age and 19.8 percent 65 years or older. The median age in Cameron County is 49.5 (according to the 2010-2014 American

Community Survey 5-Year Estimates – US Census Bureau – American Factfinder). During the 2010 Census the largest population in Cameron County was 55 to 59 years of age (449) with those aged 50 to 54 coming in a close second. The chart below depicts the breakdown of the different age groups from the 2010 Census.

Figure 1 - 2010 Population Change Chart



https:// factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF

A total of 4,455 housing units were identified during the 2010 census, this is a loss of one-hundred and thirty-seven housing units from the 2000 census. In the 2000 census seventy-four percent of the 4,592 housing units in the County are single-unit, owner-occupied structures. The percentage of housing units that were vacant or unoccupied (including seasonal units) was 46 percent. In 2000, the average cost for a new residential housing unit was $119,444.44. The median monthly housing costs for mortgaged home-owners is $721 and non-mortgaged owners is $281. Ninety-eight percent of the county's population is White, 0.4 percent is Black or African-American, 0.6 percent is Hispanic, and 0.1 percent is Asian (U.S. Census, 2009). There are two assisted rental housing units in Cameron County, Maple Street Apartments and Emporium Arms. The rental housing units totaled 107 units, of which 98.1 percent are assisted elderly units and 1.9 percent are assisted special need units.

2.4. Land Use and Development

The majority (97.4 percent) of Cameron County's total land area is undeveloped, and is largely devoted to forestland and some agricultural uses. Most of Cameron County is devoted to either state forest or state game lands. A substantial part of the Elk Forest lies within Cameron County's borders. This 200,000-acre forest, also partially situated in Elk County, is available for primitive camping, licensed hunting and fishing, and other recreational pursuits. Bucktail State Park is also located in Cameron County.

There is approximately 473 acres of land dedicated to general farming according to the Cameron County Comprehensive Plan – 2009. The county's total of 26 farms is the second smallest number of farms among Pennsylvania's counties. The average size of a farm in Cameron County is 159 acres. The small acreage of land use dedicated to general farming is due to the rugged terrain of Cameron County. Because of this rugged terrain, there is approximately 95,606 acres of wooded land. Development constraints of floodplains and wetlands also make up the acreage of wooded areas within the county.

There are approximately 110 miles of state maintained roads in the county. Cameron County is one of nine counties located in PennDOT Engineering District 2-0. State Route 120 is the major highway artery in Cameron County. It connects Cameron County to the Borough of Renovo located to the east in Clinton County, and to the City of St. Marys in Elk County to the west. Route 46 provides access to Smethport, the county of seat of McKean County, to the north. State Route 120 is the only transportation corridor in the county that attracts development. Development along State Route 120 is occurring at a moderate pace and has resulted in minimal agricultural land conversion. A map of the county is provided in *Figure 3 - Land Use/Land Cover Map*.

According to the Cameron County Comprehensive Plan – 2009 single-family residential land use comprised of approximately 1,309 acres, multi-family residential dwellings (to include apartment building and duplexes) represented approximately thirteen acres, and seasonal residential housing units represented approximately 1,641 acres. Seasonal housing units represented the largest residential land use as outlined by the Comprehensive Plan.

Commercial and industrial land uses represented 118 acres and 125 acres respectfully in the Cameron County Comprehensive Plan – 2009. Commercial and industrial activity is primarily in Emporium Borough and Shippen Township.

Public/semi-public land use in Cameron County includes Elk State Forest, covering approximately 137,848 acres and State Game Land #14, which covers approximately 14,228 acres of land in Shippen Township. Public land use is classified as governmental function reserved for public use (i.e. state game lands, state forests, borough halls, county courthouses, fire houses, post offices, schools, etc.). Semi-public are lands developed by a limited group of people for their own use (i.e., churches, private schools,

cemeteries, etc.). Portions of Sinnemahoning (Grove Township) and Sizerville (Portage Township) State Parks are located on 1,567 acres.

Cameron County has approximately 112 acres dedicated to recreational land use. The only area classified as recreational in the county is the Emporium County Club Golf Course.

2.5 Data Sources

- Cameron County Knowledge Center™
- National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI) Storm Events Database
- United States Department of Agriculture (USDA) Census
- United States Geological Survey (USGS) Pennsylvania Water Science Center
- Environmental Protection Agency (EPA) Hazardous Materials (TRI Facilities)
- Environmental Protection Agency (EPA) Geospatial Data
- Department of Conservation and Natural Resources (DCNR) Pennsylvania Ground Water Information System (PaGWIS)
- Pennsylvania Department of Environmental Protection (PA DEP) Drought Monitor
- Pennsylvania West Nile Virus Control Program
- Centers for Disease Control (CDC)
- National Inventory of Dams (NID)
- Pennsylvania Spatial Data Access (PASDA)

Table 3 - GIS Data Summary

Geographic Information Systems (GIS) Data Summary	
Data	**Source**
Critical Facilities	Cameron County GIS
SARA Tier III Facilities	Cameron County GIS
Airports	Cameron County GIS
Dams	Cameron County GIS
Waste Facilities	Cameron County GIS
Municipalities	Cameron County GIS
Structures	Cameron County GIS
Driveways	Cameron County GIS
Roads	Cameron County GIS
Railroads	Cameron County GIS
Parcels	Cameron County GIS
Rivers & Streams	Cameron County GIS
Lakes & Ponds	Cameron County GIS
Levees	Cameron County GIS
Population Density	PASDA
Oil & Gas Locations	PASDA
Marcellus Shale Water Sources	PASDA
Water Pollution Control Facilities	PASDA
Public Water Supply	PASDA
Wild Urban Interface	PASDA
Wilderness Trails	PASDA
State Parks	PASDA
State Forests	PASDA
State Game Lands	PASDA
Nuclear Facilities	PASDA
Topology DEM	PASDA
Earthquake History	DCNR
Tornado History	NOAA / NCEI
TRI Hazardous Waste Facilities	EPA

Figure 2 - Cameron County Base Map

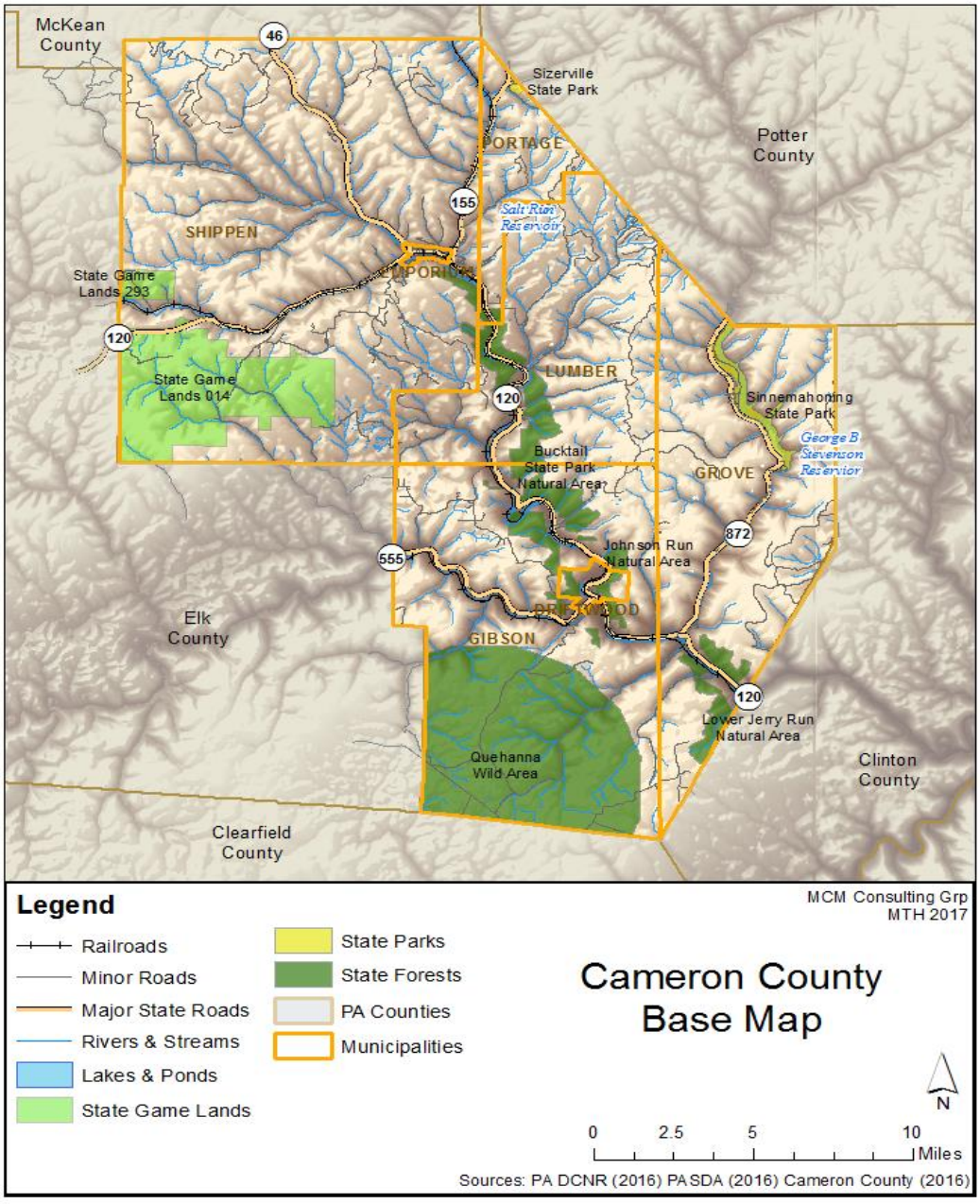


Figure 3 - Land Use/Land Cover Map

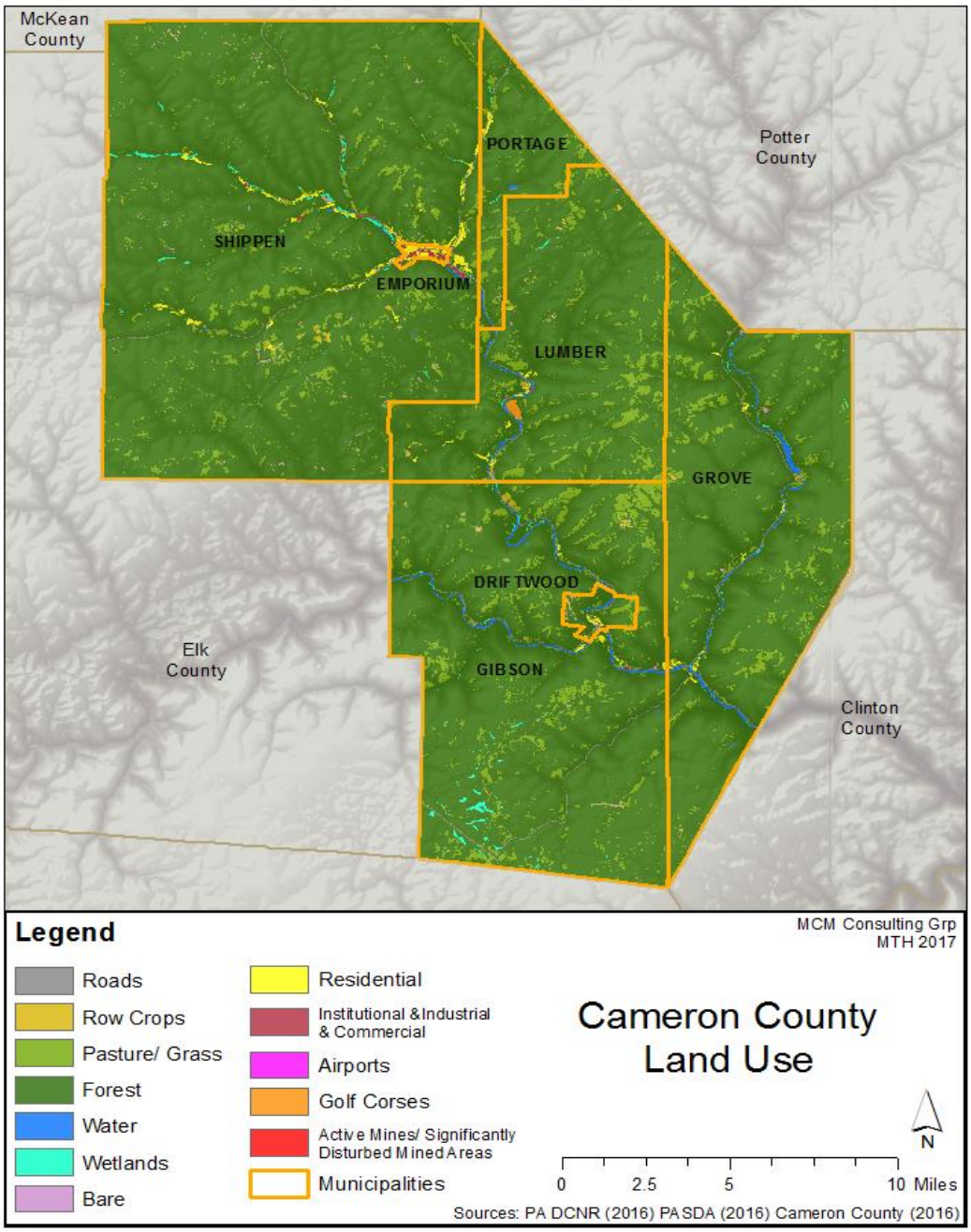
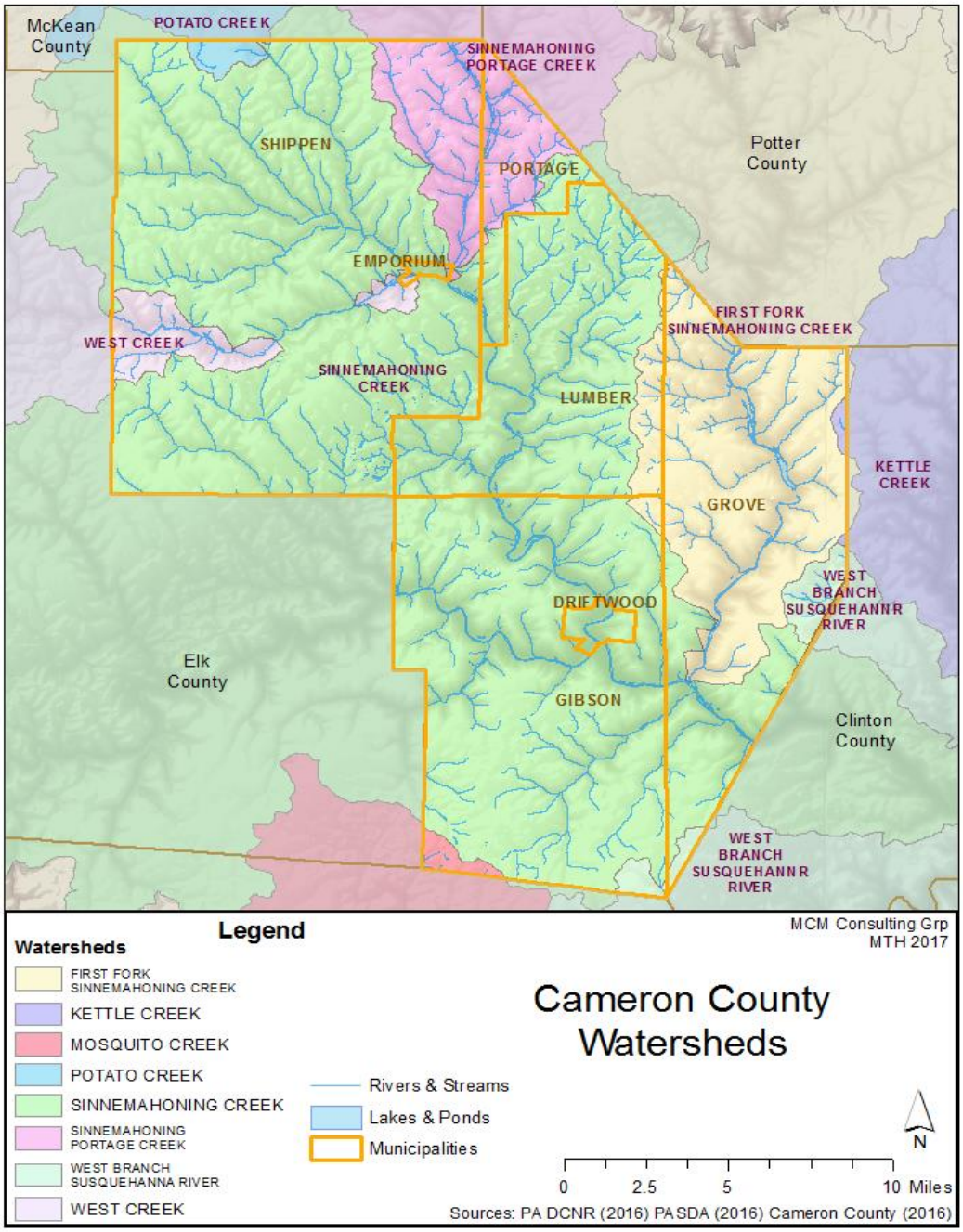


Figure 4 - Hydrologic Features



3. Planning Process

3.1. Update Process and Participation Summary

The Cameron County Hazard Mitigation Plan update began July 26, 2016. The Cameron County Commissioners were able to secure a hazard mitigation grant to start the process. The Cameron County Office of Emergency Services was identified as the lead agency for the Cameron County Hazard Mitigation Plan update. The planning process involved a variety of key decision makers and stakeholders within Cameron County. Cameron County immediately determined that the utilization of a contracted consulting agency would be necessary to assist with the plan update process. MCM Consulting Group, Inc. was selected as the contracted consulting agency to complete the update of the hazard mitigation plan. The core hazard mitigation team, which was referred to as the project team, included officials from the Cameron County Office of Emergency Services, Cameron County Planning Office and MCM Consulting Group, Inc. (MCM).

The process was developed around the requirements laid out in the Federal Emergency Management Agency (FEMA) Local Hazard Mitigation Crosswalk, referenced throughout this plan, as well as numerous other guidance documents including, but not limited to, Pennsylvania's All-Hazard Mitigation Standard Operating Guide, FEMA's State and Local Mitigation Planning How-to Guide series of documents (FEMA 386-series) and the National Fire Protection Association (NFPA) 1600 Standard on Disaster/Emergency Management and Business Continuity Programs.

MCM Consulting Group, Inc. assisted the Cameron County Office of Emergency Services in coordinating and leading public involvement meetings, local planning team meetings, analysis and the writing of the HMP. The Cameron County Local Planning Team worked closely with MCM in the writing and review of the HMP. MCM conducted project meetings and local planning team meetings throughout the process. Meeting agendas, meeting minutes and sign in sheets were developed and maintained for each meeting conducted by MCM. These documents are detailed in Appendix C of this plan.

Public meetings with local elected officials were held, as well as work sessions and in-progress review meetings with the Cameron County Local Planning Team and staff. At each of the public meetings, respecting the importance of local knowledge, municipal officials were strongly encouraged to submit hazard mitigation project opportunity forms, complete their respective portions of the capabilities assessment and review and eventually adopt the county hazard mitigation plan. Cameron County will continue to work with all local municipalities to collect local hazard mitigation project opportunities.

The HMP planning process consisted of:

Applying for and receiving a pre-disaster mitigation grant to fund the planning project.

Announcing the initiative via press releases and postings on the county website.

Involving elected and appointed county and municipal officials in a series of meetings, training sessions and workshops.

Identifying capabilities and reviewed the information with the municipalities.

Identifying hazards.

Assessment of risk and analyzing vulnerabilities.

Identifying mitigation strategies, goals and objectives.

Developing an implementation plan.

Announcing completion via press releases and postings on the county website.

Plan adoption at a public meeting of the Cameron County Board of Commissioners.

Plan submission to FEMA and PEMA.

The 2017 Cameron County HMP was completed March 1, 2017. The 2017 plan follows an outline developed by PEMA which provides a standardized format for all local HMPs in the Commonwealth of Pennsylvania. The 2017 HMP format is consistent with the PEMA recommended format. The 2017 Cameron County HMP has additional hazard profiles that were added to the HMP and these additional profiles increased the subsections in section 4.3 of the HMP.

3.2. The Planning Team

The 2017 Cameron County Hazard Mitigation Plan update was led by the Cameron County Project Team. The Cameron County Project Team provided guidance and leadership for the overall project. The project team assisted MCM Consulting Group, Inc. with dissemination of information and administrative tasks. *Table 4 - Project Team* outlines the individuals that comprised this team.

Table 4 - Project Team

Cameron County Hazard Mitigation Plan Update Project Team		
Name	**Organization**	**Position**
Kevin Johnson	Cameron County Office of Emergency Services	Director
Laura Narby	Cameron County Office of Emergency Services	Deputy Director
Cliff Clark	Cameron County Planning Commission	Director
Michael Rearick	MCM Consulting Group, Inc.	Project Manager

In order to represent the county, the Cameron County Project Team developed a diversified list of potential Local Planning Team (LPT) members. Members that participated in the 2011 hazard mitigation plan were highly encouraged to join the 2017 team. The

project team then provided invitations to the prospective members and provided a description of duties to serve on the LPT. The following agencies, departments and organizations were invited to participate in the LPT: Cameron County Commissioners, Cameron County Planning Commission, Mid-Cameron Authority, DCNR Bureau of Parks, DCNR Bureau of Forestry, Bucktail Watershed, Cameron County Historical Society, PennDOT, Pennsylvania State Police, Cameron County Conservation District, Cameron County School District, Cameron County Fire Chiefs, Cameron County Ambulance, Cameron County Sheriff, AECOM and all seven municipalities. The invitations for membership of the LPT were disseminated by the Cameron County Emergency Management Agency utilizing letters, email and telephone calls. The LPT worked throughout the process to plan and hold meetings, collect information and conduct public outreach.

The stakeholders listed in *Table 5 - Local Planning Team* served on the 2017 Cameron County Hazard Mitigation Local Planning Team, actively participated in the planning process by attending meetings, completing assessments, surveys and worksheets and/or submitting comments. Sign in sheets from meetings are located in Appendix C.

Table 5 - Local Planning Team

Cameron County Hazard Mitigation Plan Update Local Planning Team		
Name	**Organization**	**Position**
Lori Reed	Cameron County Commissioners	Commissioner
Phil Jones	Cameron County Commissioners	Commissioner
Jim Thomas	Cameron County Commissioners	Commissioner
Kevin Johnson	Cameron County OES	Director
Laura Narby	Cameron County OES	Deputy Director
Cliff Clark	Cameron County Planning Commission	Director
Misty Lupro	Driftwood Borough	Councilperson
Joseph Williams	Driftwood Borough	Mayor
Don Reed	Emporium Borough	Borough Manager
Robert Bushor	Grove Township	Supervisor
Brandy Ferraro	Shippen Township	Supervisor
Craig Hudson	Shippen Township	Emergency Management Coordinator
Greg Burkhouse	Pennsylvania DCNR Forestry	Forest Fire Supervisor
Ryan Neyman	Mid-Cameron Authority	Director
Jeanne Wabaugh	Pennsylvania DCNR Forestry	Director
Marsha Patros	Lumber Township and Portage Township	Secretary
Paul Benedict	Lumber Township	Supervisor
Paul Gabor	Portage Township	Supervisor
Kyle Brown	Portage Township	Supervisor
Ken Geelen	Portage Township	Supervisor

3.3. Meetings and Documentation

Monthly public meetings with local elected officials and the local planning team were held. At each of the public meetings, municipal officials were strongly encouraged to submit hazard mitigation project opportunity forms, complete their respective portions of the capability assessment and review and eventually adopt the multi-jurisdictional HMP. *Table 6 - HMP Process Timeline* lists the meetings held during the HMP planning process, which organizations and municipalities attended and the topic that was discussed at each meeting. All meeting agendas, sign-in sheets, presentation slides and any other support documentation is located in Appendix C.

A final public meeting was held on March 16, 2017 to present the draft plan and invite public comments. The meeting was advertised in the local newspaper and also made available digitally on the Cameron County web site at: www.CameronCountyPa.com The Cameron County website was used to make a digital copy of the draft hazard mitigation plan available.

The public comment period remained open until April 20, 2017. All public comments were to be submitted in writing to Kevin Johnson, Director at the Cameron County Office of Emergency Services. No public comments were received during the public comment period. The draft plan location of the website did not show any activity and did not receive any comments from any agency or individual that accessed the draft plan.

Table 6 - HMP Process Timeline

Cameron County HMP Process - Timeline		
Date	**Meeting**	**Description**
07/26/2016	Cameron County Hazard Mitigation Plan (HMP) Kick-Off Meeting	Identified challenges and opportunities as they relate to fulfilling the DMA 2000 requirements. Identified existing studies and information sources relevant to the Hazard Mitigation Plan. Identified stakeholders, including the need to involve local officials.
08/23/2016	Local Planning Team Initial Meeting	Defined hazard mitigation planning and identified roles and responsibilities. Discussed the 2011 hazard mitigation plan and defined a timeline to complete the update.
01/19/2017	Public Meeting	Conducted a public meeting to review the draft risk assessment section of the Cameron County Hazard Mitigation Plan update.
01/19/2017 and 01/26/2017	Meeting with Municipal Officials	Educated county and local elected officials on the hazard mitigation planning process. Presented the findings of the hazard vulnerability analysis and risk assessment. Sought input for mitigation projects throughout the county. Distributed Hazard Mitigation Project Opportunity Forms.

Cameron County HMP Process - Timeline		
Date	**Meeting**	**Description**
03/16/2017	Cameron County Hazard Mitigation Plan – Draft Plan Review Public Meeting	An update of the hazard mitigation planning process was delivered. The Draft HMP was reviewed with the municipal representatives and public. Attendees were informed about the timeline and their opportunity to review the entire draft plan and provide written comments for inclusion into the plan.

3.4. Public and Stakeholder Participation

Cameron County engaged numerous stakeholders and encouraged public participation during the HMP update process. Advertisements for public meetings were completed utilizing the local newspaper and the Cameron County website. Copies of those advertisements are located in Appendix C. Municipalities and other county entities were invited to participate in various meetings and encouraged to review and update various worksheets and surveys. Copies of all meeting agendas, meeting minutes and sign-in sheets are located in Appendix C. Worksheets and surveys completed by the municipalities and other stakeholders are located in appendices of this plan update as well. Municipalities were also encouraged to review hazard mitigation related items with other constituents located in the municipality like businesses, academia, private and non-profit interests.

The tools listed below were distributed with meeting invitations, provided directly to municipalities to complete and return to the Cameron County Office of Emergency Services or at meetings to solicit information, data and comments from both local municipalities and other key stakeholders. Responses to these worksheets and surveys are available for review at the Office of Emergency Services.

1. **Risk Assessment Hazard Identification and Risk Evaluation Worksheet:** Capitalizes on local knowledge to evaluate the change in the frequency of occurrence, magnitude of impact and/or geographic extent of existing hazards and allows communities to evaluate hazards not previously profiled using the Pennsylvania Standard List of Hazards.
2. **Capability Assessment Survey:** Collects information on local planning, regulatory, administrative, technical, fiscal and political capabilities that can be included in the countywide mitigation strategy.
3. **Municipal Project Opportunity Forms and Mitigation Actions:** Copies of the 2011 mitigation opportunity forms that were included in the current HMP were provided to the municipalities for review and amendment. These opportunities are located in Appendix F. The previous mitigation actions were provided and reviewed at update meetings. New 2017 municipal project opportunity forms are included as well, located in Appendix G**.**

A schedule that provided appropriate opportunities for public comment was utilized during the review and drafting process. Any public comment that was received during public meetings or during the draft review of the plan were documented and included in the plan. Copies of newspaper public meeting notices, website posted public notices and other correspondence are included in Appendix C of this plan.

Cameron County invited all contiguous counties to review the 2017 draft hazard mitigation plan. A letter was sent to the county emergency management coordinator in Clinton County, Potter County, McKean County, Elk County and Clearfield County. Copies of these letters are included in Appendix C.

3.5. Multi-Jurisdictional Planning

Cameron County used an open, public process to prepare this HMP. Meetings and letters to municipal officials were conducted to inform and educate them about hazard mitigation planning and its local requirements. Municipal officials provided information related to existing codes and ordinances, the risks and impacts of known hazards on local infrastructure and critical facilities and recommendations for related mitigation opportunities. The pinnacle to the municipal involvement process was the adoption of the final plan. *Table 7 - Worksheets, Surveys and Forms Participation* reflects the municipality participation by completing worksheets, surveys and forms.

Table 7 - Worksheets, Surveys and Forms Participation

Municipality Participation in Worksheets, Surveys and Forms			
Municipality	**Capability Assessment Survey**	**Risk Assessment Hazard Identification and Risk Evaluation Worksheet**	**Hazard Mitigation Opportunity Form Review and Updates**
Driftwood Borough	**X**	**X**	**X**
Emporium Borough	**X**	**X**	
Gibson Township	**X**	**X**	**X**
Grove Township	**X**	**X**	
Lumber Township	**X**	**X**	**X**
Portage Township	**X**	**X**	
Shippen Township	**X**	**X**	**X**

All municipalities within Cameron County have adopted the 2011 Cameron County Hazard Mitigation Plan as the municipal hazard mitigation plan. The Cameron County Local Planning Team goal is 100% participation by municipalities in adopting the 2017 Cameron County Hazard Mitigation Plan.

4. Risk Assessment

4.1. Update Process Summary

A key component to reducing future losses is to first have a clear understanding of what the current risks are and what steps may be taken to lessen their threat. The development of the risk assessment is the critical first step in the entire mitigation process, as it is an organized and coordinated way of assessing potential hazards and risks. The risk assessment identifies the effects of both natural and manmade hazards and describes each hazard in terms of its frequency, severity and county impact. Numerous hazards were identified as part of the process.

A risk assessment evaluates threats associated with a specific hazard and is defined by probability and frequency of occurrence, magnitude, severity, exposure and consequences. The Cameron County risk assessment provides in-depth knowledge of the hazards and vulnerabilities that affect Cameron County and its municipalities. This document uses an all-hazards approach when evaluating the hazards that affect the county and the associated risks and impacts each hazard presents.

This risk assessment provides the basic information necessary to develop effective hazard mitigation/prevention strategies. Moreover, this document provides the foundation for the Cameron County Emergency Operations Plan (EOP), local EOPs and other public and private emergency management plans.

The Cameron County risk assessment is not a static document, but rather, is a biennial review requiring periodic updates. Potential future hazards include changing technology, new facilities and infrastructure, dynamic development patterns and demographic and socioeconomic changes into or out of hazard areas. By contrast, old hazards, such as brownfields and landfills, may pose new threats as county conditions evolve.

Using the best information available and Geographic Information Systems (GIS) technologies, the county can objectively analyze its hazards and vulnerabilities. Assessing past events is limited by the number of occurrences, scope and changing circumstances. For example, ever-changing development patterns in Pennsylvania have a dynamic impact on traffic patterns, population density and distribution, storm water runoff and other related factors. Therefore, limiting the risk assessment to past events is myopic and inadequate.

The Cameron County Local Planning Team reviewed and assessed the change in risk for all natural and manmade hazards identified in the 2011 hazard mitigation plan. The mitigation planning team then identified hazards that were outlined within the Pennsylvania Hazard Mitigation Plan but not included in the 2011 Cameron County Hazard

Mitigation Plan that could impact Cameron County. The team utilized the Hazard Identification and Risk Evaluation worksheet that was provided by the Pennsylvania Emergency Management Agency.

The Cameron County Project Team met with municipalities and provided guidance on how to complete the municipal hazard identification and risk evaluation worksheet. Seven (7) municipalities returned a completed worksheet. This information was combined with the county information to develop an overall list of hazards that would need to be profiled.

Once the natural and manmade hazards were identified and profiled, the local planning team then completed a vulnerability assessment for each hazard. An inventory of vulnerable assets was completed utilizing GIS data and local planning team knowledge. The team used the most recent Cameron County assessment data to estimate loss to particular hazards. Risk factor was then assessed to each profiled hazard utilizing the hazard prioritization matrix. 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.

4.2. Hazard Identification

4.2.1. Presidential and Gubernatorial Disaster Declarations

Table 8 - Presidential & Gubernatorial Disaster Declarations presents a list of all Presidential and Governor's Disaster Declarations that have affected Cameron County from 1972 through 2014, according to the Pennsylvania Emergency Management Agency.

Table 8 - Presidential & Gubernatorial Disaster Declarations

Presidential Disaster Declarations and Gubernatorial Declarations and Proclamations		
Date	**Hazard Event**	**Action**
September, 1955	Drought	Gubernatorial Declaration
January, 1966	Heavy snow	Gubernatorial Declaration
February, 1972	Heavy snow	Gubernatorial Declaration
June, 1972	Flood (Agnes)	Presidential Disaster Declaration
February, 1974	Truckers strike	Gubernatorial Declaration
January, 1978	Heavy snow	Gubernatorial Declaration
February, 1978	Blizzard	Gubernatorial Declaration
March, 1993	Blizzard	Presidential Emergency Declaration
January, 1994	Severe winter storms	Presidential Disaster Declaration
September, 1995	Drought	Gubernatorial Declaration
January, 1996	Severe winter storms	Presidential Disaster Declaration
January, 1996	Flooding	Presidential Disaster Declaration
July, 1999	Drought	Gubernatorial Declaration

Presidential Disaster Declarations and Gubernatorial Declarations and Proclamations		
Date	**Hazard Event**	**Action**
September, 1999	Hurricane Floyd	Presidential Disaster Declaration
December, 1999	Drought	Gubernatorial Declaration
September, 2003	Hurricane Isabel/Henri	Presidential Disaster Declaration
September, 2004	Tropical Depression Ivan	Presidential Disaster Declaration
September, 2005	Hurricane Katrina – to render mutual aid and to receive and house evacuees	Presidential Emergency Declaration
September, 2005	Hurricane Katrina	Gubernatorial Proclamation of Emergency
September, 2006	Tropical depression Ernesto	Gubernatorial Proclamation of Emergency
February, 2007	severe winter storm	Gubernatorial Proclamation of Emergency
February, 2007	waive the regulations regarding hours of service limitations for drivers of commercial vehicles	Gubernatorial Proclamation of Emergency
April, 2007	Severe storm	Gubernatorial Declaration
April, 2007	Severe winter storm	Gubernatorial Proclamation of Emergency
February, 2010	severe winter storm	Gubernatorial Proclamation of Emergency
October,2010	Hurricane Sandy	Presidential Emergency Declaration
January, 2011	Severe winter storm	Gubernatorial Proclamation of Emergency
September, 2011	Severe storms and flooding (Lee/Irene)	Gubernatorial Proclamation of Emergency
April, 2012	Spring winter storms	Gubernatorial Proclamation of Emergency
October, 2012	Hurricane Sandy	Gubernatorial Proclamation of Emergency
June, 2013	High winds, thunderstorms, heavy rain, tornado, flooding	Gubernatorial Proclamation of Emergency

Source: Pennsylvania Emergency Management Agency and Federal Emergency Management Agency

4.2.2. Summary of Hazards

The Cameron County Local Planning Team (LPT) was provided the Pennsylvania Standard List of Hazards to be considered for evaluation in the 2017 HMP Update. Following a review of the hazards considered in the 2011 HMP and the standard list of hazards, the local planning team decided that the 2017 plan should identify, profile and analyze 21 hazards. These hazards include all of the hazards profiled in the 2011 plan. The list below contains the 21 hazards that have the potential to impact Cameron County as identified through previous risk assessments, the Cameron County Hazard Vulnerability Analysis and input from those that participated in the 2017 HMP update. Hazard profiles are included in Section 4.3 for each of these hazards.

Identified Natural Hazards

Drought

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

Earthquake

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

Flood, Flash Flood, Ice Jam

Flooding is the temporary condition of partial or complete inundation on normally dry land and it is the most frequent and costly of all hazards in Pennsylvania. Flooding events are generally the result of excessive precipitation. General flooding is typically experienced when precipitation occurs over a given river basin for an extended period of time. Flash flooding is usually a result of heavy localized precipitation falling in a short time period over a given location, often along mountain streams and in urban areas where much of the ground is covered by impervious surfaces. The severity of a flood event is dependent upon a combination of stream and river basin topography and physiography, hydrology, precipitation and weather patterns, present soil moisture conditions, the degree of vegetative clearing as well as the presence of impervious surfaces in and around flood-prone areas. Winter flooding can include ice jams which occur when warm temperatures and heavy rain cause snow to melt rapidly. Snow melt combined with heavy rains can cause frozen rivers to swell, which breaks the ice layer on top of a river. The ice layer often breaks into large chunks, which float downstream, piling up in narrow passages and near other obstructions such as bridges and dams. All forms of flooding can damage infrastructure.

Hurricanes, Tropical Storms, Nor'easter

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

Invasive Species

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

Landslide

A landslide is the downward and outward movement of slope-forming soil, rock and vegetation reacting to the force of gravity. Landslides may be triggered by both natural and human-caused changes in the environment, including heavy rain, rapid snow melt, steepening of slopes due to construction or erosion, earthquakes and changes in groundwater levels. Mudflows, mudslides, 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. (Delano & Wilshusen, 2001).

Pandemic and Infectious Diseases

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

Radon Exposure

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

Subsidence, Sinkhole

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

Tornado, Wind Storm

A wind storm can occur during severe thunderstorms, winter storms, coastal storms, or tornados. 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. Tornados 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 tornados are a few dozen yards wide and touch down briefly, but even small, short-lived tornados 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 dam-

age. Waterspouts are weak tornados that form over warm water and are relatively uncommon in Pennsylvania. Each year, an average of over 800 tornados is reported nationwide, resulting in an average of 80 deaths and 1,500 injuries (NOAA, 2002). Based on NOAA Storm Prediction Center Statistics, the number of recorded F3, F4, & F5 tornados between 1950-1998 ranges from <1 to 15 per 3,700 square mile area across Pennsylvania (FEMA, 2009). A water spout is a tornado over a body of water (American Meteorological Society, 2009).

Wildfire

A wildfire is a raging, uncontrolled fire that spreads rapidly through vegetative fuels, exposing and possibly consuming structures. Wildfires often begin unnoticed and can spread quickly, creating dense smoke that can be seen for miles. Wildfires can occur at any time of the year, but mostly occur during long, dry hot spells. Any small fire in a wooded area, if not quickly detected and suppressed, can get out of control. Most wildfires are caused by human carelessness, negligence and ignorance. However, some are precipitated by lightning strikes and in rare instances, spontaneous combustion. Wildfires in Pennsylvania can occur in fields, grass, brush and forests. 98% of wildfires in Pennsylvania are a direct result of people, often caused by debris burns (PA DCNR, 1999).

Winter Storm

Winter storms may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. A winter storm can range from a moderate snowfall or ice event over a period of a few hours to blizzard conditions with wind-driven snow that lasts for several days. Many winter storms are accompanied by low temperatures and heavy and/or blowing snow, which can severely impair visibility and disrupt transportation. The Commonwealth of Pennsylvania has a long history of severe winter weather. (NOAA, 2009).

Identified Manmade Hazards

Civil Disturbance

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

Famine; involving a widespread scarcity of food leading to malnutrition and increased mortality (Robson, 1981).

Economic Collapse, Recession; Very slow or negative growth, for example (Economist, 2009).

Misinformation; erroneous information spread unintentionally (Makkai, 1970).

Civil Disturbance, Public Unrest, Mass Hysteria, Riot; group acts of violence against property and individuals, for example (18 U.S.C. § 232, 2008).

Strike, Labor Dispute; controversies related to the terms and conditions of employment, for example (29 U.S.C. § 113, 2008).

Dam Failure

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

Disorientation

Large numbers of people are attracted to Pennsylvania's rural areas for recreational purposes such as hiking, camping, hunting and fishing. As a result, people can become lost or trapped in remote and rugged wilderness areas. Search and rescue may be required for people who suffer from medical problems or injuries and those who become accidentally or intentionally disoriented. Search and rescue efforts are focused in and around state forest and state park lands (DCNR, 2009).

Environmental Hazards

Environmental hazards are hazards that pose threats to the natural environment, the built environment and public safety through the diffusion of harmful substances, materials, or products. Environmental hazards include the following:

Hazardous material releases; at fixed facilities or as such materials are in transit and including toxic chemicals, infectious substances, biohazardous waste and any materials that are explosive, corrosive, flammable, or radioactive (PL 1990-165, § 207(e)).

Air or Water Pollution; the release of harmful chemical and waste materials into water bodies or the atmosphere, for example (National Institute of Health Sciences, July 2009; Environmental Protection Agency, Natural Disaster PSAs, 2009).

Superfund Facilities; hazards originating from abandoned hazardous waste sites listed on the National Priorities List (Environmental Protection Agency, National Priorities List, 2009).

Manure Spills; involving the release of stored or transported agricultural waste, for example (Environmental Protection Agency, Environmental Impacts of..., 1998).

Product Defect or Contamination; highly flammable or otherwise unsafe consumer products and dangerous foods (Consumer Product Safety Commission, 2003).

Levee Failure

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

Terrorism

Terrorism is use of force or violence against persons or property with the intent to intimidate or coerce. Acts of terrorism include threats of terrorism; assassinations; kidnappings; hijackings; bomb scares and bombings; cyber-attacks (computer-based); and the use of chemical, biological, nuclear and radiological weapons. (FEMA, 2009).

Transportation Accidents

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

Urban Fire and Explosion

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

Utility Interruption

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

Geomagnetic Storms; including temporary disturbances of the Earth's magnetic field resulting in disruptions of communication, navigation and satellite systems (National Research Council et al., 1986).

Fuel or Resource Shortage; resulting from supply chain breaks or secondary to other hazard events, for example (Mercer County, PA, 2005).

Electromagnetic Pulse; originating from an explosion or fluctuating magnetic field and causing damaging current surges in electrical and electronic systems (Institute for Telecommunications Sciences, 1996).

Information Technology Failure; due to software bugs, viruses, or improper use (Rainer Jr., et al, 1991).

Ancillary Support Equipment; electrical generating, transmission, system-control and distribution-system equipment for the energy industry (Hirst & Kirby, 1996).

Public Works Failure; damage to or failure of highways, flood control systems, deep-water ports and harbors, public buildings, bridges, dams, for example (United States Senate Committee on Environment and Public Works, 2009).

Telecommunications System Failure; Damage to data transfer, communications and processing equipment, for example (FEMA, 1997)

Transmission Facility or Linear Utility Accident; liquefied natural gas leakages, explosions, facility problems, for example (United States Department of Energy, 2005)

Major Energy, Power, Utility Failure; interruptions of generation and distribution, power outages, for example (United States Department of Energy, 2000).

4.2.3. Climate Change

Impacts of Climate Change on Identified Hazards

Humans have become the dominant species on Earth and our society and influence is globalized. Human activity such as the large scale consumption of fossil fuels and deforestation has caused atmospheric carbon dioxide concentrations to significantly increase and a notable diversity of species to go extinct. The result is rapid climate change unparalleled in Earth's history and an extinction event approaching the level of a mass extinction (Barnosky et al., 2011; Wake & Vredenburg, 2008). The corresponding rise of average atmospheric temperatures is intensifying many natural hazards, and further threatening biodiversity. The effects of climate change on these hazards is expected to intensify over time as temperatures continue to rise, so it is prudent to be aware of how climate change is impacting natural hazards.

The most obvious change is in regard to extreme temperatures. As average atmospheric temperatures rise, extreme high temperatures become more threatening, with record high temperatures outnumbering record low temperatures 2:1 in recent years (Meehl et al., 2009). As climate change intensifies, it is expected that the risk of extreme heat will be amplified whereas the risk of extreme cold will be attenuated. Less immediately apparent, climate change could increase the prevalence of the West Nile Virus (Section 4.3.7). Some studies show increased insect activities during a similar rapid warming event in Earth's history (Curano et al., 2008). Other studies make projections that with the warming temperatures and lower annual precipitation that are expected with climate change, there will be an expansion of the suitable climate for mosquitos and West Nile Virus, potentially increasing the risk that the disease poses (Harrigan et al., 2014).

Climate change is likely to increase the risk of droughts (Section 4.3.1). Higher average temperatures means that more precipitation will fall as rain rather than snow, snow will melt earlier in the spring, and evaporation and transpiration will increase. Along with the prospect of decreased annual precipitation, the risk of hydrological and agricultural drought is expected to increase (Sheffield & Wood, 2008). Correspondingly this will impact wildfires (Section 4.3.11). Drought is accompanied by drier soils and forests, resulting in an elongated wildfire season and more intense and long-burning wildfires (Pechony & Shindell, 2010). However, the Southwest United States is at a greater risk of this increased drought and wildfire activity than Cameron County in the Eastern United States.

While it may seem counterintuitive considering the increased risk of drought, there is also an increased risk of flooding associated with climate change (Section 4.3.3). As previously mentioned, warmer temperatures mean more precipitation will fall as rain rather than snow. Combined with the fact that warmer air holds more moisture, the result is heavier and more intense rainfalls, increasing the risk of flooding and dam and levee failures. Similarly, winter storms are expected to become more intense, if possibly less frequent (Section 4.3.12). Climate change is also expected to result in more intense hurricanes and tropical storms (Section 4.3.4). With the rise of atmospheric temperatures, ocean surface temperatures are rising, resulting in warmer and moister conditions where tropical storms develop (Stott et al., 2010). A warmer ocean stores more energy, and is capable of fueling stronger storms. It is projected that the Atlantic hurricane season is elongating, and there will be more category 4 and 5 hurricanes than before (Trenberth, 2010).

Climate change is contributing to the introduction of new invasive species (Section 4.3.5). As maximum and minimum seasonal temperatures change, non-native species are able to establish themselves in previously inhospitable climates where they have a competitive advantage. This may shift the dominance of ecosystems in the favor of non-native species, contributing to species loss and the risk of extinction.

This type of sudden global change is novel to humanity. Despite the myriad of well thought out research, there is still much uncertainty surrounding the future of the Earth. All signs point to the intensification of the hazards mentioned above, especially if human society and individuals do not make swift and significant changes to reduce emissions and species losses.

4.3. Hazard Profiles

4.3.1. Drought

4.3.1.1 Location and Extent

While Pennsylvania is generally more water-rich than many U.S. states, the Commonwealth may be subject to drought conditions. A drought is broadly defined as a time period of prolonged dryness that contributes to the depletion of ground and surface water. Droughts are regional climatic events, so when such an event occurs in Cameron County, impacts are not restricted to the county and are often more widespread. The spatial extent of the impacted area can range from localized areas in Pennsylvania to the entire Mid-Atlantic region.

There are three types of drought:

Meteorological Drought – A deficiency of moisture in the atmosphere compared to average conditions. Meteorological drought is defined by the duration of the deficit and degree of dryness, and is often associated with below average rainfall. Depending on the severity of the drought, it may or may not have a significant impact on agriculture and the water supply.

Agricultural Drought – A drought inhibiting the growth of crops, due to a moisture deficiency in the soil. Agricultural drought is linked to meteorological and hydrologic drought.

Hydrologic Drought – A prolonged period of time without rainfall that has an adverse effect on streams, lakes, and groundwater levels, potentially impacting agriculture.

4.3.1.2 Range of Magnitude

The Commonwealth uses five parameters to assess drought conditions:

- Stream flows (compared to benchmark records);
- Precipitation (measured as the departure from normal, 30 year average precipitation);
- Reservoir storage levels in a variety of locations (especially three New York City reservoirs in Upper Delaware River Basin);
- Groundwater elevations in a number of counties (comparing to past month, past year and historic record); and
- Soil moisture via the Palmer Drought Index (*See Table 9 - Palmer Drought Severity Index* - a soil moisture algorithm calibrated for relatively homogeneous regions which measures dryness based on recent precipitation and temperature.

Table 9 - Palmer Drought Severity Index

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

Table 10 - Drought Preparation Phases (PA DEP)

Phase	General Activity	Actions	Request	Goal
Drought Watch	Early stages of planning and alert for drought possibility	Increased water monitoring, awareness and preparation for response among government agencies, public water suppliers, water users and the public	Voluntary water conservation	Reduce water use by 5%
Drought Warning	Coordinate a response to imminent drought conditions and potential water shortages	Reduce shortages, relieve stressed sources, develop new sources if needed	Continue voluntary water conservation, impose mandatory water use restrictions if needed	Reduce water use by 10-15%
Drought Emergency	Management of operations to regulate all available resources and respond to emergency	Support essential and high priority water uses and avoid unnecessary uses	Possible restrictions on all nonessential water uses	Reduce water use by 15%

Local Water Rationing: With the approval of the PA Emergency Management Council, local municipalities may 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 4 PA 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. [PEMA, 409 Plan]

4.3.1.3 Past Occurrence

Declared drought status for Cameron County from 1980 through 2016 as reported by the Pennsylvania Department of Environmental Protection (PA DEP) can be found in *Table 11 - Past Drought Events in Cameron County (PA DEP 2016),* as well as all previous drought related disaster declarations affecting Cameron County.

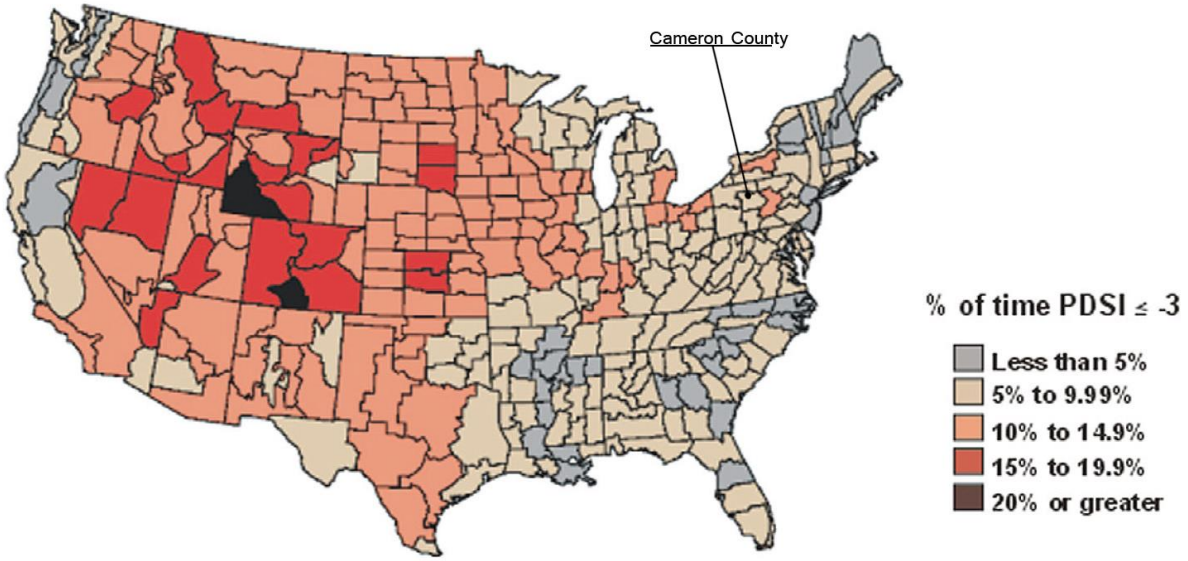
Figure 5 - Palmer Drought Severity Index History (1985-1995) shows that Cameron County has experienced severe drought (PDSI ≤ -3) between five and ten percent of time from 1895-1995, which gives a good idea of how often Cameron County has been affected by drought events.

Table 11 - Past Drought Events in Cameron County (PA DEP 2016)

Start Date	Duration	Drought Status	Start Date	Duration	Drought Status
Sept 1955		Emergency*	11/18/1980	1 year 5 months 3 days	Emergency
4/26/1985	7 months 24 days	Watch	7/7/1988	1 month 18 days	Watch
8/24/1988	3 months 19 days	Warning	3/3/1989	2 months 13 days	Watch
6/28/1991	27 days	Warning	7/24/1991	8 months 28 days	Emergency
4/20/1992	2 months 4 days	Warning	6/23/1992	2 months 20 days	Watch
9/1/1995	20 days	Warning	9/20/1995	1 month 20 days	Emergency*
11/8/1995	1 month 11 days	Warning	7/17/1997	3 months 28 days	Watch
12/3/1998	14 days	Warning	12/16/1998	3 months	Emergency
3/15/1999	2 months 27 days	Watch	7/20/1999	2 months 11 days	Emergency*
6/10/1999	1 month 11 days	Warning	9/30/1999	4 months 27 days	Warning*
2/25/2000	2 months 11 days	Watch	8/24/2001	8 months 20 days	Watch
9/5/2002	2 months 3 days	Watch	4/11/2006	2 months 20 days	Watch
8/6/2007	6 months 10 days	Watch	11/7/2008	2 months 20 days	Watch

Start Date	Duration	Drought Status	Start Date	Duration	Drought Status
9/16/2010	1 month 26 days	Watch	8/5/2011	29 days	Warning
9/2/2011	1 month 12 days	Watch	8/10/2016	3 months	Watch

Figure 5 - Palmer Drought Severity Index History (1985-1995)



Source: McKee et al. (1993); NOAA (1990); High Plains Regional Climate Center (1996)
Albers Equal Area Projection; Map prepared at the National Drought Mitigation Center

4.3.1.4 Future Occurrence

It is difficult to forecast the exact severity and frequency of future drought events, and the future of climate change will lead to increased uncertainty and extremity of climate events, suggesting that it is best to be prepared for potentially adverse conditions. Cameron County has experienced severe drought between five and ten percent of the time between 1895 and 1995, which can be used to make a rough estimate of the future probability of drought in Cameron County, although it does not account for uncertainty introduced by climate change.

Climate change is likely to increase the risk of droughts. Higher average temperatures means that more precipitation will fall as rain rather than snow, snow will melt earlier in the spring, and evaporation and transpiration will increase. Along with the prospect of decreased annual precipitation, the risk of hydrological and agricultural drought is expected to increase (Sheffield & Wood, 2008).

4.3.1.5 Vulnerability Assessment

The most significant losses resulting from drought events are typically found in the agriculture sector. The 1999 Gubernatorial Proclamation was issued in part due to significant crop damage. Preliminary estimates by the Department of Agriculture indicated possible crop losses across the Commonwealth in excess of $500 million. This estimate did not include a 20 percent decrease in dairy milk production which also resulted in million dollar losses (NCDC, 2009).

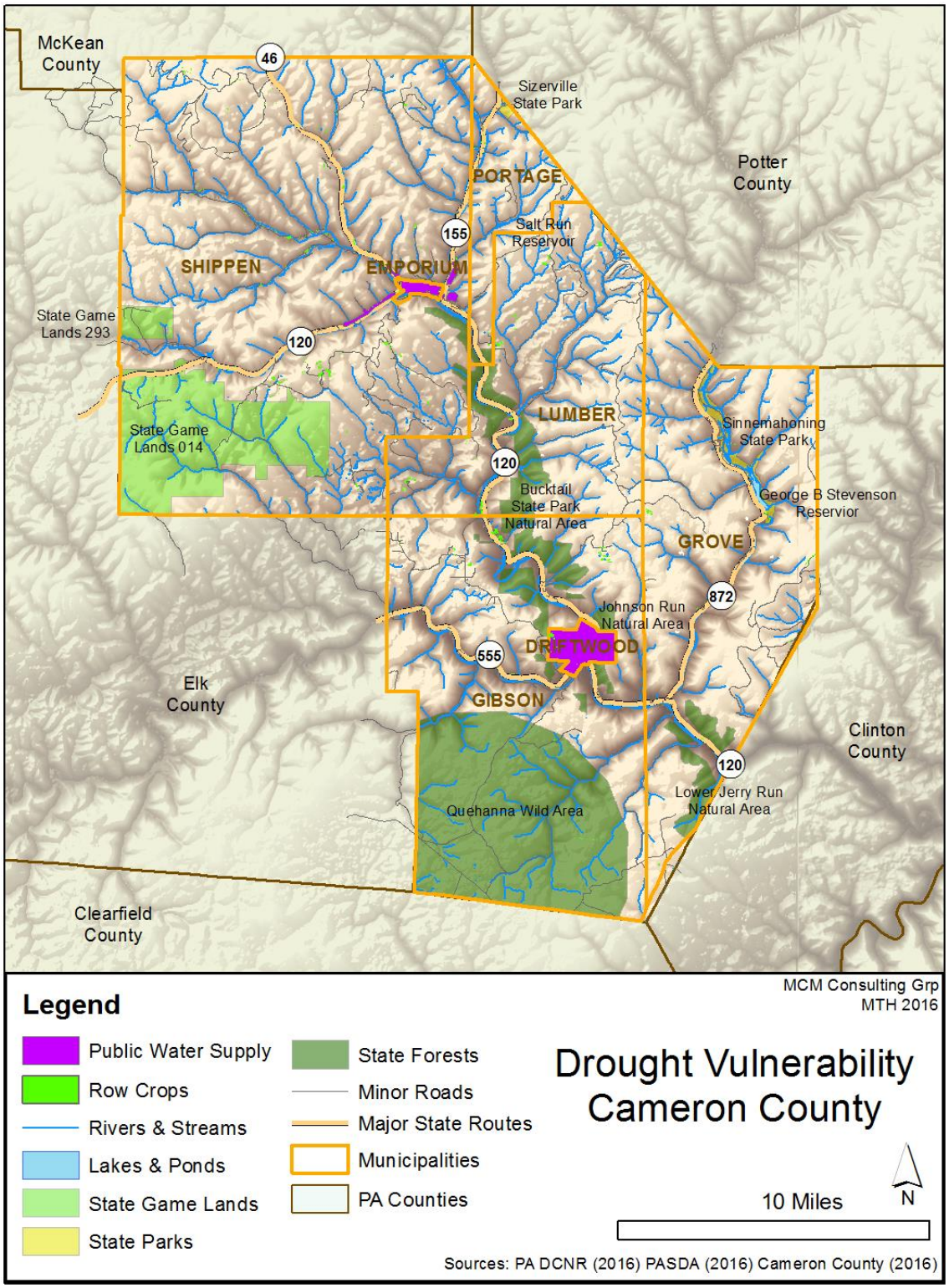
While these were statewide impacts, they illustrate the potential for droughts to severely impair the local economy in more agricultural communities. As of 2012, Cameron County ranks last of the 67 counties with agricultural production totaling $692,000; $378,000 from livestock, poultry and their products, and $314,000 from crops, including nurseries and greenhouses (USDA, 2012).

Water supplies are also vulnerable to the effects of drought. Public Water Service Areas only cover Emporium and Driftwood boroughs, in total covering ~1% of the county (see *Figure 6 - Drought Vulnerability*). The majority of the county relies on wells for their fresh drinking water. Droughts will quickly affect systems that rely on surface supplies, whereas systems with wells are more capable of handling short-term droughts without issue. Longer-term droughts inhibit the recharging of groundwater aquifers which has an impact on well owners. Depending on the severity of the drought, this could cause the well to dry up, rendering the well owner at a loss for useable water, meaning Cameron County residents who use private domestic wells are vulnerable to drought events. *Table 12 - Domestic Wells (PAGWIS, 2015)* shows the number of wells in each municipality in Cameron County. Well data was gathered from the Pennsylvania Groundwater Information System (PaGWIS), which relies on voluntary submissions by well drillers. While this is the best dataset of domestic wells available for Cameron County, it is not a complete due to the voluntary nature of the data submission.

Table 12 - Domestic Wells (PAGWIS, 2015)

Municipality	Reported Domestic Wells	Municipality	Reported Domestic Wells
Driftwood Borough	13	Emporium Borough	32
Gibson Township	99	Grove Township	106
Lumber Township	76	Portage Township	22
Shippen Township	222	Undesignated	26
		Total	**596**

Figure 6 - Drought Vulnerability



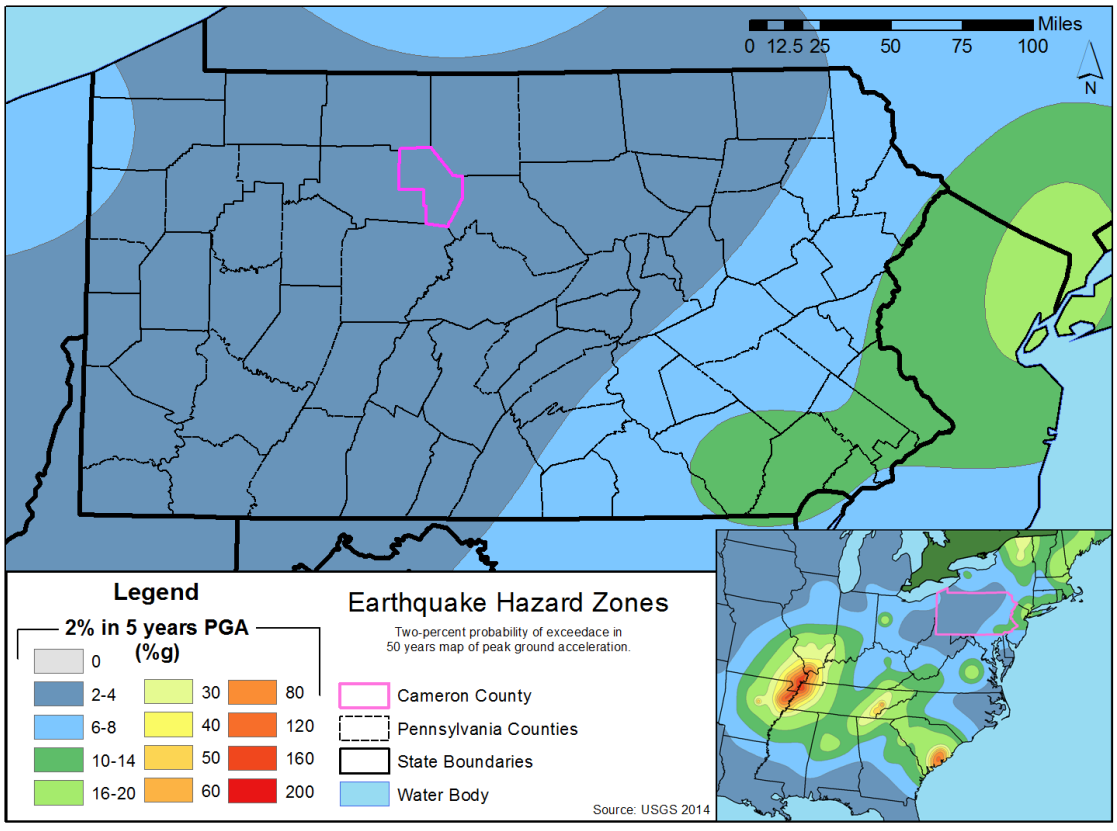
4.3.2. Earthquake

4.3.2.1 Location and Extent

An earthquake is sudden movement of the earth's surface caused by the release of stress accumulated within or along the edge off the earth's tectonic plates, a volcanic eruption, or by a manmade explosion (DCNR, 2007). Earthquake events in Pennsylvania, including Cameron County are usually mild events; impacting areas no greater than 100 km in diameter from the epicenter. A majority of earthquakes occur along boundaries between tectonic plates. Today, Eastern North America, including Cameron County, Pennsylvania, is far from the nearest plate boundary. That plate boundary is the Mid-Atlantic Ridge, and is approximately 2,000 miles to the east.

When the supercontinent of Pangaea broke up about 200 million years ago, the Atlantic Ocean began to form. This event produced many faults. Locating all of the faults would be an idealistic approach to identifying the region's earthquake hazard; however, many of the fault lines in this region have no seismicity associated with them. The best way to determine earthquake history for Cameron County is to conduct a probabilistic earthquake-hazard analysis, with the earthquakes that have already happened in and around the county (See *Figure 7 - Earthquake Hazard Zones*).

Figure 7 - Earthquake Hazard Zones



4.3.2.2 Range of Magnitude

Earthquakes result in the propagation of seismic waves, which are detected using seismographs. These seismograph results are measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake. *Table 13 - Richter Scale* summarizes Richter Scale Magnitudes as they relate to the spatial extent of impacted areas. The Modified Mercalli Intensity scale *(Table 14 - Modified Mercalli Intensity Scale*) is an alternative measure of earthquake intensity that is broken down by the impacts of the earthquake event.

Table 13 - Richter Scale

Richter Magnitude	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 in areas where people live up to about 100 kilometers across.
7.0-7.9	Major earthquake; can cause serious damage over large areas.
8.0 or greater	Great earthquake; can cause serious damage in areas several hundred kilometers across.

Table 14 - Modified Mercalli Intensity Scale

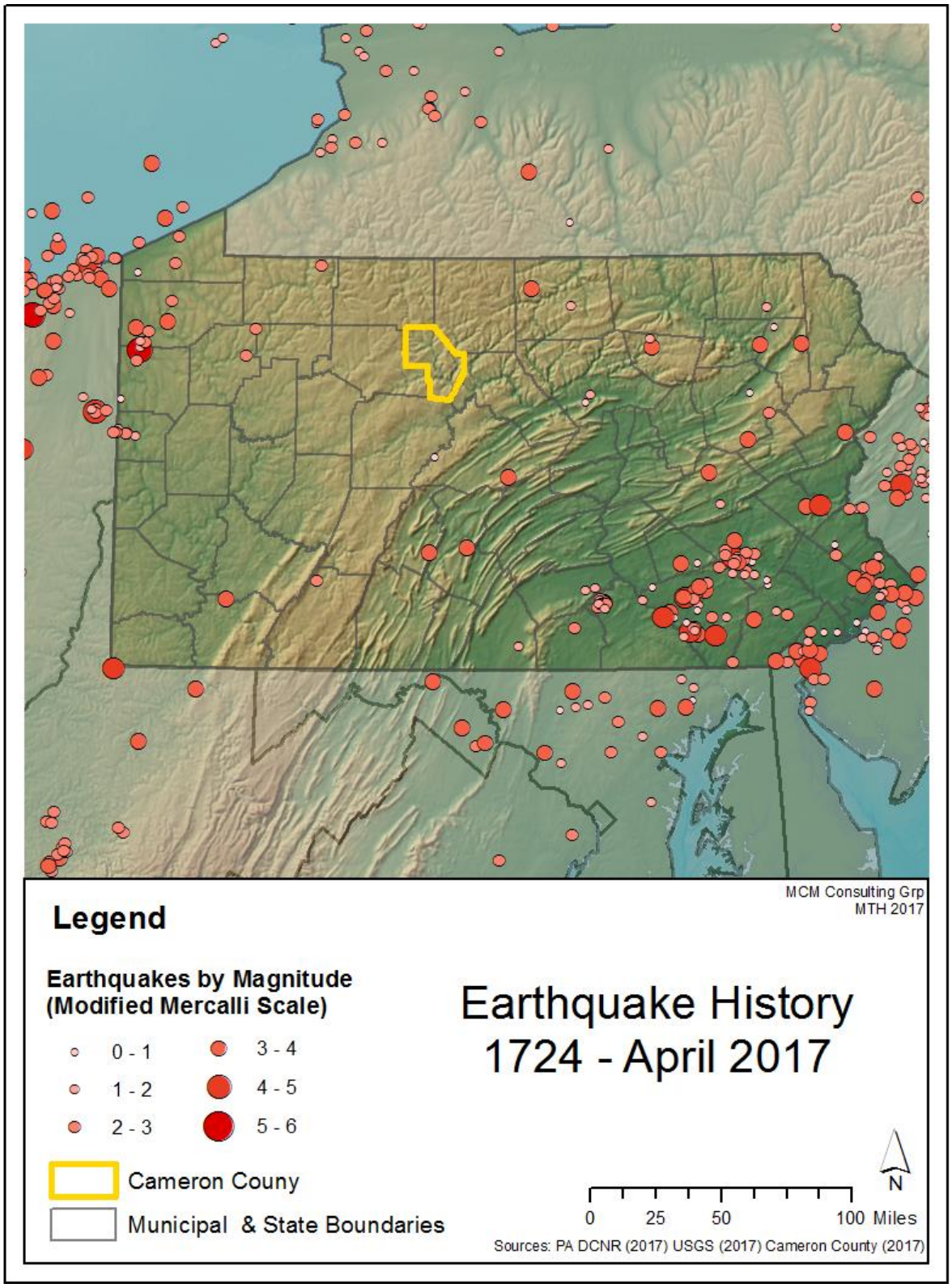
Scale	Intensity	Earthquake Effects	Richter Scale Magnitude
I	Instrumental	Detected only on seismographs	<4.2
II	Feeble	Some people feel it	
III	Slight	Felt by people resting; like a truck rumbling by	
IV	Moderate	Felt by people walking	
V	Slightly Strong	Sleepers awake; church bells ring	<4.8
VI	Strong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

The strongest recorded earthquake in Pennsylvania was a magnitude 5.1 on the Richter Scale, so it could be expected that effects of such an event could be felt in Cameron County from earthquake events that happen around the Commonwealth.

4.3.2.3 Past Occurrence

No earthquakes are recorded that originated in Cameron County. A total of eleven earthquake events occurred within 100 km of Cameron County since 1724, and all were minor quakes with Modified Mercalli magnitudes less than four. All earthquake events that occurred in the area surrounding Cameron County between 1724 and April 2017 can be seen in *Figure 8 - Earthquake History.*

Figure 8 - Earthquake History



4.3.2.4 Future Occurrence

Earthquake activity and intensities are difficult to predict, but a probabilistic analysis of prior earthquakes can assist in gauging the likelihood of future occurrences. No earthquakes are recorded as occurring in Cameron County, and *Figure 7 - Earthquake Hazard Zones* shows Cameron County in the lowest non-zero hazard zone for earthquake activity according to the USGS (2014), suggesting a low probability of earthquake occurrence.

4.3.2.5 Vulnerability Assessment

According to the U.S. Geological Society Earthquake Hazards Program, an earthquake hazard is anything associated with an earthquake that may affect a resident's normal activities. For Cameron County this could include: surface faulting, ground shaking, landslides, liquefaction, tectonic deformation, and seiches (sloshing of a closed body of water from earthquake shaking).

Earthquakes usually occur without warning, and can impact areas a great distance from their point of origin (epicenter). Ground shaking is the greatest risk to building damage within Cameron County. Risk to public safety and loss of life from an earthquake is dependent upon the severity of the event. Injury or death to those inside buildings, or people walking below building ornamentation and chimneys is a higher risk to Cameron County's general public during an earthquake.

4.3.3. Flood, Flash Flood and Ice Jams

4.3.3.1 Location and Extent

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 rapidly. Snow melt combined with heavy rains can cause frozen rivers to swell, which breaks the ice layer on top of a river. The ice layer often then breaks into large chunks, which float downstream, piling up in narrow passages and near other obstructions such as bridges and dams. All forms of flooding can damage infrastructure.

Floodplains are lowlands adjacent to rivers, streams and creeks that are subject to recurring floods. The size of the floodplain is described by the recurrence interval of a given flood. Flood recurrence intervals are explained in more detail in Section 4.3.3.4. 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% chance of occurring in a given year is smaller than the floodplain associated with a flood that has a 0.2% annual chance of occurring. The National Flood Insurance Program (NFIP) publishes digital flood insurance rate maps (DFIRMs). These maps identify the 1% annual chance of flood area. Special Flood Hazard Area (SFHA) and Base Flood Elevations (BFE) are developed from the 1% annual chance flood event, as seen in Figure 9 - Flooding and Floodplain Diagram. Structures located in the SFHA have a 26% chance of flooding in a 30 year period. The SFHA serves as the primary regulatory boundary used by FEMA, the Commonwealth of Pennsylvania and Cameron County local governments. Federal floodplain management regulations and mandatory flood insurance purchase requirements apply to the following high risk special flood hazard areas in *Table 15 - Flood Hazard High Risk Zones (FEMA, 2016)*. Appendix D of this hazard mitigation plan includes a flooding vulnerability map for each municipality in Cameron County with vulnerable structures and critical facilities identified.

Cameron County is located largely in the Sinnemahoning Watershed. Past flooding events have been primarily caused by heavy rains which cause small creeks and streams to overflow their banks, often leading to road closures. Flooding poses a threat to critical facilities, agricultural areas, and those who reside or conduct business in the floodplain. The most significant hazard exists for facilities in the floodplain that process, use and/or store hazardous materials. A flood could potentially release and transport hazardous materials out of these areas. As the water recedes it would spread the hazardous materials throughout the area. Most flood damage to property and structures located in the floodplain is caused by water exposure to the interior, high velocity water and debris flow.

Figure 9 - Flooding and Floodplain Diagram

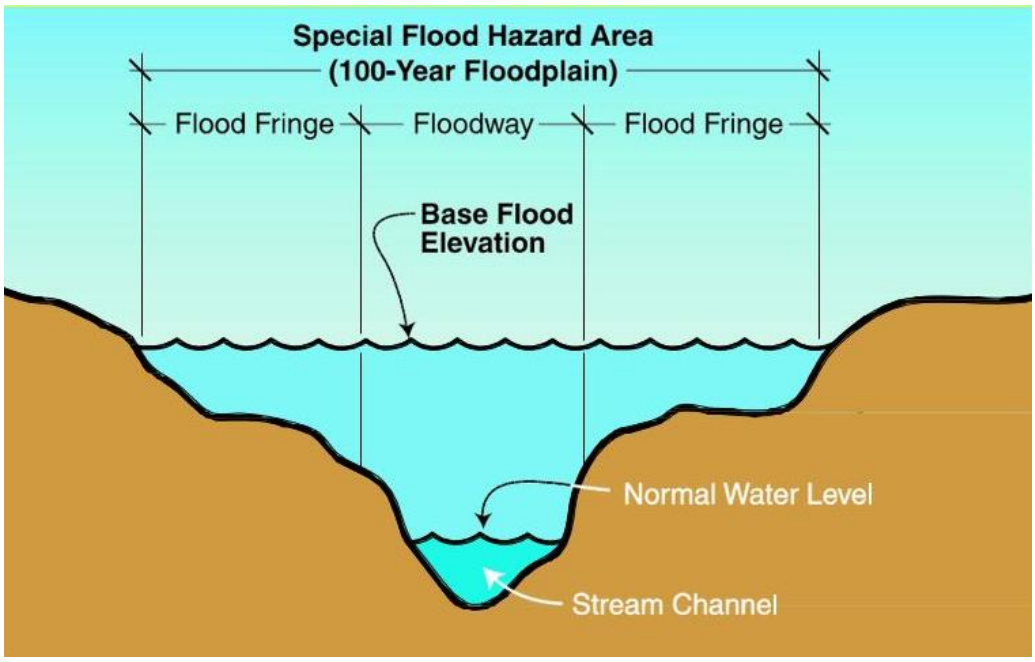


Table 15 - Flood Hazard High Risk Zones (FEMA, 2016)

Zone	Description
A	Areas subject to inundation by the 1% annual chance flood event. Because detailed hydraulic analysis have not been performed, no base flood elevations or flood depths are shown
AE	Areas subject to inundation by the 1% annual chance flood event determined by detailed methods. BFEs are shown within these zones.
AH	Areas subject to inundation by the 1% annual chance shallow flooding (usually areas of ponding) where average depths are 1-3 feet. BFEs derived from detailed hydraulic analysis are shown in this zone.
AO	Areas subject to inundation by the 1% annual chance shallow flooding (usually sheet flow on sloping terrain) where average depths are 1-3 feet. Average flood depths derived from detailed hydraulic analysis are shown within this zone.
AR	Areas that result from the decertification of a previously accredited flood protection system that is determined to be in the process of being restored to provide base flood protection.

4.3.3.2 Range of Magnitude

Several factors determine the severity of floods, including rainfall intensity and duration, topography, ground cover and rate of snowmelt. Water runoff is greater in areas with

steep slopes and little to no vegetative ground cover. The mountainous terrain of Cameron County can cause more severe floods as runoff reaches receiving water bodies more rapidly over steep terrain. Urbanization typically results in the replacement of vegetative ground cover with impermeable surfaces like asphalt and concrete, increasing the volume of surface runoff and stormwater, particularly in areas with poorly planned stormwater drainage systems. A large amount of rainfall over a short time span can cause flash floods. Additionally, small amounts of rain can cause floods in locations where the soil is frozen, saturated from a previous wet period, or if the area is rife with impermeable surfaces such as large parking lots, paved roadways and other developed areas. The county occasionally experiences intense rainfall from tropical storms in late summer and early fall which can potentially cause flooding as well.

In winter months, local flooding could be exacerbated by ice jams in rivers. Ice jam floods occur on rivers that are totally or partially frozen. A rise in stream level will break up a totally frozen river and create ice flows that can pile up on channel obstructions such as shallow riffles, log jams, or bridge piers. The jammed ice creates a dam across the channel over which the water and ice mixture continues to flow, allowing for more jamming to occur.

Severe flooding can cause injuries and deaths, and can have long-term impacts on the health and safety of the citizens. Severe flooding can also result in significant property damage, potentially disrupting the regular function of critical facilities and have long-term negative impacts on local economies. Industrial, commercial and public infrastructure facilities can become inundated with flood waters, threatening the continuity of government and business. The special needs population must be identified and located in flooding situations, as they are often home-bound. Mobile homes are especially vulnerable to high water levels. Flooding can have significant environmental impacts when flood waters release and/or transport hazardous materials, and can also result in spreading diseases.

Severe flooding also comes with many secondary effects that could have long lasting impacts on the population, economy and infrastructure of Cameron County. Power failures are the most common secondary effect associated with flooding. Coupled with a shortage of critical services and supplies, power failures could cause a public health emergency. Critical infrastructure, such as sewage and water treatment facilities, can be severely damaged, having a significant effect on public health. High flood waters can cause sewage systems to fail and overflow, contaminating groundwater and drinking water. Flooding also has the potential to trigger other hazards, such as landslides, hazardous material spills and dam failures.

The maximum threat of flooding in Cameron County is estimated by looking at potential loss data and repetitive loss data, both analyzed in the risk assessment portion of the hazard mitigation plan. In these cases, the severity and frequency of damage can result

in permanent population displacement, and businesses may close if they are unable to recover from the disaster.

Although floods can cause deaths, injuries and damage to property, they are naturally occurring events that benefit riparian systems which have not been disrupted by human actions. Such benefits include groundwater recharge and the introduction of nutrient rich sediment which improves soil fertility. However, human development often disrupts natural riparian buffers by changing land use and land cover, and the introduction of chemical or biological contaminants that often accompany human presence can contaminate habitats after flood events.

4.3.3.3 Past Occurrence

Cameron County has experienced numerous flooding, flash flooding and ice jam flooding events in the past. The flooding and flash flooding was caused by a variety of heavy storms, tropical storms, ice jams and other issues. A summary of flood event history for Cameron County is found in *Table 16 - Flood Event History* (NCEI, 2016; Knowledge Center, 2016; 2011 HMP).

Table 16 - Flood Event History (NCEI, 2016; Knowledge Center, 2016; 2011 HMP)

Date	Location & Description	Estimated Property Damage (USD)
1936	Countywide	$200,000
1942	Countywide; Severe Thunderstorm; Three deaths	$1,000,000
June, 1972	Countywide; Tropical Storm Agnes	not provided
6/18/1984	Countywide; Severe thunderstorm causing power outages, two lost bridges, minor mud slides	not provided
6/20/1989	Countywide; Tributaries of E. Branch Susquehanna overflowed. One home with major damage, 17 homes with minor damage, three camps with major damage. Major damage to Route 120 East approximately 21/2 miles east of Emporium	not provided
11/28/1993	Sinnemahoning; Flood/Flash Flood	not provided
8/18/1994	Countywide; Flood/Flash Flood	not provided
1/19/1996	Countywide; Damage to local homes, roads, bridges, businesses, and levees. Flooding of major roadways, power outages, evacuations in Gibson Township and Driftwood Borough, all major roads closed.	$5,000,000
2/20/1996	Countywide; Flood/Flash Flood	not provided
5/11/1996	Emporium; Flood/Flash Flood	not provided
8/9/2003	Emporium; Flood/Flash Flood; Flash flooding affected 50 homes in Emporium, mainly with basement flooding. Flooding and mudslides affected Routes 46, 120 and 555. Shippen Township reported damages to culvert pipes, guard rails, private driveways and bridges.	$50,000

Date	Location & Description	Estimated Property Damage (USD)
10/9/2003	Shippen Township; Flooding at Plank Hollow Road, bridges out, roadway undermined	not provided
11/19/2003	Countywide; Heavy rain caused flash flooding, closing roadways across the county, including Route 120 East and Plank Hollow Road	not provided
9/8/2004	Countywide; Flood as result of impacts of Hurricane	not provided
9/17/2004	Countywide; As a result of this excessive rainfall from Hurricane Ivan and antecedent heavy rainfall from the remnants of Hurricane Frances one week earlier, widespread flooding occurred throughout central Pennsylvania from 9/17/2004 through 9/20/2004. Flood levels at many locations ranked in the top 5 for all flood events, with many river forecast points cresting above levels reached in the January 1996, flood. The Sinnemahoning Creek exceeded its flood stage of 17 feet. The river rose above flood stage at 00:30 EST on the 18th, crested at 17.78 feet at 03:00 EST on the 18th, and fell below flood stage at 8:30 EST on the 18th. Moderate to major flooding was experienced on the larger tributaries of the Susquehanna River. The widespread flooding closed hundreds of roads and bridges across central Pennsylvania, causing a significant adverse impact on commerce and transportation for several days. Preliminary monetary estimates of flood damage from the remnants of Ivan across the state were over 260 million dollars.	$50,000,000
3/9/2009	Lumber Township Flooding and Roadway Closure	not provided
1/25/2010	Countywide; Flooding due to heavy rain and snow melt. Flooding occurred mainly along the Driftwood Branch of Sinnemahoning Creek. Several roads were closed due to flooding, including route 120 from the Emporium Country Club south to Driftwood. A temporary bridge was lost in Shippen Township Floyd's Road sustained significant damage due to flooding on Sinnemahoning Creek. Wyckoff Run Bridge was closed due to flooding as well.	not provided

Date	Location & Description	Estimated Property Damage (USD)
12/1/2010	Flooding due to heavy rain from Lawn View to NW Sitzerville: heavy rain fell in two distinct periods with the first round of 1-2 inches falling by the evening of November 30th. The second period of heavy rain fell overnight into the afternoon on December 1st. The initial rainfall on the 30th resulted in antecedent conditions that proved to be very favorable for significant flooding. The flooding continued to worsen through the morning of the 1st and reached a pinnacle during the afternoon and evening on the 2nd before stream levels and flood waters slowly receded into the morning of the 3nd. Cold season hydrologic conditions (non-receptive or partially frozen soils) contributed to enhanced runoff and poor drainage. Dozens of state, county and municipal roads were closed. Numerous basements were flooded. The Stevenson Dam was closely monitored for potential flooding as the with pool elevation approached (but crested short of) 1000 feet.	$200,000
2/28/2011	Countywide Flooding	not provided
7/27/2011	Countywide Flooding	not provided
9/29/2015	Countywide Flooding	not provided

The National Flood Insurance Program identifies properties that frequently experience flooding. *Repetitive loss properties* are structures insured under the NFIP which have had at least two paid flood losses of more than $1,000 over any ten year period since 1978. A property is considered a *severe repetitive loss property* either when there are at least four losses each exceeding $5,000 or when there are two or more losses where the building payments exceed the property value. As of October 2016, there is only one repetitive loss property in Cameron County. The property is a single family dwelling located in Lumber Township that experienced significant flood damage on both 1/19/1996 and 9/17/2004. Information about NFIP policies can be found in *Table 17 - Municipal NFIP Policies*.

Table 17 - Municipal NFIP Policies

Municipality	Losses	Average Payment ($)	Active Contracts	Average Premium ($)	Cancelled Contracts	Expired Contracts	Total Records	Repetitive Loss Properties
Driftwood Boro	5	$1,513.60	4	$815.75	0	53	62	0
Emporium Boro	5	$3,788.40	19	$2,016.42	34	94	152	0
Gibson Twp	9	$13,577.78	3	$1,563.67	9	81	102	0
Grove Twp	14	$13,675.71	6	$817.33	3	128	151	0
Lumber Twp	17	$8,893.06	11	$1,577.18	23	122	173	1
Portage Twp	5	$2,948.60	13	$668.46	19	108	145	0
Shippen Twp	23	$2,408.48	104	$1,222.76	208	618	953	0

4.3.3.4 Future Occurrence

Table 18 - Flood Probability Summary (FEMA)

Flood Recurrence Intervals	Annual Chance of Occurrence
10-year	10.00%
50-year	2.00%
100-year	1.00%
500-year	0.20%

Flooding is a frequent problem throughout Pennsylvania. The probability of a flooding event impacting Cameron County is highly likely. Cameron County experiences some degree of flooding annually. The threat of flooding is compounded in the late winter and early spring months, as melting snow can overflow streams, creeks and tributaries, increasing the amount of groundwater, clogging stormwater culverts and bridge openings. The NFIP recognizes the 1%-annual-chance flood, also known as the base flood or 100 year flood, as 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, or is likely once every 100 years. The digital flood insurance rate maps (DFIRMs) are used to identify areas subject to the 1% annual-chance flooding as seen in *Figure 10 - Flooding Vulnerability*. A property's vulnerability to a flood is dependent upon its location in the floodplain. Properties along the banks of a waterway are the most vulnerable. The property within the floodplain is broken into sections depending on its distance from the waterway. The 10-year flood zone is the area that has a 10 percent chance of being flooded every year. However, this label does not mean that this area can-not flood more than once every 10 years. It just designates the probability of a flood of this magnitude every year. Further away from this area is the 50-year flood-plain. This area includes all

of the 10-year floodplain plus additional property. The probability of a flood of this magnitude occurring during a one-year period is two percent. A summary of flood probability is shown in *Table 18 - Flood Probability Summary* (FEMA).

4.3.3.5 Vulnerability Assessment

River and Stream Flooding:

Cameron County is vulnerable to flooding events. Flooding puts the entire population at some level of risk, whether through the flooding of homes, businesses, places of employment, or the road, sewer and water infrastructure. *Table 20 - Critical Facilities Vulnerable to Flooding* (Cameron County GIS, 2016) identifies the critical facilities and SARA Title III facilities within Cameron County that are located within the special flood hazard area. Both SARA Title III facilities that are located in Cameron County are in the 100 year floodplain. *Table 19 - Addressable Structures Vulnerable to Flooding* (Cameron County GIS, 2016) identifies the quantity of structures that are located in the special flood hazard area by municipality. The structures were identified using county GIS data. Critical facilities are facilities that if damaged would present an immediate threat to life, public health and safety. Critical Facilities and structures located in Emporium or close to Portage and Sinnemahoning Creeks are most vulnerable to the effects of flooding. Appendix D of this hazard mitigation plan includes a flooding vulnerability map for each municipality in Cameron County with vulnerable structures and critical facilities identified.

Flash Flooding:

Flash flooding can occur anywhere within Cameron County when the conditions are right - there are records of flash floods in Emporium Borough and the Sinnemahoning Creek has been prone to rapid swelling and flash flooding events in the past.

Ice Jam Flooding:

Ice jams are an annual occurrence, especially at Moateville, south of Emporium on Route 120.

Table 19 - Addressable Structures Vulnerable to Flooding (Cameron County GIS, 2016)

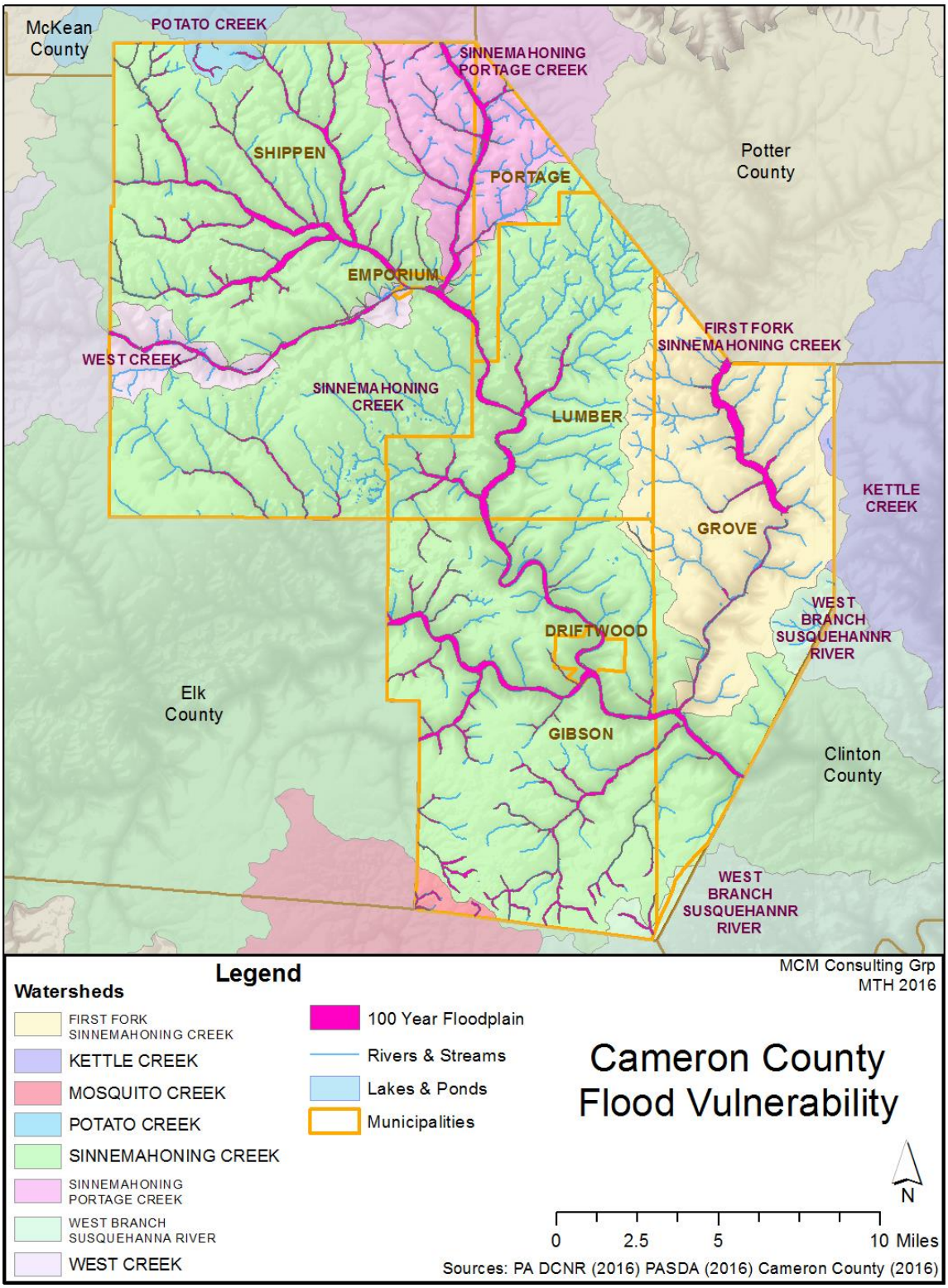
Municipality	Number of Addressable Structures	Total Land Value
Driftwood	86	$ 999,820
Emporium	68	$ 3,641,285
Gibson	348	$ 4,503,364
Grove	257	$ 4,814,078
Lumber	174	$ 2,078,979
Portage	166	$ 2,645,595
Shippen	1382	$ 30,547,265
Total	**2481**	**$ 49,230,386**

Table 20 - Critical Facilities Vulnerable to Flooding (Cameron County GIS, 2016)

Type	Name	Description	Address	Municipality
Communication Tower	Commonwealth of Pa. OPRS PSP	800 MHz Site CAME616	4027 Low Grade Rd.	GIBSON
Communication Tower	Commonwealth of Pa. OPRS PSP	800 MHz Site CAME693	6531 Low Grade Rd.	GIBSON
Communication Tower	Commonwealth of Pa. OPRS PSP	800 MHz Site CAME646	5690 Rt. 46	SHIPPEN
Communication Tower	Commonwealth of Pa. OPRS PSP	800 MHz Site CAME629	1570 Four Mile Rd.	SHIPPEN
Communication Tower	Commonwealth of Pa. OPRS PSP	800 MHz Site CAME649	3603 Rich Valley Rd.	SHIPPEN
Communication Tower	Commonwealth of Pa. OPRS PSP	800 MHz Site CAME648	2113 Clear Creek Rd.	SHIPPEN
Communication Tower	Commonwealth of Pa. OPRS PSP	800 MHz Site CAME695	824 First Fork Rd.	GROVE
Political Infrastructure	Driftwood Senior Center	Polling/Shelter	7806 Bridge St.	DRIFTWOOD
Water Infrastructure	Driftwood Water Company	Well/Pump	7705 Bridge St.	DRIFTWOOD
Water Infrastructure	Emporium Water Company	Water Facility	174 Nickler Rd.	SHIPPEN
Water Infrastructure	Emporium Water Company	Towner Run Tank/Pump		SHIPPEN
Water Infrastructure	Emporium Water Company	Intake Pump		EMPORIUM
Health Care	George B. Erskine Health Care & Wellness Center	Health Care/Polling	288 Sizerville Rd.	SHIPPEN
Political Infrastructure	Gibson Township Building	Gibson Municipal Building/Polling	7656 Bridge St.	DRIFTWOOD

Type	Name	Description	Address	Municipality
Political Infrastructure	Grove Township Building	Grove Municipal Building/Polling	246 Railroad St.	GROVE
Day Care	Jane Ullman Day Care	Day Care/Special Needs	383 Arch Dr.	SHIPPEN
Political Infrastructure	Lumber Township Building	Lumber Municipal Building/Polling	281 Sterling Run Rd.	LUMBER
Water Infrastructure	Mid-Cameron Authority	Sewage Treatment Facility	718 S. Mountain Rd.	SHIPPEN
Political Infrastructure	Shippen Township	Shippen Municipal Building/Polling	1681 Rich Valley Rd.	SHIPPEN
EMS	Sinnemahoning Fire Department	Fire Dept/U.S. Post Office/Shelter	186 Railroad St.	GROVE
Dam	George B Stevenson Dam			GROVE
SARA Tier III	Emporium Water Company	Water Facility	174 Nickler Rd.	SHIPPEN
SARA Tier III	Mid-Cameron Authority	Sewage Treatment Facility	718 S. Mountain Rd.	SHIPPEN

Figure 10 - Flooding Vulnerability



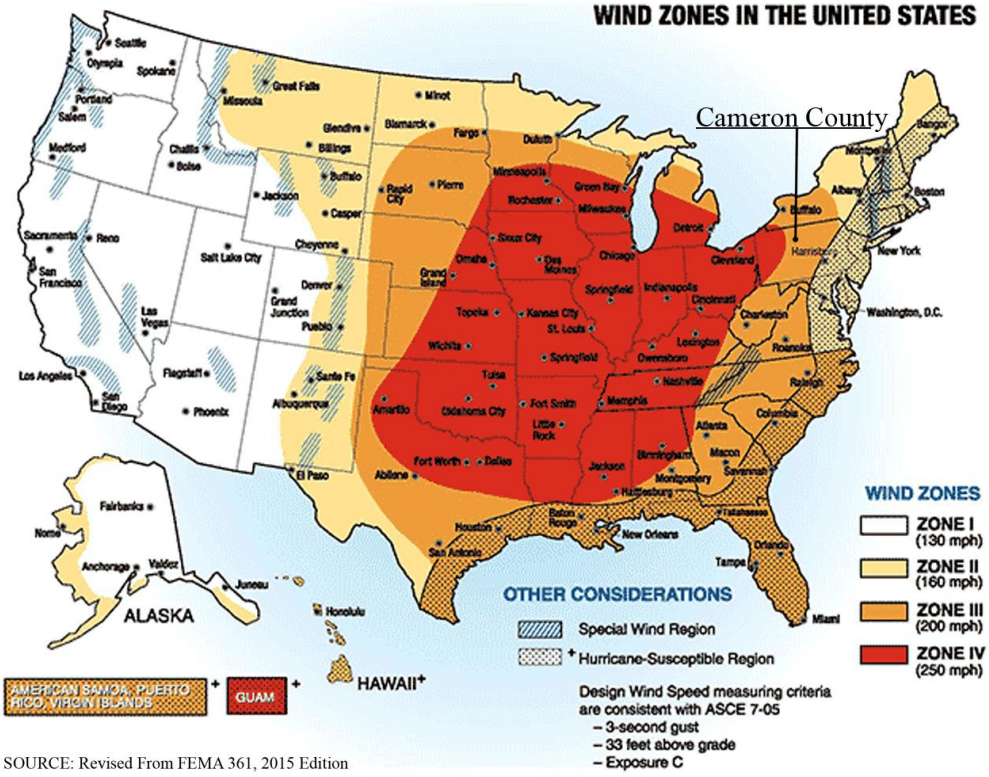
4.3.4. Hurricane, Tropical Storm

4.3.4.1 Location and Extent

Tropical depressions are cyclones with maximum sustained winds of less than 39 miles per hour (mph). The system becomes a tropical storm when the maximum sustained winds reach between 39-74 mph. When wind speeds in exceed 74 mph, the system is considered a hurricane. Tropical storms impacting Cameron County develop in tropical or sub-tropical waters found in the Atlantic Ocean, Gulf of Mexico, or Caribbean Sea.

While Cameron County is located over 250 miles from the Atlantic Coast, tropical storms can track inland causing heavy rainfall and strong winds, however Cameron County is not located within the high risk regions for hurricanes (see *Figure 11 - Wind Zones*). Cameron County falls within Zone III, meaning it is suggested that shelters and critical facilities should be able to withstand a 3-second gust of wind of up to 200 mph. Tropical Storms and Hurricanes are regional and seasonal events that can impact very large areas hundreds to thousands of miles across over the life the storm. Hurricane season is typically June to November. All communities within Cameron County are equally subject to the impacts of hurricanes and tropical storms that track through or near the county. Areas in Cameron County which are subject to flooding, wind, and winter storm damage are particularly vulnerable.

Figure 11 - Wind Zones



4.3.4.2 Range of Magnitude

The impact tropical storm or hurricane events have on an area is typically measured in terms of wind speed. Expected damage from hurricane force winds is measured using the Saffir-Simpson Scale *(Table 21 - Saffir-Simpson Scale)*. The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds, barometric pressure, and storm surge potential (characteristic of tropical storms and hurricanes, but not a threat to inland locations like Cameron County). Categories 3, 4, and 5 are classified as "major" hurricanes. While major hurricanes comprise only 20 of all tropical cyclones making landfall, they account for over 70 percent of the damage in the United States.

Table 21 - Saffir-Simpson Scale

Saffir-Simpson Hurricane Scale		
Category	Wind Speed	
	mph	knots
5	≥156	≥135
4	131-155	114-134
3	111-130	96-113
2	96-110	84-95
1	74-95	65-83
Non-Hurricane Classifications		
Tropical Storm	39-73	34-64
Tropical Depression	0-38	0-33

It is important to recognize the potential for flooding events during hurricanes and tropical storms; the risk assessment and associated impact for these events is included Section 4.3.4. Wind impacts in Cameron County generally include downed trees and utility poles, which can spark widespread utility interruptions. Wind impacts are particularly an issue for mobile homes and other manufactured housing; these structures are often not well-anchored and are highly susceptible to wind damage in a hurricane, tropical storm, or Nor'easter.

4.3.4.3 Past Occurrence

Table 22 - History of Coastal Storms Impacting Cameron County (NCEI, 2016)lists all coastal storms that have impacted Cameron County from 1970 to October 2016. Although impacts of tropical storms are commonly felt in the Commonwealth, it is rare that a hurricane would track through Cameron County.

Table 22 - History of Coastal Storms Impacting Cameron County (NCEI, 2016)

Year	Name	Year	Name
1972	Tropical Storm Agnes	2006	Tropical Depression Ernesto
1999	Hurricane Floyd	2008	Hurricane Ike
2003	Tropical Storm Henri	2011	Hurricane Irene
2003	Tropical Storm Isabel	2011	Tropical Storm Lee
2004	Tropical Depression Ivan	2012	Hurricane Sandy

Year	Name	Year	Name
2005	Hurricane Katrina		

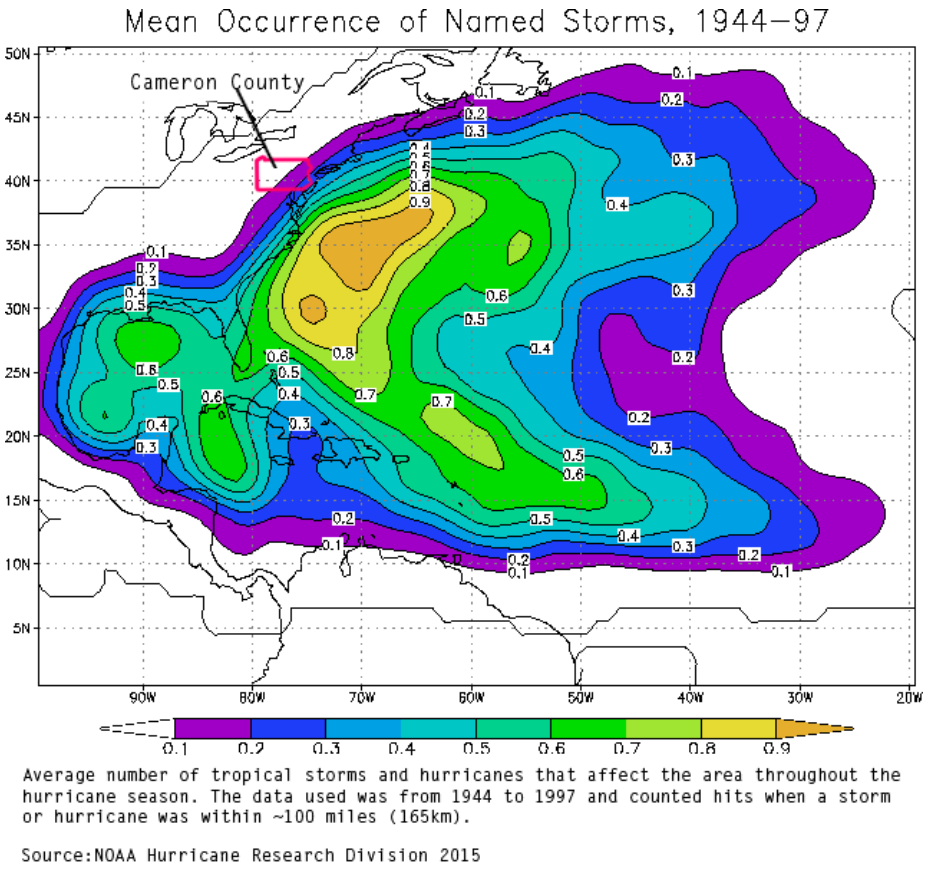
4.3.4.4 Future Occurrence

Although hurricanes and tropical storms can cause flood events consistent with 100 and 500 year flood levels, the probability of occurrence of hurricanes and tropical storms is measured relative to wind speed. *Table 23 - Annual Probability of Wind Speeds* (FEMA, 2000) shows the annual probability of winds that reach the strength of tropical storms and hurricanes in Cameron County and the surrounding areas based on a sample period of 46 years.

Table 23 - Annual Probability of Wind Speeds (FEMA, 2000)

Wind Speed (mph)	Saffir-Simpson Scale	Annual Probability of Occurrence (%)
45-77	Tropical Storms// Category 1 Hurricane	91.59
78-118	Category 1 to 2 Hurricanes	8.32
119-138	Category 3 to 4 Hurricanes	.0766
139-163	Category 4 to 5 Hurricanes	.0086
164-194	Category 5 Hurricanes	.00054
195+	Category 5 Hurricanes	.00001

Figure 12 - Mean Occurrence of Named Storms (NOAA Hurricane Research Division, 2015)



According to FEMA (*Table 23 - Annual Probability of Wind Speeds* (FEMA, 2000), there is high probability (~92%) each year that Cameron County will experience winds of 45-77 mph, however there is under a 10% chance of winds of 78-118 mph. While this data from FEMA is not specific to cyclonic winds, they could cause minimal to moderate damages. NOAA's Hurricane Research Division estimates that Cameron County will experience impacts from a named tropical storm or hurricane with a probability of less than 10% annually. *Figure 12 - Mean Occurrence of Named Storms (NOAA Hurricane Research Division, 2015).*

Climate change is causing atmospheric temperatures to rise, and correspondingly ocean surface temperatures to rise resulting in warmer and moister conditions where tropical storms develop (Stott et al., 2010). Warmer oceans store more energy, and are capable of fueling stronger storms and it is projected that Atlantic hurricanes will become more intense and produce more precipitation as surface temperatures rise (Trenberth, 2010). There are expected to be more category 4 and 5 hurricanes in the Atlantic, and the hurricane season may be elongating. Cameron County can be affected by Atlantic coastal storms, so the county should be prepared to deal with impacts of coastal storms more frequently in the future.

4.3.4.5 Vulnerability Assessment

While Cameron County is located somewhat distally from the Atlantic coast, hurricanes and tropical storms tracking nearby can still cause high winds and heavy rains. A vulnerability assessment for hurricanes and tropical storms focuses on the impacts of flooding and severe wind. The assessment for flood-related vulnerability is addressed in Section 4.3.3.5 and vulnerability to wind damage is addressed in Section 4.3.9.5.

4.3.5. Invasive Species

4.3.5.1 Location and Extent

An invasive species is a species that is not indigenous to a given ecosystem and that, when introduced to a non-native environment, tends to thrive. The spread of an invasive species often alters ecosystems, which can cause environmental and economic harm and pose a threat to human health. The phenomena of invasive species is due to human activity. Human society is globalized, and people have the capability to traverse the globe at rates unparalleled in the history of the Earth. Either intentionally or unintentionally, other species may accompany people when they travel, introducing the stowaway species to a novel ecosystem. In a foreign ecosystem, a transported 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
- 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
- Invasive species threats are typically divided into two main subsets:

Aquatic Invasive Species (AIS) are nonnative, invertebrates, fish, 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 24 - Invasive*

Species Threats (EDD Maps, 2016; PA DCNR, 2016; USDA FS, 2016)lists invasive species that have been found in Cameron County as well as invasive species that were found near Cameron County and could spread into the county.

4.3.5.2 Range of Magnitude

Some invasive species are not considered agricultural pests and do not harm humans. Other invasive species can have many negative impacts and cause significant changes in the composition of ecosystems. For example, the Emerald Ash Borer has a 99% mortality rate for any ash tree it infects. Didymo, an aggressive form of algae not yet found in Cameron County, can clog waterways and smother native aquatic plants and animals.

The aggressive nature of many invasive species can cause significant reductions in biodiversity by crowding out native species. This can affect the health of individual host organisms as well as the overall well-being of the affected ecosystem. An example of a possible worst-case scenario for invasive species is the presence of the Emerald Ash Borer in Cameron County. There is a high mortality rate for trees associated with the Emerald Ash Borer and hardwood forests in the county are in danger due to this invasive species. Degradation of forest health cascades into other problems. Among other benefits, forests prevent soil degradation and erosion, protect watersheds, and sequester carbon from the atmosphere. Forests have a key role in hydrologic systems, so losing a forest amplifies the effects of erosion and flooding. Forest degradation also has adverse economic effects, impacting such activities as logging, tourism, and other production activities dependent on lumber.

The magnitude of an invasive species threat is generally amplified when the ecosystem or host species is already stressed, such as in times of drought. The already weakened state of the native ecosystem causes it to more easily succumb to an infestation.

4.3.5.3 Past Occurrence

Invasive species have been entering Pennsylvania since the arrival of European settlers. *Table 24 - Invasive Species Threats* (EDD Maps, 2016; PA DCNR, 2016; USDA FS, 2016)lists all invasive species that are established in Cameron County that pose a threat. Some invasive species such as the Elongate Hemlock Scale, European Bark Beetle, and Sirex Woodwasp are widespread in the region surrounding Cameron County. While Cameron County can work towards mitigating the negative impacts of such widespread species, controlling the spread of the species is more difficult. For some of these species, Cameron County is on the edge of the species range, meaning control efforts taken in the county can help limit the propagation of the threat even beyond the County.

In 2014, the county targeted sixteen sites for chemical treatment where invasive plants were widespread. The species treated included: Japanese knotweed, Japanese barberry, oriental bittersweet, thistle species, multifloral rose, spotted knapweed, Japanese stiltgrass, and goats rue. A summary of the 2014 – 2016 invasive plant treatment locations

and actions can be found in *Table 25 - Invasive Plant Treatment Actions 2014* Each location received treatment in 2014, 2015 and 2016.

Table 24 - Invasive Species Threats (EDD Maps, 2016; PA DCNR, 2016; USDA FS, 2016)

Reported in Cameron County		
Scientific Name	**Common Name**	**Type**
Corbicula fluminea	Asiatic Clam	Aquatic Animal
Orconectes rusticus	Rusty Crayfish	Aquatic Animal
Persicaria hydropiper	Marshpepper Knotweed, Smartweed	Aquatic Plant
Asterolecarnium sp.	Oak Pit Scale A. Minus	Disease
Ceratocystis fagacearum	Oak Wilt	Disease
Cronartium ribicola	White Pine Blister Rust	Disease
Cryphonectria parasitica	Chestnut Blight	Disease
Cryptococcus fagisula & Nectria coccinea var. faginata	Beech Bark Disease Com-plex	Disease
Discula destructiva	Dogwood Anthracnose	Disease
Neonectria faginata	Neonectria Canker	Disease
Sirococcus clavigignenti-juglandacearum	Butternut Canker	Disease
Adelges tsugae	Hemlock Woolly Adelgid	Insect/Invertebrate
Agrilus planipennis	Emerald Ash Borer	Insect/Invertebrate
Choristoneura conflictana	Large Aspen Tortrix	Insect/Invertebrate
Christoneura fumiferana	Spruce Budworm	Insect/Invertebrate
Lymantria dispar	Gypsy Moth	Insect/Invertebrate
Popillia japonica	Japanese Beetle	Insect/Invertebrate
Pristiphora erichsonii	Larch Sawfly	Insect/Invertebrate
Rhinoncomimus latipes	Mile-a-minute Weevil	Insect/Invertebrate
Tomicus piniperda	Pine Shoot Beetle	Insect/Invertebrate
Acer platanoides	Norway Maple	Plant
Aegopodium podagraria	Bishop's Goutweed	Plant
Ailanthus altissima	Tree-of-Heaven	Plant
Cardamine impatiens	Touch-me-not Bittercress	Plant
Celastrus orbiculata; Celastrus orbicula-tus	Oriental Bittersweet	Plant
Elaeagnus umbellata	Autumn Olive	Plant
Galega officinalis	Goatsrue; Common Milkpea	Plant
Hesperis matronalis	Dame's Rocket	Plant
Lonicera maackii	Amur Honeysuckle	Plant
Lonicera morrowii	Morrow's Honeysuckle	Plant
Microstegium vimineum	Japanese Stiltgrass, Nepa-lese Browntop	Plant
Myosotis scorpioides	True Forget-me-not	Plant
Ornithogalum umbellatum	Common Star-of-bethlehem	Plant

Scientific Name	Common Name	Type
Phalaris arundinacea	Reed Canary Grass	Plant
Polygonum cuspidatum; Fallopia japonica var. japonica	Japanese Knotweed	Plant
Polygonum perfoliatum; Persicaria perfoliata	Mile-a-minute-weed	Plant
Rhamnus cathartica	Buckthorn	Plant
Rosa multiflora	Multiflora Rose	Plant
Rumex crispus	Curly Dock	Plant
Tussilago farfara	Colt's-foot	Plant
Vinca minor	Lesser Periwinkle	Plant
Alliaria petiolata	Garlic Mustard	Plant
Vulnerable (Reported Near Cameron County)		
Scientific Name	**Common Name**	**Type**
Fiorinia externa	Elongate Hemlock Scale	Disease
Lepidosaphes ulmi	Oystershell Scale	Disease
Ophiostomatales: Ophiostomataceae	Dutch Elm Disease	Disease
Acantholyda erythrocephala	Pine False Webworm	Insect/Invertebrate
Adelges abietis	Eastern Spruce Gall Adelgid	Insect/Invertebrate
Caliroa cerasi	Pear Sawfly	Insect/Invertebrate
Endothenia albolineana	Eastern Spruce Needle-miner	Insect/Invertebrate
Homadaula anisocentra	Mimosa Webworm	Insect/Invertebrate
Hylastes opacus	European Bark Beetle (H. Opacus)	Insect/Invertebrate
Hymenoptera: Tenthredinadae	Birch Leafminer	Insect/Invertebrate
Periphyllus lyropictus	Norway Maple Aphid	Insect/Invertebrate
Plagiodera versicolora	Imported Willow Leaf Beetle	Insect/Invertebrate
Sirex noctilio	Sirex Woodwasp	Insect/Invertebrate

Table 25 - Invasive Plant Treatment Actions 2014-2016

Location	Species	Treatment
Hicks Run Wildlife Viewing Area	Japanese barberry, Japanese stiltgrass, mile-a-minute	Herbicide
Fourmile Hollow	Japanese Knotweed	Herbicide
East Cowley Run	Japanese barberry	Herbicide
Hoover Road	Japanese Knotweed	Herbicide
Pepper Hill	Goats Rue	Herbicide
Wykoff Run	Japanese Knotweed	Herbicide

4.3.5.4 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 Invasive Species Management Plan in April of 2010. 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 invasivespeciescouncil.com.

There are several invasive species that are found nearby Cameron County but have not yet been detected inside the county (see *Table 24 - Invasive Species Threats* (EDD Maps, 2016; PA DCNR, 2016; USDA FS, 2016)), the most prevalent of which being the Elongate Hemlock Scale, which is present in all surrounding counties. Especially in cases like this, control efforts can help prevent an invasive species from becoming established. 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).

4.3.5.5 Vulnerability Assessment

Cameron County's vulnerability to invasion depends on the species in question. 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 adverse economic effects by impacting agriculture and logging activities. Natural forest ecosystems provide clean water, recreational opportunities, habitat for native wildlife, and places to enjoy the tranquility and transcendence of nature. The balance of forest ecosystems and forest health are vulnerable to invasive species threats.

An invasive plant management plan was developed for Elk State Forest and the surrounding land where five primary components to managing invasive plants were identified:

Prioritize: Public use areas such as state parks and other healthy forest ecosystems should be prioritized over developed and private areas. Locations with lower densities of

invasive plants are often easier to control and should be given quick attention. Locations where humans are disturbing the landscape opens up niche space, and often times the aggressive invasives move in faster than native species. Such locations include: road work, ditch/ culvert work, logging activities, stream improvement/stabilization and bridge work. Some pants pose a higher risk than others, and the following were identified as high priority species:

- Goats rue
- Japanese knotweed
- Oriental bittersweet
- Spotted knapweed
- Multiflora rose
- Bush honeysuckle(s)
- Exotic thistle species (Canada, bull, musk, scotch)
- Mile-a-Minute Vine
- Japanese barberry
- Japanese stiltgrass
- Tree of heaven
- Garlic mustard
- Autumn olive

Locate: Detailed locations should be recorded for invasive plants so sites can be easily relocated, treated and monitored.

Delineate: The scale and extent of the infestation should be recorded and mapped so that the progress of the infestation can be monitored.

Control: Methods of control depend on the specific infestation, but the most common approaches are mechanical (cutting and hand-pulling) and chemical (herbicide treatments).

Monitor: Identified sites should be monitored and revisited as often as several times in a growing season (depending on the location / species). Monitoring can allow for early detection of spreading infestations. Most importantly, it prevents a relapse towards full-blown infestation.

4.3.6. Landslides/Subsidence

4.3.6.1 Location and Extent

Rock falls and other slope failures can occur in areas of Cameron County with moderate to steep slopes. Many slope failures are associated with precipitation events – periods of sustained above-average precipitation, specific rainstorms, or snowmelt events. Areas experiencing erosion, decline in vegetation cover and earthquakes are also susceptible to landslides. Human activities that contribute to slope failure include altering the natural slope gradient, increasing soil water content and removing vegetation cover.

The Department of Conservation and Natural Resources (DCNR) describes landslide susceptibility in Cameron County as generally moderate, but includes local areas of combo-high. Combo-high is described by DCNR as high susceptibility to land sliding

and moderate incidence. *Figure 13 - Landslide Hazard Areas* shows areas of landslide susceptibility in Cameron County. The majority of Cameron County, including populated areas such as Emporium Borough and Shippen Township, have generally low susceptibility, but do have local areas of high to moderate susceptibility. There are larger areas of moderate to high susceptibility, such as the western and southern portions of the county.

4.3.6.2 Range of Magnitude

Landslides cause damage to transportation routes, utilities and buildings. They can also 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 rock falls or other slides along highways have involved vehicles. Storm induced debris flows are the only other type of landslide likely to cause death and injuries. As residential and recreational development increases on and near steep mountain slopes, the hazard from these rapid events will also increase. Most Pennsylvania landslides are moderate to slow moving and damage objects rather than people.

The Pennsylvania Department of Transportation and large municipalities incur substantial costs due to landslide damage and to additional 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, 2009).

The 2013 Pennsylvania HMP records Cameron County as having a low ranking for landslides with a risk factor of 1.3. The average risk factor for counties in Pennsylvania is 1.6, making Cameron County below average risk for landslides.

4.3.6.3 Past Occurrence

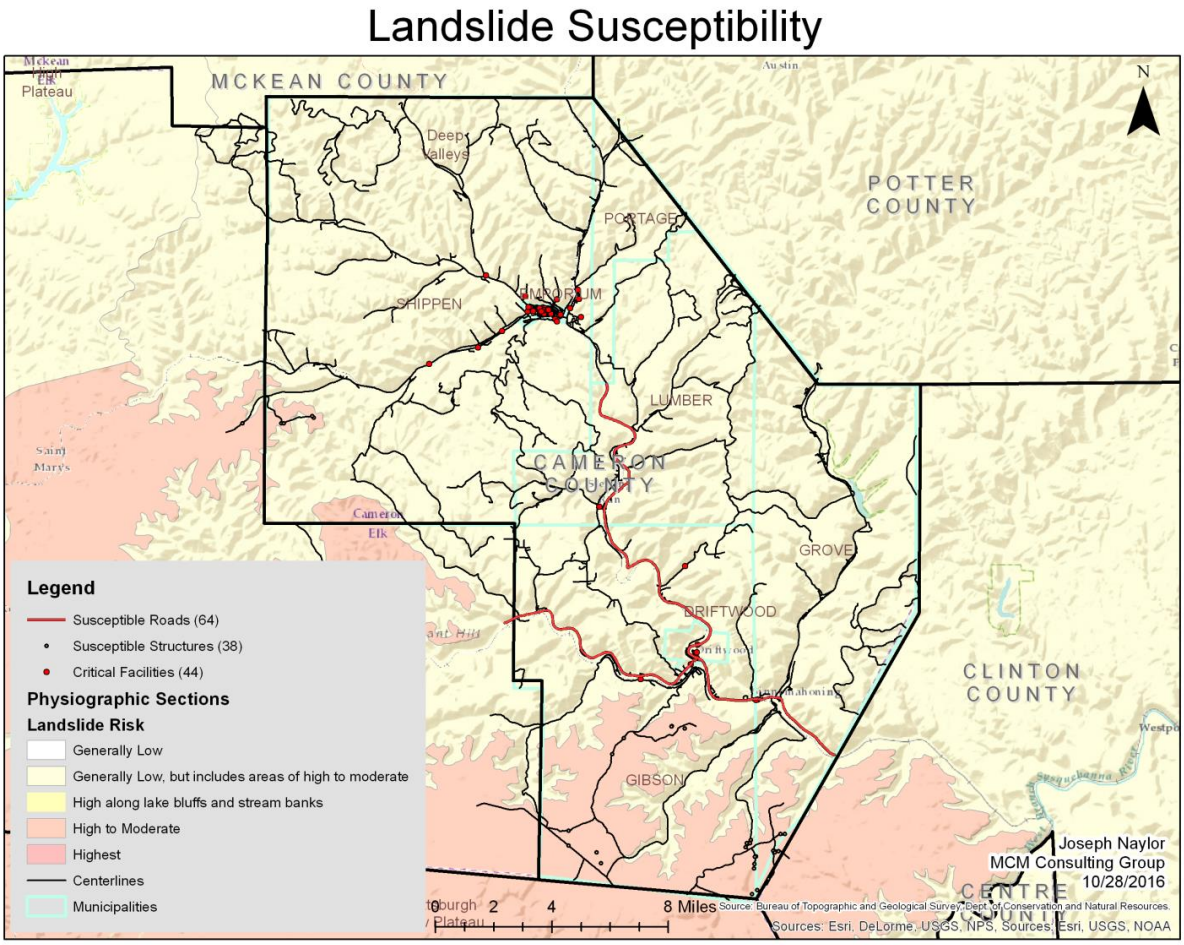
Landslides occur often along Route 120 south of Emporium to the Clinton County line, usually resulting in road closures lasting several days. One landslide resulted in the death of a driver on Route 120 near Sinnemahoning. Landslides also occasionally occur on Route 555 in the Mix Run area.

4.3.6.4 Future Occurrence

Based on historical events, significant landslide events are likely in the county (once every three years). Mismanaged intense development in steeply sloped areas could increase their frequency of occurrence.

According to the 2013 Pennsylvania HMP, Cameron County has 5,214 buildings that could be impacted by a landslide event, exposing the county to an estimated $1,048,498,000 loss of building and contents.

Figure 13 - Landslide Hazard Areas



4.3.6.5 Vulnerability Assessment

Seven of the seven municipalities in Cameron County are vulnerable to landslides. Critical facilities located along Route 120 and Route 555 are most vulnerable to the effects of landslides. Landslide events are most likely to occur in steeply sloped areas and in 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. These areas should be considered vulnerable to landslides, particularly if mitigation measures have not been implemented.

4.3.7. Pandemic and Infectious Disease

4.3.7.1 Location and Extent

Pandemic & Epidemic

Pandemic is a widespread outbreak of infectious disease that impacts an extensive region, potentially spanning continents and having global impacts. An epidemic also refers to an outbreak of a rapidly spreading infectious disease, but is more regional and less widespread than a pandemic. The spread of a disease depends on the mode of transmission of the disease, how contagious it is, and the amount of contact between infected and non-infected persons. In the event of a pandemic occurring in the eastern United States, the entirety of Cameron County would likely be affected. Strains of influenza, or the flu have caused epidemics and pandemics, and they commonly attack the respiratory tract in humans. Influenza pandemic planning began in response to the H5N1 (avian) flu outbreak in Asia, Africa, Europe, the Pacific, and the Near East in the late 1990s and early 2000s. Avian flu did not reach pandemic proportions in the United States, but the county began planning for flu outbreaks. The PA Department of Health Influenza Pandemic Response Plan states that "an influenza pandemic is inevitable and will probably give little warning" (PA Department of Health, 2005). For this reason, influenza is a primary concern regarding pandemic and infectious disease in Cameron County.

Infectious Disease

West Nile Virus has been detected in all 67 counties in the Commonwealth at least once in the past 10 years, making it a hazard to Cameron County. The disease is commonly spread by ticks or insects such as the mosquito. West Nile causes headaches, high fever, neck stiffness, disorientation, tremors, convulsions, muscle weakness, paralysis, and death in its most serious form. Blacklegged ticks in Cameron County can also spread Lyme disease, a bacterial disease with symptoms including fever, headaches and a characteristic skin rash (erythema migrans). Untreated, Lyme disease can spread to joints, the heart and the nervous system (CDC 2016).

4.3.7.2 Range of Magnitude

Pandemic

Advancements in medical technologies have greatly reduced the number of deaths caused by influenza over time. For example, the 1918 Spanish Flu caused approximately 50 million deaths worldwide (the worst influenza pandemic event on record), while the 2009 Swine Flu only caused less than 20,000 deaths worldwide. Most people infected with Swine Flu in 2009 have recovered without needing medical treatment. However, the virus did cause many deaths, including 78 in Pennsylvania by the end of the pandemic event. About 70 percent of those who were hospitalized with the 2009 H1N1 flu

virus in the United States belonged to a high risk group (CDC, 2009). High risk populations for influenza include children, the elderly, pregnant women, and patients with reduced immune system capability. Such high risk populations are discussed in more detail in Section 4.3.7.5.

Infectious Disease

West Nile Virus originated in regions of East Africa around 1937 but spread globally. In 2012, West Nile Virus caused 286 deaths in the United States. Most West Nile infections in humans are subclinical, causing no symptoms. Approximately 20% of infections cause symptoms and less than 1% of cases result in severe neurological disease or death. Symptoms typically appear between 2 and 15 days after infection and there is currently no vaccine for West Nile Virus. Person to person transmission of West Nile is less prevalent than person to person transmission of influenza.

Each year since 2005, there are consistently well over 3000 cases of Lyme disease in Pennsylvania, with 6470 confirmed cases in 2014 (CDC, 2016). While most cases of Lyme disease can be treated with a few weeks of antibiotic use, undetected Lyme disease can become very serious, sometimes resulting in death.

4.3.7.3 Past Occurrence

Pandemic & Epidemic

Table 26 - Past Influenza Outbreaks and Pandemics

Year/Time Frame	Common Name	Virus Type	Geographic Origin
1889	*Russian flu*	*H2N2 or H3N8*	*Russia*
1918-1920	*Spanish flu*	*H1N1*	*Germany, Britain, France and the United States*
1957-1958	*Asian flu*	*H2N2*	*China*
1968-1969	*Hong Kong flu*	*H3N2*	*Hong Kong*
1976	*Swine flu*	*H1N1*	*Fort Dix, United States*
2006-2008	*Avian (Bird) Flu*	*H5N1*	*India*
2007	*Equine flu*	*H3N8*	*Australia*
2009	*Swine Flu*	*H1N1*	*Mexico*

Influenza outbreaks of Spanish Flu, Asian flu, Hong Kong Flu and Swine Flu caused deaths in the United States and are considered pandemics. The 1918-1920 Spanish Flu claimed 50 million lives worldwide and 500,000 in the United States with 350,000 cases in Pennsylvania. The Asian flu caused about 1.5-2 million deaths worldwide with 70,000 deaths in the United States, peaking between September 1957 and March 1958. Approximately 15% of the population of Pennsylvania was affected by Asian flu. The first cases of the Hong Kong Flu in the U.S. were detected in September of 1968 with deaths peaking between December, 1968 and January, 1969 (Global Security, 2009). The most recent flu outbreak to impact Cameron County was the 2009 outbreak of Swine flu. There were 10,940 cases reported in Pennsylvania resulting in 78 deaths. Cameron

County had 41 confirmed cases and no reported deaths (Pennsylvania Department of Health, 2010).

Infectious Disease

West Nile Virus was first detected in Pennsylvania in the year 2000. The most annual reported cases of West Nile occurred in 2003, with 237 infected Pennsylvanians resulting in 9 deaths. Since then, a comprehensive network has been developed in Pennsylvania to detect West Nile Virus, including trapping mosquitoes, collecting dead birds and monitoring horses, people, and in past years, sentinel chickens. West Nile Virus was detected in 56 of 67 counties in the Commonwealth in 2015, however many of the counties where the virus was not detected had few or zero (including Cameron County) samples tested (PA West Nile Virus Control Program, 2016). West Nile Virus has been detected in Cameron County in 2 out of the last 15 years (2003 and 2011). Fourteen counties in the Commonwealth reported cases of West Nile infected humans in 2015 with 30 cases total and one death. None of these cases occurred in Cameron County. In 2016, 10 counties have reported cases of West Nile with a total of 13 infected humans, again, none in Cameron County. The last reported human West Nile infection in Cameron County was in 2003 (PA West Nile Virus Control Program, 2016).

Cases of Lyme disease are consistently reported in Cameron County. Lyme disease occurrence in Cameron County is available through 2014 and is summarized in *Table 27 - Past Cases of Lyme Disease in Cameron County* (CDC, 2016). No data is available from the CDC for 2015-2017.

Table 27 - Past Cases of Lyme Disease in Cameron County (CDC, 2016)

Year	Number of Cases	Year	Number of Cases	Year	Number of Cases
2000	11	2005	24	2010	14
2001	8	2006	9	2011	21
2002	16	2007	15	2012	16
2003	9	2008	18	2013	21
2004	10	2009	20	2014	23

4.3.7.4 Future Occurrence

Pandemic & Epidemic

The precise timing of pandemic influenza is uncertain, but occurrences are most likely when the Influenza Type A virus makes a dramatic change, or antigenic shift, that results in a new or "novel" virus to which the population has no immunity. The emergence of a novel virus is the first step towards pandemic, and based on historical events, is expected every 11 to 41 years.

Infectious Disease

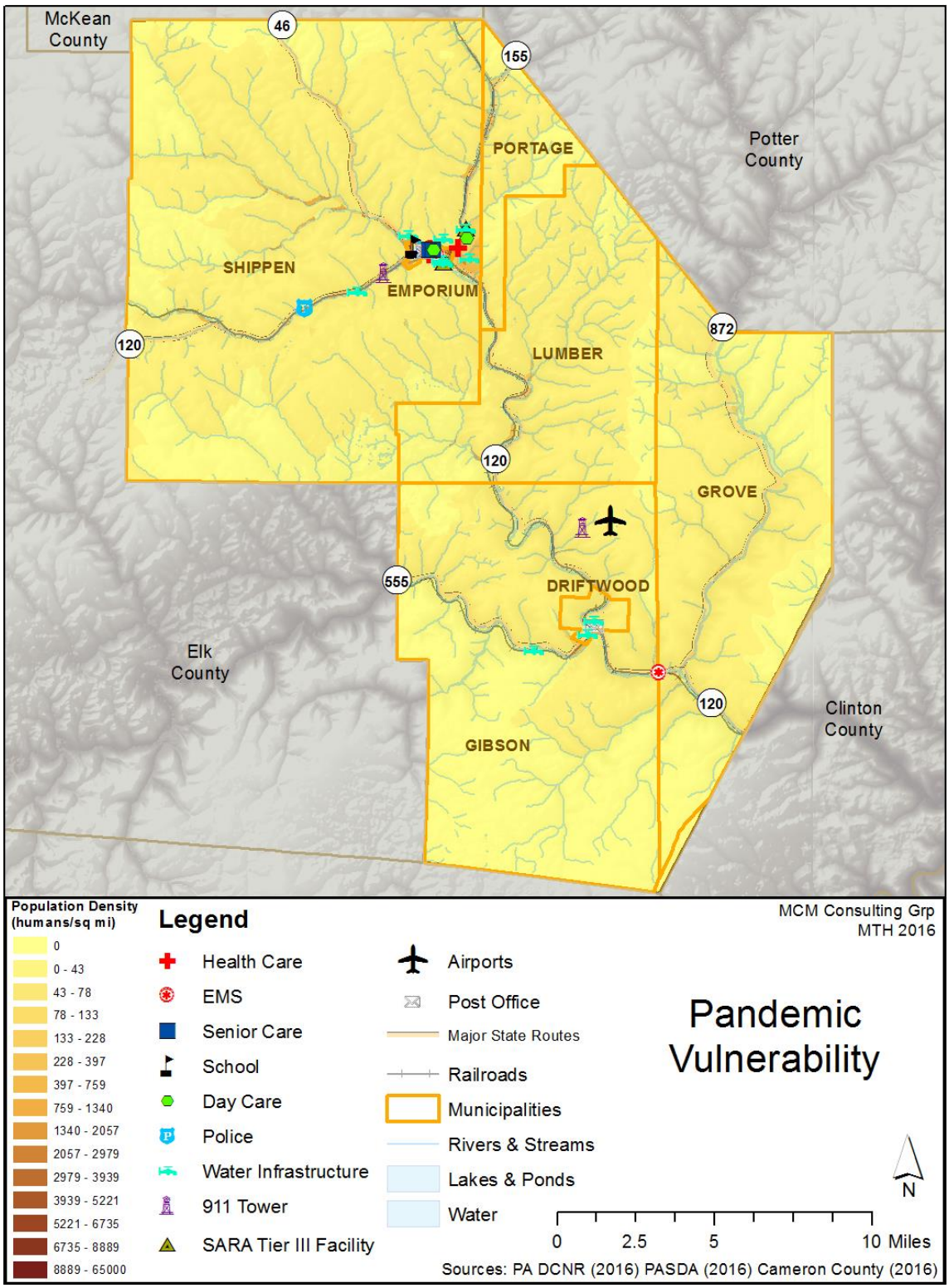
Instances of West Nile Virus have been decreasing due to extensive planning and eradication efforts, however the prospect of climate change could increase the prevalence of the virus. Some studies show increased insect activities during a similar rapid warming event in Earth's history (Curano et al., 2008). Other studies make projections that with the warming temperatures and lower annual precipitation that are expected with climate change, there will be an expansion of the suitable climate for mosquitos and West Nile Virus, increasing the risk that the disease poses (Harrigan et al., 2014). Lyme disease is expected to continue its consistent prevalence in Cameron County.

4.3.7.5 Vulnerability Assessment

Certain groups are at higher risk of infectious disease infection, including people 65 years and older, children younger than 5 years, pregnant women, and people with certain chronic medical conditions. Such conditions include but are not limited to diabetes, heart disease, asthma, and kidney disease. Schools, convalescent centers, and other institutions serving those younger than 5 years old and older than 65 are locations that are conducive to faster transmission of influenza. More generally, areas with higher population densities and places where people gather can be hotspots where influenza can spread more rapidly. *Figure 14 - Pandemic & Infectious Disease Vulnerability* shows the population density according to 2010 census data and locations of schools, daycares and health care facilities, shedding light on areas where the disease may more readily spread. The highest concentration of elevated-transmission risk locations in the county (schools, retirement homes and senior centers) is found in Emporium Borough.

Persons who spend time in wooded areas are most at risk for contracting Lyme disease via tick bite. Residents should conduct thorough tick checks after spending time in woodland areas and keep on the lookout for the characteristic "bulls-eye" rash indicative of a tick bite infected with Lyme disease.

Figure 14 - Pandemic & Infectious Disease Vulnerability



4.3.8. Radon Exposure

Radon is an airborne noble gas that naturally occurs from the radioactive decay of uranium into radium. The radium further breaks down into a gas referred to as radon. Sources of radon include soil and rock beneath homes, well water, and building materials. In its natural form as a gas, radon is tasteless, odorless, colorless, and considered extremely toxic. Radon is a proven carcinogen and its effect on humans is the development of lung cancer. According to EPA, about 21,000 lung cancer deaths each year in the U.S. are related to radon and it is the second leading cause of lung cancer after smoking and number one among nonsmokers.

4.3.8.1 Location and Extent

Radon in the air is considered ubiquitous and can be found in both indoor and outdoor environments. There is no known safe level of exposure to radon. For most people, the greatest risk of exposure to radon is within their home in rooms that are below, directly in contact with, or immediately above the ground. Risks for developing cancer are associated with different levels of radon in the air and measured in Pico Curies per Liter (pCi/L).

4.3.8.2 Range of Magnitude

Exposure to radon is the second leading cause of lung cancer after smoking. It is the number one cause of lung cancer among non-smokers. Radon is responsible for about 21,000 lung cancer deaths every year. The maximum level of radon recorded in the county has been 82.0 pCi/L and the minimum was 0.1 pCi/L in several instances. This information implies a high occurrence of exposure to radon at unsafe levels, in certain parts of the county.

Table 28 – Radon Risk for Smokers and Non-Smokers (EPA 2010)

Radon Level (pCi/L)	If 1000 people were exposed to this level over a lifetime....	Risk of Cancer from radon exposure compares to.....	Action Threshold
10	18 could get lung cancer	20 times the risk of dying in a home fire	Fix Structure
8	15 could get lung cancer	4 times the risk of dying in a fall	Fix Structure
4	7 could get lung cancer	The risk of dying in a car crash	Fix Structure
2	4 could get lung cancer	The risk of dying from poison	Consider fixing between 2-4 pCi/L
1.3	2 could get lung cancer	(average indoor radon level)	Reducing levels lower than 2 are difficult
0.4		(average outdoor radon level)	

4.3.8.3 Past Occurrence

Both DEP and EPA provide radon-testing results by zip code. The numbers provided by DEP include more test results; however, the information provided by EPA is in a format, which is more applicable to analysis on a countywide basis. The zip code based information does not indicate an individual's exposure or necessarily imply that the radon levels will apply throughout the zip code area, but they are a good indicator of what has been recorded and can generally be expected. Due to the relatively short half-life of radon, it tends to only affect living and breathing organisms, such as humans or pets, which are routinely in contained areas where the gas is released.

4.3.8.4 Future Occurrence

EPA and USGS have mapped radon potential in the US to help target resources and assist local governments in determining if radon-resistant features are applicable for new construction. The designations are broken down in three (3) zones and are assigned by county, as shown in *Figure 15 - Radon Exposure Risk in Pennsylvania*.

Radon Hazard Zones in PA. Each zone reflects the average short-term measurement of radon that can be expected in a building without radon controls.

1. Zone 1 has the highest potential and readings can be expected to exceed the 4 pCi/L recommended limit.
2. Zone 2 has a moderate potential for radon with levels expected to be between 2 and 4 pCi/L and
3. Zone 3 has a low potential with levels expected to be less than 2 pCi/L.

Cameron County is located in Zone 1. Note that although corrective measures are needed above 4, levels between 2-4 pCi/L are still deemed dangerous by the EPA and remediation should be considered.

4.3.8.5 Vulnerability Assessment

Currently, the EPA determines that an average radon mitigation system costs approximately $1,200. The EPA also asserts that the current state survey shows one (1) in five (5) homes have elevated radon levels. Using this methodology, radon loss is factored by assuming 20% of buildings would be affected by radon at a mitigation average cost of $1,200. There is no additional information related to vulnerability assessment of radon exposure in the PA HMP.

Cameron County's classification of being in Zone 1 as well as the high average reported radon tests around the Emporium Borough area means that there is a high risk for radon exposure. All homes are recommended to be tested for Radon.

Figure 15 - Radon Exposure Risk in Pennsylvania.

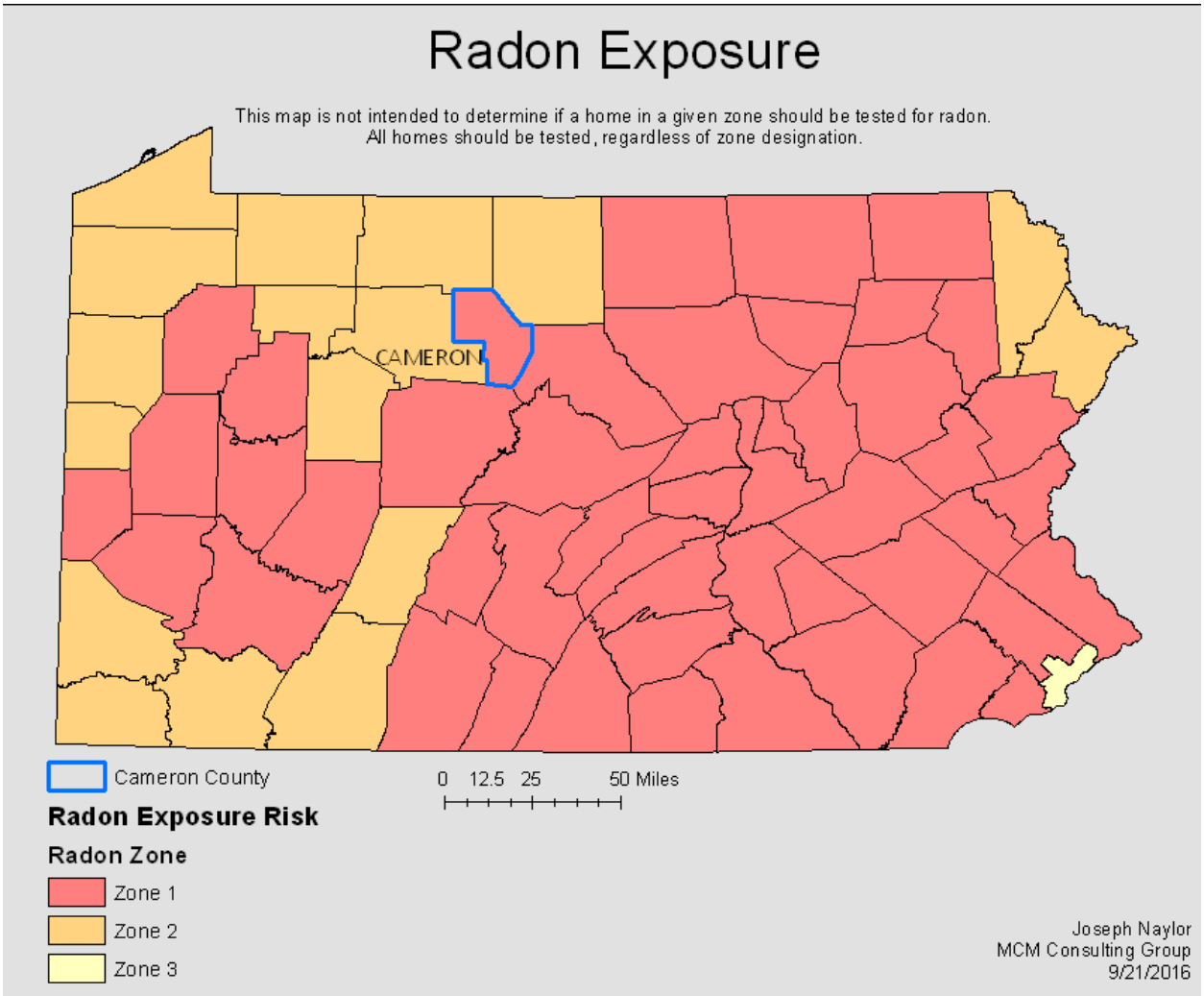
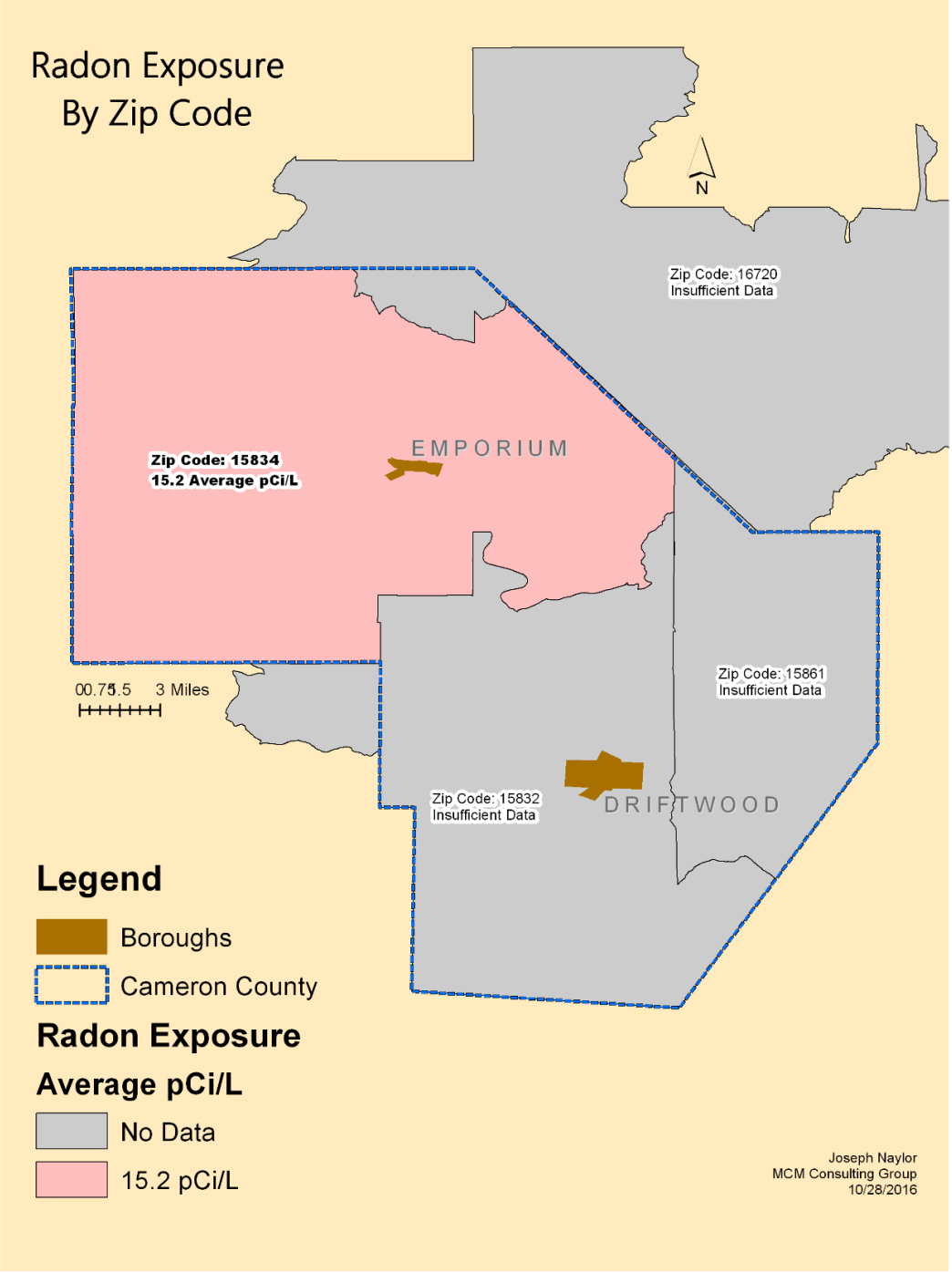


Figure 16 - 4 Curies per Liter and Above Percentage Zip Code Map



4.3.9. Tornados and Windstorms

4.3.9.1 Location and Extent

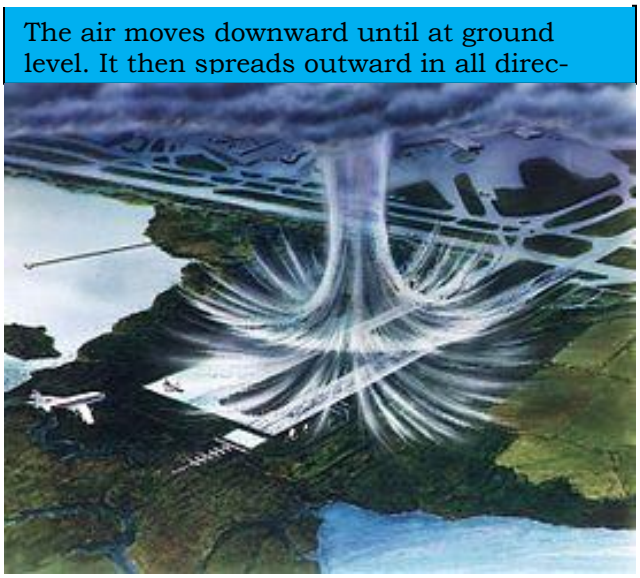
Tornados

Tornados occur in the Commonwealth most frequently during the spring and summer months and are most likely at the warmest times of the day. In the past 65 years, records show that 415 tornados have been reported in all 67 counties in Pennsylvania during the period of 1950-2015. The National Weather Service estimates the Commonwealth will experience ten tornados annually. According to the National Centers for Environmental Information (NCEI, formerly NCDC), wind speeds in tornados range from values below that of hurricane speeds to more than 300 miles per hour. The NCEI continues by reporting that, "the maximum winds in tornados are often confined to extremely small areas and vary tremendously over short distances." This is the reason that one house will be completely demolished by a tornado and the house next to it might be untouched. The width of tornados can vary greatly, from 100 feet wide to over a mile, and the forward motion of tornados can range from speeds between 0 and 50 miles per hour.

Windstorms

Windstorms such as those caused by thunderstorms are more frequent than hurricanes or tornados in Northeastern Pennsylvania. Straight-line winds and windstorms are experienced on a more regional scale. While such winds usually also accompany tornados, straight-line winds are caused by the movement of air from areas of high pressure to low pressure. Windstorms are generally defined with sustained wind speeds of 40 mph or greater, lasting for at least one hour, or simply winds of 58 mph or greater for any duration. A microburst is a very-localized column of sinking air, capable of producing damaging opposing and straight-line winds at the surface.

Figure 17 - Microburst



A Wind Sheer is usually found when a violent weather front is moving through; wind speeds have been recorded up to 100 mph. Wind Sheer is defined as a difference in wind speed and direction over a relatively short distance in the atmosphere.

4.3.9.2 Range of Magnitude

Each year, tornados account for $1.1 billion in damages and cause over 80 deaths nationally. 2011 was the second worst year on record for deadly tornados, the worst being 1936. The number of tornado reports has increased by 14% since 1950. While the extent of tornado damage is usually localized, the vortex of extreme wind associated with a tornado can result in some of the most destructive forces on Earth.

Rotational wind speeds can range from 100 mph to more than 250 mph. In addition, a tornado's speed of forward motion can range from 0 to 50 mph. Therefore, some estimates place the maximum velocity (combination of ground speed, wind speed, and upper winds) of tornados at about 300 mph. The damage caused by a tornado is a result of the high wind velocity and wind-blown debris, also accompanied by lightning or large hail. The most violent tornados have rotating winds of 250 miles per hour or more and are capable of causing extreme destruction and turning normally harmless objects into deadly missiles.

Damages and deaths can be especially significant when tornados move through populated, developed areas. The destruction caused by tornados ranges from light to inconceivable depending on the intensity, size and duration of the storm. Typically, tornados cause the greatest damages to structures of light construction. The Enhanced Fujita Scale, also known as the "EF-Scale," measures tornado strength and associated damages. The EF-Scale is an update to the earlier Fujita Scale, also known as the "F-Scale," that was published in 1971. It classifies United States tornados into six intensity categories, as shown in Table 29 – Enhanced Fujita-Scale, based upon the estimated maximum winds occurring within the wind vortex. Since its implementation by the National Weather Service in 2007, the EF-Scale has become the definitive metric for estimating wind speeds within tornados based upon damage to buildings and structures. F-Scale

categories with corresponding EF-Scale wind speeds are provided in *Table 29 – Enhanced Fujita-Scale* since the magnitude of previous tornado occurrences is based on the F-Scale.

Figure 11 - Wind Zones described the wind speed zones developed by the American Society of Civil Engineers based on tornado and hurricane historical events. These wind speed zones are intended to guide the design and evaluation of the structural integrity of shelters and critical facilities. Since Cameron County falls within Zone III, design wind speeds for shelters and critical facilities should be able to withstand a 3-second gust of up to 200 mph, regardless of whether the gust is the result of a tornado, coastal storm, or windstorm event. Therefore, these structures should be able to withstand the wind speeds experienced in an EF4 or EF5 tornado event.

While it is difficult to pinpoint the exact locations at the greatest risk of a tornado, the southeast, southwest and northwest sectors of the Commonwealth are more prone to tornados and, Cameron County lies towards the northwest part of Pennsylvania.

Tornados can have varying secondary effects. The most common is power failure. The severe wind can dismantle power sources and cause significant structural damage. Hazardous material spills can occur if a tornado comes near a holding tank, or the spill stems from a traffic accident caused by high winds.

Windstorms of all types have caused the following problems within Cameron County:

- Power failures lasting 4 hours or longer
- Loss of communications networks lasting 4 hours or more
- Residents requiring evacuation or provision of supplies or temporary shelter
- Severe crop loss and or damage

Table 29 – Enhanced Fujita-Scale

EF-Scale Number	Wind Speed (MPH)	F-Scale Number	Description of Potential Damage
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 tornados with no reported damage (i.e., those that remain in open fields) are always rated EF0.
EF1	86-110	F1	**Moderate damage**: Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111–135	F1-F2	**Considerable damage**: Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136–165	F2-F3	**Severe damage**: Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166–200	F3	**Devastating damage**: Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	>200	F3-F6	**Extreme damage**: Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (300 ft.); steel reinforced concrete structure badly damaged; high-rise buildings have significant structural deformation.

4.3.9.3 Past Occurrence

One of the deadliest tornados in Pennsylvania occurred in May of 1985, killing six people, injuring sixty, and destroying campers, manufactured homes and businesses across Lycoming, Union and Northumberland Counties. Cameron County has experienced eight tornados since 1854, the last one occurred in 1998 (Cameron EOP, 1984; NCEI, 2016). *Table 30 - Tornado & Windstorm History 1950-2016* (NCEI, 2016) and *Figure 18 - Tornado History 1950-2016* (NCEI, 2016) outline previous tornados and windstorm recorded in Cameron County. The most destructive windstorm in Cameron County occurred in December of 2000, where $500,000 in damages were incurred.

Table 30 - Tornado & Windstorm History 1950-2016 (NCEI, 2016)

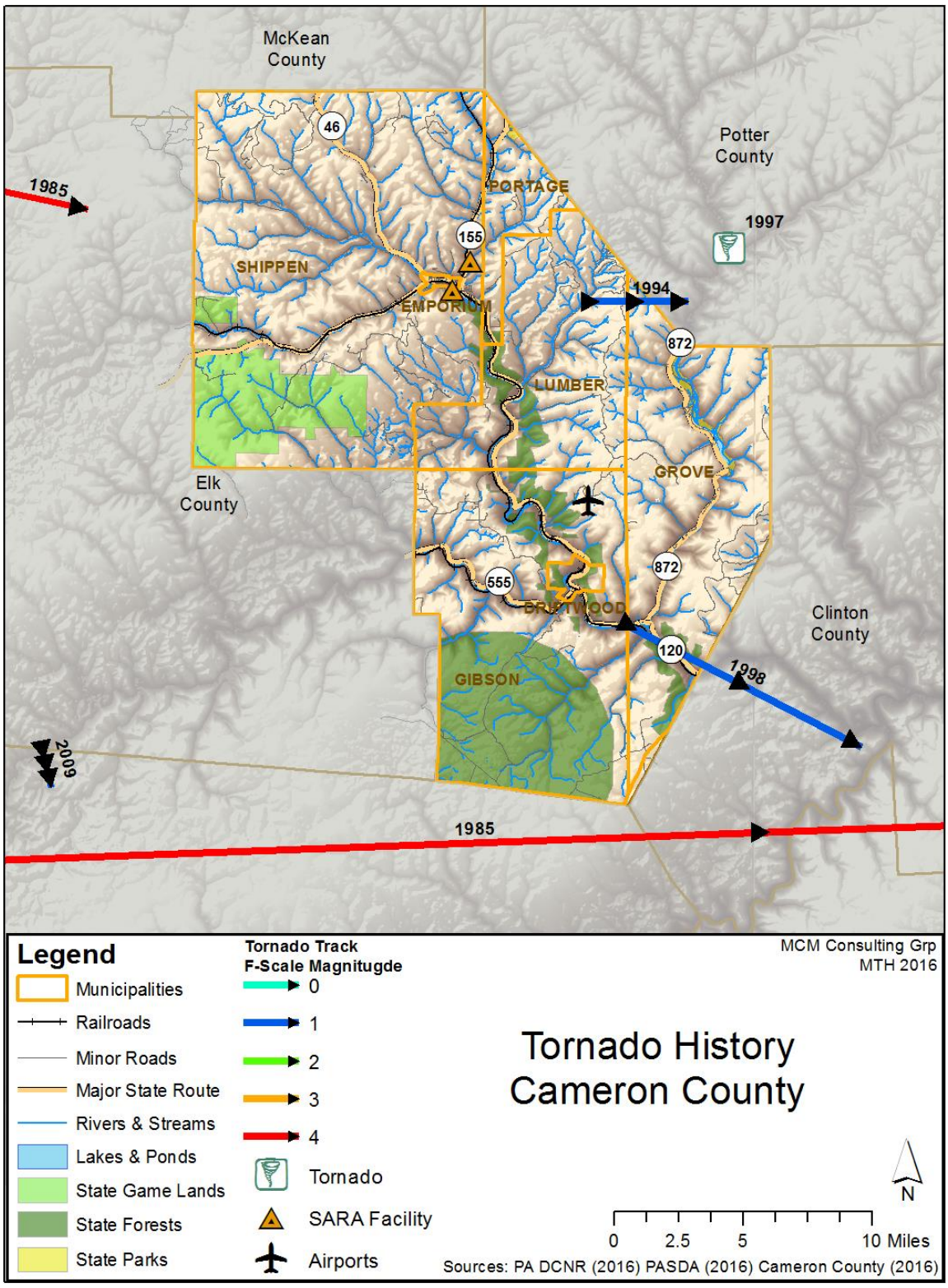
Date	Location	Type	Wind Speed/ Magnitude	Deaths	Injuries	Property Damage	Crop Damage
5/31/1985	CAMERON CO.	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
5/31/1985	CAMERON CO.	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
7/20/1986	CAMERON CO.	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K

Date	Location	Type	Wind Speed/ Magnitude	Deaths	Injuries	Property Damage	Crop Damage
7/20/1986	CAMERON CO.	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
7/16/1988	CAMERON CO.	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
6/29/1990	CAMERON CO.	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
8/28/1990	CAMERON CO.	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
4/30/1991	CAMERON CO.	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
7/23/1991	CAMERON CO.	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
7/10/1992	CAMERON CO.	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
7/10/1992	CAMERON CO.	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
8/28/1994	Truman	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
9/26/1994	Emporium	Tornado	F1	0	0	0.00K	0.00K
6/2/1995	Sizerville	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
7/6/1995	Sterling Run	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
7/28/1995	Emporium	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
11/11/1995	Emporium	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
4/12/1996	EMPORIUM	Thunderstorm Wind		0	0	1.00K	0.00K
5/19/1997	SINNAMAHONING	Thunderstorm Wind	51 kts.	0	0	0.00K	0.00K
6/25/1997	EMPORIUM	Thunderstorm Wind	51 kts.	0	0	0.00K	0.00K
7/15/1997	EMPORIUM	Thunderstorm Wind	51 kts.	0	0	0.00K	0.00K
7/18/1997	EMPORIUM	Thunderstorm Wind	51 kts.	0	0	0.00K	0.00K
7/18/1997	EMPORIUM	Thunderstorm Wind	51 kts.	0	0	0.00K	0.00K
8/16/1997	EMPORIUM	Thunderstorm Wind	51 kts.	0	0	0.00K	0.00K
5/29/1998	EMPORIUM	Thunderstorm Wind	51 kts.	0	0	0.00K	0.00K
5/31/1998	CAMERON	Thunderstorm Wind	51 kts.	0	0	0.00K	0.00K
5/31/1998	SINNAMAHONING	Tornado	F1	0	0	0.00K	0.00K
6/30/1998	EMPORIUM	Thunderstorm Wind	51 kts.	0	0	0.00K	0.00K
6/30/1998	SINNAMAHONING	Thunderstorm Wind	51 kts.	0	0	0.00K	0.00K
8/16/1998	EMPORIUM	Thunderstorm Wind	51 kts.	0	0	0.00K	0.00K
8/24/1998	EMPORIUM	Thunderstorm Wind	51 kts.	0	0	0.00K	0.00K
9/7/1998	EMPORIUM	Thunderstorm Wind	51 kts.	0	0	0.00K	0.00K
7/6/1999	EMPORIUM	Thunderstorm Wind		0	0	10.00K	0.00K
7/9/1999	EMPORIUM	Thunderstorm Wind		0	0	20.00K	0.00K

Date	Location	Type	Wind Speed/ Magnitude	Deaths	Injuries	Property Damage	Crop Damage
7/9/1999	SINNAMAHONING	Thunderstorm Wind		0	0	10.00K	0.00K
9/29/1999	CAMERON (ZONE)	High Wind	60 kts.	0	0	0.00K	0.00K
5/18/2000	DRIFTWOOD	Thunderstorm Wind		0	0	2.00K	0.00K
6/2/2000	EMPORIUM	Thunderstorm Wind		0	0	3.00K	0.00K
6/21/2000	EMPORIUM	Thunderstorm Wind		0	0	10.00K	0.00K
12/12/2000	CAMERON (ZONE)	High Wind		0	0	500.00K	0.00K
2/10/2001	CAMERON (ZONE)	High Wind		0	0	5.55K	0.00K
8/16/2001	EMPORIUM	Thunderstorm Wind		0	0	5.00K	0.00K
3/9/2002	CAMERON (ZONE)	High Wind	50 kts. E	0	0	0.00K	0.00K
7/21/2003	EMPORIUM	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
6/14/2004	EMPORIUM	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
6/17/2004	EMPORIUM	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
12/1/2004	CAMERON (ZONE)	High Wind	60 kts. EG	0	0	0.00K	0.00K
7/26/2005	EMPORIUM	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
9/29/2005	EMPORIUM	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
11/6/2005	EMPORIUM	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
2/17/2006	CAMERON (ZONE)	High Wind	52 kts. EG	0	0	0.00K	0.00K
6/22/2006	DRIFTWOOD	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
12/1/2006	CAMERON (ZONE)	High Wind	45 kts. ES	0	0	0.00K	0.00K
6/8/2007	EMPORIUM	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
1/30/2008	CAMERON (ZONE)	High Wind	50 kts. EG	0	0	0.00K	0.00K
9/14/2008	CAMERON (ZONE)	High Wind	50 kts. EG	0	0	0.00K	0.00K
4/8/2010	EMPORIUM	Thunderstorm Wind	50 kts. EG	0	0	5.00K	0.00K
7/21/2010	TRUMAN	Thunderstorm Wind	50 kts. EG	0	0	5.00K	0.00K
7/21/2010	EMPORIUM	Thunderstorm Wind	50 kts. EG	0	0	5.00K	0.00K

Date	Location	Type	Wind Speed/ Magnitude	Deaths	Injuries	Property Damage	Crop Damage
5/25/2011	EMPORIUM	Thunderstorm Wind	50 kts. EG	0	0	5.00K	0.00K
5/26/2011	DRIFTWOOD	Thunderstorm Wind	50 kts. EG	0	0	5.00K	0.00K
7/26/2012	EMPORIUM	Thunderstorm Wind	50 kts. EG	0	0	5.00K	0.00K
4/10/2013	SIZERVILLE	Thunderstorm Wind	61 kts. EG	0	0	0.00K	0.00K
6/3/2014	SIZERVILLE	Thunderstorm Wind	50 kts. EG	0	0	1.00K	0.00K
6/11/2014	RICH VLY	Thunderstorm Wind	50 kts. EG	0	0	1.00K	0.00K
7/19/2015	DRIFTWOOD	Thunderstorm Wind	50 kts. EG	0	0	1.00K	0.00K

Figure 18 - Tornado History 1950-2016 (NCEI, 2016)



4.3.9.4 Future Occurrence

The probability of a disastrous tornado hitting Cameron County is possible. While the chance of being hit by a tornado is somewhat small, the damage that results when the tornado arrives can be devastating. An EF5 tornado with a 0.019 percent annual probability of occurring can carry wind velocities of 200 mph, resulting in a force of more than 100 pounds per square foot of surface area. This is a "wind load" that exceeds the design limits of most buildings.

Based on tornado activity information for Pennsylvania between 1950 and 2016, most of Cameron County lies within an area that has experienced six to fifteen EF4 or EF5 tornados per 3,700 square miles. There is an estimated 1.3% to 3.4% chance that the planning area will be affected by a Category EF4 or EF5 tornado each year. Additionally, based on historic patterns, tornados are unlikely to remain on the ground for long distances, especially in areas of the county with hilly terrain. However, the high historical number of windstorms with winds over 50 knots indicates that annual chance of a windstorm is higher.

4.3.9.5 Vulnerability Assessment

Tornados can occur at any time of the year, though they're more likely during peak months, which are during the summer for the northern part of the United States. Tornados are most likely to occur between 3 P.M and 9 P.M. but have been known to occur at all hours of the day or night. Factors that impact the amount of damage caused by a tornado are the strength of the tornado, the time of day and the area of impact. Usually such distinct funnel clouds are localized phenomena impacting a small area, however, the high winds of tornados make them one of the most destructive natural hazards. There can be many secondary impacts of tornados and windstorms, including transportation accidents, hazardous material spills, flooding, and power outages. A proper warning system is vital for the public to be informed of what to do and where to go. Because of the abundance of forested areas in Cameron, numerous hikers and hunters visit Cameron County annually. In the event of a tornado or severe storm, these tourists and hunters have limited emergency notification measures.

Dangers that accompany thunderstorms which can produce tornados:

Flash floods – with 146 deaths annually nationwide

Lightning – 75 to 100 deaths annually nationwide

Damaging straight-line winds – reaching 140 mph wind speed

Large hail – can reach the size of a grapefruit and causes several hundred million dollars in damages annually to property and crops.

Critical facilities are highly vulnerable to high wind storms. While many severe storms can cause exterior damage to structures, tornados can also completely destroy structures, along with their surrounding infrastructure, abruptly halting operations. Severe

storms and their secondary effects often accompanying tornados and can be just as threatening to the critical facilities within the county. Many critical facilities are particularly vulnerable to power outages which can leave facilities functionless, potentially crippling infrastructure supporting the population of the county. With a storm's ability to destroy structures, citizens and their possessions are often left at the will of the storm. The elderly and disabled people are vitally at risk when faced with tornados. Without assistance to evacuate, they may be unable to prepare themselves or their homes and other possessions to safely weather the storm.

The local economy can also be crippled by tornados and windstorms and their secondary effects when buildings and supporting infrastructure are destroyed in the storm. Power outages can create work stoppages while transportation accidents and road closings can limit the transportation of goods and services. Additionally, flooding cannot be discounted as it can destroy the physical structures, merchandise and equipment essential for business operation. In the case of hazardous material spills caused by windstorms, the local environment can also be negatively impacted, requiring extensive clean-up and mitigation efforts.

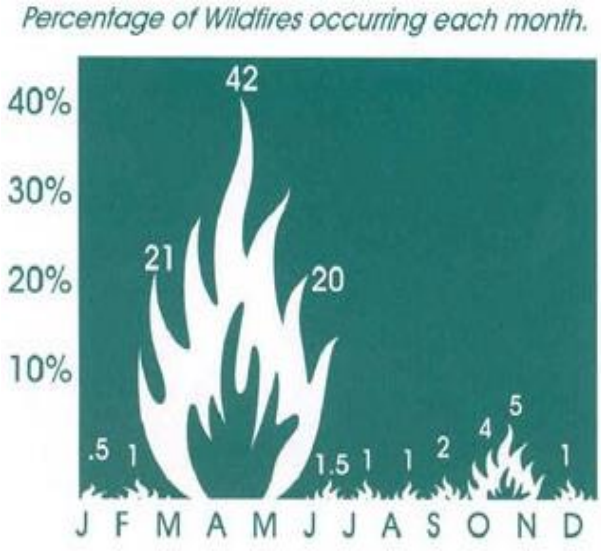
4.3.10. Wildfire

4.3.10.1 Location and Extent

While wildfires are a natural and essential part of many native Pennsylvania ecosystems (e.g. pitch pine – scrub oak woodlands), wildfires can also cause devastating damage if they are undetected and allowed to propagate unfettered. Wildfires most often occur in less developed areas such as open fields, grass, dense brush or forests where they can spread rapidly feeding off of vegetative fuels. Wildfires are most prevalent under prolonged dry and hot spells, or generally drought conditions. The greatest potential for wildfires (83% of all PA wildfires) occur in the spring months of March, April, and May, and the autumn months of October and November. In the spring, bare trees allow sunlight to reach the forest floor, drying fallen leaves and other ground debris and in the fall, dried leaves are also fuel for fires. *Figure 19 - Seasonal Wildfire Percentage* (PA DCNR, 2016) shows the wildfire percentage occurrence during each month occurring in Pennsylvania.

The most prevalent causes of devastating wildfires are droughts, lightning strikes, arson, human carelessness, and in rare circumstances, spontaneous combustion. Most wildfires in Pennsylvania are caused by anthropogenic fires such as debris burns that get out of control. A fire started in somebody's backyard could travel through dead grasses and weeds into bordering woodlands.

Figure 19 - Seasonal Wildfire Percentage (PA DCNR, 2016)



4.3.10.2 Range of Magnitude

Forested areas, croplands and property that is at the interface between wild lands and human development are most at risk for being impacted by and causing wildfires. If an urban fire or wildfire is not contained, secondary impacts such as power outages may result. Other negative impacts of wildfires include killing people, livestock, fish and wildlife, destroying property, valuable timber, and forage, recreational and scenic values. Wildfires can also cause severe erosion, silting of stream beds and reservoirs, and flooding due to a loss of ground cover.

The United States Forest Service utilizes the Forest Fire Assessment System to classify the dangers of wildfire. *Table 31 - Wildland Fire Assessment System* (U.S. Forest Service)identifies each threat classification and provides a description of the level.

Table 31 - Wildland Fire Assessment System (U.S. Forest Service)

Rank	Description
Low (L)	Fuels do not ignite readily from small firebrands although a more intense heat source, such as lightning, may start fires in duff or punky wood. Fires in open cured grasslands may burn freely a few hours after rain, but woods fires spread slowly by creeping or smoldering and burn in irregular fingers. There is little danger of spotting.
Moderate (M)	Fires can start from most accidental causes, but with the exception of lightning fires in some areas, the number of starts is generally low. Fires in open cured grasslands will burn briskly and spread rapidly on windy days. Timber fires spread slowly to moderately fast. The average fire is of moderate intensity, although heavy concentrations of fuel, especially draped fuel, may burn hot. Short-distance spotting may occur, but is not persistent. Fires are not likely to become serious and control is relatively easy.

High (H)	All fine dead fuels ignite readily and fires start easily from most causes. Unattended brush and campfires are likely to escape. Fires spread rapidly and short-distance spotting is common. High-intensity burning may develop on slopes or in concentrations of fine fuels. Fires may become serious and their control difficult unless they are attacked successfully while small.
Very High (VH)	Fires start easily from all causes and, immediately after ignition, spread rapidly and increase quickly in intensity. Spot fires are a constant danger. Fires burning in light fuels may quickly develop high intensity characteristics such as long-distance spotting and fire whirlwinds when they burn into heavier fuels.
Extreme (E)	Fires start quickly, spread furiously and burn intensely. All fires are potentially serious. Development into high intensity burning will usually be faster and occur from smaller fires than in the very high fire danger class. Direct attack is rarely possible and may be dangerous except immediately after ignition. Fires that develop headway in heavy slash or in conifer stands may be unmanageable while the extreme burning condition lasts. Under these conditions the only effective and safe control action is on the flanks until the weather changes or the fuel supply lessens.

4.3.10.3 Past Occurrences

Between 1979 and 2015 there were 183 wildfires reported to the DCNR, including four wildfires that each burned more than 100 acres. The most widely impacting fire in Cameron County history was in 2013 when 352 acres were burned in Gibson Township. While there are quite a number of reported fires, many more wildfires go unreported, meaning this is not an all-inclusive list.

Table 32 - Wildfire Occurrence 1979-2015 (2016 DCNR)

Year	Name	Cause	Acres	Municipality
1979	NO NAME	INCENDIARY	0	GIBSON TWP
1979	NO NAME	SMOKING	2	GIBSON TWP
1979	NO NAME	CHILDREN	2	SHIPPEN TWP
1979	NO NAME	CHILDREN	0	SHIPPEN TWP
1979	NO NAME	CHILDREN	0	SHIPPEN TWP
1979	NO NAME	SMOKING	9	SHIPPEN TWP
1980	NO NAME	CAMP FIRE	6	GIBSON TWP
1980	NO NAME	SMOKING	75	GIBSON TWP
1980	NO NAME	RAILROAD	15	GROVE TWP
1980	NO NAME	FALSE ALARM	0	GROVE TWP
1980	NO NAME	DEBRIS BURNING	0	LUMBER TWP
1980	NO NAME	SMOKING	1	LUMBER TWP
1980	NO NAME	DEBRIS BURNING	1	SHIPPEN TWP
1980	NO NAME	DEBRIS BURNING	0	SHIPPEN TWP
1980	NO NAME	DEBRIS BURNING	4	SHIPPEN TWP
1980	NO NAME	RAILROAD	0	SHIPPEN TWP

Year	Name	Cause	Acres	Municipality
1980	NO NAME	RAILROAD	0	SHIPPEN TWP
1980	NO NAME	EQUIPMENT USE	2	SHIPPEN TWP
1980	NO NAME	CAMP FIRE	0	SHIPPEN TWP
1980	NO NAME	RAILROAD	0	SHIPPEN TWP
1981	NO NAME	INCENDIARY	15	GIBSON TWP
1981	NO NAME	CAMP FIRE	0	GROVE TWP
1981	NO NAME	DEBRIS BURNING	4	GROVE TWP
1981	NO NAME	RAILROAD	2	LUMBER TWP
1981	NO NAME	EQUIPMENT USE	0	LUMBER TWP
1981	NO NAME	SMOKING	0	PORTAGE TWP
1981	NO NAME	DEBRIS BURNING	0	SHIPPEN TWP
1981	NO NAME	DEBRIS BURNING	3	SHIPPEN TWP
1981	NO NAME	EQUIPMENT USE	0	SHIPPEN TWP
1981	NO NAME	CHILDREN	1	SHIPPEN TWP
1982	NO NAME	EQUIPMENT USE	1	GIBSON TWP
1982	NO NAME	CAMP FIRE	0	GIBSON TWP
1982	NO NAME	RAILROAD	1	GIBSON TWP
1982	NO NAME	DEBRIS BURNING	15	GIBSON TWP
1982	NO NAME	CAMP FIRE	4	LUMBER TWP
1982	NO NAME	SMOKING	0	LUMBER TWP
1982	NO NAME	RAILROAD	1	PORTAGE TWP
1982	NO NAME	CHILDREN	0	SHIPPEN TWP
1982	NO NAME	DEBRIS BURNING	0	SHIPPEN TWP
1982	NO NAME	CAMP FIRE	0	SHIPPEN TWP
1982	NO NAME	MISCELLANEOUS	4	SHIPPEN TWP
1982	NO NAME	SMOKING	0	SHIPPEN TWP
1983	NO NAME	INCENDIARY	0	GIBSON TWP
1983	NO NAME	DEBRIS BURNING	2	GROVE TWP
1983	NO NAME	DEBRIS BURNING	0	SHIPPEN TWP
1984	NO NAME	CAMP FIRE	5	GIBSON TWP
1984	NO NAME	SMOKING	5	GIBSON TWP
1984	NO NAME	EQUIPMENT USE	2	GIBSON TWP
1984	NO NAME	SMOKING	0	GIBSON TWP
1984	NO NAME	RAILROAD	0	LUMBER TWP
1984	NO NAME	EQUIPMENT USE	0	SHIPPEN TWP
1985	NO NAME	SMOKING	0	GIBSON TWP
1985	NO NAME	INCENDIARY	0	GIBSON TWP
1985	NO NAME	RAILROAD	0	GIBSON TWP
1985	NO NAME	EQUIPMENT USE	2	GIBSON TWP

Year	Name	Cause	Acres	Municipality
1985	NO NAME	MISCELLANEOUS	0	GIBSON TWP
1985	NO NAME	RAILROAD	0	LUMBER TWP
1985	NO NAME	DEBRIS BURNING	0	LUMBER TWP
1985	NO NAME	CHILDREN	1	LUMBER TWP
1985	NO NAME	MISCELLANEOUS	1	SHIPPEN TWP
1985	NO NAME	DEBRIS BURNING	0	SHIPPEN TWP
1986	NO NAME	DEBRIS BURNING	2	GIBSON TWP
1986	NO NAME	MISCELLANEOUS	0	GIBSON TWP
1986	NO NAME	EQUIPMENT USE	0	LUMBER TWP
1986	NO NAME	DEBRIS BURNING	20	LUMBER TWP
1986	NO NAME	INCENDIARY	78	LUMBER TWP
1986	NO NAME	INCENDIARY	0	PORTAGE TWP
1986	NO NAME	INCENDIARY	25	PORTAGE TWP
1986	NO NAME	DEBRIS BURNING	16	SHIPPEN TWP
1986	NO NAME	INCENDIARY	0	SHIPPEN TWP
1986	NO NAME	DEBRIS BURNING	0	SHIPPEN TWP
1986	NO NAME	EQUIPMENT USE	2	SHIPPEN TWP
1986	NO NAME	FALSE ALARM	0	SHIPPEN TWP
1986	NO NAME	MISCELLANEOUS	0	SHIPPEN TWP
1987	NO NAME	RAILROAD	0	GIBSON TWP
1987	NO NAME	CAMP FIRE	0	GIBSON TWP
1987	NO NAME	MISCELLANEOUS	1	PORTAGE TWP
1987	NO NAME	DEBRIS BURNING	0	PORTAGE TWP
1987	NO NAME	DEBRIS BURNING	0	SHIPPEN TWP
1988	NO NAME	DEBRIS BURNING	1	LUMBER TWP
1988	NO NAME	RAILROAD	2	LUMBER TWP
1988	NO NAME	DEBRIS BURNING	6	SHIPPEN TWP
1988	NO NAME	DEBRIS BURNING	4	SHIPPEN TWP
1988	NO NAME	EQUIPMENT USE	0	SHIPPEN TWP
1989	NO NAME	DEBRIS BURNING	35	GIBSON TWP
1989	NO NAME	EQUIPMENT USE	0	GIBSON TWP
1989	NO NAME	INCENDIARY	0	GIBSON TWP
1989	NO NAME	INCENDIARY	0	GIBSON TWP
1989	NO NAME	EQUIPMENT USE	1	GIBSON TWP
1989	NO NAME	DEBRIS BURNING	1	LUMBER TWP
1989	NO NAME	MISCELLANEOUS	6	LUMBER TWP
1989	NO NAME	DEBRIS BURNING	0	SHIPPEN TWP
1989	NO NAME	INCENDIARY	6	SHIPPEN TWP
1989	NO NAME	INCENDIARY	1	SHIPPEN TWP

Year	Name	Cause	Acres	Municipality
1990	NO NAME	RAILROAD	2	GIBSON TWP
1990	NO NAME	RAILROAD	153	GIBSON TWP
1990	NO NAME	EQUIPMENT USE	0	GIBSON TWP
1990	NO NAME	RAILROAD	0	SHIPPEN TWP
1991	NO NAME	DEBRIS BURNING	5	DRIFTWOOD BORO
1991	NO NAME	DEBRIS BURNING	5	SHIPPEN TWP
1991	NO NAME	CHILDREN	0	SHIPPEN TWP
1992	NO NAME	RAILROAD	4	DRIFTWOOD BORO
1992	NO NAME	RAILROAD	0	DRIFTWOOD BORO
1992	NO NAME	RAILROAD	0	DRIFTWOOD BORO
1992	NO NAME	RAILROAD	0	DRIFTWOOD BORO
1992	NO NAME	RAILROAD	0	DRIFTWOOD BORO
1992	NO NAME	RAILROAD	0	DRIFTWOOD BORO
1992	NO NAME	RAILROAD	0	DRIFTWOOD BORO
1992	NO NAME	INCENDIARY	0	GROVE TWP
1992	NO NAME	INCENDIARY	0	GROVE TWP
1992	NO NAME	INCENDIARY	0	GROVE TWP
1992	NO NAME	INCENDIARY	0	GROVE TWP
1992	NO NAME	EQUIPMENT USE	0	LUMBER TWP
1992	NO NAME	DEBRIS BURNING	0	SHIPPEN TWP
1996	NO NAME	DEBRIS BURNING	61	GIBSON TWP
1996	NO NAME	DEBRIS BURNING	1.5	GIBSON TWP
1997	NO NAME	INCENDIARY	26	GIBSON TWP
1997	NO NAME	DEBRIS BURNING	3	GIBSON TWP
1997	NO NAME	MISCELLANEOUS	0.01	GIBSON TWP
1997	NO NAME	MISCELLANEOUS	0.01	GIBSON TWP
1997	NO NAME	CAMP FIRE	0.5	SHIPPEN TWP
1997	NO NAME	EQUIPMENT USE	12	SHIPPEN TWP
1998	NO NAME	DEBRIS BURNING	8	GIBSON TWP
1998	NO NAME	SMOKING	13	LUMBER TWP
1998	NO NAME	INCENDIARY	0.1	SHIPPEN TWP
1999	NO NAME	INCENDIARY	0.5	GIBSON TWP
1999	NO NAME	RAILROAD	0	GIBSON TWP
1999	NO NAME	RAILROAD	0	GIBSON TWP
1999	NO NAME	RAILROAD	0	GIBSON TWP
1999	NO NAME	RAILROAD	0	GIBSON TWP
1999	NO NAME	RAILROAD	0	GIBSON TWP
1999	NO NAME	RAILROAD	0	PORTAGE TWP
1999	NO NAME	RAILROAD	0	PORTAGE TWP

Year	Name	Cause	Acres	Municipality
1999	NO NAME	DEBRIS BURNING	21	SHIPPEN TWP
1999	NO NAME	CAMP FIRE	0.5	SHIPPEN TWP
1999	NO NAME	RAILROAD	0	SHIPPEN TWP
1999	NO NAME	EQUIPMENT USE	0	SHIPPEN TWP
1999	NO NAME	MISCELLANEOUS	0	SHIPPEN TWP
1999	NO NAME	MISCELLANEOUS	0	SHIPPEN TWP
1999	NO NAME	MISCELLANEOUS	0	SHIPPEN TWP
1999	NO NAME	MISCELLANEOUS	0	SHIPPEN TWP
1999	NO NAME	MISCELLANEOUS	0	SHIPPEN TWP
1999	NO NAME	SMOKING	41	SHIPPEN TWP
2000	NO NAME	DEBRIS BURNING	0.5	GIBSON TWP
2000	NO NAME	DEBRIS BURNING	0.1	GROVE TWP
2000	NO NAME	EQUIPMENT USE	3	PORTAGE TWP
2001	NO NAME	SMOKING	3	GIBSON TWP
2001	NO NAME	EQUIPMENT USE	3	GROVE TWP
2001	NO NAME	MISCELLANEOUS	0	LUMBER TWP
2002	NO NAME	DEBRIS BURNING	0.15	GROVE TWP
2002	NO NAME	RAILROAD	11.5	GROVE TWP
2002	NO NAME	DEBRIS BURNING	2.7	GROVE TWP
2003	NO NAME	Lightning	7.4	GROVE TWP
2003	NO NAME	Lightning	11.6	GROVE TWP
2003	NO NAME	MISCELLANEOUS	1.2	SHIPPEN TWP
2005	NO NAME	MISCELLANEOUS	24.4	GIBSON TWP
2005	NO NAME	CAMP FIRE	23.3	GIBSON TWP
2005	NO NAME	MISCELLANEOUS	2.8	GROVE TWP
2006	NO NAME	EQUIPMENT USE	0.5	SHIPPEN TWP
2008	NO NAME	DEBRIS BURNING	1	LUMBER TWP
2009	TUNNEL HILL	RAILROAD	236	GIBSON TWP
2009	TANGLEFOOT	RAILROAD	0.2	GIBSON TWP
2009	MASON FARM	RAILROAD	1.1	GIBSON TWP
2009	STERLING RUN	DEBRIS BURNING	32.88	LUMBER TWP
2009	NO NAME	RAILROAD	0.47	LUMBER TWP
2009	TANGLEFOOT 2	RAILROAD	0.1	LUMBER TWP
2009	SIZER RUN	MISCELLANEOUS	5	SHIPPEN TWP
2010	THREE RUNS #3	INCENDIARY	11.845	GIBSON TWP
2010	THREE RUNS #2	INCENDIARY	8.273	GIBSON TWP
2010	LOWE	MISCELLANEOUS	1.3	GIBSON TWP
2010	DUTCHMAN 1	INCENDIARY	0.01	GROVE TWP
2010	DUTCHMAN ROAD 2	INCENDIARY	0.01	GROVE TWP

Year	Name	Cause	Acres	Municipality
2010	DUTCHMAN ROAD 3	INCENDIARY	0.5	GROVE TWP
2010	FUENFFINGER	DEBRIS BURNING	0.7	SHIPPEN TWP
2012	GROVE HILL	INCENDIARY	116	GIBSON TWP
2012	BARR HOLLOW	CAMP FIRE	1	GIBSON TWP
2012	KEPHART	DEBRIS BURNING	78	GROVE TWP
2012	HAWK ROAD	DEBRIS BURNING	1	LUMBER TWP
2013	TRACER	MISCELLANEOUS	1.07	GIBSON TWP
2013	WYKOFF RUN	INCENDIARY	352	GIBSON TWP
2013	STEAM MILL	DEBRIS BURNING	19.06	LUMBER TWP
2014	NORDBURG	EQUIPMENT USE	1.7	GIBSON TWP
2014	CASHDOLLAR	CHILDREN	88	GIBSON TWP

4.3.10.4 Future Occurrence

Annual occurrences of wildfire in Cameron County are expected. The occurrence of large scale and intensity wildfires is somewhat unpredictable and highly dependent on environmental conditions and human response. Weather conditions play a major role in the occurrence of wildfires, so in the event of dry drought conditions, wildfire caution should be heightened. Any fire without the quick response or attention of fire-fighters, forestry personnel, or visitors to the forest, has the potential to become a wildfire.

4.3.10.5 Vulnerability

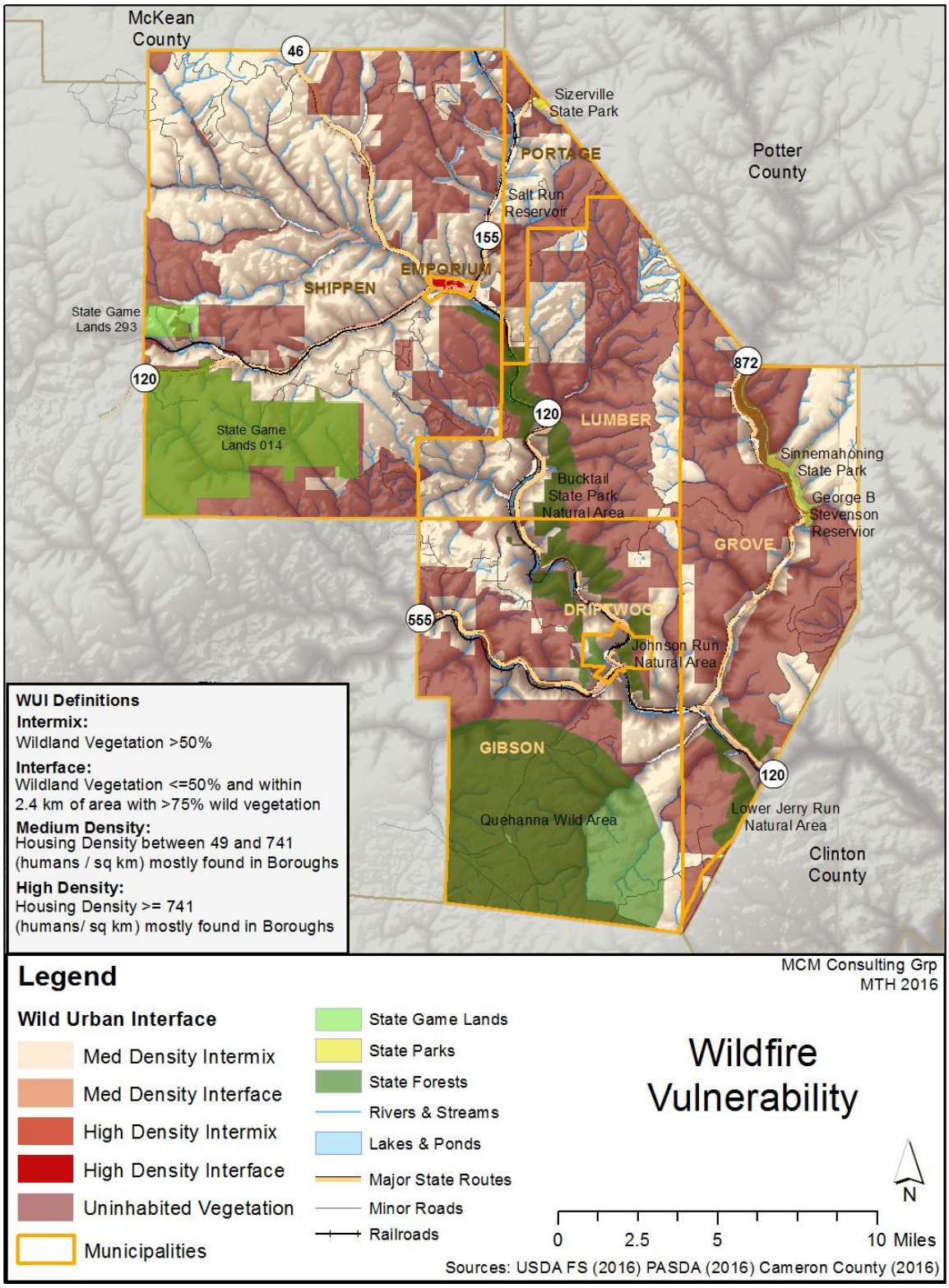
The size and impact of a wildfire depends on its location, climate conditions and the response of firefighters. If the right conditions exist, these factors may often mitigate the effects of wildfires, however during a drought, wildfires can be devastating. Wildfires are most common in the spring (March–May) and fall (October–November) months. During spring and fall months, the lack of leaves on the trees allows the sunlight to heat and dry the existing leaves on the ground, increasing the risk of forest fires. Firefighters and other first responders can encounter life threatening situations due to forest fires. Traffic accidents during a response and then the impacts of fighting the fire once on scene are examples of the first responder vulnerabilities.

Table 33 - Structures in High Wildfire Hazard Areas (Cameron County GIS, 2016)shows the total addressable structures and critical facilities in high wildfire hazard areas, including State Game Lands, State Parks, and State Forests. Wildfire hazard is defined based on conditions that affect wildfire ignition and/or behavior such as fuel, topography and local weather.

Table 33 - Structures in High Wildfire Hazard Areas (Cameron County GIS, 2016)

Municipality	Addressable Structures	Critical Facilities	Wildfires (1979 – 2015)
Driftwood	14	2	8
Emporium	0	2	0
Gibson	0	0	60
Grove	24	0	21
Lumber	29	0	26
Portage	16	0	9
Shippen	21	0	59
TOTAL	**104**	**4**	**183**

Figure 20 - Wildfire Vulnerability



4.3.11. Winter Storms

4.3.11.1: Location and Extent

Most severe winter storm hazards include heavy snow (snowstorms), blizzards, sleet, freezing rain, and ice storms. Since most extra-tropical cyclones (mid-Atlantic cyclones locally known as Northeasters or Nor'easters), generally take place during the winter weather months (with some events being an exception), these hazards have also been grouped as a type of severe winter weather storm. According to the Pennsylvania State Hazard Mitigation Plan (PA HMP), winter storms are frequent events for the Commonwealth and occur from late October until mid-April. These types of winter events or conditions are further defined below.

- **Heavy Snow**: According to the National Weather Service (NWS), heavy snow is generally snowfall accumulating to 4 inches or more in depth in 12 hours or less; or snowfall accumulating to six inches or more in depth in 24 hours or less. A snow squall is an intense, but limited duration, period of moderate to heavy snowfall, also known as a snowstorm, accompanied by strong, gusty surface winds and possibly lightning (generally moderate to heavy snow showers) (NWS, 2009).
- **Blizzard**: Blizzards are characterized by low temperatures, wind gusts of 35 miles per hour (mph) or more and falling and/or blowing snow that reduces visibility to ¼-mile or less for an extended period of time (three or more hours) (NWS, 2009).
- **Sleet or Freezing Rain Storm**: Sleet is defined as pellets of ice composed of frozen or mostly frozen raindrops or refrozen partially melted snowflakes. These pellets of ice usually bounce after hitting the ground or other hard surfaces. Freezing rain is rain that falls as a liquid but freezes into glaze upon contact with the ground. (NWS, 2009).
- **Ice storm**: An ice storm is used to describe occasions when damaging accumulations of ice are expected during freezing rain situations. Significant accumulations of ice pull down trees and utility lines resulting in loss of power and communication. These accumulations of ice make walking and driving extremely dangerous, and can create extreme hazards to motorists and pedestrians (NWS, 2009).
- **Extra-Tropical Cyclone**: Sometimes called mid-latitude cyclones, are a group of cyclones defined as synoptic scale, low pressure, weather systems that occur in the middle latitudes of the Earth. These storms have neither tropical nor polar characteristics and are connected with fronts and horizontal gradients in temperature and dew point otherwise known as "baroclinic zones". Extra-tropical cyclones are everyday weather phenomena which, along with anticyclones, drive the weather over much of the Earth. These cyclones produce impacts ranging from cloudiness and mild showers to heavy gales and thunderstorms. Tropical cyclones often transform into extra-tropical cyclones at the end of their tropical existence, usually between 30° and 40° latitude, where there is sufficient force from upper-level shortwave troughs riding the westerlies (weather systems moving west to east) for

the process of extra-tropical transition to begin. A shortwave trough is a disturbance in the mid or upper part of the atmosphere which induces upward motion ahead of it. During an extra-tropical transition, a cyclone begins to tilt back into the colder air mass with height, and the cyclone's primary energy source converts from the release of latent heat from condensation (from thunderstorms near the center) to baroclinic processes (Canadian Hurricane Centre [CHC], 2003).

- **Nor'easter** (abbreviation for Northeaster): Nor'easters are named for the strong northeasterly winds that blow in from the ocean ahead of the storm and over coastal areas. They are also referred to as a type of extra-tropical cyclones (mid-latitude storms, or Great Lake storms). Wind gusts associated with Nor'easters can exceed hurricane forces in intensity. Nor'easters contain a cold core of low barometric pressure that forms in the mid-latitudes. Their strongest winds are close to the earth's surface and often measure several hundred miles across. Nor'easters may occur at any time of the year but are more common during fall and winter months (September through April) (NYCOEM, Date Unknown).

Nor'easters can cause heavy snow, rain, gale force winds and oversized waves (storm surge) that can cause beach erosion, coastal flooding, structural damage, power outages and unsafe human conditions. If a Nor'easter cyclone stays just offshore, the results are much more devastating than if the cyclone travels up the coast on an inland track. Nor'easters that stay inland are generally weaker and usually cause strong winds and rain. Precipitation falling from warmer air moves into the colder air at the surface, causing crippling sleet or freezing rain (McNoldy [Multi-Community Environmental Storm Observatory (MESO)], Date Unknown). While some of the most devastating effects of Nor'easters are experienced in coastal areas (e.g. beach erosion, coastal flooding), the effects on inland areas, like Cameron County, may include heavy snow, strong winds and blizzards. Ice jams are caused when long cold spells freeze up rivers and lakes. A rise in the water level or a thaw breaks the ice into large chunks. These chunks become jammed at man-made and natural obstructions. The ice jams act as a dam and result in flooding (NSSL, 2006).

4.3.11.2 Range and Magnitude

The magnitude or severity of a severe winter storm depends on several factors including a region's susceptibility to snowstorms, snowfall amounts, snowfall rates, wind speeds, temperatures, visibility, storm duration, topography, and time of occurrence during the day (e.g., weekday versus weekend), and time of season. The extent of a severe winter storm can be classified by meteorological measurements, such as those above, and by evaluating its societal impacts. The Northeast Snowfall Impact Scale (NESIS) categorizes snowstorms, including Nor'easter events, in this manner. Unlike the Fujita Scale (tornado) and Saffir Simpson Scale (hurricanes), there is no widely used scale to classify snowstorms. NESIS was developed by Paul Kocin of The Weather Channel and Louis Uccellini of the NWS to characterize and rank high impact, northeast snowstorms. These

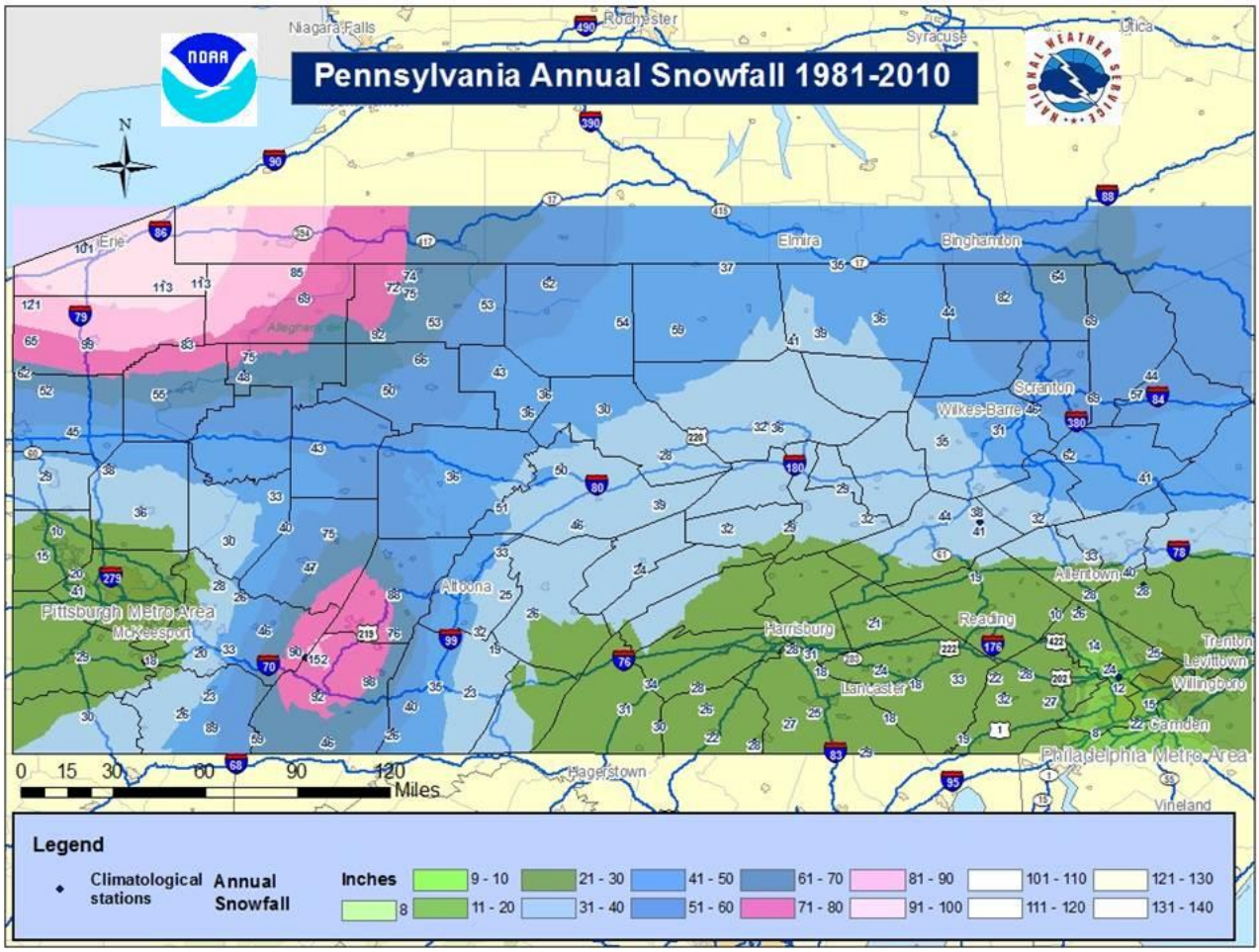
storms have large areas of 10 inch snowfall accumulations and greater. NESIS has five ranking categories: Notable (1), Significant (2), Major (3), Crippling (4), and Extreme (5) (*Table 34 - NESIS Winter Storm Rankings*). The index differs from other meteorological indices in that it uses population information in addition to meteorological measurements. Thus, NESIS gives an indication of a storm's societal impacts. This scale was developed because of the impact northeast snowstorms can have on the rest of the country in terms of transportation and economic impact (Kocin and Uccellini, 2011). The climate of Pennsylvania is marked by abundant snowfall. Winter weather can reach Pennsylvania as early as October and is usually in full force by late November with average winter temperatures between 20 and 40 degrees Fahrenheit. Cameron County receives an average of about 40 inches of snowfall a year (*Figure 21 - Pennsylvania Annual Snowfall* 1981-2010). Most areas of Cameron County experience the effects of winter storms frequently. The general indication of the average annual snowfall map shows areas that are subject to a consistent risk for large quantities of snow.

Table 34 - NESIS Winter Storm Rankings

Category	Description	NESIS Range	Definition
1	Notable	1.0 – 2.49	These storms are notable for their large areas of 4-inch accumulations and small areas of 10-inch snowfall.
2	Significant	2.5 – 3.99	Includes storms that produce significant areas of greater than 10-inch snows while some include small areas of 20-inch snowfalls. A few cases may even include relatively small areas of very heavy snowfall accumulations (greater than 30 inches).
3	Major	4.0 – 5.99	This category encompasses the typical major Northeast snowstorm, with large areas of 10-inch snows (generally between 50 and 150 × 103 mi^2— roughly one to three times the size of New York State with significant areas of 20-inch accumulations.
4	Crippling	6.0 – 9.99	These storms consist of some of the most widespread, heavy snows of the sample and can be best described as crippling to the northeast U.S, with the impact to transportation and the economy felt throughout the United States. These storms encompass huge areas of 10-inch snowfalls, and each case is marked by large areas of 20-inch and greater snowfall accumulations.
5	Extreme	10 +	The storms represent those with the most extreme snowfall distributions, blanketing large areas and populations with snowfalls greater than 10, 20, and 30 inches. These are the only storms in which the 10-inch accumulations exceed 200 × 103 mi^2 and affect more than 60 million people.

Source: Kocin and Uccellini, 2004

Figure 21 - Pennsylvania Annual Snowfall 1981-2010



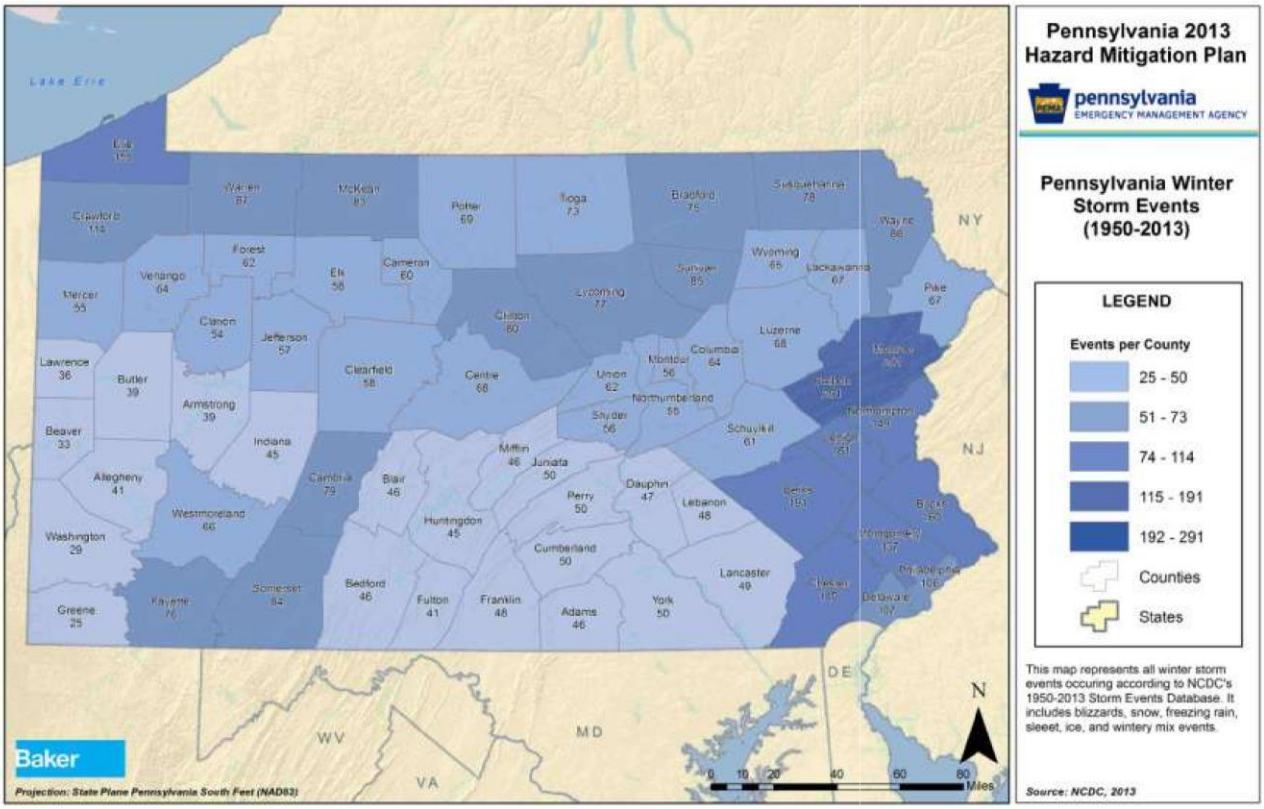
4.3.11.3 Past Occurrence

Emporium Borough holds the Pennsylvania state record for greatest 5-day, 6-day and 7day snowfall totals. The storm finally ended on December 29th, 1944. The final snowfall total was 57 inches. *Figure 22 - Winter Storm Events by County in Pennsylvania* shows the number of winter storm events from 1950-2013 for the State of Pennsylvania. Cameron County had 60 such events. *Figure 21* shows the average annual snowfall from 1981-2010, and *Table 35 – Recent Annual Snowfall Estimates* (NOAA, 2017) shows recent annual snowfall measurements. The estimated snowfall for 2010-2011 and 2013 through 2015 was increased compared to the estimated snow amounts for the 1981 through 2010 period. Only the 2011 through 2012 and 2015 through 2016 periods were slightly decreased. So overall, Cameron County has experienced an increase on the annual estimated average of snowfall.

Table 35 – Recent Annual Snowfall Estimates (NOAA, 2017)

Timespan	Snowfall estimate (inches)
1981-2010	41-60
2010-2011	52-90
2011-2012	20-55
2012-2013	40-68
2013-2014	60-70
2014-2015	54-70
2015-2016	12-33

Figure 22 - Winter Storm Events by County in Pennsylvania



4.3.11.4 Future Occurrence

Winter storm hazards in Pennsylvania are virtually guaranteed yearly since the state is located at relatively high latitudes resulting in winter temperatures that range between 0 and 32 degrees F for a good deal of the fall through early spring season (late October until mid-April). In addition, the state is exposed to large quantities of moisture from both the Great Lakes and the Atlantic Ocean. While it is almost certain that a number

of significant winter storms will occur during the winter and fall season, what is not easily determined is how many such storms will occur during that time frame. Based on historical snow related disaster declaration occurrences, Pennsylvania State can expect a snow storm of disaster declaration proportions, on average, once every 3 to 5 years. Similarly, for ice storms, based on historical disaster declarations, it is expected that on average, ice storms of disaster proportions will occur once every seven to 10 years within the state.

4.3.11.5 Vulnerability Assessment

Severe winter storms are of significant concern to Cameron County because of their frequency and magnitude in the region. Additionally, they are of significant concern due to the direct and indirect costs associated with these events; delays caused by the storms; and impacts on the people and facilities of the region related to snow and ice removal, health problems, cascade effects such as utility failure (power outages) and traffic accidents, and stress on community resources.

Every year, winter weather indirectly and deceptively kills hundreds of people in the U.S., primarily from automobile accidents, overexertion and exposure. Winter storms are often accompanied by strong winds creating blizzard conditions with blinding wind-driven snow, drifting snow and extreme cold temperatures and dangerous wind chill. They are considered deceptive killers because most deaths and other impacts or losses are indirectly related to the storm. Heavy accumulations of ice can bring down trees and power lines, disabling electric power and communications for days or weeks. Heavy snow can immobilize a region and paralyze a city, shutting down all air and rail transportation and disrupting medical and emergency services. The economic impact of winter weather each year is huge, with costs for snow removal, damage and loss of business in the millions. Heavy snow can immobilize a region and paralyze a city, stranding commuters, stopping the flow of supplies, and disrupting emergency and medical services. In rural areas, homes and farms may be isolated for days, and unprotected livestock may be lost. Bridges and overpasses are particularly dangerous because they freeze before other surfaces. For the purposes of this HMP, the entire population of Cameron County (4,886 people) is exposed to severe winter storm events (U.S. Census, 2010). The elderly are considered most susceptible to this hazard due to their increased risk of injuries and death from falls and overexertion and/or hypothermia from attempts to clear snow and ice. Residents with low incomes may not have access to housing or their housing may be less able to withstand cold temperatures (e.g., homes with poor insulation and heating supply).

The entire general building stock inventory in Cameron County is exposed and vulnerable to the severe winter storm hazard. In general, structural impacts include damage to roofs and building frames, rather than building content. There was no historic information available that identified property damages within Cameron County due to a sin-

gle severe winter storm event. Current modeling tools are not available to estimate specific losses for this hazard. A specific area that is vulnerable to the severe winter storm hazard is the floodplain. At risk general building stock and infrastructure in floodplains are presented in the flood hazard profile due to snow and ice melt. Generally, losses from flooding associated with severe winter storms should be less than that associated with a 100-year or 500-year flood.

Full functionality of critical facilities such as police, fire and medical facilities is essential for response during and after a severe winter storm event. These critical facility structures are largely constructed of concrete and masonry; therefore, they should only suffer minimal structural damage from severe winter storm events. Because power interruption can occur, backup power is recommended for critical facilities and infrastructure. Infrastructure at risk for this hazard includes roadways that could be damaged due to the application of salt and intermittent freezing and warming conditions that can damage roads over time. Severe snowfall requires infrastructure to clear roadways, alert citizens to dangerous conditions, and following the winter; requires resources for road maintenance and repair. Additionally, freezing rain and ice storms impact utilities (i.e., power lines and overhead utility wires) causing power outages for hundreds to thousands of residents.

The cost of snow and ice removal and repair of roads from the freeze/thaw process can drain local financial resources. However, because severe winter storms are a regular occurrence in this area, Cameron County is generally well-prepared for snow and ice removal each season.

4.3.12. Civil Disturbance

4.3.12.1 - Location and Extent

The scale and scope of civil disturbance events varies widely. However, government facilities, local landmarks, prisons, and universities are common sites where crowds and mobs may gather.

4.3.12.2 - Range of Magnitude

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

Casual Crowd: A casual crowd is merely a group of people who happen to be in the same place at the same time. Violent conduct does not occur.

Cohesive Crowd: A cohesive crowd consists of members who are involved in some type of unified behavior. Members of this group are involved in some type of common activity, such as worshipping, dancing, or watching a sporting event. Although they may have intense internal discipline, they require substantial provocation to arouse to action.

Expressive Crowd: An expressive crowd is one held together by a common commitment or purpose. Although they may not be formally organized, they are assembled as an expression of common sentiment or frustration. Members wish to be seen as a formidable influence. One of the best examples of this type is a group assembled to protest.

Aggressive Crowd: An aggressive crowd is comprised of individuals who have assembled for a specific purpose. This crowd often has leaders who attempt to arouse the members or motivate them to action. Members are noisy and threatening and will taunt authorities. They may be more impulsive and emotional, and require only minimal stimulation to arouse violence. Examples of this type of crowd could include demonstrators and strikers, though not all demonstrators and strikers are aggressive.

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

Aggressive Mob: An aggressive mob is one that attacks, riots and terrorizes. The object of violence may be a person, property, or both. An aggressive mob is distinguished from an aggressive crowd only by lawless activity. Examples of aggressive mobs are the inmate mobs in prisons and jails, mobs that act out their frustrations after political defeat, or violent mobs at political protests or rallies.

Escape Mob: An escape mob is attempting to flee from something such as a fire, bomb, flood, or other catastrophe. Members of escape mobs are generally difficult to control can be characterized by unreasonable terror.

Acquisitive Mob: An acquisitive mob is one motivated by a desire to acquire something. Riots caused by other factors often turn into looting sprees. This mob exploits a lack of control by authorities in safeguarding property.

Expressive Mob: An expressive mob is one that expresses fervor or revelry following some sporting event, religious activity, or celebration. Members experience a release of pent up emotions in highly charged situations.

There is no known history of civil disturbance in Cameron County. A possible worst case scenario would be an aggressive mob demonstrating in Emporium Borough and/or Shippen Township, the two most populated municipalities in the county.

4.3.12.3 - Past Occurrence

Recorded events of civil disturbances for Cameron County are not extensive. There were three events in 2012 involving school lockdowns. One was a planned event: a K-9 search for drugs, another was a drug related lockdown, and an event where a student brought a BB gun to school to show a classmate. All of these events occurred in Emporium Borough. There are no other recorded events of civil disturbances in Cameron County.

4.3.12.4 - Future Occurrence

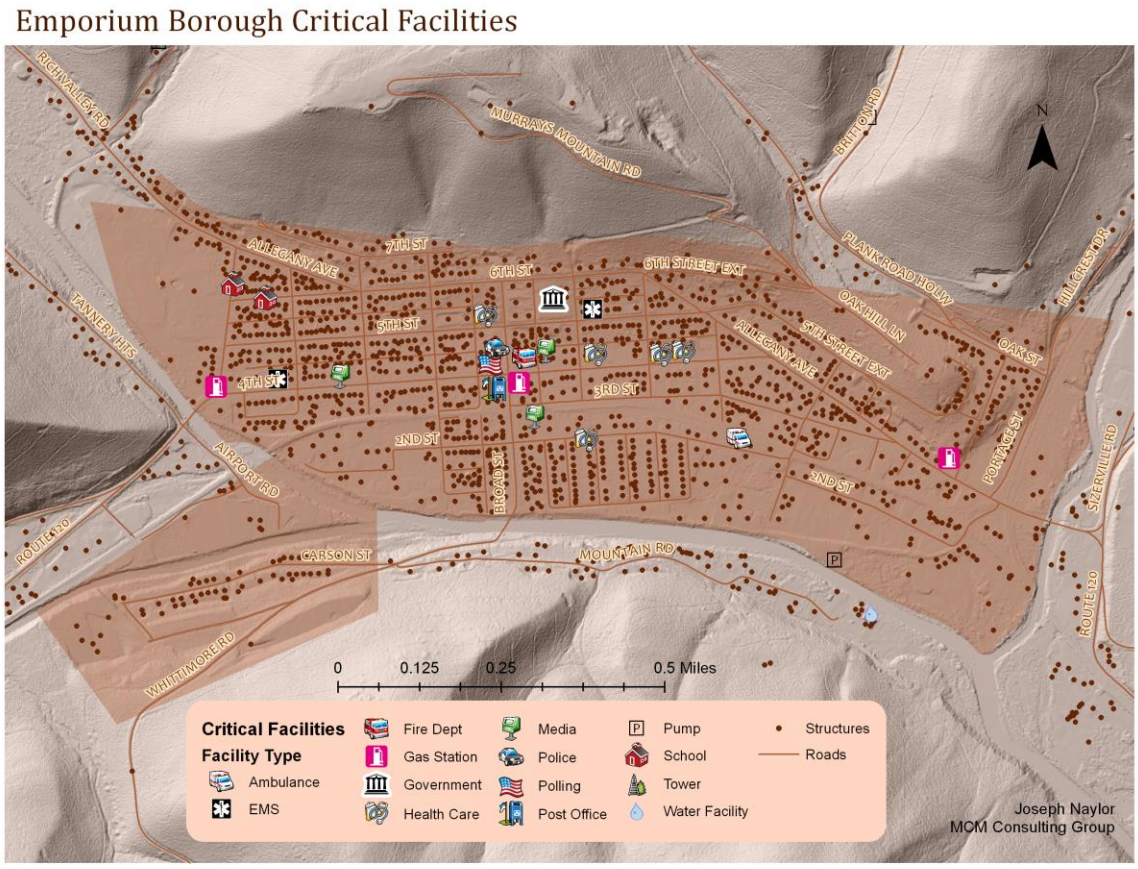
Minor civil disturbances may occur in Cameron County, but it is not possible to accurately predict the probability of future occurrence for civil disturbance events over the long-term. However, it may be possible to recognize the potential for an event to occur in the near-term. The most likely occurrence of civil disorder in Cameron County would be a labor strike.

4.3.12.5 - Vulnerability Assessment

Seven of the seven municipalities in Cameron County are vulnerable to civil disturbance.

Critical facilities located in Emporium (*Figure 23 - Critical Facilities in Emporium Borough* shows those facilities that are at risk) are most vulnerable to civil disturbances due to the relatively high population density. However, most civil disturbance events, should they occur, would have minimal impact. Adequate law enforcement at these locations minimizes the chances of a small assembly of people turning into a civil disturbance.

Figure 23 - Critical Facilities in Emporium Borough



4.3.13. Dam Failure

4.3.13.1 - Location and Extent

Dam failures most often occur during or after a massive rainfall, flooding, or spring thaws, sometimes with little to no warning. Depending on the size of the water body where the dam is constructed. Water contributions may come from distant upstream locations. There are two dams located within the county that are classified as high hazard dam and requires an emergency action plan. The inundation maps for these dams are housed at the Cameron County Emergency Management Agency, Courthouse, 20 East 5th Street, Emporium, PA 15834.

George B. Stevenson Dam: This high-hazard dam owned by the Pennsylvania Fish and Boat Commission is located in Grove Township. An emergency action plan has been developed for this dam and is included in this appendix.

Salt Run Reservoir Dam: This high-hazard dam is located in Portage Township. An emergency action plan has been developed for this dam and is included in this appendix.

4.3.13.2 - Range of Magnitude

Dam failures can pose a serious threat to communities located downstream from major dams. The impact of a dam failure is dependent on the volume of water impounded by the dam and the amount of population or assets located downstream. The Pennsylvania Department of Environmental Protection defines a high hazard dam as "any dam so located as to endanger populated areas downstream by its failure" (def. Added May 16, 1985, P.L.32, No. 15). While there are approximately 3,200 dams located throughout Pennsylvania, about 780 of them are considered to be high hazard, while the remainder are considered significant or low hazard. High hazard dams receive two inspections each year - once by a professional engineer on behalf of the owner and once by a Pennsylvania Department of Environmental Protection inspector (PADEP, 2008).

4.3.13.3 - Past Occurrence

There have been two significant dam failures in Pennsylvania. The worst dam failure to occur in the U.S. took place in Johnstown, PA in 1889 which claimed 2,209 lives. Another dam failure took place in Austin, PA (Potter County) in 1911 which claimed 78 lives. No significant dam failures have occurred in Cameron County. According to PEMA, minor dam failures occur annually, but the impact of these events is minimal.

There have not been any failures of dams in Cameron County since the last hazard mitigation plan. There are two recorded dam failure drills that occurred in 2014 at the George B. Stevenson dam.

4.3.13.4 - Future Occurrence

Provided that adequate engineering and maintenance measures are in place, high hazard dam failures are unlikely in Cameron County. The Pennsylvania Department of Environmental Protection inventories and regulates all dams that meet or exceed the following criteria (PADEP, 2008):

Impound water from a drainage area of greater than 100 acres;

Have a maximum water depth greater than 15 feet;

Have a maximum storage capacity of 50 acre-feet or greater.

The construction, operation, maintenance, modification and abandonment of dams is reviewed and monitored by the Department's Division of Dam Safety. Dams are evaluated based on categories such as slope stability, undermining seepage and spillway adequacy. The presence of structural integrity and inspection programs significantly reduces the potential for major dam failure events to occur.

4.3.13.5 - Vulnerability Assessment

Property and populations located downstream from any dam are vulnerable to dam failure. However, communities downstream of high hazard dams should pay particular attention to inspection and maintenance activities that keep their communities safe. With these activities and oversight from the Pennsylvania Department of Environmental Protection, vulnerability decreases significantly. Cameron County does not have any low risk or moderate risk dams in the county.

For the George B. Stevenson Dam, there are approximately 280 vulnerable structures (no critical facilities, however) located within the inundation area. The Salt Run Reservoir Dam has approximately 330 structures located in the inundation area. There are also 3 critical facilities located downstream of this dam, they are:

Emporium Water Company Facility - 174 Nickler Rd., Emporium.

George B. Erskine Health Care and Wellness Center - 288 Sizerville Rd., Emporium

Jane Ullman Day Care - 383 Arch Dr., Emporium

In addition, the county should remain aware of changes that may take place regarding dams outside and upstream of Cameron County.

Figure 24 - High Hazard Dams – Grove area

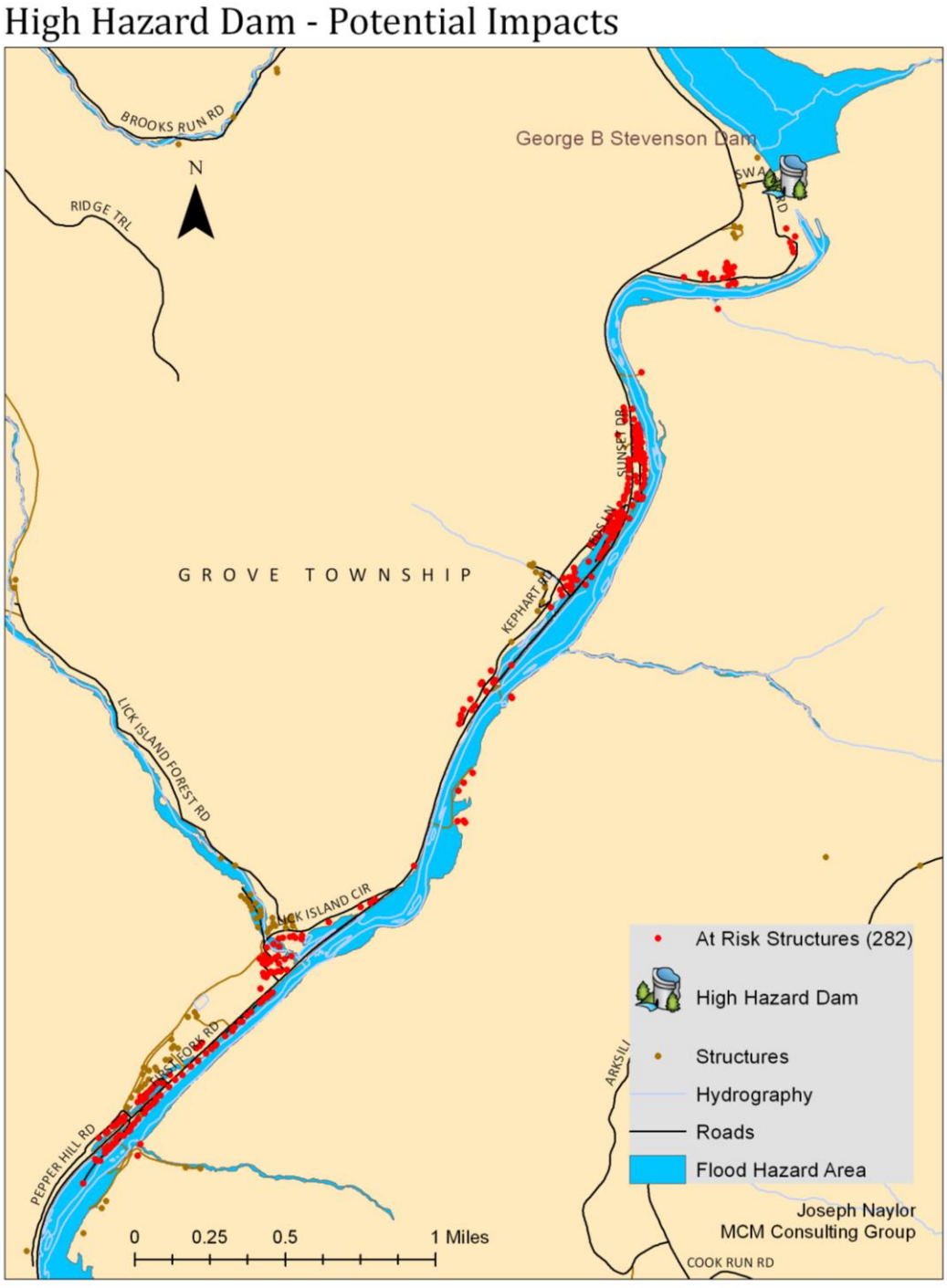
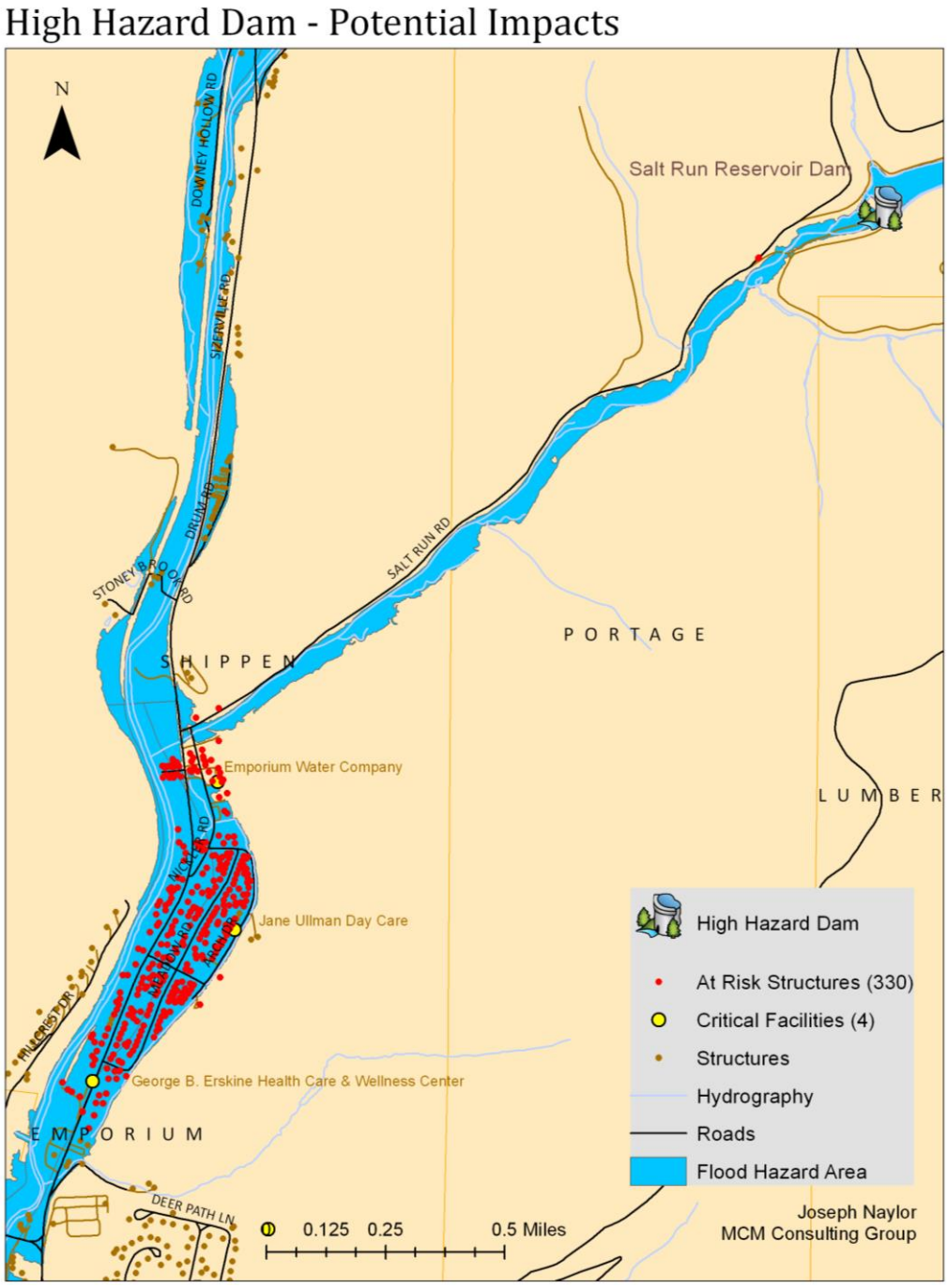


Figure 25 - High Hazard Dams – Portage area



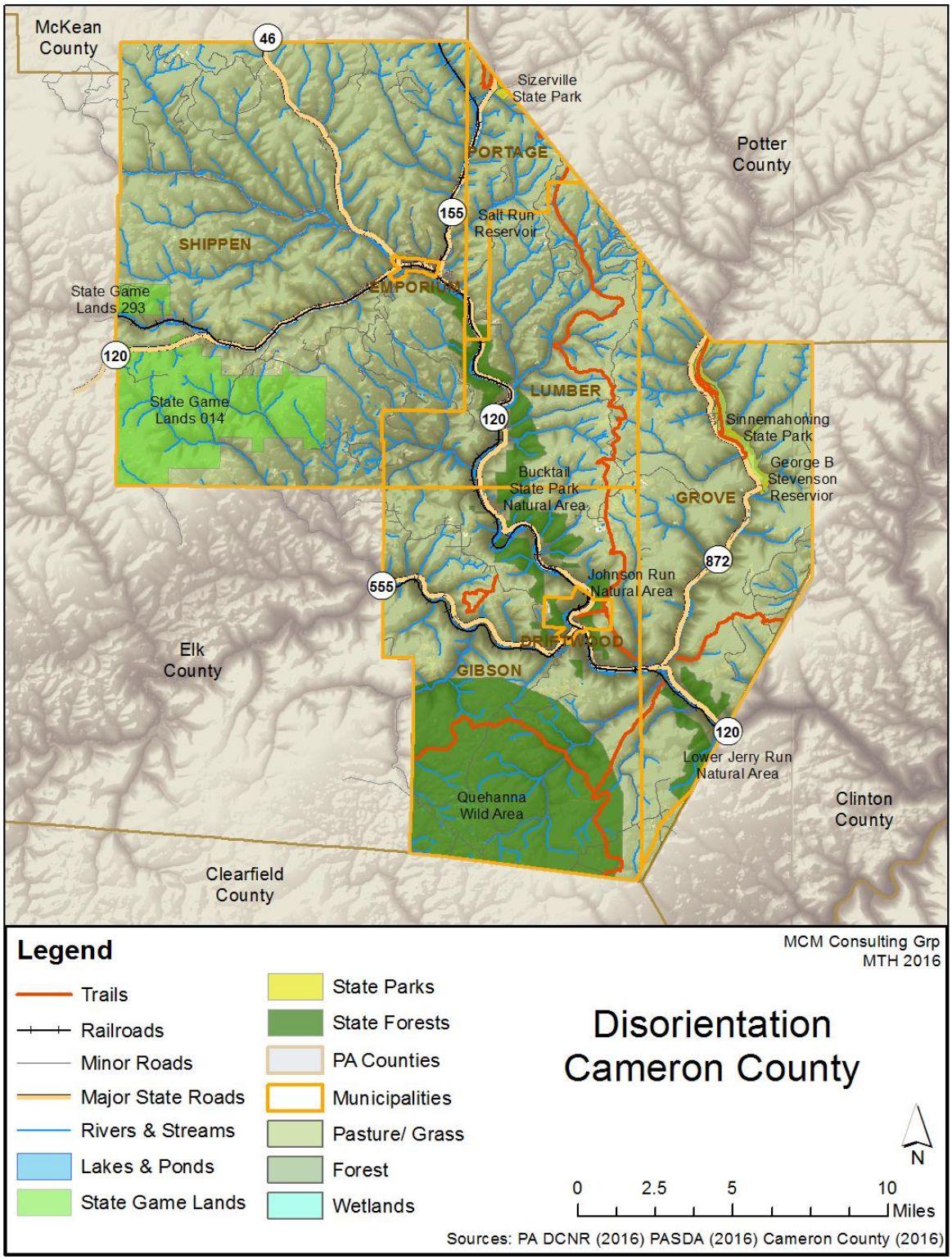
4.3.14. Disorientation

4.3.14.1 Location and Extent

Disorientation is the loss of one's sense of direction, position, or relationship with one's surroundings. This can also be defined as mental confusion or impaired awareness. In Cameron County, disorientation can vary from a missing child to a lost hunter. Emergency services will be expected to search for missing or disoriented persons at all times of the year and in all types of conditions. Disorientation events have the potential to take place throughout the county.

Cameron County's terrain consists of wooded hills with sharp ridge lines and small flat plateaus, narrow valleys, and winding streams. The elevation ranges from 760 feet to 2,380 feet above sea level. Sinnemahoning Creek is the major waterway in Cameron County, and has the following branches: Driftwood, First Fork Creek and Bennett Branch. Recreation activities such as fishing, canoeing, hunting and hiking occur in the wooded areas and along the waterways in the county.

Figure 26 - Disorientation Vulnerability Map



4.3.14.2 Range of Magnitude

All ranges of the population, from age to social status, would be at a maximum threat to disorientation as 130,800 acres are Pennsylvania State Forest land in Cameron County. The rural setting of Cameron County attracts a large amount of hunters annually. Many of the hunters come from urban areas and do not always have the skills or resources to adequately navigate the woods. There are events that require first responders to respond and search for lost hunters on a regular basis.

4.3.14.3 Past Occurrence

Table 36 - Disorientation Incidents below depicts the events that required emergency service personnel to be utilized for search and rescue of disoriented persons. This list is compiled from data gathered on Knowledge Center™. The people that were disoriented, but did not require emergency service personnel to assist them are not accounted for; and it is difficult to determine the frequency of this occurrence.

Table 36 - Disorientation Incidents

Disorientation Incidents in Cameron County Requiring First Responders		
Date	**Event**	**Location / Municipality**
11-26-2007	Two lost hunters	Shippen Township
12-01-2008	Missing, overdue hunter on State Forest Land	Lumber Township
12-04-2008	Lost hunter	Shippen Township
12-12-2008	Lost hunter across from Stevenson Dam in the Mooley Run/ Lushbaugh area.	Grove Township
04-26-2009	Missing persons, a 13 and 14 year old were missing from a camp in Wykof Run area.	Grove Township
11-23-2009	Injured hunter; fell from a tree stand with back and pelvic pain	Shippen Township
07-09-2011	Missing person at Sizerville State Park	Portage Township
11-27-2011	MVA with SAR Deployment – accident occurred with a patient with a head injury and when fire, ems and police units arrived there was no one around the vehicle.	Driftwood Borough
08-10 to 16-2012	Dog teams sent out to Cameron and McKean counties to search for a subject of an armed abduction	Shippen Township
11-27-2012	Extrication of injured hunter who fell over steep hillside	Gibson Township
11-30-2015	3 Lost hunters – Third hunter found DOA 12-2-2015	

4.3.14.4 Future Occurrence

The probability of a disorientation event is high. Citizens should be aware of their surroundings, although the very young and those with mental incapacities will always be

at a higher risk. Hunters should be aware of the areas in which they hunt. Maps and other resources would enhance the hunter's capabilities to navigate safely. A risk factor of 2.3 has been assigned to this hazard.

4.3.14.5 Vulnerability Assessment

Disorientation events are typically a local event, but sometimes may span across municipality and county borders as state game lands and forests lie within multiple municipalities. A search and rescue operation can take place in all types of settings, to include a village, a park, forested lands, or lakes and ponds. Due to the rural nature of Cameron County and seasonal dwellings within the county, many people are not familiar with the area. Many people enter the forests and waterways to enjoy recreational activities, not aware of their surroundings and how to return.

4.3.15. Environmental Hazards

4.3.15.1 Location and Extent

Environmental hazards are most commonly due to hazardous material incidents which occur when such materials are manufactured, used, stored or transported. Most hazardous materials incidents are unintentional, however hazardous materials could also be released in a criminal or terrorist act. A release, whether it is intentional or accidental, can result in injury or death and may contaminate air, water and/or soils. Hazardous materials incidents can be generally broken down into the subcategories of transportation and fixed facility.

Tanker trucks, tractor trailers and rail cars often are used to transport hazardous materials. When there are transportation incidents involving these type of vehicles, hazardous materials can be released in significant quantities. *Section 4.3.19.1 Figure 33 - Cameron County Transportation Routes* shows major transportation routes through Cameron County, including Pennsylvania routes 120, 155 and 46.

In Pennsylvania, facilities that use, manufacture, or store hazardous materials must comply with Title III of the federal Superfund Amendments and Reauthorization Act (SARA), and the Commonwealth's reporting requirements under the Hazardous Materials Emergency Planning and Response Act (1990-165), as amended. There are two SARA Title III facilities in Cameron County, though it is important to recognize that these facilities are not an exhaustive and comprehensive list of all locations where hazardous material resides in the county. *Figure 27 - Hazardous Waste Locations* identifies SARA Title III facilities as well as several other locations that consume, store or release potentially hazardous materials and wastes.

Fixed facilities are also monitored by the Environmental Protection Agency (EPA). The EPA has identified hazardous materials sites, not regulated by SARA Title III, and are known as Toxic Release Inventory (TRI) sites. Facilities which employ ten or more full-

time employees and which manufacture or process more than 25,000 pounds (or use more than 10,000 pounds) of any SARA Section 313-listed toxic chemical in the course of a calendar year are required to report TRI information to the EPA, the federal enforcement agency for SARA Title III and PEMA. As of 2015, there are seven TRI facilities in Cameron County, all located in and around Emporium Borough.

Oil and gas extraction facilities can also be sources of hazardous material release. Most wells in the county are active, but there are also many inactive and abandoned wells. *Figure 28 - Oil & Gas Well Locations* shows the location of all oil and gas wells in the county along with their proximity to surface waters.

Figure 27 - Hazardous Waste Locations

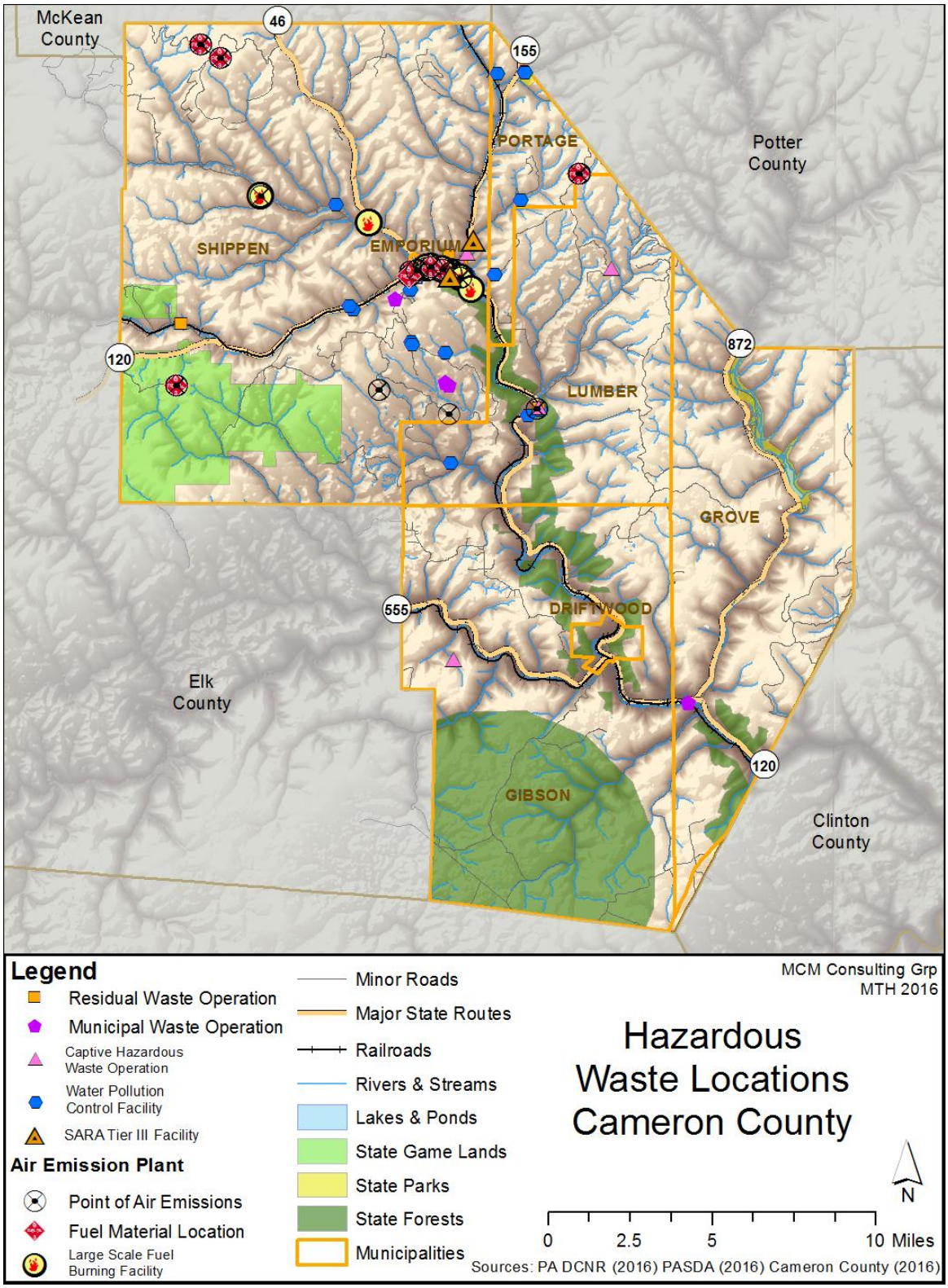
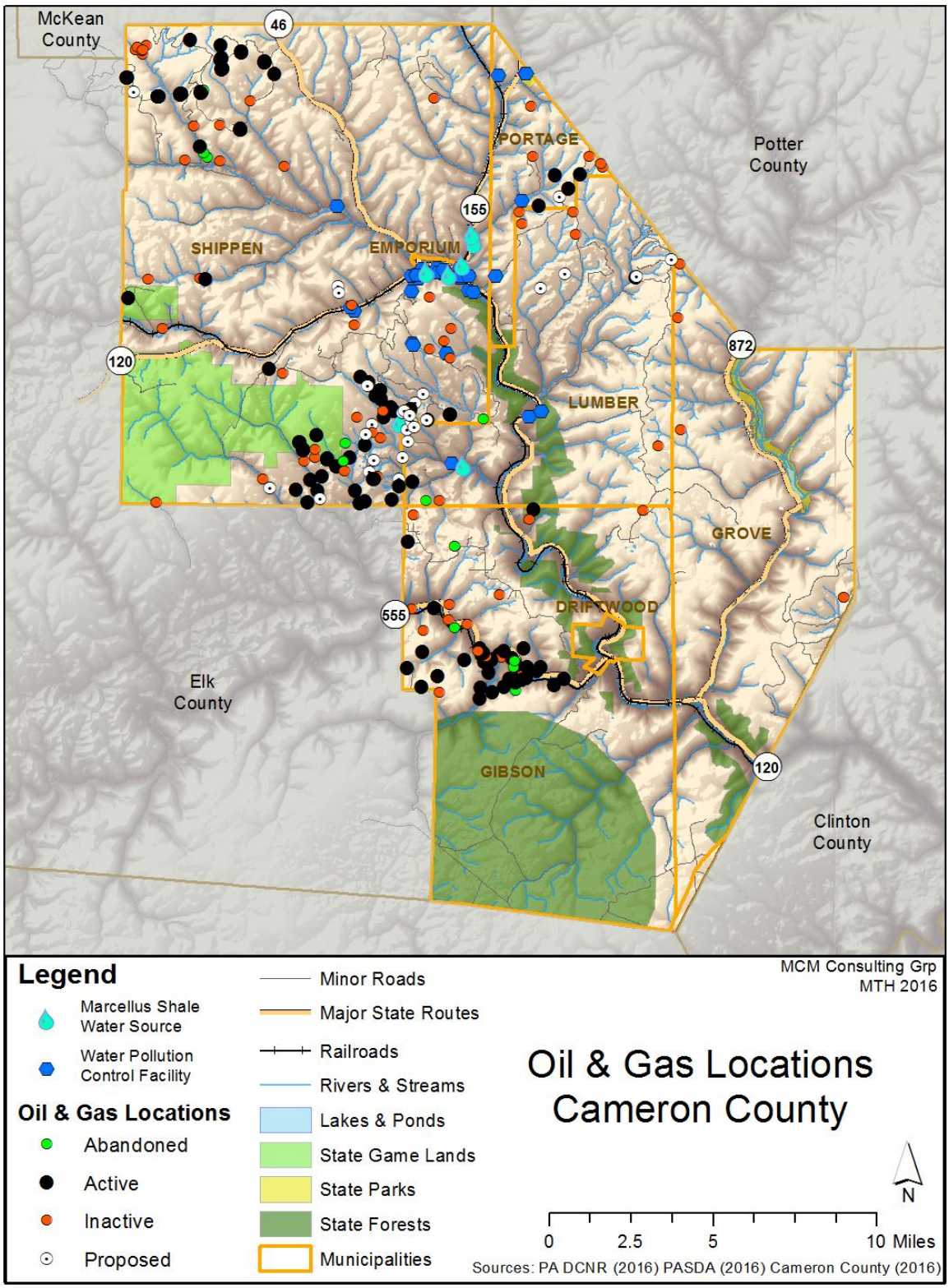


Figure 28 - Oil & Gas Well Locations



4.3.15.2 Range of Magnitude

Hazardous material releases can contaminate air, water and soil, and can possibly cause injuries, poisonings, or deaths. Hazardous materials fall into nine hazard classes: explosives; gases (flammable, non-flammable, non-toxic, and toxic); flammable and combustible liquids; flammable solids (spontaneously combustible materials, and dangerous when wet materials/water-reactive substances); oxidizing substance and organic peroxides; toxic substances and infectious substances; radioactive materials; corrosive substances; and miscellaneous hazardous materials/products, substances or organisms. All nine hazard classes can be found being transported and at fixed facilities. Certain conditions can exacerbate release incidents:

Weather conditions affect how the hazard occurs (e.g. transportation accidents) and develops (dispersion can take place rapidly when transported by water and/ or wind). Release can be a secondary impact of natural hazards such as tornadoes or flooding.

Micro-meteorological effects of buildings and terrain: alters dispersion of hazardous materials

Proximity to surface and ground water sources

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 type of material released, distance and related response time of emergency responders also significantly impact the severity and scope of hazardous materials releases and clean-up efforts. Areas most proximal to the release are usually at greatest risk, but depending on the material, a release can travel great distances or remain present in the environment for long periods of time (e.g. centuries or millennia for some radioactive materials) resulting in chronic and extensive impacts on people and the environment.

Oil and gas well drilling can have a variety of effects on the environment. Abandoned oil and gas wells, not properly plugged can contaminate groundwater and consequently drinking water wells. Surface waters and soil are sometimes polluted by brine, a salty wastewater product of oil and gas well drilling, and from oil 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, making water safety an important factor in oil and gas extraction (Gregory et al., 2011). In some cases associated with hydraulic fracturing (fracking), methane has been found contaminating drinking water in surrounding areas (Osborn et al., 2011).

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.

4.3.15.3 Past Occurrence

In the past, deaths have resulted from a fuel oil truck fire. In May of 1992, a drainage pipe at Pennsylvania Pressed Metal, Inc. leaked into the Sinnemehoning Creek in Shippen Township. In April 1994, a backhoe operated by the Emporium Borough street crew ruptured the natural gas line at the intersection of Allegheny Avenue and East 3rd Street in Emporium. Fifty people were evacuated in a one block area and offered shelter at St. Mark's Center for three hours. More recent events are recorded in the Knowledge Center™ and are summarized in *Table 37 - Hazardous Material Incidents* (Knowledge Center™, 2016). Transportation incidents can be found in *Table 42 - Past Transportation Accidents or Incidents.*

Table 37 - Hazardous Material Incidents (Knowledge Center™, 2016)

Title	Municipality	Date
Bridge Construction	Driftwood Borough	3/12/2008
natural gas leak	Shippen Township	10/6/2008
MORTAR FOUND	Emporium Borough	10/22/2008
Meth Lab Incident	Emporium Borough	5/21/2009
Oil Spill	Shippen Township	8/31/2009
fuel spill	Emporium Borough	6/5/2011
Diesel Fuel Leak/Spill	Shippen Township	12/9/2011
Leaking Drums	Shippen Township	7/26/2012
PSP Bomb Squad Detail	Emporium Borough	4/16/2013
Chlorine Leak	Cameron County	8/26/2014
WELL CONTAMINATION COMPLAINT	Emporium Borough	1/21/2016

The EPA tracks the management of hazardous materials in facilities that handle significant amounts of hazardous materials. The seven TRI facilities in Cameron County as of 2015 are summarized in *Table 38 - TRI Facilities* (EPA, 2016). Production-related waste managed is a collective term to refer to how much of a chemical is recycled, combusted for energy recovery, treated for destruction or disposed of or otherwise released on and off site.

Table 38 - TRI Facilities (EPA, 2016)

Name	Address	Industry Sector	Chemical	Production-related Waste Managed (lbs)
GKN SINTER METALS CAMERON RD	15420 RT 120 CAMERON RD	Fabricated Metals	COPPER	5771
GKN SINTER METALS CAMERON RD	15420 RT 120 CAMERON RD	Fabricated Metals	NICKEL	4415
GE TRANSPORTATION SYSTEMS	55 PINE ST	Electrical Equipment	COPPER	68
AMERICAN SINTERED TECHNOLOGIES INC	513 E SECOND ST	Fabricated Metals	COPPER	5024
AMERICAN SINTERED TECHNOLOGIES INC	513 E SECOND ST	Fabricated Metals	ZINC (FUME OR DUST)	1787

Name	Address	Industry Sector	Chemical	Production-related Waste Managed (lbs)
GKN SINTER METALS AIRPORT ROAD	1 AIRPORT RD	Fabricated Metals	COPPER	57905
GKN SINTER METALS AIRPORT ROAD	1 AIRPORT RD	Fabricated Metals	NICKEL	20214

As of 2011, Cameron County was home to 43 active natural gas wells, at which a total of 56 violations were recorded, with Samson Exploration LLC being responsible for 52 of these 56 violations (PA DEP, 2011)

4.3.15.4 Future Occurrence

Hazardous material release incidents are generally difficult to predict, but the presence of such dangerous materials warrants preparation for accidental or intentional release events. Emergency response in Cameron County should be prepared to handle the types of hazardous materials housed and used in the SARA Title III facilities, TRI facilities and oil and gas wells that are located in the county. The federal Superfund Amendments and Reauthorization Act (SARA) is also known as the Emergency Planning and Community Right-to-Know Act (EPCRA), and Local Emergency Planning Committees (LEPCs) are designed by EPCRA to ensure that state and local communities are prepared to respond to potential chemical accidents.

A study of the flow of commodities through Cameron County could help shed light on the types of hazardous materials being transported through the county and would help inform emergency responders about the types of incidents they should be prepared for. Intentional acts are covered in the profile of Terrorism in section 4.3.18 terrorism profile.

4.3.15.5 Vulnerability Assessment

Populations, critical facilities and natural habitats within a quarter mile of major highways and railways are considered to be at risk for hazardous material transportation incidents, and are covered in more detail in section 4.3.19 transportation profile. Additionally, populations, critical facilities and natural habitats within 1.5 miles of Sara Title III and Toxic Release Inventory sites are also vulnerable to hazardous material incidents.

Private water supplies such as domestic drinking water wells in the vicinity of oil and gas wells are at risk of contamination from brine and other pollutants, including methane which can pose a fire and explosive hazard. Ideally, vulnerability of private drinking well owners would be established by comparing distance of drinking water wells to known oil and gas well locations, but this extensive detailed data is not readily available at this time. Private drinking water is largely unregulated and information on these wells is voluntarily submitted to the Pennsylvania Topographic and Geologic Survey by water well drillers, and the existing data is largely incomplete and/or not completely accurate. Shippen Township contains the most oil and gas wells along with the most drinking

water wells, meaning Shippen Township is most vulnerable to water contamination from oil and gas wells.

Table 39 - Oil Gas & Drinking Water Wells (PASDA & PAGWIS, 2016)

Municipality	Oil & Gas Wells				Domestic Drinking Water Wells
	Active	Abandoned	Inactive	Proposed	
Driftwood	0	0	0	0	13
Emporium	0	0	0	0	32
Gibson	34	5	16	0	99
Grove	1	0	5	0	106
Lumber	2	1	6	8	76
Portage	4	0	5	1	22
Shippen	140	7	36	21	222
Total	**181**	**13**	**68**	**30**	**570**

4.3.16. Levee Failure

4.3.16.1 - Location and Extent

Levees and floodwalls are man-made structures designed to protect specific areas from flooding. These structures fail when floodwaters exceed the height of the structure, or when the maximum pressure exerted by the floodwaters against the levee/floodwall exceeds its capability.

There is a levee protecting the town of Emporium. This levee holds back the Sinnemahoning Creek in event of high waters. The levees extent runs from the Rich Valley Road and Wheaton Hollow Road intersection on the west end of town, follows the creek around the southern extent of town, all the way to East 2nd Street and East Allegheny Avenue on the east. The levees extent is pictured in *Figure 31 - Potential Impacted Area in Case of Levee Failure*.

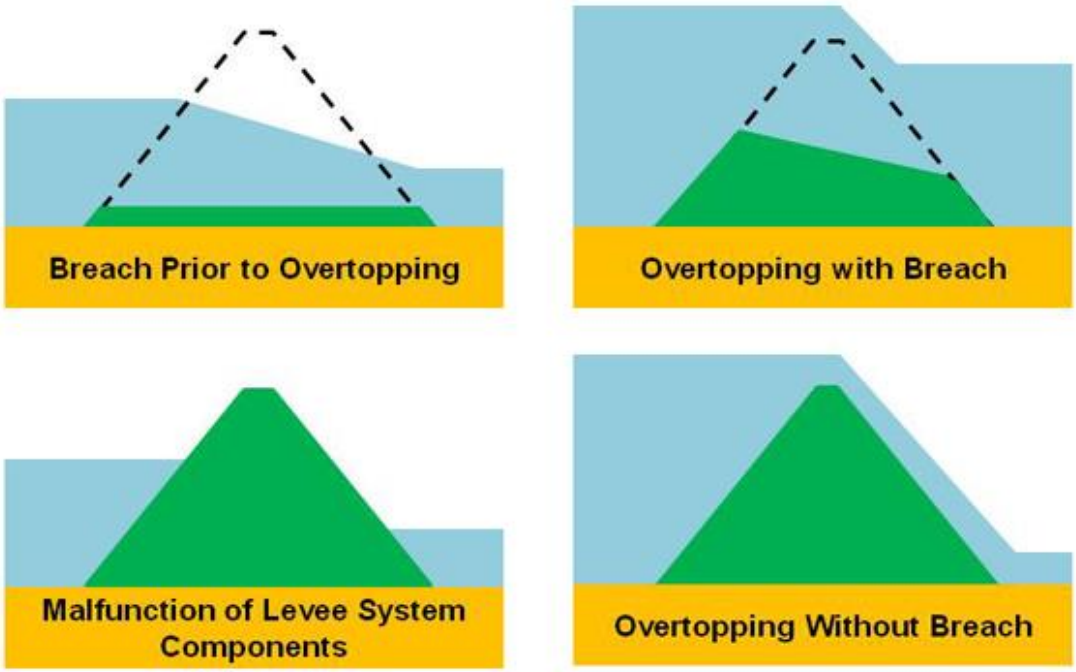
4.3.16.2 - Range of Magnitude

See Section 4.3.4 for a description of flood events in Cameron County.

Levee failures can pose a serious threat to communities located in flat or low lying areas near bodies of water that are protected by levees. The impact of a levee failure is dependent on the volume of water behind the levee, the size of the failure and the amount of population or assets located in the protected area. The U.S. Army Corps of Engineers

quantify flood risk associated with four scenarios as shown below in *Figure 29 - Types of Levee failures*.

Figure 29 - Types of Levee failures



Any of these failures could lead to significant damages to the town of Emporium and could affect all of the critical infrastructure and other structures that the levee protects.

4.3.16.3 - Past Occurrence

There have been no past occurrences of levee failures in Cameron County.

4.3.16.4 - Future Occurrence

The probability of a levee failure in Cameron County cannot be determined, but based upon the Risk Factor Methodology Probability Criteria, is considered to be highly likely.

4.3.16.5 - Vulnerability Assessment

When assessing the vulnerability of a community protected by a levee, there are three questions that the USACOE uses to help judge the potential impact of a levee failure.

Figure 30 - Judging the Impact of Levee failure

1. What event could occur? (flood, storm, earthquake)
2. How will the levee perform during these events?
3. What are the consequences if the levee doesn't perform well, in particular, could any loss of life occur?

Using these questions as a framework, we can judge a levees risk and vulnerability.

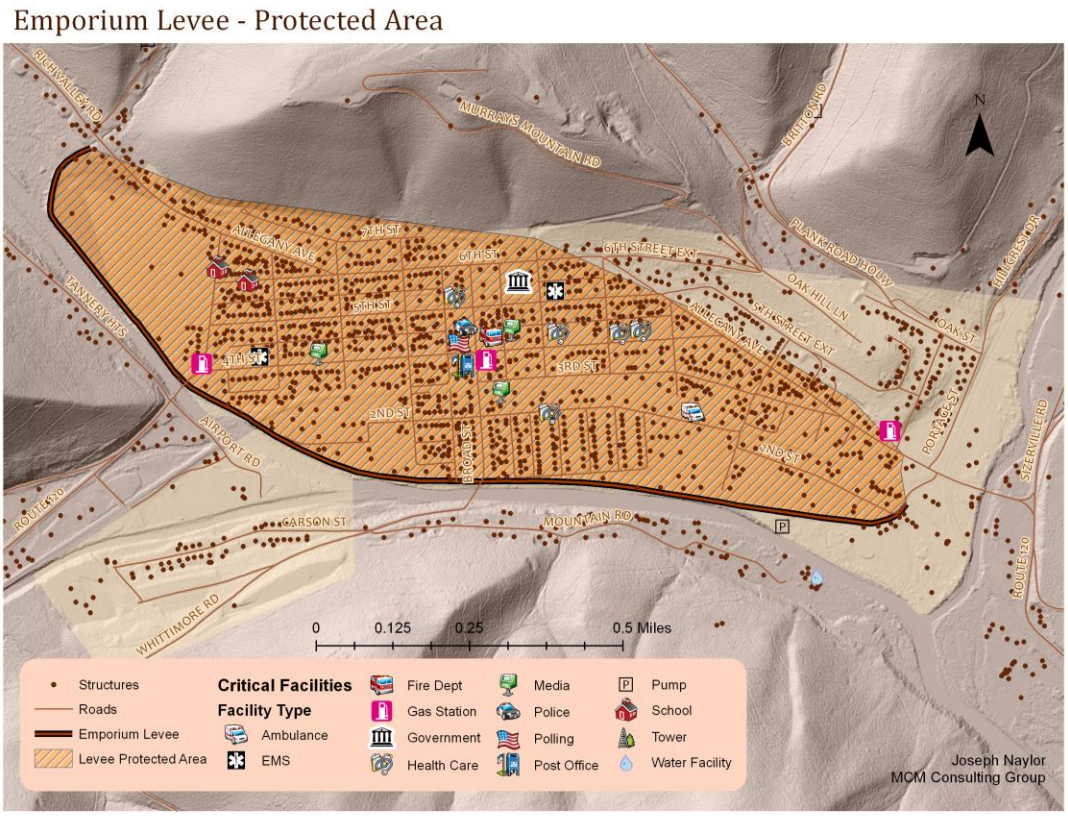
Table 40 - Levee System Inspection Ratings

Levee System Inspection Ratings

Acceptable	All inspection items are rated as Acceptable.
Minimally Acceptable	One or more inspection items are rated as Minimally Acceptable or one or more items are rated as Unacceptable and an engineering determination concludes that the Unacceptable inspection items would not prevent the segment/system from performing as intended during the next flood event.
Unacceptable	One or more inspection items are rated as Unacceptable and would prevent the segment/system from performing as intended, or a serious deficiency noted in past inspections (previous Unacceptable items in a Minimally Acceptable overall rating) has not been corrected within the established timeframe, not to exceed two years.

If the levee in Emporium Borough were to fail, many structures and critical facilities would be at risk. Twenty (20) of the county's 44 critical facilities fall into the potential inundation area. These facilities include the Police Station, Cameron County Court-house, Cameron County High School, Woodland Elementary School, County Emergency Services Office, Emporium Fire Department and Cameron County Health Care Center. In addition to these facilities, over 1,200 other structures also fall into the potential inundation area. In the event of a critical failure, all of these structures, as well as people contained within, would be at risk of damage and loss.

Figure 31 - Potential Impacted Area in Case of Levee Failure



4.3.17. Subsidence & Sinkholes

4.3.17.1 Location and Extent

Subsidence potential in Cameron County is primarily associated with mining activities. Deep mining techniques in areas underlain by coal or other minerals can result in susceptibility to subsidence. Poor engineering practices at the time of withdrawal, or progressive degradation in geological stability additionally contribute to subsidence. Isolated incidents throughout the coal regions of the Commonwealth have contributed to structure damage, roadway closures, and community risk. Natural subsidence has not occurred in Cameron County.

4.3.17.2 Range of Magnitude

Based on the limited history of mining in Cameron County, subsidence and sinkhole events are not likely to occur. However, events could result in minor elevation changes or deep, gaping holes in the ground surface. Subsidence and sinkhole events can cause severe damage in urban environments, although gradual events can be addressed before significant damage occurs. If long-term subsidence or sinkhole formation is not recognized and mitigation measures are not implemented, fractures or complete collapse of building foundations and roadways may result.

Pennsylvania identifies Cameron County's risk factor for sinkhole events to be 2.2. This is classified as medium risk, as the average risk factor for the state is 1.7. The Pennsylvania HMP did not report any sinkholes in their 2013 report.

Limited data beyond reports of secondary road cave-ins was available for the worst case scenario of subsidence in Cameron County. A possible worst case scenario would be the cave-in of the county's most traveled roadways, Route 120, Route 46, and Route 155.

4.3.17.3 Past Occurrence

Both the 2003 Hazards Vulnerability Analysis (HVA) and the 2004 Hazard Mitigation Plan state that there have been two subsidence events resulting in secondary road cave-ins within Cameron County. Unfortunately, neither the 2003 HVA, the 2004 plan nor the Cameron County Emergency Management Agency have any further details as to the geographic location of these cave-ins in the county. There have been no deaths or injuries resulting from mine subsidence.

4.3.17.4 Future Occurrence

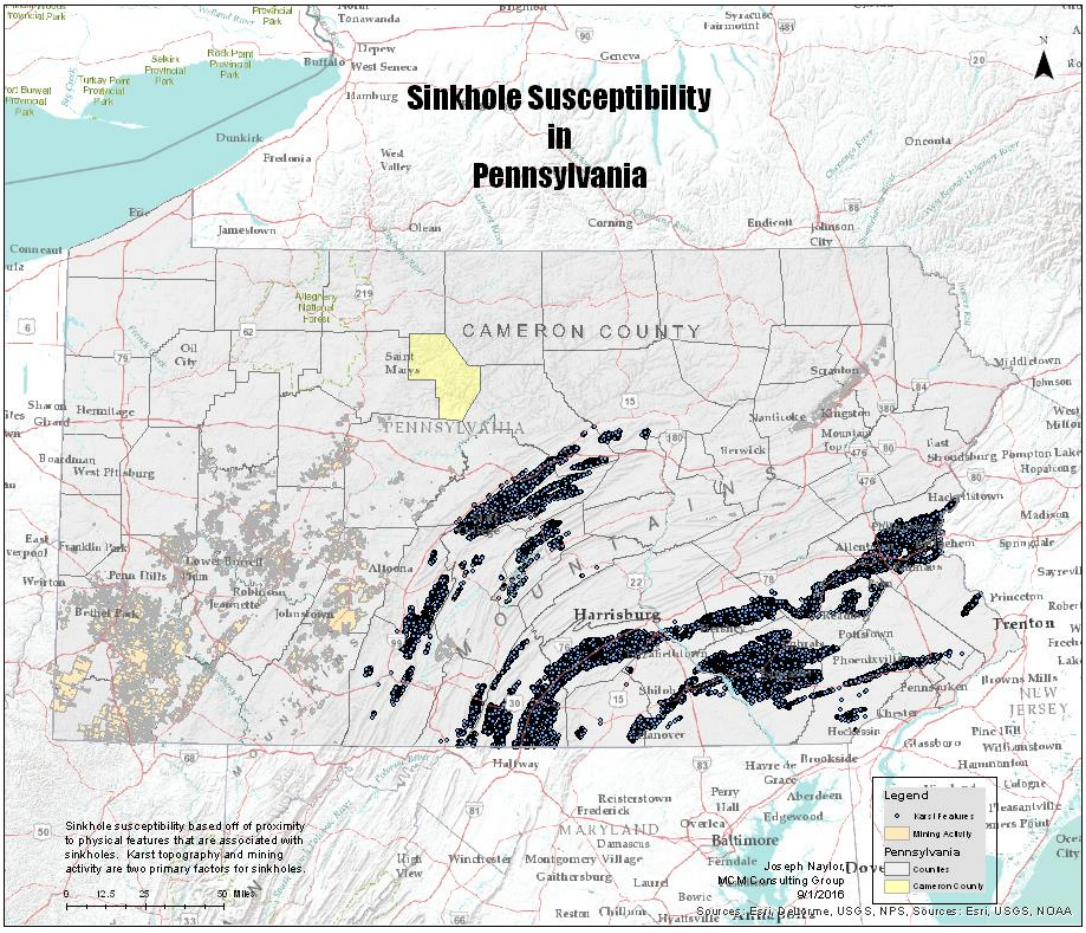
Based on geological conditions and the lack of large scale mining operations, subsidence events are not likely to occur in Cameron County.

4.3.17.5 Vulnerability Assessment

Areas of the county where commercial mining operations take place are the most vulnerable to subsidence hazards. Natural subsidence and sinkholes have never been reported in Cameron County.

There are no state or county critical facilities at risk in the county due to sinkholes.

Figure 32 - Sinkhole Susceptibility in Pennsylvania



4.3.18. Terrorism

4.3.18.1 Location and Extent

Following several serious international and domestic terrorist incidents during the 1990's and early 2000's, citizens across the United States paid increased attention to the potential for deliberate, harmful actions of individuals or groups. The term "terrorism" refers to intentional, criminal, malicious acts. The functional definition of terrorism can be interpreted in many ways. Officially, terrorism is defined in the Code of Federal Regulations as "*...the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives.*" (28 CFR §0.85)

The Federal Bureau of Investigation (FBI) further characterizes terrorism as either domestic or international, depending on the origin, base, and objectives of the terrorist organization. While Cameron County has many notable local historical landmarks, there are no sites considered significant national or international landmarks in Cameron County, meaning the county is likely not a primary target for international terrorism. Nonetheless, terrorism can take many forms and the origin of the terrorist or person causing the hazard is far less relevant to mitigation planning than the hazard itself and its consequences.

A critical facility is defined as a facility in either the public or private sector that provides essential products and/or 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, police stations, and schools.

4.3.18.2 Range of Magnitude

Terrorism refers to the use of weapons of mass destruction (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.

Potential terrorist methods:

Active Shooter

Agri-terrorism

Arson/incendiary attack

Armed attack

Biological agent

Chemical agent

Cyber-terrorism

Conventional bomb or bomb threat

Hazardous material release (intentional)

Nuclear bomb

Radiological agent

Four types of terrorist are particularly relevant to Cameron County: agri-terrorism, intentional hazardous material releases, bomb threats, and active shooters. Agri-terrorism is the direct, intentional and often covert contamination of food supplies or introduction of pests and/or disease agents to crops and livestock. Cameron County is primarily rural with most of its land area devoted to forest and agriculture. There are also two SARA Title III facilities in the county making intentional hazardous material releases a potential threat to citizens and the environment. This hazard is addressed in Section 4.3.16.

4.3.18.3 Past Occurrence

For the most part, Cameron County has not experienced the impacts of major terrorist incidents, however there were two bomb threats in October of 2009 in Emporium Borough and a school lockdown in January 2012. These events were reported to the Knowledge Center™ and are summarized in *Table 41 - Terrorist Incidents* (Knowledge Center™, 2016).

Table 41 - Terrorist Incidents (Knowledge Center™, 2016)

Title	Type	Municipality	Date
Bomb Threat	Terrorist Activity	Emporium Borough	10/1/2009
Bomb Threat	Terrorist Activity	Emporium Borough	10/8/2009
School Incident	Civil Disorder	Emporium Borough	1/6/2012

4.3.18.4 Future Occurrence

The likelihood of Cameron County being a main target for major international terrorist acts is small, however activity like bomb threats or incidents at schools are more likely. The county could provide ample refuge for populace evacuating other areas of the commonwealth if under terrorist attack.

4.3.18.5 Vulnerability Assessment

Because the probability of terrorism occurring cannot be quantified in the same way as that of many natural hazards, it is not possible to assess vulnerability in terms of likelihood of occurrence. Instead, vulnerability is assessed in terms of specific assets. By

identifying potentially at-risk terrorist targets in a community, planning efforts can be put in place to reduce the risk of attack. A comprehensive list of critical assets should be developed, and 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.

All communities in Cameron County are vulnerable on some level, directly or indirectly, to a terrorist attack. However, communities where critical facilities are located should be considered more vulnerable. Site-specific assessments should be based on the relative importance of a particular site to the surrounding community or population, threats that are known to exist, and vulnerabilities, including:

Inherent vulnerability:

Visibility – How aware is the public of the existence of the facility?

Utility – How valuable might the place be in meeting the objectives of a potential terrorist?

Accessibility – How accessible is the place to the public?

Asset mobility – is the asset's location fixed or mobile?

Presence of hazardous materials – Are flammable, explosive, biological, chemical, and/or radiological materials present on site? If so, are they well secured?

Potential for collateral damage – What are the potential consequences for the surrounding area if the asset is attacked or damaged?

Occupancy – What is the potential for mass casualties based on the maximum number of individuals on-site at a given time?

Tactical vulnerability:

Site Perimeter:

- Site planning and Landscape Design – Is the facility designed with security in mind – both site-specific and with regard to adjacent land uses?
- Parking Security – Are vehicle access and parking managed in a way that separates vehicles and structures?

Building Envelope:

- Structural Engineering – Is the building's envelope designed to be blast-resistant? Does it provide collective protection against chemical, biological, and radiological contaminants?

Facility Interior:

- Architectural and Interior Space Planning – Does security screening cover all public and private areas?
- Mechanical Engineering – Are utilities and HVAC systems protected and/or backed up with redundant systems?
- Electrical Engineering – Are emergency power and telecommunications available? Are alarm systems operational? Is lightning sufficient?

- Fire Protection Engineering – Are the building's water supply and fire suppression systems adequate, code-compliant, and protected? Are on-site personnel trained appropriately? Are local first responders aware of the nature of the operations at the facility?
- Electronic and Organized Security – Are systems and personnel in place to monitor and protect the facility?

4.3.19. Transportation Accidents

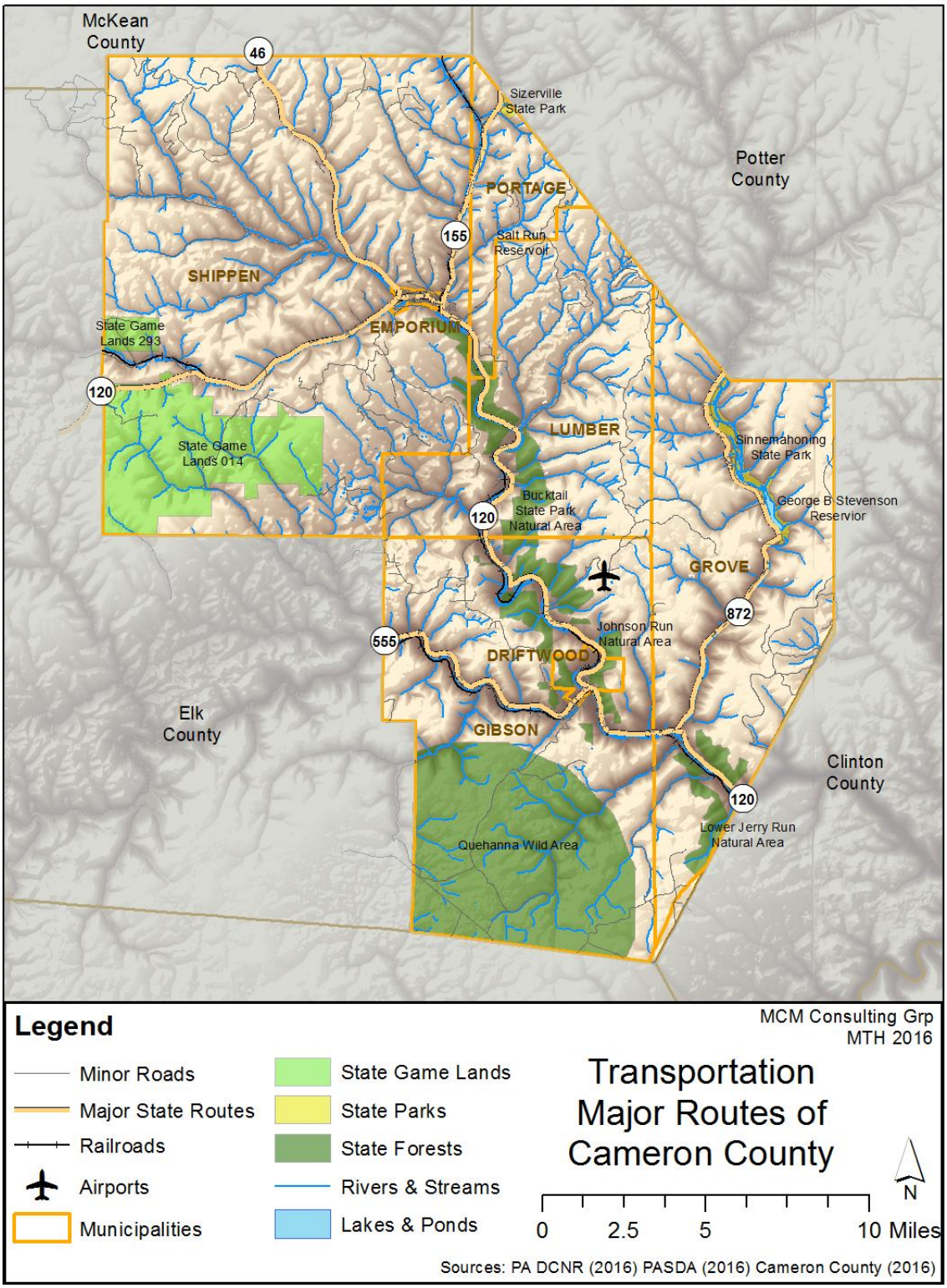
4.3.19.1 Location and Extent

Transportation accidents, for the purposes of this plan, are defined as incidents involving highway, air and rail travel. Within Cameron County, there are over 113 miles of roads, 84 bridges (state and locally owned) and approximately 45 miles of railways with nine railroad crossings, and two private airports.

Significant routes are Pennsylvania Routes 120, 46, 155, 555, and 872. The Norfolk Southern Railroad runs between Port Allegheny in McKean County and Renovo in Clinton County, passing through Cameron County. The Pittsburgh and Shawmut Division of the Genesee & Wyoming Railroad runs between DuBois in Clearfield County and Driftwood in Cameron County.

The two airports in Cameron County are privately owned. They are Murray's Mountain in Emporium and Grove Hill in Grove Township. These two private airports are used infrequently. While Harrisburg International Airport is the largest airport in the area, it is greater than 100 miles away from the county.

Figure 33 - Cameron County Transportation Routes



4.3.19.2 Range of Magnitude

Transportation accidents can result in death or serious injury, or extensive property damage or loss. Road and railway accidents can also result in hazardous materials release. Accidents involving hazardous materials pose potential environmental contamination to the air, water and/or soil.

Aviation accidents most often occur near landing or take-off sites, as such a five-mile radius around the two private airports in Cameron County can be considered a high-risk area.

The more heavily traveled roads experience a higher percentage of automobile accidents, typically due to high speeds and inclement weather.

4.3.19.3 Past Occurrence

The most common transportation accidents in Cameron County involve incidents on highways, with the most concerns involving transportation along PA Routes 120, 155 and 46.

Table 42 - Past Transportation Accidents or Incidents shows the accidents that were reported to the Elk County 9-1-1 (which is the contracted public-safety answering point [PSAP] for Cameron County) as entered into the Cameron County Knowledge Center™ data base between November 29, 2007 and September 1, 2016.

Table 42 - Past Transportation Accidents or Incidents

Date	Event	Municipality
11-29-2007	Accident with ejection, 4 injuries	Shippen Township
06-14-2008	ATV accident with fatality	Lumber Township
08-05-2008	Accident with power outage	Shippen Township
09-06-2008	Accident with road closure	Shippen Township
01-11-2009	Vehicle crash with power outage	Shippen Township
12-13-2009	EMS Unit accident	Emporium Borough
04-01-2010	Aircraft emergency landing	Gibson Township
12-06-2010	Low flying aircraft	Emporium Borough
08-11-2011	Accident with road closure	Gibson Township
11-27-2011	Accident with SAR deployment	Driftwood Borough
04-25-2013	Accident with power and phone outage	Shippen Township
11-22-2014	Route 46 closed due to icy roadways and an accident	Norwich to Emporium
02-19-2015	School bus vs passenger vehicle	
03-20-2015	Multiple accidents on Route 46 due to icy roadways	Shippen Township

4.3.19.4 Future Occurrence

There is the potential for major accidents on any of these roads, bridges or railways, even though automobile accidents occur more frequently than rail or aviation accidents have in the past. Transportation accidents along the roadways can be caused by human

error or carelessness, and/or by weather conditions. Heavy rain, snow and ice pose a hazard to vehicles on all roadways and bridges. With the steep slopes that make up the terrain in Cameron County, weather conditions can quickly change drastically along the roadways.

The probability of transportation accidents in Cameron County exists. A risk factor of 2.5 has been assessed to this hazard utilizing the risk factor assessment tool.

4.3.19.5 Vulnerability Assessment

The terrain and possibility of severe weather in the county, rather than high traffic volumes, increase the chances of traffic accidents occurring. Vulnerability for highway accidents fall within a ¼ mile of the highways. Like highway incidents, rail incidents can impact populations living near rail lines. Vulnerability for rail incidents fall within a ¼ mile of the rail line.

Emporium Borough and Grove Township are susceptible to airplane accidents due to the privately owned airports in those areas. Vulnerability of airplane accidents fall within jurisdictions within five miles of the airports.

Table 43 - Addressable Structures and Critical Facilities Vulnerable to Transportation Accidents identifies the addressable structures and critical facilities vulnerable to railroad, highway, and airport accidents.

Table 43 - Addressable Structures and Critical Facilities Vulnerable to Transportation Accidents

MUNICIPALITY	ADDRESSABLE STRUCTURES WITHIN ¼ MILE OF *MAJOR HIGHWAYS AND RAILROADS	CRITICAL FACILITIES WITHIN ¼ MILE OF *MAJOR HIGHWAYS	ADDRESSABLE STRUCTURE WITHIN 5 MILE RADIUS OF AN AIRPORT	CRITICAL FACILITIES WITHIN 5 MILE RADIUS OF AN AIRPORT
Driftwood Borough	169	6	169	6
Emporium Borough	1491	22	0	0
Gibson Township	622	5	733	7
Grove Township	849	4	352	1
Lumber Township	264	3	314	2
Portage Township	226	0	0	0
Shippen Township	1605	16	0	0
TOTAL	**5,226**	**56**	**1,568**	**16**

4.3.20. Urban Fire

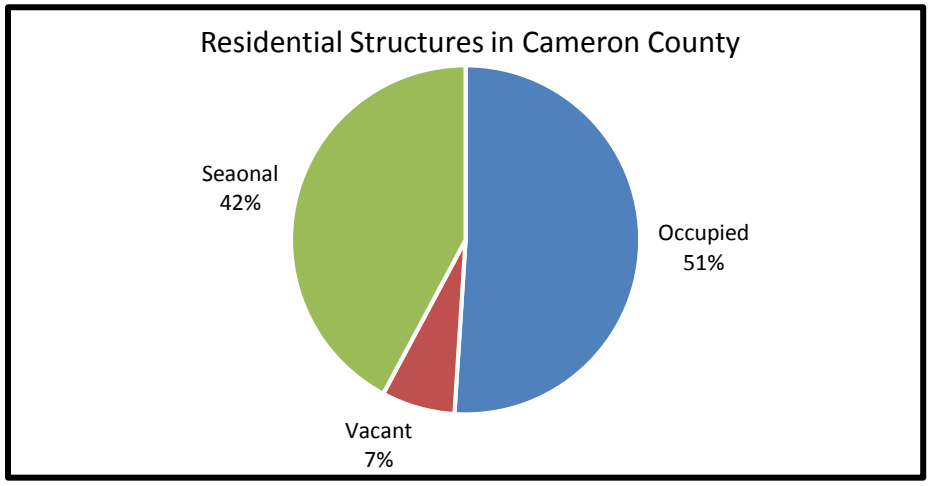
4.3.20.1 Location and Extent

Significant urban fires are limited to more densely populated areas that contain large and/or multiple buildings. Such fires may start in a single structure, but spread to nearby buildings or throughout a large building if adequate fire control measures are not in place.

Shippen Township and Emporium Borough are the most densely populated areas within Cameron County respectfully. Emporium Borough is also the county seat with structures built closely together.

According to the 2010 U.S. Census Cameron County has 4,455 structures designated for housing. Of these 4,455 structures, 2,273 or 51% are occupied. There are 1,879 seasonal housing units, which are mostly hunting camps and seasonal homes. Seven percent or approximately 303 houses of the structures in Cameron County are vacant. *Figure 34 - Residential* Structures below shows the percentages of residential structures types in Cameron County.

Figure 34 - Residential Structures



Although fires can start from numerous causes, major fires can often be the result of other hazards such as storms, droughts, transportation accidents, hazardous material spills, and criminal activity such as arson or terrorism. Small structural fires occur on a regular basis and do not have a large impact on an area. However, the increased insurance rates from these fires will impact an area.

4.3.20.2 Range of Magnitude

Severe urban fires result in extensive damage to residential, commercial and/or public property. Fire can spread faster in areas with a higher concentration of housing. Devastating injuries could happen, lives may be lost, and people are often displaced for several months to years depending on the magnitude of the event.

There are economic consequences related to urban fires. These types of events may result in lost wages due to temporarily or permanently closed businesses, destruction and damage involving business and personal assets, loss of tax base, recovery costs, and the loss of investments on destroyed property. A secondary effect of urban fire and explosion events relate to the ability of public, private, government and non-profit entities to provide post-incident relief.

Limited data was available for the worst case histories of urban fires in Cameron County. A possible worst case scenario would be a fire occurring in a densely populated area, such as Emporium Borough, where the fire could spread to multiple structures.

4.3.20.3 Past Occurrence

Cameron County experiences a small number of urban fires every year, most of which are minor and affect one to a few structures. A fire-related death has not occurred since 1980.

Table 44 - Cameron County Structure Fires lists all structure fires in Cameron County from December 1, 2007 to September 30, 2016 as provided in Knowledge Center™.

Table 44 - Cameron County Structure Fires

Cameron County Structure Fires from December 2007 to October 2016 (Knowledge Center™)			
Date	**Location**	**Event**	**Information**
12/6/2007	Emporium Borough	Commercial/Apartment structure fire	Working structure fire at NAPA Auto Parts. The building has apartments above the business.
01/31/2009	Portage Township	Structure fire	Fully involved structure fire.
09/25/2010	Shippen Township	Structure fire	A fully involved structure fire at the old Holmstead
03/01/2011	Emporium Borough	Electrical fire	A light fixture on fire at the Cameron County High School.
12/28/2011	Emporium Borough	Industrial hazmat fire	Barrels of Titanium Swarft (flammable solid) ignited at Ti-Max Industries.
06/16/2013	Shippen Township	Graftech fire	Fire in the induction furnace.
12/30/2014	Emporium Borough	Structure fire	Fire in a four-unit apartment building. One male with burns on hand and lower leg.

4.3.20.4 Future Occurrence

Based on historical events, Cameron County is expected to experience three to four significant urban fire events per decade. Note that this estimate is based on the occurrence of past events over a short period of time and is not the result of detailed statistical sampling.

Due to the population density of 12 people per square mile (according to the 2010 U.S. Census), Cameron County has a low risk factor of having a devastating urban fire event that would destroy multiple residential structures.

4.3.20.5 Vulnerability Assessment

All seven municipalities in Cameron County are vulnerable to fires. Areas where large buildings are located or development is dense should be considered more vulnerable to urban fire events. Therefore, critical facilities located in Emporium are most vulnerable. In order to adequately assess vulnerability to urban fires, detailed information on the design specifications, specifically fires codes, used for construction of individual buildings is required. The uniform construction code assures buildings are designed to address structure fire hazards. However, these regulations will only affect new construction, as well as additions and renovations to existing structures. Older buildings that do not meet the criteria established in modern fire codes continue to remain vulnerable.

Manufacturing in Cameron County consists of predominantly machine shops and powder metal shops. There is also logging, lumber and furniture manufacturing firms within the county. A fire in any one of these businesses could be costly not only to the lives of those involved (including the general public and local firefighters), but also in financial ramifications.

As noted in *Table 44 - Cameron County Structure Fires* there have only been seven structure fires in the past nine years. Fewer fires is always a good situation; however, local firefighters need to train to keep their skills current when it comes to structure fires. Firefighters can become complacent, thereby exposing themselves to injuries and/or death when it comes to fighting structure fires.

4.3.21. Utility Interruptions

4.3.21.1 Location and Extent

Utility interruptions in Cameron County are mainly power failures, which are often a secondary impact of another event. For example, severe thunderstorms or winter storms could bring down power lines and cause widespread disruptions in electrical service. Strong heat waves may result in rolling blackouts where power may not be available for an extended period of time. Local outages may be caused by traffic accidents or wind damage.

Utility interruptions can also include communications failures and water supply issues. Communication failures can also be a secondary impact of another event. Utility interruptions can take place throughout the county.

4.3.21.2 Range of Magnitude

Most severe power failures or outages are regional events. A loss of electricity can have numerous impacts including, but not limited to, food spoilage, loss of heat or air conditioning, basement flooding (including sump pump failure), lack of indoor lighting, loss of water supply (including well pump failure) and lack of phone or internet service. These issues are often more of a nuisance than a hazard, but can cause damage or harm depending on the population affected and the severity of the outage.

Communication failures can occur locally or throughout the county. The worst case scenario for a communication failure is the loss of 911 phone lines. When 911 phone lines are lost those in need of emergency help are unable to quickly get assistance.

A possible worst case scenario would be a power outage lasting several days requiring distribution of provisions in the most populated parts of the county, such as Emporium Borough and Shippen Township.

4.3.21.3 Past Occurrence

Minor outages of electric and phone service occur annually. A significant outage occurred on December 16, 2007. Approximately 75,000 Pennsylvania power and lighting customers were without power across south-central Pennsylvania due to heavy icing. Some customers were without power for up to three days.

In Cameron County, power outages are most often associated with winter storms and wind storms. *Table 45 - Utility Interruptions* below depicts the events. This list is compiled from data gathered on Knowledge Center™.

Table 45 - Utility Interruptions

Utility Interruption incidents in Cameron County		
Date	**Event**	**Location / Municipality**
Electric		
01-30-2008	Power outage	County
02-11-2008	Power outage	Shippen Township
08-05-2008	Power outage due to a motor vehicle accident	Shippen Township
01-11-2009	Power outage due to a motor vehicle accident	Shippen Township
03-11-2009	Power outage	Driftwood Borough
08-10-2009	Power outage	Grove Township
10-13-2009	Power and phone outage	Shippen Township
10-16-2009	Power outage	County
10-20-2009	Trees on lines	Shippen Township
12-14-2009	Power outage	Emporium Borough
04-01-2010	Phase 2 failure	Emporium Borough
04-16-2010	Power outage	Emporium Borough
08-16-2010	Power and phone outage	Gibson Township
09-22-2010	Power outage	Grove Township
02-28-2011	Power outage	Shippen Township
07-11-2012	Power outage on Plank Road Hollow	Shippen Township
05-20-2013	Power outage	Emporium Borough
Communications		
11-06-2007	Microwave outage	County
12-12-2008	General and 911 phone outage	County
04-23-2009	Communications outage	County
05-16-2009	Total 911 outage	Grove Township
10-28-2009	Cell phone outage	County
02-28-2011	Radio outage	County
09-05-2011	Phone outage	County
09-05-2011	Phone outage	County
01-03-2012	Phone and 911 outage	Driftwood Borough
03-30-2013	911 outage	Grove Township
04-14-2013	911 Service down	County
05-24-2013	Long distance outage	County
12-11-2013	Phone outage	County
07-20-2014	Phone outage	Grove Township
04-08-2015	Unable to connect to 911 PSAP	Shippen Township
05-08-2015	911 outage	County
07-27-2015	Windstream phone problems	County
Water		
01-14-2014	Drinking water issues	Driftwood Borough
03-09-2014	Boil water notice	Driftwood Borough
07-15-2016	Voluntary water restrictions	Driftwood Borough

4.3.21.4 Future Occurrence

The probability of a utility interruption event is high. Minor power failure events (i.e. short outage) events may occur several times a year for any given area in the county, while major (i.e. widespread, long term outage) events take place once every few years. Power failures are a likely occurrence during severe weather and therefore, should be expected during those events. A risk factor of 3.1 has been assigned to this hazard.

4.3.21.5 Vulnerability Assessment

All municipalities in Cameron County are vulnerable to utility interruptions. Critical facilities such as emergency medical facilities, 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 loss of heating or cooling, for which elderly populations are particularly vulnerable.

4.4. Hazard Vulnerability Summary

4.4.1. Methodology

Ranking hazards helps communities set goals and priorities for mitigation based on their vulnerabilities. A risk factor (RF) is a tool used to measure the degree of risk for identified hazards in a particular planning area. The RF can also assist local community officials in ranking and prioritizing hazards that pose the most significant threat to a planning 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 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 hazards profiled in the HMP update. Those categories include *probability*, *impact*, *spatial extent*, *warning time and duration*. Each degree of risk was assigned a value ranging from one to four. The weighting factor agreed upon by the planning team is shown in *Table 46 - Risk Factor Approach Summary*. 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 following example equation:

Risk Factor Value =
[(Probability x .30) + (Impact x .30) +(Spatial Extent x .20) + (Warning Time x .10) + (Duration x .10)]

Table 46 - Risk Factor Approach Summary summarizes each of the five categories used for calculating a RF for each hazard. According to the weighting scheme applied, the highest possible RF value is 4.0.

Table 46 - Risk Factor Approach Summary

Summary of Risk Factor Approach Used to Rank Hazard Risk					
RISK ASSESSMENT CATEGORY	**DEGREE OF RISK**				**WEIGHT VALUE**
	LEVEL	**CRITERIA**		**INDEX**	
PROBABILITY *What is the likelihood of a hazard event occurring in a given year?*	**UNLIKELY**	LESS THAN 1% ANNUAL PROBABILITY		1	30%
	POSSIBLE	BETWEEN 1 & 10% ANNUAL PROBABILITY		2	
	LIKELY	BETWEEN 10 &100% ANNUAL PROBABILITY		3	
	HIGHLY LIKELY	100% ANNUAL PROBABILTY		4	
IMPACT *In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?*	**MINOR**	VERY FEW INJURIES, IF ANY. ONLY MINOR PROPERTY DAMAGE & MINIMAL DISRUPTION ON QUALITY OF LIFE. TEMPORARY SHUTDOWN OF CRITICAL FACILITIES.		1	30%
	LIMITED	MINOR INJURIES ONLY. MORE THAN 10% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR MORE THAN ONE DAY.		2	
	CRITICAL	MULTIPLE DEATHS/INJURIES POSSIBLE. MORE THAN 25% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR MORE THAN ONE WEEK.		3	
	CATASTROPHIC	HIGH NUMBER OF DEATHS/INJURIES POSSIBLE. MORE THAN 50% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR 30 DAYS OR MORE.		4	
SPATIAL EXTENT *How large of an area could be impacted by a hazard event? Are impacts localized or regional?*	**NEGLIGIBLE**	LESS THAN 1% OF AREA AFFECTED		1	20%
	SMALL	BETWEEN 1 & 10% OF AREA AFFECTED		2	
	MODERATE	BETWEEN 10 & 50% OF AREA AFFECTED		3	
	LARGE	BETWEEN 50 & 100% OF AREA AFFECTED		4	
WARNING TIME *Is there usually some lead time associated with the hazard event? Have warning measures been implemented?*	**MORE THAN 24 HRS**	SELF-DEFINED	*(NOTE: Levels of warning time and criteria that define them may be adjusted based on hazard addressed.)*	1	10%
	12 TO 24 HRS	SELF-DEFINED		2	
	6 TO 12 HRS	SELF-DEFINED		3	
	LESS THAN 6 HRS	SELF-DEFINED		4	
DURATION *How long does the hazard event usually last?*	**LESS THAN 6 HRS**	SELF-DEFINED	*(NOTE: Levels of warning time and criteria that define them may be adjusted based on hazard addressed.)*	1	10%
	LESS THAN 24 HRS	SELF-DEFINED		2	
	LESS THAN 1 WEEK	SELF-DEFINED		3	
	MORE THAN 1 WEEK	SELF-DEFINED		4	

4.4.2. Ranking Results

Using the methodology described in Section 4.4.1, *Table 47 - Risk Factor Assessment* lists the risk factor calculated for each of the 21 potential hazards identified in the 2017 HMP. *It should be noted that the flooding, flash flooding, ice jam flooding, tornado and windstorm hazards were ranked individually instead of together.* 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.

Table 47 - Risk Factor Assessment

Cameron County Hazard Ranking Based on RF Methodology.							
HAZARD RISK	HAZARD NATURAL(N) OR MANMADE(M)	RISK ASSESSMENT CATEGORY					RISK FACTOR (RF)
		PROBABILITY	ECONOMIC IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	
HIGH	Levee Failure	4	4	3	3	4	3.7
	Pandemic and Infectious Disease	4	3	4	1	4	3.4
	Dam Failure	2	4	3	4	4	3.2
	Winter Storm	4	2	4	2	3	3.1
	Utility Interruption	4	2	3	4	3	3.1
	Flooding	3	3	3	2	3	2.9
	Drought	3	2	4	1	4	2.8
	Flash Flood	4	2	2	4	2	2.8
	Invasive Species	4	1	4	1	4	2.8
	Radon Exposure	4	1	4	1	4	2.8
	Wildfire	3	3	2	4	2	2.8
	Hurricane, Tropical Storm	3	2	4	1	3	2.7
	Environmental Hazards	3	1	3	4	4	2.6
	Transportation Accidents	4	2	1	4	1	2.5
MODERATE	Ice Jam Flooding	3	2	1	4	2	2.3
	Disorientation	4	1	1	4	2	2.3
	Windstorm	3	1	2	4	2	2.2
LOW	Earthquake	1	1	4	4	1	1.9
	Urban Fire	2	1	2	4	2	1.9
	Landslide	2	1	1	4	1	1.6
	Subsidence & Sinkholes	1	1	1	4	4	1.6
	Tornado	1	1	2	4	2	1.6
	Civil Disturbance	2	1	1	4	1	1.6
	Terrorism	1	1	1	4	2	1.4

Based on these results, there are fourteen (14) *high* risk hazards, three (3) *moderate* risk hazards and seven (7) *low* risk hazards in Cameron County. Mitigation actions were developed for all high, moderate and low risk hazards (see Section 6.4). The threat posed to life and property for moderate and high risk hazards is considered significant enough to warrant the need for establishing hazard-specific mitigation actions. Mitigation actions related to future public outreach and emergency service activities are identified to address all hazard events.

A risk assessment result for the entire county does not mean that each municipality is at the same amount of risk to each hazard. *Table 48 - Countywide Risk Factor by Hazard* shows the different municipalities in Cameron County and whether their risk is greater than (>), less than (<), or equal to (=) the risk factor assigned to the county as a whole. This table was developed by the consultant based on the findings in the hazard profiles located in sections 4.3.1 through 4.3.21.

Table 48 - Countywide Risk Factor by Hazard

Calculated Countywide Risk Factor by Hazard and Comparative Jurisdictional Risk														
IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR														
JURISDICTION	Lever Failure	Pandemic and Infectious Disease	Dam Failure	Winter Storm	Utility Interruption	Flooding	Drought	Flash Flood	Invasive Species	Radon Exposure	Wildfire	Hurricane, Tropical Storm	Environmental Hazards	Transportation Accidents
	3.7	***3.4***	***3.2***	***3.1***	***3.1***	***2.9***	***2.8***	***2.8***	***2.8***	***2.8***	***2.8***	***2.7***	***2.6***	***2.5***
Driftwood Borough	<	=	=	=	=	>	>	=	=	=	<	=	>	=
Emporium Borough	>	=	=	=	=	>	=	=	=	=	<	=	>	=
Gibson Township	<	=	=	=	=	=	>	=	=	=	>	=	<	=
Grove Township	<	=	=	=	=	=	=	=	=	=	>	=	<	=
Lumber Township	<	=	=	=	=	=	=	=	=	=	>	=	<	=
Portage Township	<	=	=	=	=	=	=	=	=	=	>	=	<	=
Shippen Township	>	=	=	=	=	>	=	=	=	=	>	=	<	=

Calculated Countywide Risk Factor by Hazard and Comparative Jurisdictional Risk										
IDENTIFIED HAZARD AND CORRESPONDING COUNTYWIDE RISK FACTOR										
JURISDICTION	Ice Jam Flooding	Disorientation	Windstorm	Earthquake	Urban Fire	Landslide	Subsidence and Sinkholes	Tornado	Civil Disturbance	Terrorism
	2.3	***2.3***	***2.2***	***1.9***	***1.9***	***1.6***	***1.6***	***1.6***	***1.6***	***1.4***
Driftwood Borough	=	=	=	=	>	=	=	=	>	=
Emporium Borough	=	=	=	=	>	=	=	=	>	=
Gibson Township	=	=	=	=	<	>	=	=	<	=
Grove Township	=	=	=	=	<	=	=	=	<	=
Lumber Township	=	=	=	=	<	=	=	=	<	=
Portage Township	=	=	=	=	<	=	=	=	<	=
Shippen Township	=	=	=	=	<	>	=	=	<	=

4.4.3. Potential Loss Estimates

Based on various kinds of available data, potential loss estimates were established for flood, flash flood, and ice jam flooding. Estimates provided in this section are based on HAZUS-MH, version 3.2, geospatial analysis, and previous events. 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.

Flooding Loss Estimation:

Flooding is a high risk natural hazard in Cameron County. The estimation of potential loss in this assessment focuses on the monetary damage that could result from flooding. The potential property loss was determined for each municipality and for the entire

county. The quantity of commercial and residential structures in each Cameron County municipality is outlined in section 4.3.4 of the flooding hazard profile.

MCM Consulting Group conducted a county wide flood study using the Hazards U.S. Multi-Hazard (HAZUS-MH) software that is provided by the Federal Emergency Management Agency. This software is a standardized loss estimation software deriving economic loss, building damage, content damage and other economic impacts that can be used in local flood mitigation planning activities.

Using HAZUS-MH, total building-related losses from a 1%-annual-chance flood in Cameron County are estimated to equal nearly $141,670,000. Residential occupancies make up 37.61% of the total estimated building-related losses. Total economic loss, including replacement value, content loss, functional loss and displacement cost, from a county-wide 1%-annual-chance flood are estimated to equal $143,290,000.

Severe Wind Storm and Tornado Loss Estimation:

Table 49 - Wind & Tornado Loss Estimates, outlines the potential losses for each municipality due to a high wind related event. Losses shown here can only be viewed as estimates and as potential, based on the random occurrence of wind conditions and the limitations of data. Assessed value data include those based on a point within a two-dimensional (latitude and longitude) plane. Further, this analysis assumes a total loss of a property that is designated as a mobile home property. As a result of these limitations, the estimates are likely overstated, but to what degree the potential losses are overstated cannot be determined.

Table 49 - Wind & Tornado Loss Estimates

Wind and Tornado Estimation of Loss		
Municipality	**# Mobile Homes**	**Total Value**
Driftwood Borough	11	$61,495
Emporium Borough	6	$88,820
Gibson Township	134	$1,841,935
Grove Township	98	$522,650
Lumber Township	58	$453,892
Portage Township	24	$247,045
Shippen Township	219	$3,111,763
Total	**550**	**$6,327,600**

4.4.4. Future Development and Vulnerability

Total population in Cameron County increased one percent between 1990 and 2000 from 5,889 to 5,974. However, all seven municipalities within the county have seen population decreases in the period between 2000 and 2010 with an overall county population loss of 14.9%, as seen in Table 50 - 2000-2010 Population Change. At the same

time, the Borough of Driftwood and Borough of Emporium have (and will continue to have) the highest population densities in the county, meaning that hazard vulnerability and loss estimates will most be relatively higher in those two municipalities. The only municipality that had an increase in population from 2000 to 2010 was Grove Township. Although there was a population increase for Grove Township, no new development areas have been identified by the Cameron County Planning Commission. Overall, though, Cameron County's hazard vulnerability and loss estimates should remain constant or decrease over the next five years.

Table 50 - 2000-2010 Population Change

Population Change in Cameron County from 2000-2010			
Municipality	**2000 Population**	**2010 Population**	**Percent of Change**
Borough of Driftwood	103	67	-34.95
Borough of Emporium	2,526	2,073	-17.93
Township of Gibson	222	164	-26.13
Township of Grove	129	183	+29.51
Township of Lumber	241	195	-19.09
Township of Portage	258	171	-33.72
Township of Shippen	2,495	2,232	-10.54
TOTAL	**5,974**	**5,085**	**-14.9%**

5. Capability Assessment

5.1. Update Process Summary

The capability assessment is an evaluation of Cameron County's governmental structure, political framework, legal jurisdiction, fiscal status, policies and programs, regulations and ordinances and resource availability. Each category is evaluated for its strengths and weaknesses in responding to, preparing for and mitigating the effects of the profiled hazards. A capability assessment is an integral part of the hazard mitigation planning process. Here, the county and municipalities identify, review and analyze what they are currently doing to reduce losses and identify the framework necessary to implement new mitigation actions. This information will help the county and municipalities evaluate alternative mitigation actions and address shortfalls in the mitigation plan.

A capabilities assessment survey was provided to the municipalities during the planning process at meetings of Cameron County officials. These meetings were designed to seek input from key county and municipal stakeholders on legal, fiscal, technical and administrative capabilities of all jurisdictions. As such, the capabilities assessment helps guide the implementation of mitigation projects and will help evaluate the effectiveness of existing mitigation measures, policies, plans, practices and programs.

Throughout the planning process, the mitigation local planning team considered the county's seven municipalities. Pennsylvania municipalities have their own governing bodies, pass and enforce their own ordinances and regulations, purchase equipment and manage their own resources, including critical infrastructure. These capability assessments, therefore, consider the various characteristics and capabilities of municipalities under study. Additionally, NFPA 1600 recommends that a corrective action program be established to address shortfalls and provide mechanisms to manage the capabilities improvement process.

The evaluation of the following categories – political framework, legal jurisdiction, fiscal status, policies and programs and regulations and ordinances – allows the mitigation planning team to determine the viability of certain mitigation actions. The capability assessment analyzes what Cameron County and its municipalities have the capacity to do and provides an understanding of what must be changed to mitigate loss.

Cameron 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 hazardous event. While the capability assessment serves as a good instrument for identifying local capabilities, it also provides a means for recognizing gaps and weaknesses that

can be resolved through future mitigation actions. The results of this assessment lend critical information for developing an effective mitigation strategy.

5.2. Capability Assessment Findings

All participating municipalities completed and submitted a capability assessment survey. The results of the survey were collected, aggregated and analyzed.

5.2.1. Planning and Regulatory Capability

Municipalities have the authority to govern more restrictively than state and county minimum requirements; as long as they are in compliance with all criteria established in the Pennsylvania Municipalities Planning Code (MPC) and their respective municipal codes. Municipalities can develop their own policies and programs and implement their own rules and regulations to protect and serve their local residents. Local policies and programs are typically identified in a comprehensive plan, implemented through a local ordinance and enforced by the governmental body or its appointee.

Municipalities regulate land use via the adoption and enforcement of zoning, subdivision and land development, building codes, building permits, floodplain management and/or stormwater management ordinances. When effectively prepared and administered, these regulations can lead to an opportunity for hazard mitigation. For example, the National Flood Insurance Program (NFIP) established minimum floodplain management criteria. Adoption of the Pennsylvania Floodplain Management Act (Act 166 of 1978) established higher standards. A municipality must adopt and enforce these minimum criteria to be eligible for participation in the NFIP. Municipalities have the option of adopting a single-purpose ordinance or incorporating these provisions into their zoning, subdivision and land development, or building codes; thereby mitigating the potential impacts of local flooding. This capability assessment details the existing Cameron County and municipal legal capabilities to mitigate the profiled hazards. It identifies the county's and the municipalities' existing planning documents and their hazard mitigation potential. Hazard mitigation recommendations are, in part, based on the information contained in the assessment.

Building Codes

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

The code applies to almost all buildings, excluding manufactured and industrialized housing (which are covered by other laws), agricultural buildings and certain utility and miscellaneous buildings. The UCC has many advantages. It requires builders to use materials and methods that have been professionally evaluated for quality and safety, as well as inspections to ensure compliance.

The initial election period, during which all of Pennsylvania's 2,565 municipalities were allowed to decide whether the UCC would be administered and enforced locally, officially closed on August 7, 2004. The codes adopted for use under the UCC are the 2003 International Codes issued by the International Code Council (ICC). Supplements to the 2003 codes have been adopted for use over the years since.

If a municipality has "opted in", all UCC enforcement is local, except where municipal (or third party) code officials lack the certification necessary to approve plans and inspect commercial construction for compliance with UCC accessibility requirements. If a municipality has "opted out", the PA Department of Labor and Industry is responsible for all commercial code enforcement in that municipality; and all residential construction is inspected by independent third party agencies selected by the owner. The department also has sole jurisdiction for all state-owned buildings no matter where they are located. Historical buildings may be exempt from such inspections and Act 45 provides quasi-exclusion from UCC requirements.

The municipalities in Cameron County adhere to the standards of the Pennsylvania Uniform Construction Code (Act 45). All municipalities have opted in on building code enforcement.

Zoning Ordinance

Article VI of the Municipalities Planning Code (MPC) authorizes municipalities to prepare and enact zoning to regulate land use. Its regulations can apply to: the permitted use of land; the height and bulk of structures; the percentage of a lot that may be occupied by buildings and other impervious surfaces; yard setbacks; the density of development; the height and size of signs; the parking regulations. A zoning ordinance has two parts, including the zoning map that delineates zoning districts and the text that sets forth the regulations that apply to each district. There is no zoning in any municipality in Cameron County.

Subdivision Ordinance

Subdivision and land development ordinances include regulations to control the layout of streets, the planning of lots and the provision of utilities and other site improvements. The objectives of a subdivision and land development ordinance are to: coordinate street patterns; assure adequate utilities and other improvements are provided in a manner that will not pollute streams, wells and/or soils; reduce traffic congestion; and provide

sound design standards as a guide to developers, the elected officials, planning commissions and other municipal officials. Article V of the Municipality Planning Code authorizes municipalities to prepare and enact a subdivision and land development ordinance. Subdivision and land development ordinances provide for the division and improvement of land. All municipalities in Cameron County have adopted the Cameron County Subdivision and Land Development Ordinance as the municipal ordinance.

Stormwater Management Plan/Stormwater Ordinance

The proper management of stormwater runoff can improve conditions and decrease the chance of flooding. Pennsylvania's Storm Water Management Act (Act 167) confers on counties the responsibility for development of watershed plans. The Act specifies that counties must complete their watershed stormwater plans within two years following the promulgation of these guidelines by the DEP, which may grant an extension of time to any county for the preparation and adoption of plans. Counties must prepare the watershed plans in consultation with municipalities and residents. This is to be accomplished through the establishment of a watershed plan advisory committee. The counties must also establish a mechanism to periodically review and revise watershed plans so they are current. Plan revisions must be done every five years or sooner, if necessary.

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

There are seven watersheds in Cameron County. Cameron County and other local municipalities have general (non-Act 167 compliant) stormwater management regulations as part of either the county or local subdivision and land development plan. No specific storm water management plans have been adopted by any municipality in Cameron County.

Comprehensive Plan

A comprehensive plan is a policy document that states objectives and guides the future growth and physical development of a municipality. The comprehensive plan is a blueprint for housing, transportation, community facilities, utilities and land use. It exam-

ines how the past led to the present and charts the community's future path. The Pennsylvania Municipalities Planning Code (MPC Act 247 of 1968, as reauthorized and amended) requires counties to prepare and maintain a county comprehensive plan. In addition, the MPC requires counties to update the comprehensive plan every 10 years.

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

Cameron County has a county comprehensive plan that was adopted in 2009.

Article III of the Municipality Planning Code (MPC) enables municipalities to prepare a comprehensive plan; however, development of a comprehensive plan is voluntary. All municipalities in Cameron County have adopted the Cameron County Comprehensive Plan as the municipal plan. No municipalities have independent plans.

Capital Improvements Plan

The capital improvements plan is a multi-year policy guide that identifies needed capital projects and is used to coordinate the financing and timing of public improvements. Capital improvements relate to streets, stormwater systems, water distribution, sewage treatment and other major public facilities. A capital improvements plan should be prepared by the respective county's planning department and should include a capital budget. This budget identifies the highest priority projects recommended for funding in the next annual budget. The capital improvements plan is dynamic and can be tailored to specific circumstances. There are no municipalities within Cameron County that have an identified capital improvements plan.

Participation in the National Flood Insurance Program (NFIP)

Floodplain management is the operation of programs or activities that may consist of both corrective and preventive measures for reducing flood damage, including but not limited to such things as emergency preparedness plans, flood control works and flood plain management regulations. The Pennsylvania Floodplain Management Act (Act 166) requires every municipality identified by the Federal Emergency Management Agency (FEMA) to participate in the National Flood Insurance Program (NFIP) and permits all municipalities to adopt floodplain management regulations. It is in the interest of all property owners in the floodplain to keep development and land usage within the scope of the floodplain regulations for their community. This helps keep insurance rates low and makes sure that the risk of flood damage is not increased by property development.

The Pennsylvania DCED provides communities, based on their CFR, Title 44, Section 60.3 level of regulations, with a suggested ordinance document to assist municipalities

in meeting the minimum requirements of the NFIP along with the Pennsylvania Flood Plain Management Act (Act 166). These suggested or model ordinances contain provisions that are more restrictive than state and federal requirements. Suggested provisions include, but are not limited to:

1. Prohibiting manufactured homes in the floodway.
2. Prohibiting manufactured homes within the area measured 50 feet landward from the top-of bank of any watercourse within a special flood hazard area.
3. Special requirements for recreational vehicles within the special flood hazard area.
4. Special requirement for accessory structures.
5. Prohibiting new construction and development within the area measured 50 feet landward from the top-of bank of any watercourse within a special flood hazard area.
6. Providing the County Conservation District an opportunity to review and comment on all applications and plans for any proposed construction or development in any identified floodplain area.

Act 166 mandates municipal participation in and compliance with the NFIP. It also establishes higher regulatory standards for new or substantially improved structures which are used for the production or storage of dangerous materials (as defined by Act 166) by prohibiting them in the floodway. Additionally, Act 166 establishes the requirement that a Special Permit be obtained prior to any construction or expansion of any manufactured home park, hospital, nursing home, jail and prison if said structure is located within a special flood hazard area.

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

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

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

1. Reduce flood losses
2. Protect public health and safety
3. Reduce damage to property
4. Prevent increases in flood damage from new construction
5. Reduce the risk of erosion damage
6. Protect natural and beneficial floodplain functions
7. Facilitate accurate insurance rating
8. Promote the awareness of flood insurance

There are 10 Community Rating System classes. Class 1 requires the most credit points and gives the largest premium reduction; Class 10 receives no premium reduction. CRS premium discounts on flood insurance range from five percent for Class 9 communities up to 45 percent for Class 1 communities. The CRS recognizes 18 credible activities, organized under four categories: Public Information, Mapping and Regulations, Flood Damage Reduction and Flood Preparedness.

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.

All municipalities in Cameron County participate in the NFIP. Currently, no municipalities have completed or started to complete the CRS program. Additional research will be conducted on the CRS program and mitigation actions will be developed in support of the CRS.

5.2.2. Administrative and Technical Capability

There is two boroughs and five townships within Cameron County. Each of these municipalities conducts its daily operations and provides various community services according to local needs and limitations. Some of these municipalities have formed cooperative agreements and work jointly with their neighboring municipalities to provide services such as police protection, fire and emergency response, infrastructure maintenance and water supply management. Others choose to operate on their own. Municipalities vary in staff size, resource availability, fiscal status, service provision, constituent population, overall size and vulnerability to the profiled hazards.

County Planning Department

In Pennsylvania, planning responsibilities traditionally have been delegated to each county and local municipality through the Municipalities Planning Code (MPC). A planning agency acts as an advisor to the governing body on matters of community growth and development. A governing body may appoint individuals to serve as legal or engineering advisors to the planning agency. In addition to the duties and responsibilities authorized by Article II of the MPC, a governing body may, by ordinance, delegate approval authority to a planning agency for subdivision and land development applications. A governing body has considerable flexibility, not only as to which powers and duties are assigned to a planning agency, but also as to what form an agency will possess. A governing body can create a planning commission, a planning department, or both. The Cameron County Planning Commission assists all municipalities in the county as needed. The county employs a county planner on an annual basis.

Municipal Engineer

A municipal engineer performs duties as directed in the areas of construction, reconstruction, maintenance and repair of streets, roads, pavements, sanitary sewers, bridges, culverts and other engineering work. The municipal engineer prepares plans, specifications and estimates of the work undertaken by the township. All municipalities within Cameron County have a contracted municipal engineer. The county does not employ and engineer but does contract the service as needed.

Personnel Skilled in GIS or FEMA HAZUS Software

A geographic information system (GIS) is an integrated, computer-based system designed to capture, store, edit, analyze and display geographic information. Some examples of uses for GIS technology in local government are: land records management, land use planning, infrastructure management and natural resources planning. A GIS automates existing operations such as map production and maintenance, saving a great deal of time and money. The GIS also includes information about map features such as the capacity of a municipal water supply or the acres of public land. GIS is utilized by a majority of the Cameron County Departments and Offices. Cameron County GIS data is managed, maintained and developed by the North Central Planning Commission. There are no employees that have completed Basic HAZUS-MH.

Emergency Management Coordinator

Emergency Management is a comprehensive, integrated program of mitigation, preparedness, response and recovery for emergencies/disasters of any kind. No public or private entity is immune to disasters and no single segment of society can meet the complex needs of a major emergency or disaster on its own.

A municipal emergency management coordinator is responsible for emergency management – preparedness, response, recovery and mitigation within the respective authority having jurisdiction (AHJ). The responsibilities of the emergency management coordinator are outlined in PA Title 35 §7503:

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

Title 35 requires Cameron County and its municipalities to have an emergency management coordinator.

The Cameron County Office of Emergency Services coordinates countywide emergency management efforts. Each municipality has a designated local emergency management coordinator who possesses a unique knowledge of the impact hazard events have on their community.

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. Each municipality is required to adopt the countywide EOP. The notification and resource section of the plan was developed individually by each municipality. A copy of each EOP is on file with the Office of Emergency Services. Cameron County updates the EOP every 2 years. The next update will occur in 2019.

Political Capability

One of the most difficult capabilities to evaluate involves the political will of a jurisdiction to enact meaningful policies and projects designed to mitigate hazard events. The adoption of hazard mitigation measures may be seen as an impediment to growth and economic development. In many cases, mitigation may not generate interest among local officials when compared with competing priorities. Therefore, the local political climate must be considered when designing mitigation strategies, as it could be the most difficult hurdle to overcome in accomplishing the adoption or implementation of specific actions.

The capability assessment survey was used to capture information on each jurisdiction's political capability. Survey respondents were asked to identify examples of political capability, such as guiding development away from hazard areas, restricting public investments or capital improvements within hazard areas, or enforcing local development standards that go beyond minimum state or federal requirements (i.e. building codes, floodplain management ordinances, etc.). These examples were used to guide respondents in scoring their community on a scale of "unwilling" (0) to "very willing" (5) to adopt policies and programs that reduce hazard vulnerabilities. Of the municipalities that responded, none of the municipalities completed this section with a numerical response.

Self-Assessment

In addition to the inventory and analysis of specific local capabilities, the *Capability Assessment Survey* required each local jurisdiction to conduct its own self-assessment of its capability to effectively implement hazard mitigation activities. As part of this process, county and municipal officials were encouraged to consider the barriers to implementing proposed mitigation strategies in addition to the mechanisms that could enhance or further such strategies. In response to the survey questionnaire, local officials classified each of the capabilities as either "L = limited" "M = moderate" or "H = high." *Table 51 - Capability Self-Assessment Matrix* summarizes the results of the self-assessment survey. All municipalities returned this section of the assessment completed.

Table 51 - Capability Self-Assessment Matrix

Cameron County Capability Self-Assessment Matrix				
Municipality Name	**Capability Category**			
	Planning and Regulatory Capability	**Administrative and Technical Capability**	**Fiscal Capability**	**Community Political Capability**
Driftwood Borough	L	L	L	L
Emporium Borough	H	H	H	H
Gibson Township	M	L	L	M
Grove Township	M	M	L	L
Lumber Township	L	L	L	L
Portage Township	L	L	L	L
Shippen Township	M	L	L	M

Existing Limitations

Funding has been identified as the largest limitation for a municipality to complete mitigation activities. The acquisition of grants is the best way to augment this process for the municipalities. The county and municipalities representatives will need to rely on regional, state and federal partnerships for future financial assistance. Development of

intra-county regional partnerships and intra-municipality regional partnerships will bolster this process.

5.2.3. Financial Capability

Fiscal capability is significant to the implementation of hazard mitigation activities. Every jurisdiction must operate within the constraints of limited financial resources. The following information pertains to various financial assistance programs relevant to hazard mitigation.

State and Federal Grants

During the 1960s and 1970s, state and federal grants-in-aid were available to finance a large number of municipal programs, including streets, water and sewer facilities, airports, parks and playgrounds. During the early 1980s, there was a significant change in federal policy, based on rising deficits and a political philosophy that encouraged states and local governments to raise their own revenues for capital programs. The result has been a growing interest in "creative financing."

Capital Improvement Financing

Because most capital investments involve the outlay of substantial funds, local governments can seldom pay for these facilities through annual appropriations in the annual operating budget. Therefore, numerous techniques have evolved to enable local government to pay for capital improvements over a time period exceeding one year. Public finance literature and state laws governing local government finance classify techniques that are used to finance capital improvements. The techniques include: revenue bonds; lease-purchase, authorities and special district; current revenue (pay-as-you-go); reserve funds; and tax increment financing. Most municipalities have very limited local tax funds for capital projects. Grants and other funding is always a priority.

Indebtedness through General Obligation Bonds

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

Municipal Authorities

Municipal authorities are most often used when major capital investments are required. In addition to sewage treatment, municipal authorities have been formed for water supply, airports, bus transit systems, swimming pools and other purposes. Joint authorities have the power to receive grants, borrow money and operate revenue generating pro-

grams. Municipal authorities are authorized to sell bonds, acquire property, sign contracts and take similar actions. Authorities are governed by authority board members, who are appointed by the elected officials of the member municipalities.

Sewer Authorities

Sewer authorities include multi-purpose authorities with sewer projects. They sell bonds to finance acquisition of existing systems or for construction, extension, or system improvement. Sewer authority operating revenues originate from user fees. The fee frequently is based on the amount of water consumed and payment is enforced by the ability to terminate service or by the imposition of liens against real estate. In areas with no public water supply, flat rate charges are calculated on average use per dwelling unit.

Water Authorities

Water authorities are multi-purpose authorities with water projects, many of which operate both water and sewer systems. The financing of water systems for lease back to the municipality is among the principal activities of the local government facilities' financing authorities. An operating water authority issues bonds to purchase existing facilities or to construct, extend, or improve a system. The primary source of revenue is user fees based on metered usage. The cost of construction or extending water supply lines can be funded by special assessments against abutting property owners. Tapping fees also help fund water system capital costs. Water utilities are also directly operated by municipal governments and by privately owned public utilities regulated by the PA Public Utility Commission. The PA Department of Environmental Protection has a program to assist with consolidating small water systems to make system upgrades more cost effective.

Circuit Riding Program (Engineer)

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

5.2.4. Education and Outreach

Cameron County has a limited education and outreach program. The Cameron County Office of Emergency Services conducts some public outreach at public events to update the citizens and visitors of the county on natural and human-caused hazards. The county conservation district also conducts outreach on various activities and projects in the county. Many of these projects are related to or directly impact hazard mitigation projects.

Educational activities that directly impact hazard mitigation in Cameron County predominantly revolve around the first responders. Providing fire, medical and search and rescue training and education enhances the response and recovery capabilities of response agencies in the county. Additional training is always a goal within Cameron County.

Education and outreach on the NFIP is necessary. With new regulations in floodplain management, updated digital flood insurance rate maps and new rate for insurance policies, education and outreach on the NFIP would assist the program. The Cameron County Local Planning Team will identify actions necessary to complete this.

5.2.5. Plan Integration

There are numerous existing regulatory and planning mechanisms in place at the state, county and municipal level of government which support hazard mitigation planning efforts. These tools include the 2013 Commonwealth of Pennsylvania Standard All-Hazard Mitigation Plan, local floodplain management ordinances, the Cameron County Comprehensive Plan, Cameron County Emergency Operations Plan, local emergency operation plans, local zoning ordinances, local subdivision and land development ordinances.

Information from several of these documents has been incorporated into this plan and mitigation actions have been developed to further integrate these planning mechanisms into the hazard mitigation planning process. In particular, information on identified development constraints and potential future growth areas was incorporated from the Cameron County Comprehensive Plan so that vulnerability pertaining to future development could be established. Floodplain management ordinance information was used to aid in the establishment of local capabilities in addition to participation in The National Flood Insurance Program (NFIP).

The Cameron County Comprehensive Plan, the Cameron County Emergency Operations Plan, and various municipal regulatory tools as identified in the capability assessment section of this plan, require alignment with this updated hazard mitigation plan. The county comprehensive plan has not been updated since 2009. This plan is very limited on the amount of hazard mitigation principals that are incorporated into the plan. Discussions on specific hazard areas within municipalities that may be used for future development must be addressed. Municipalities should also identify mitigation projects that could decrease the impact of hazards in these specific areas in the annual municipal capital improvement plan.

Stormwater management plans have not been implemented in the county and should strongly be considered and encouraged in the future. In the event that these plans are implemented, Cameron County officials will ensure that hazard mitigation data and principals are implemented as appropriate.

Cameron County is a small county with a very limited amount of population and resources to appropriately ensure and implement hazard mitigation principals into all regulatory tools. Cameron County will continue to explore options to further enhance the implementation of these principals utilizing already multi-tasked staff and resources. Cameron County will review other local and state plans that could be impacted with hazard mitigation principals over the next five year planning period.

Cameron County Comprehensive Plan

Article III of the Pennsylvania Municipalities Planning code (Act 247 of 1968, as reenacted and amended) requires all Pennsylvania counties (except Philadelphia) to adopt a comprehensive plan and update it at least every 10 years. The Cameron County Commissioners adopted the updated Cameron County Comprehensive Plan in 2009.

The Cameron County Planning Commission is responsible for maintaining and updating the Cameron County Comprehensive Plan and many other regulatory tools. Technical assistance on community planning matters is provided to the Cameron County Board of Commissioners through the Cameron County Planning Commission. The planning commission administers the Cameron County Comprehensive Plan. The planning commission also performs technical reviews of municipal subdivision and land development plans, municipal floodplain ordinances and other community planning and development matters.

The next scheduled complete update of the comprehensive plan will be by 2019, based on the municipalities planning code's 10-year review cycle. Certain sections of the county comprehensive plan may be updated prior to 2019. Coupling this requirement with the DMA 2000-required five-year update cycle for county hazard mitigation plans, when possible, will allow the county to better integrate the Cameron County Comprehensive Plan and the Cameron County Hazard Mitigation Plan planning processes and strengthen public participation for both efforts.

The risk assessment section 4.3.1 through 4.3.21; section 4.4.4; capability assessment section 5 and the mitigation strategy section 6 of the Cameron County Hazard Mitigation Plan will provide valuable information for the update of the next comprehensive plan and any section specific updates prior to 2019. Consideration and incorporation of data from this plan will ensure the inclusion of hazard mitigation practices in the county comprehensive plan. Action 1.1.4 of this hazard mitigation plan identifies that the integration of hazard mitigation principals will be completed at the next update of the comprehensive plan.

Cameron County Emergency Operations Plan

The Pennsylvania Emergency Management Services Code, 35 PA C.S. Sections 7701-7707, as amended, requires each county and municipality to prepare, maintain and

keep current an Emergency Operations Plan (EOP). Cameron County Office of Emergency Services is responsible for preparing and maintaining the county's EOP, which applies to both the county and municipal emergency management operations and procedures.

The EOP is reviewed at least biennially. Whenever portions of the plan are implemented in an emergency event or training exercise, a review is performed and changes are made where necessary. These changes are then distributed to the county's municipalities.

The complete risk assessment section, mitigation actions and mitigation project opportunities identified in the Cameron County Hazard Mitigation Plan will assist with decreasing hazard specific risk and vulnerability. Understanding the risks and vulnerability in the county and municipalities will allow for emergency management and other response agencies to better direct planning, response and recovery aspects.

EMA will consider the Cameron County Hazard Mitigation Plan during its biennial review of the county EOP. Recommended changes to the HMP will then be coordinated with the hazard mitigation local planning team.

Plan Interrelationships

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

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

6. Mitigation Strategy

6.1. Update Process Summary

Mitigation goals are general guidelines that explain what the county wants to achieve. Goals are usually expressed as broad policy statements representing desired long-term results. Mitigation objectives describe strategies or implementation steps to attain the identified goals. Objectives are more specific statements than goals; the described steps are usually measurable and can have a defined completion date. There were six goals and thirteen objectives identified in the 2011 hazard mitigation plan. The 2017 Cameron County Hazard Mitigation Plan Update has four goals and thirteen objectives. Objectives have been added and arranged in order to associate them with the most appropriate goal. These changes are noted in *Table 52 - 2011 Mitigation Goals and* Objectives. A list of these goals and objectives as well as a review summary based on comments received from stakeholders who participated in the HMP update process is included in *Table 52 - 2011 Mitigation Goals and Objectives.* These reviews are based on the 5-Year hazard mitigation plan review worksheet, which includes a survey on existing goals and objectives, completed by the local planning team. Municipal officials then provided feedback on the changes to the goals and objectives via a mitigation strategy update meeting. Copies of these meetings and all documentation associated with the meetings are located in Appendix C.

Actions provide more detailed descriptions of specific work tasks to help the county and its municipalities achieve prescribed goals and objectives. There were twenty seven actions identified in the 2011 mitigation strategy. A review of the 2011 mitigation actions was completed by the local planning team. The results of this review is identified in *Table 52 - 2011 Mitigation Goals and Objectives.* A list of these actions as well as a review and summary of their progress based on comments from the Cameron County Local Planning Team is included in

Table 52 - 2011 Mitigation Goals and Objectives

Cameron County 2011 Mitigation Goals and Objectives Review Worksheet		
GOAL **Objective**	**Description**	**Review**
GOAL 1	Reduce potential injury/death and damage to existing community assets due to flooding	This goal has been reworded and added into 2017 goal 1 which reads, Reduce potential injury, death, and damage to existing community assets due to natural hazards, especially flooding.
Objective 1A	Prevent property damage by properly administering applicable codes, ordinances and plans.	Renumbered to action 1.3 and now reads: Ensure adequate and consistent enforcement of ordinances and codes within and between jurisdictions.
Objective 1B	Continue participation in NFIP.	Renumbered to action 1.2 and now reads: Recommend that flood insurance policies remain affordable through government programs, especially through participation in the national flood insurance program.
Objective 1C	Provide public outreach/education regarding strategies (e.g. floodproofing) for property owners in the 100-year floodplain.	This action remains and has been renumbered to action 3.1
Objective 1D	Acquisition, elevation and relocation of properties in the floodplain.	Renumbered to action 5.1 and now reads: Complete acquisition, elevation and relocation of properties in the floodplain to reduce the impact of flooding.

Cameron County 2011 Mitigation Goals and Objectives Review Worksheet		
GOAL **Objective**	**Description**	**Review**
GOAL 2	Reduce potential injury/death and damage to existing community assets due to severe weather	This goal has been reworded and added into 2017 goal 1 which reads, Reduce potential injury, death, and damage to existing community assets due to natural hazards, especially flooding.
Objective 2A	Identify by municipality the most vulnerable and critical existing structures and infrastructure.	Moved to objective 5.5
Objective 2B	Increase public awareness of actions to take during an emergency.	This action has been renumbered and updated. The new action is 3.2 and will read as follows: Support public education programs for business, household and individual mitigation, safety measures and preparedness.
GOAL 3	Reduce potential injury/death and damage to existing community assets due to utility outages	This goal has been reworded and added into 2017 goal 2 which reads, Reduce potential injury, death, and damage to existing community assets due to human caused disasters on public and private property.
Objective 3A	Identify by municipality the most vulnerable and critical existing structures.	This action remains and has been renumbered to action 2.1
Objective 3B	Assess the adequacy of contingency power sources and methods of prevention.	Move to objective 5.4

Cameron County 2011 Mitigation Goals and Objectives Review Worksheet		
GOAL **Objective**	**Description**	**Review**
GOAL 4	Reduce potential injury/death and damage to existing community assets due to hazardous materials releases	This goal has been reworded and added into 2017 goal 2 which reads, Reduce potential injury, death, and damage to existing community assets due to human caused disasters on public and private property.
Objective 4A	Identify by municipality the most vulnerable and critical existing structures.	Remove, duplicate
Objective 4B	Develop comprehensive approach to reducing potential injury/damages for nearby critical facilities and vulnerable populace.	This will be removed but is supported by new Objective 2.4
GOAL 5	Reduce potential injury/death and damage to existing community assets due to transportation accidents	This goal has been reworded and added into 2017 goal 2 which reads, Reduce potential injury, death, and damage to existing community assets due to human caused disasters on public and private property.
Objective 5A	Enhance response capability of County and municipal services.	This has been renumbered to action 4.1 and has also been reworded. The action now reads: Enhance response capability of county and municipal services by maintaining and upgrading emergency services equipment.
Objective 5B	Increase public awareness of actions to take during an emergency.	Remove, duplicate

Cameron County 2011 Mitigation Goals and Objectives Review Worksheet		
GOAL **Objective**	**Description**	**Review**
GOAL 6	Improve response and recovery capabilities	Moved to goal 4 and re-worded. Now reads: Improve emergency preparedness, warning and response procedures and capabilities.
Objective 6A	Increase awareness (i.e. through public outreach/education) of actions to take during an emergency.	Remove, duplicate
Objective 6B	Enhance response capability of County and municipal fire, police, and emergency medical services personnel.	Renumbered to action 4.2. Removed county and municipal.

Table 52 - 2011 Mitigation Actions Review. Actions were evaluated by the local planning team with the intent of carrying over any actions that were not started or continuous for the next five years.

Table 53 - 2011 Mitigation Actions Review

2011 Cameron County Mitigation Actions Review						
Existing Mitigation Actions	***Status***					***Review Comments***
	No Progress / Unknown	**In Progress / Not Yet Complete**	**Continuous**	**Completed**	**Discontinued**	
1. Review existing Floodplain Management Ordinances, Zoning Ordinances, and Comprehensive Plan			**x**			Emporium, Grove, Gibson, Portage, Shippen, Driftwood, Lumber Emporium Boro: States these are continuous. All municipalities updated the floodplain ordinances in 2014. Lumber, Portage, Driftwood, Shippen, Gibson, Grove follow the county comprehensive plan.
2. Conservation Office Projects. Venture Pond Project, Strategic River Assessment, North Creek Riparian Buffers Project, Streamside Cleanups				**x**		Emporium, Grove, Gibson, Portage, Shippen, Driftwood, Lumber. These will be removed as an action and added to any project opportunities for municipalities. Also need to discuss with conservation office. Venture Pond Project was completed in Shippen Township in 2006 and North Creek Riparian Buffers Project was completed. All completed prior to 2011.

2011 Cameron County Mitigation Actions Review						
Existing Mitigation Actions	***Status***					***Review Comments***
	No Progress / Unknown	**In Progress / Not Yet Complete**	**Continuous**	**Completed**	**Discontinued**	
3. May Hollow Road Bank Stabilization. Stabilize banks at four locations			**X**			This action only applies to Lumber Township. This action will remain continuous due to constant washouts and flash flooding. Lumber Township will meet with PennDOT to determine if there are any further opportunities to further update this project.
4. Emporium Flood Protection Project. Flooding mitigation including earth debris, impounding basins, culverts, concrete stilling basins, etc. Completed in 1962; Operations & Maintenance continue.			**X**			Emporium Borough. This will be continually maintained by the borough on an annual basis. This will be added to a project opportunity.
5. NFIP Library Section. Section about flooding hazards and the NFIP at Barbara Moscato Brown Memorial Library					**X**	County floodplain coordinator is responsible for this action.
6. 4-Wheel Drive Fire Truck Replacement Program. 4-Wheel Drive vehicles for each volunteer fire department with replacement schedule.			**X**			Emporium, Grove, Gibson, Portage, Shippen, Driftwood, Lumber. Emporium VFD and Sinnemahoning VFD both have acquired 4 wheel drive fire apparatus. This will move to a continuous actions due to future replacements.

2011 Cameron County Mitigation Actions Review						
Existing Mitigation Actions	***Status***					***Review Comments***
	No Progress / Unknown	**In Progress / Not Yet Complete**	**Continuous**	**Completed**	**Discontinued**	
7. Develop flood mitigation project proposals which are eligible for state and federal mitigation grant funding programs for acquisition, elevation and relocation of properties in the floodplain and other flood mitigation projects			**X**			Emporium, Grove, Gibson, Portage, Shippen, Driftwood, Lumber. This action will remain continuous due to funding application process. Municipalities will apply for funding as available.
8. Emergency Generator. Purchase and maintain an emergency generator for emergency operations center					**X**	Emporium Borough uses the fire department as the EOC and a generator is present at that location. Grove uses the Sinnemahoning VFD for their EOC and there is a generator at that facility. Driftwood Borough and Gibson Township utilize the senior center which has an emergency generator. Each municipality will put this into a project opportunity form.
9. Conduct feasibility Study for Salt Run Reservoir Dam and George B. Stevenson Dam Warning Systems.	**X**					Grove Township: Completed, A study was conducted and a new warning system was installed for the George B. Stevenson Dam. Portage: This dam is a private owned dam and all of the inundation area is in Shippen Township

2011 Cameron County Mitigation Actions Review						
Existing Mitigation Actions	***Status***					***Review Comments***
	No Progress / Unknown	**In Progress / Not Yet Complete**	**Continuous**	**Completed**	**Discontinued**	
10. Storm Drain Rehabilitation. Purchase setter/vacuum and/or develop engineering plan to update the storm drain system			**X**			Emporium Borough, Shippen Township and Mid Cameron Authority continues to plan for reducing the infiltration of storm water into the sewage system. The jetter/vacuum purchase will placed on an opportunity form.
11. Raise road at PennDOT Railroad Dike.					**X**	Lumber Township will determine a status on this project. If valid, this will be added to an opportunity form
12. Narrow Re-Banding Radio Project. Replacement of all emergency radios to meet new FCC frequency standards				**X**		Emporium, Grove, Gibson, Portage, Shippen, Driftwood, Lumber. This project was completed by the Cameron County Office of Emergency Services during 2011. All communications systems have been re-banded.
13. Sizer Run Culvert Replacement. Replacement of existing pipe with box culvert		**X**				Portage Township received a grant for this project. This will be added to a project
14. Sealing of open cisterns throughout county fairgrounds	**X**					Shippen Township. Landowner cooperation is needed and funding is needed to complete the project. No progress at this time.
15. Conduct Shale Drilling Safety Training.				**X**		Emporium, Grove, Gibson, Portage, Shippen, Driftwood, Lumber. Completed by EMA 2013-2015.

2011 Cameron County Mitigation Actions Review						
Existing Mitigation Actions	***Status***					***Review Comments***
	No Progress / Unknown	**In Progress / Not Yet Complete**	**Continuous**	**Completed**	**Discontinued**	
16. Streamside cleanup to prevent large refuse from being washed downstream during floods.			**X**			Emporium, Grove, Gibson, Portage, Shippen, Driftwood, Lumber. This a maintenance issue for all municipalities. Emporium, Portage, Lumber, Shippen complete annually. Gibson and Grove do not do anything with this item.
17. Feasibility study to analyze options for reducing flooding at Plank Hollow Road	**X**					Shippen Township and Emporium Borough. Requires funding to complete
18. Sinnemahoning Creek Floodplain Management Study. Study to analyze effects of existing dike on Driftwood Branch and to determine alternatives to downstream flood protection	**X**					Requires funding to complete. Bucktail Watershed Organization and conservation district should be the primary organizations
19. Sinnemahoning Creek & West Creek Hydraulic Study. Hydraulic study of streams to develop sound scientific and environmental approaches to flood protection	**X**					Requires funding to complete. Bucktail Watershed Organization and conservation district should be the primary organizations

2011 Cameron County Mitigation Actions Review						
Existing Mitigation Actions	Status					Review Comments
	No Progress / Unknown	In Progress / Not Yet Complete	Continuous	Completed	Discontinued	
20. Castle Garden Culvert Replacement. Install cross culvert pipe at Castle Garden to aid in water flow/restriction	X					Gibson Township will place this project on an opportunity form and submit.
21. Wycoff Run Bridge Debris Removal.			X			Grove Township completes as necessary.
22. Engineering study to mitigate subsidence at Tannery Road				X		Shippen Township. The engineering study was completed and the project was completed during 2016.
23. Gather data for potential loss estimates.					X	Emporium, Grove, Gibson, Portage, Shippen, Driftwood, Lumber
24. Acquire more detailed hazard information. Collect more comprehensive data on past hazard occurrences					X	Emporium, Grove, Gibson, Portage, Shippen, Driftwood, Lumber
25. Participate in FEMA's Community Rating System (CRS) Program. Each municipality will review opportunities within FEMA's Community Rating System (CRS) Program to determine the program's applicability and potential effectiveness within their jurisdiction	X					Emporium, Grove, Gibson, Portage, Shippen, Driftwood, Lumber.

2011 Cameron County Mitigation Actions Review						
Existing Mitigation Actions	***Status***					***Review Comments***
	No Progress / Unknown	**In Progress / Not Yet Complete**	**Continuous**	**Completed**	**Discontinued**	
26. Review existing building codes to ensure anchoring requirements for manufactured homes are adequate. If determined inadequate for existing vulnerability, consider revising.			**X**			Emporium, Grove, Gibson, Portage, Shippen, Driftwood, Lumber, and County. Emporium Borough has their own codes. Lumber, Portage, Driftwood, Gibson, Grove use Pennsylvania UCC standards.
27. Collect location data for manufactured homes. Work with Tax Assessors office to determine number and locations of manufactured homes within the county in order to prepare a more comprehensive vulnerability analysis.	**X**					Ask the tax assessment office the status of this. Tax assessment is the primary agency on this action.

6.2. Mitigation Goals and Objectives

Based on results of the goals and objectives evaluation exercise and input from the local planning team, a list of five goals and eighteen corresponding objectives was developed. *Table 54 - 2017 Goals and Objectives* details the mitigation goals and objectives established for the 2017 Cameron County Hazard Mitigation Plan.

Table 54 - 2017 Goals and Objectives

Cameron County 2017 Goals and Objectives	
GOAL 1	Reduce potential injury, death, and damage to existing community assets due to natural hazards, especially flooding.
Objective 1.1	Utilize comprehensive planning as a means to reduce flood losses.
Objective 1.2	Continue participation in the national flood insurance program to ensure flood insurance policies remain available through government programs.
Objective 1.3	Ensure adequate and consistent enforcement of ordinances and codes within and between jurisdictions.
Objective 1.4	Reduce the number of repetitive loss and severe repetitive loss properties in the county.
Objective 1.5	Assess and implement historical preservation data to enhance hazard mitigation planning.
GOAL 2	Reduce potential injury, death and damage to existing community assets due to human caused disasters on public and private property.
Objective 2.1	Review, update and exercise all plans associated with human caused hazards.
Objective 2.2	Develop strategy for mitigating high risk and moderate risk human caused hazards.
Objective 2.3	Conduct planning and develop strategy to decrease hazardous material releases
GOAL 3	Increase public education awareness regarding natural and human caused risk, vulnerability, preparedness, and mitigation.

Cameron County 2017 Goals and Objectives	
Objective 3.1	Provide public outreach/education regarding strategies (e.g. floodproofing) for property owners in the 100 year floodplain
Objective 3.2	Support public education programs for business, household and individual mitigation, safety measures and preparedness for all hazards.
GOAL 4	Improve emergency preparedness, planning, procedures and capabilities.
Objective 4.1	Enhance response capability of emergency services.
Objective 4.2	Develop and maintain GIS data that supports hazard mitigation planning.
Objective 4.3	Encourage and facilitate the development of continuity planning to reduce impact of all hazards
GOAL 5	Reduce or redirect the impact of natural and human caused disaster away from at risk environmental and population areas.
Objective 5.1	Complete acquisition, elevation and relocation of properties in the floodplain to reduce the impact of flooding.
Objective 5.2	Research possible structural mitigation projects to redirect or reduce the impact of disasters.
Objective 5.3	Encourage and facilitate the development of comprehensive planning, zoning, land use, and most importantly, floodplain management ordinances to appropriately direct development away from high-hazard areas.
Objective 5.4	Assess the adequacy of contingency power sources and methods of prevention.
Objective 5.5	Identify by municipality the most vulnerable and critical existing structures.

6.3. Identification and Analysis of Mitigation Techniques

This section includes an overview of alternative mitigation actions based on the goals and objectives identified in Section 6.2. There are four general mitigation strategy techniques to reducing hazard risks:

Local plans and regulations

Structure and infrastructure

Natural systems protection

Education and awareness

Local Plans and Regulations: These actions include government authorities, policies or codes that influence the way land and buildings are developed and built. The following are some examples:

Comprehensive plans

Land use ordinances

Subdivision regulations

Development review

Building codes and enforcement

National Flood Insurance Program and Community Rating System

Capital improvement programs

Open space preservation

Stormwater management regulations and master plans

The local plans and regulations technique will protect and reduce the impact of specific hazards on new and existing buildings by improving building code standards and regulating new and renovation construction. The improved building codes will decrease the impact of risk hazards. Subdivision and land development enhancements will also augment this process. Ensuring that municipalities participate in the National Flood Insurance Program and encourage participation in the Community Rating System will decrease the impact as well.

Structure and infrastructure implementation: These actions involve modifying existing structures and infrastructure or constructing new structures to reduce hazard vulnerability. The following are examples:

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 implementation is a technique that removes or diverts the hazard from structures or protects the structure from a specific hazard. The new or renovated structures are therefore protected or have a reduced impact of hazards.

Natural Resource Protection: These are actions that minimize damage and losses and also preserve or restore the functions of natural systems. They include the following:

Erosion and sediment control

Stream corridor restoration

Forest management

Conservation easements

Wetland restoration and preservation

Natural resource protection techniques allow for the natural resource to be used to protect or lessen the impact on new or renovated structures through the management of these resources. Utilization and implementation of the examples above will protect new and existing buildings and infrastructure.

Education and Awareness: These are actions to inform and educate citizens, elected officials and property owners about hazards and potential ways to mitigate them and may also include participation in national programs. Examples of these techniques include the following:

Radio and television spots

Websites with maps and information

Real estate disclosure

Provide information and training

NFIP outreach

StormReady

Firewise Communities

The education and awareness technique will protect and reduce the impact of specific hazards on new and existing buildings through education of citizens and property owners on the impacts that specific hazards could have on new or renovated structures.

This information will allow the owner to make appropriate changes or enhancements that will lessen or eliminate the impact of hazards.

Table *55 - Mitigation Strategy Technique Matrix* provides a matrix identifying the mitigation techniques used for all low, moderate and high risk hazards in the county. The specific actions associated with these techniques are included in *Table 56 - 2017 Mitigation Action Plan*.

Table 55 - Mitigation Strategy Technique Matrix

HAZARD	MITIGATION TECHNIQUE			
	Local Plans and Regulations	Structural and Infra-structure	Natural Systems Protection	Education and Awareness
Levee Failure	X	X	X	X
Pandemic and Infectious Disease	X			X
Dam Failure	X	X	X	X
Winter Storm	X			X
Utility Interruption	X	X		X
Flooding	X	X	X	X
Drought	X	X	X	X
Flash Flood	X	X	X	X
Invasive Species	X		X	X
Radon Exposure	X	X		X
Wildfire	X			X
Hurricane, Tropical Storm	X			X
Environmental Hazards	X	X		X
Transportation Accidents	X			X
Ice Jam Flooding	X	X	X	X
Disorientation	X			X
Windstorm	X			X
Earthquake	X			X
Urban Fire	X			X
Landslide	X	X	X	X
Subsidence and Sinkholes	X			X
Tornado	X			X
Civil Disturbance	X			X
Terrorism	X			X
All Hazards	X			X

6.4. Mitigation Action Plan

The Cameron County Hazard Mitigation Local Planning Team (LPT) immediately began work on the mitigation strategy section of the 2017 hazard mitigation plan (HMP) update after the risk assessment section was completed. The LPT started this section by reviewing the 2011 HMP mitigation strategy section. A review of the previous goals, objectives, actions and project opportunities documented in the 2011 HMP was conducted. The next step the LPT completed was the brainstorming of possible new actions based on new identified risks. The LPT compiled all this information for presentations to the municipalities.

The LPT identified the following accomplishments since the development of the 2011 Cameron County Hazard Mitigation Plan:

- The Cameron County Office of Emergency Services completed an update to the Cameron County Emergency Operations Plan and coordinated the update with the Cameron County municipalities.
- The Cameron County Conservation Office has completed numerous projects since the last hazard mitigation planning period. Projects like the Venture Pond Project and North Creek Riparian Buffers Project were completed and greatly enhanced mitigation of natural hazards identified in the hazard mitigation plan.
- The Cameron County Office of Emergency Services coordinated the upgrade of the emergency services radio system in Cameron County. The radio system was successfully upgraded to a 12.5 Mhz band split versus the previous 25 Mhz band split. This upgrade greatly enhanced communications for first responders.
- Marcellus Shale drilling safety training was conducted for all first responder and elected officials. This training provided guidance and recommendations for mitigating shale drilling emergencies.

The Cameron County Office of Emergency Services has been conducting numerous infrastructure enhancement projects over the past 5 years. Administrative staff has been committed to these infrastructure projects. With this commitment by the Cameron County Office of Emergency Services Staff, there have been challenges with the completion of actions or projects outlined in the 2011 hazard mitigation plan. The Cameron County Office of Emergency Services is committed to making progress during the 2017-2021 planning period. During this period, annual reviews will be completed and reports of all actions and projects will be developed to determine the status.

MCM Consulting Group, Inc. completed municipality meetings at various time periods at the Cameron County Office of Emergency Services. During all these meetings, an overview of mitigation strategy was presented and the municipalities were informed that they needed to have at least one hazard-related mitigation action for their municipality. All municipalities were invited to attend these meetings.

The municipalities were notified of draft mitigation actions and encouraged to provide new mitigation actions that could be incorporated into the plan. Municipalities were provided copies of their previously submitted mitigation opportunity forms and asked to determine if the projects were still valid. Municipalities were solicited for new project opportunities as well. All agendas, sign in sheets and other support information from these meetings is included in Appendix C.

Mitigation measures for the 2017 Cameron County HMP are listed in the mitigation action plan. *Table 56 - 2017 Mitigation Action Plan* is the 2017 Cameron County Mitigation Action Plan. This plan outlines mitigation actions and projects that comprise a strategy for Cameron County. The action plan includes actions, a benefit and cost prioritization, a schedule for implementation, any funding sources to complete the action, a responsible agency or department and an estimated cost. All benefit and cost analysis was completed using the Pennsylvania Emergency Management Agency recommended analysis tool. The completed analysis tool is located in Appendix H. *Table 57 - Municipal Hazard Mitigation Actions Checklist* is a matrix that identifies the county and/or municipalities responsible for mitigation actions in the new mitigation action plan.

Table 56 - 2017 Mitigation Action Plan

Cameron County 2017 Mitigation Action Plan									
Action Number	Mitigation Actions			Prioritization			Implementation		
	Category	Description/ Action Items	Hazard Vulnerability	High	Medium	Low	Schedule	Funding	Responsibility
1.1.1	Local Plans and Regulations	Feasibility study to analyze options for reducing flooding at Plank Hollow Road	Flooding and Flash Flooding		**X**		2017-2021	Local, FMA, PDM	Elected Official
1.1.2	Local Plans and Regulations	Sinnemahoning Creek Floodplain Management Study. Study to analyze effects of existing dike on Driftwood Branch and to determine alternatives to downstream flood protection	Flooding, Flash Flooding, Levee Failure	**X**			2017-2021	Local, FMA, PDM	Elected Officials
1.1.3	Local Plans and Regulations Natural Systems Protection	Sinnemahoning Creek & West Creek Hydraulic Study. Hydraulic study of streams to develop sound scientific and environmental approaches to flood protection	Flooding, Flash Flooding		**X**		2017-2021	Local, FMA, PDM	Elected Officials
1.1.4	Local Plans and Regulations	Comprehensive plan and hazard mitigation plan integration upon next update	All Hazard	**X**			2018-2019	Local	Cameron County Planning Commission

Cameron County 2017 Mitigation Action Plan									
Action Number	Mitigation Actions			Prioritization			Implementation		
	Category	Description/ Action Items	Hazard Vulnerability	High	Medium	Low	Schedule	Funding	Responsibility
1.2.1	Local Plans and Regulations Education and Awareness	Participate in FEMA's Community Rating System (CRS) Program. Each municipality will review opportunities within FEMA's Community Rating System (CRS) Program to determine the program's applicability and potential effectiveness within their jurisdiction	Flooding		**X**		2017-2021	Local, FMA	Cameron County Municipalities
1.3.1	Local Plans and Regulations	Review existing building codes to ensure anchoring requirements for manufactured homes are adequate. If determined inadequate for existing vulnerability, consider revising.	Flooding, Flash Flooding, Ice Jam Flooding, Wind Storms and Tornado			**X**		Local	Cameron County Municipalities
1.4.1	Structural and Infrastructure	Conduct buyout of repetitive loss and severe repetitive loss properties as funding is available	Flooding, Flash Flooding and Ice Jam Flooding	**X**			2017-2021	Local, FMA, PDM, HMGP	Cameron County Municipalities
2.1.1	Local Plans and Regulations	Complete annual updates to SARA facility plans	Environmental Hazards		**X**		2017-2021	Act 165 Funds	Cameron County LEPC
2.2.1	Local Plans and Regulations	Conduct feasibility Study for Salt Run Reservoir Dam warning system	Dam Failure			**X**	2017-2021	Local	Portage Township, Shippen Township, Dam Owner
2.3.1	Local Plans and Regulations	Complete commodity flow study to identify hazardous materials transported through the county	Transportation Accidents, Environmental Hazards		**X**		2018	Act 165, HMEP, HMRF	Cameron County LEPC
3.1.1	Education and Awareness	Disseminate information on the NFIP to residents of Cameron County	Flooding, Flash Flooding and Ice Jam Flooding		**X**		2017-2021	Local, FMA	Cameron County EMA and Cameron County Municipalities
3.2.1	Education and Awareness	Community Rating System education to municipalities.	Flooding, Flash Flooding and Ice Jam Flooding		**X**		2017-2021	Local, FMA	Cameron County EMA and Cameron County Municipalities
4.1.1	Structural and Infrastructure	4-Wheel Drive Fire Truck Replacement Program. 4-Wheel Drive vehicles for each volunteer fire department with replacement schedule.	All Hazards	**X**			2025-2035	Local, AFG	Emporium VFD and Sinnemahoning VFD

Cameron County 2017 Mitigation Action Plan									
Action Number	Mitigation Actions			Prioritization			Implementation		
	Category	Description/ Action Items	Hazard Vulnerability	High	Medium	Low	Schedule	Funding	Responsibility
4.2.1	Local Plans and Regulations	Collect location data for manufactured homes. Work with Tax Assessors office to determine number and locations of manufactured homes within the county in order to prepare a more comprehensive vulnerability analysis.	Flooding, Flash Flooding, Ice Jam Flooding, Wind Storm, Tornado		**X**		2017-2021	Local, EMPG	Cameron County EMA, Cameron County Tax Assessment
4.3.1	Local Plans and Regulations Education and Awareness	Complete overview with the commissioners on the current Cameron County Continuity of Government draft plan and seek adoption.	All Hazards		**X**		2017-2018	Local, EMPG	Cameron County Commissioners and Cameron County EMA
5.1.1	Structural and Infrastructure Natural Systems Protection	Develop flood mitigation project proposals which are eligible for state and federal mitigation grant funding programs for acquisition, elevation and relocation of properties in the floodplain and other flood mitigation projects	Flooding, Flash Flooding and Ice Jam Flooding		**X**		Continuous	Local	Cameron County Municipalities
5.2.1	Structural and Infrastructure	Emporium Flood Protection Project. Flooding mitigation including earth debris, impounding basins, culverts, concrete stilling basins, etc. Completed in 1962; Operations & Maintenance continue.	Levee Failure	**X**			Continuous	Local, FMA, PDM	Emporium Borough
5.2.2	Local Plans and Regulations	Portage Creek Dike feasibility study for stream bank stabilization and upgrades to the dike.	Levee Failure, Flooding, Flash Flooding, Ice Jam Flooding		**X**		2017-2021	Local, FMA, PDM	Shippen Township
5.3.1	Local Plans and Regulations	Review existing Floodplain Management Ordinances, Zoning Ordinances, and Comprehensive Plan and integrate hazard mitigation principals	Flooding, Flash Flooding and Ice Jam Flooding		**X**		2017-2019	Local	Cameron County Planning Commission
5.4.1	Structural and Infrastructure	Install and maintain emergency generators at critical facilities	All Hazards	**X**			2017-2021	Local, PDM, HMGP	All County and Municipal agencies

Cameron County 2017 Mitigation Action Plan									
Action Number	Mitigation Actions			Prioritization			Implementation		
	Category	Description/ Action Items	Hazard Vulnerability	High	Medium	Low	Schedule	Funding	Responsibility
5.5.1	Local Plans and Regulations	Maintain critical infrastructure and critical facility list that will be utilized for all emergency planning and response aspects.	All Hazards	x			2017-2021	Local, EMPG	Cameron County EMA

Funding acronym definitions:
FMA: Flood Mitigation Assistance Grant Program, administered by the Federal Emergency Management Agency
HMGP: Hazard Mitigation Grant Program, administered by the Federal Emergency Management Agency
PDM: Pre-Disaster Mitigation Grant, administered by the Federal Emergency Management Agency
EMPG: Emergency Management Performance Grant, administered by the Federal Emergency Management Agency
HSGP: Homeland Security Grant Program, administered by the Federal Emergency Management Agency
HMEP: Hazardous Material Emergency Planning Grant, administered by the Pennsylvania Emergency Management Agency
HMRF: Hazardous Material Response Fund, administered by the Pennsylvania Emergency Management Agency

Table 57 - Municipal Hazard Mitigation Actions Checklist

Municipality	1.1.1	1.1.2	1.1.3	1.1.4	1.2.1	1.3.1	1.4.1	2.1.1	2.2.1	2.3.1
Driftwood Borough	x	x	x		x	x	x			
Emporium Borough	x	x	x		x	x	x	x		
Gibson Township	x	x	x		x	x	x			
Grove Township	x	x	x		x	x	x			
Lumber Township	x	x	x		x	x	x			
Portage Township	x	x	x		x	x	x		x	
Shippen Township	x	x	x		x	x	x		x	
Cameron County	x	x	x	x	x	x	x	x	x	x

Municipality	3.1.1	3.2.1	4.1.1	4.2.1	4.3.1	5.1.1	5.2.1	5.2.2	5.3.1	5.4.1	5.5.1
Driftwood Borough	x	x	x		x	x				x	x
Emporium Borough	x	x	x		x	x	x			x	x
Gibson Township	x	x	x		x	x				x	x
Grove Township	x	x	x		x	x				x	x
Lumber Township	x	x	x		x	x				x	x
Portage Township	x	x	x		x	x				x	x
Shippen Township	x	x	x		x	x		x		x	x
Cameron County	x	x	x	x	x	x			x	x	x

National Flood Insurance Program (NFIP) Related Mitigation Actions

The Federal Emergency Management Agency (FEMA) requires that every participating jurisdiction that either participates in the NFIP or has identified Special Flood Hazard Areas (SFHAs) have at least one specific action in its mitigation action plan that relates to continued compliance with the NFIP. Action numbers 1.2.1; 1.4.1; 3.1.1; 3.2.1; and 5.3.1 comply for Cameron County and all its municipalities.

Evaluate and Prioritize Mitigation Actions

Mitigation Action Evaluation:

Evaluating mitigation actions involves judging each action against certain criteria to determine whether or not it can be executed. The feasibility of each mitigation action is evaluated using the ten evaluation criteria set forth in the Mitigation Action Evaluation methodology as outlined in the Commonwealth of Pennsylvania's All-Hazard Mitigation Planning, Standard Operating Guide. The methodology solicits input on whether each action is highly effective or feasible and ineffective or not feasible for the criteria. These criteria are listed below and aid in determining the feasibility of implementing one action over another.

- Life Safety: Will the action be effective in promoting public safety?
- Property Protection: Will the action be effective in protecting public or private property?
- Technical: How effective will the action be in avoiding or reducing future losses?
- Political: Does the action have public and political support?
- Legal: Does the community have the authority to implement the proposed measure?
- Environmental: Will the action provide environmental benefits and will it comply with local, state and federal environmental regulations?
- Social: Will the action be acceptable by the community or will it cause any one segment of the population to be treated unfairly?

- Administrative: Is there adequate staffing and funding available to implement the action in a timely manner?
- Local Champion: Is there local support for the action to help ensure its completion?
- Other Community Objectives: Does the action address any current or future community objectives either through municipal planning or community goals?

To evaluate the mitigation actions, each action is identified as highly effective or feasible; ineffective or not favorable and no cost or benefit. For each criterion, the prioritization methodology assigns a "+" if the action was highly effective or feasible, a "-" (if the action was ineffective or not feasible, and a "N" if no cost or benefit could be associated with the suggested action or the action was not applicable to the criteria.

Mitigation Action Prioritization:

Actions should be compared with one another to determine a ranking or priority by applying the multi-objective mitigation action prioritization criteria. Scores are assigned to each criterion using the following weighted, multi-objective mitigation action prioritization criteria:

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

Scores of 1, 2, or 3 are assigned for each multi-objective mitigation action prioritization criterion where 1 is a low score and 3 is a high score. Actions are prioritized using the cumulative score assigned to each. Each mitigation action is given a priority ranking (Low, Medium, and High) based on the following:

- Low Priority: 1.0 – 1.8
- Medium Priority: 1.9 – 2.4
- High Priority: 2.5 – 3.0

The cumulative results of the prioritization of mitigation actions is identified in the mitigation action evaluation and prioritization tool. The results for the mitigation action evaluation and prioritization are located in Appendix H of this plan.

7. Plan Maintenance

7.1. Update Process Summary

Monitoring, evaluating and updating this plan, is critical to maintaining its value and success in Cameron County's hazard mitigation efforts. Ensuring effective implementation of mitigation activities paves the way for continued momentum in the planning process and gives direction for the future. This section explains who will be responsible for maintenance activities and what those responsibilities entail. It also provides a methodology and schedule of maintenance activities including a description of how the public will be involved on a continued basis. The Cameron County HMP Local Planning Team decided to alter the current maintenance procedures. The 2017 HMP update establishes a review of the plan within 30 days of a disaster event in addition to continuing with an annual plan evaluation. This HMP update also defines the municipalities' role in updating and evaluating the plan. Finally, the 2017 HMP Update encourages continued public involvement and how this plan may be integrated into other planning mechanisms in the county.

7.2. Monitoring, Evaluating and Updating the Plan

Hazard mitigation planning in Cameron County is a responsibility of all levels of government (i.e., county and local), as well as the citizens of the county. The Cameron County Local Planning Team will be responsible for maintaining this Multi-Jurisdictional HMP. The Local Planning Team will meet annually and following each emergency declaration to review the plan. Every municipality that has adopted this plan will also be afforded the opportunity to provide updated information or information specific to hazards encountered during an emergency or disaster. Each review process will ensure that the hazard vulnerability data and risk analysis reflect current conditions of the county, that the capabilities assessment accurately reflects local circumstances and that the hazard mitigation strategies are updated based on the county's damage assessment reports and local mitigation project priorities. The HMP must be updated on a five-year cycle. An updated HMP must be completed and approved by the end of the five year period. The monitoring, evaluating and updating of the plan every five years will rely heavily on the outcomes of the annual HMP Planning Team meetings.

The Cameron County Local Planning Team will complete a Hazard Mitigation Progress Report to evaluate the status and accuracy of the Multi-Jurisdictional HMP and record the local planning team's review process. The Cameron County Office of Emergency Services will maintain a copy of these records and place them in Appendix I of this plan. Cameron County will continue to work with all municipalities regarding hazard mitigation projects, especially those municipalities that did not submit projects for inclusion in this plan.

7.3. Continued Public Involvement

The Cameron County Office of Emergency Services will ensure that the 2017 Cameron County Hazard Mitigation Plan is posted and maintained on the Cameron County website and will continue to encourage public review and comment on the plan. The Cameron County website that the plan will be located at is as follows: www.CameronCountyPA.com

The public will have access to the 2017 HMP through their local municipal office, the Cameron County Planning Commission, or the Cameron County Office of Emergency Services. Information on upcoming events related to the HMP or solicitation for comments will be announced via newsletters, newspapers, mailings, and the county website.

The citizens of Cameron County are encouraged to submit their comments to elected officials and/or members of the Cameron County HMP Local Planning Team. To promote public participation, the Cameron County Local Planning Team will post a public comment form as well as the Hazard Mitigation Project Opportunity Form on the county's website. These forms will offer the public various opportunities to supply their comments and observations. All comments received will be maintained and considered by the Cameron County Hazard Mitigation Planning Team.

8. Plan Adoption

8.1. Resolutions

In accordance with federal and state requirements, the governing bodies of each participating jurisdiction must review and adopt by resolution, the 2017 Cameron County Hazard Mitigation Plan. Copies of the adopting resolutions are included in this plan in Appendix J. FEMA Region III in Philadelphia is the final approval authority for the Hazard Mitigation Plan. PEMA also reviews the plan before submission to FEMA.

9. Appendices

APPENDIX A: **References**

APPENDIX B: **FEMA Local Mitigation Review Tool**

APPENDIX C: **Meetings and Support Documents**

APPENDIX D: **Municipal Flood Maps**

APPENDIX E: **Critical and Special Needs Facilities**

APPENDIX F: **2017 HAZUS Reports**

APPENDIX G: **2017 Mitigation Project Opportunities**

APPENDIX H: **2017 Mitigation Action Evaluation & Prioritization**

APPENDIX I: **Annual Review Documentation**

APPENDIX J: **Cameron County & Municipal Adoption Resolutions**

APPENDIX K: **Acronyms**